DRAFT FINAL
Engineering Evaluation/
Cost Analysis Report

Vogelsang Former Waste Disposal Area Site
Yosemite National Park

Prepared by Kane Environmental, Inc.

July 19, 2021

Signatories

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List of Abbreviations and Acronyms

ADD	average daily dose
ALM	Adult Lead Model
ARAR	applicable or relevant and appropriate requirements
BERA	baseline ecological risk assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHF	Central Hazardous Materials Fund
COC	contaminant of concern
COEC	contaminant of ecological concern
COPC	contaminant of potential concern
COPEC	contaminant of potential ecological concern
CSF	cancer slope factor
CSM	conceptual site model
CTE	central tendency exposure
ECM	Environmental Compliance Memorandum
EE/CA	Engineering Evaluation/Cost Analysis
EPC	exposure point concentration
ESV	ecological screening value
FWDA	former waste disposal area
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
HSC	High Sierra Camp
IEUBK	Integrated Exposure Uptake Biokinetic
ISM	incremental sampling methodology
IUR	inhalation unit risk
µg/dL	micrograms per deciliter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAEL	no observed adverse effect level
NPS	National Park Service
PPFL	Park Planning, Facilities and Lands
PRG	preliminary removal goal
PRP	potentially responsible party
PRSC	post-removal site control
RAO	removal action objective
RfC	reference concentration
RfD	reference dose
RME	reasonable maximum exposure
RSL	Regional Screening Level
SAP	sampling and analysis plan
SLERA	screening-level ecological risk assessment
TBC	to be considered
UCL	upper confidence limit

USC	United States Code
USDOI	U.S. Department of the Interior
USEPA	U.S. Environmental Protection Agency
WASO-ECCB	Washington Support Office-Environmental Compliance and Cleanup Branch

Executive Summary

The purpose of the Engineering Evaluation/Cost Analysis (EE/CA) Executive Summary is to highlight the key information contained in the EE/CA Report. The Executive Summary contains a summary of the site description, including investigation results and an updated conceptual site model based on these results. A summary of the risk assessment and applicable or relevant and appropriate requirements (ARARs) also is included along with the scope and objectives of the removal action.

ES 1. Introduction and Purpose

The Vogelsang Former Waste Disposal Area (FWDA) Site (the Site) is located within Yosemite National Park, which is owned by the United States and managed by the National Park Service (NPS). The Site is being investigated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). NPS is the lead agency under CERCLA at the Site because the Site is under the jurisdiction, custody, or control of NPS. NPS retained Kane Environmental to fully characterize the Site and prepare this EE/CA Report.

This EE/CA has been prepared pursuant to the authorities of Section 104(b) of CERCLA and Section 300.415 (b)(4)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan, commonly called the National Contingency Plan (NCP), which authorize NPS to conduct investigations and studies to characterize the nature and extent of contamination at the Site and to evaluate the need for a response to such contamination to protect public health or welfare or the environment.

The purpose of the EE/CA is to document the release, nature, and extent of hazardous substances at the Site; conduct human health and ecological risk assessments; and, if needed, provide a framework for evaluating removal action alternatives. The EE/CA identifies removal action objectives (RAOs) and analyzes the effectiveness, implementability, and cost of removal action alternatives that may be used to satisfy the RAOs.

ES 2. Site Description, Investigation Results, and Conceptual Site Model

The Site is within the eastern portion of Yosemite National Park (the Park), approximately 100 feet southwest of the Vogelsang High Sierra Camp (HSC), one of the backcountry tented camps in the Park (Figures 1 and 2). Vogelsang HSC is located at latitude 37º 47’ 42.1332” North and 119º 20’ 42.6912” West, at an elevation of 10,300 feet above sea level. The Site is accessed through an approximately 7.3-mile hike along the Rafferty Creek Trail via the parking lot for John Muir Trail near the Tuolumne Lodge located off Highway 120 in the Tuolumne Meadows area of the Park. The Vogelsang HSC was established at its current location in 1940 as a high elevation tented camp for hikers and backpackers within the Park. The Vogelsang HSC consists of 12 total guest cabins for a maximum capacity of 42 guests.

The Site is defined as roughly 0.65 acres of subalpine land within a grassy area of lodgepole pine trees and willow shrubs, located between granite outcrops. An ephemeral drainage extends northeast-southwest through the central portion of the Site, however no surface water has been observed within the drainage during Site investigations. There is no specific trail to the Site itself, and there are no amenities within the Site boundaries. However, the site is approximately 100 feet southwest of the Vogelsang HSC corral and is approximately 75 feet east-southeast from the trail to Merced Lake (Figure 2).

The Site was historically used as a waste disposal area for the Vogelsang HSC, with waste disposal activities reportedly occurring primarily between 1940 and 1965. Waste and debris found at the Site has consisted of crushed and rusted metal cans, metal household objects, broken glass, and broken china. Debris associated with the historical waste disposal activities has primarily been discovered in small discrete piles, extending to depths less than 4 feet below ground surface (bgs), distributed throughout the Site.

In 2002, IT Corporation completed a Focused Site Inspection (FSI) Report for the Site (IT Corporation, 2002). The report investigated the lateral and vertical extent of the surficial and subsurface debris at the Site. Soil samples were collected from test pits advanced throughout the Site and immediate vicinity and found concentrations of potential contaminants greater than preliminary screening levels. The report recommended that additional investigation be conducted at the Site to better define the nature and extent of potential impacts to soil at the Site.

In 2019, CDM Smith completed an Expanded Site Inspection (ESI) Report for the Site (CDM, 2019). In the report, additional investigation was performed at the Site to further characterize the extent of subsurface and surface debris as well as potential impacts the soil. Discrete borings were advanced throughout the FWDA where surface debris was observed. Soil samples were collected from these discrete borings and observations recorded to determine the approximate extent of subsurface debris within the FWDA area. Incremental sampling methodology (ISM) sampling was conducted within decision units (DUs) which divided the Site. Background ISM samples were also collected from a background DU located several hundred feet to the northwest of the Site. Concentrations of metals, petroleum, dioxins, and PAHs were detected at the Site. The report identified several contaminants of potential concern (COPCs) for human health and ecological receptors, including several metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, silver, thallium, vanadium, zinc, and mercury), dioxins/furans, and pentachlorophenol (PCP). The ESI recommended that a baseline human health and ecological risk assessment be performed to determine if there is potential for unacceptable risks to either human and/or ecological receptor populations.

The CSM (conceptual site model) summarizes the current understanding of how chemical contaminants have been released to the environment, have migrated, and have resulted in exposure to human and ecological receptors. The Site was utilized as a waste disposal area for the Vogelsang HSC from 1940 through 1965. Over time these materials were broken down by the environment, releasing contaminants into both surface and subsurface soils on the Site. Accordingly, the primary exposure media at the Site is surface and subsurface soil. Groundwater has not been encountered in Site investigations and other than the ephemeral drainage path observed on the Site, there are no surface water features at the Site. Direct contact and incidental ingestion of contaminated soils are the most likely exposure pathways for human receptors such as adult and child park visitors, NPS staff, and future construction workers. Dust inhalation is also evaluated as a potential migration pathway. Ecological receptors, such as terrestrial plants, soil invertebrates, mammals, and birds, are also potentially exposed to contaminated soils through direct contact and incidental ingestion. Additional potentially complete exposure pathways for birds and mammals specifically are the ingestion of plants and soil invertebrates that have bioaccumulated contaminants through their contact with contaminated soils. The potential risks presented by Site contaminants to these exposures to human and ecological receptors were evaluated further in a risk assessment for the Site.

ES 3. Risk Assessment Summary

Risk assessments provide an estimation of the potential threat to human health and the environment posed by site contaminants. The results of the risk assessment are used to determine if potential risks are unacceptable and, if so, to establish preliminary risk-based goals (PRGs) for cleanup. For this report, a human health risk assessment (HHRA), screening-level ecological risk assessment (SLERA), and a baseline ecological risk assessment (BERA) were performed to evaluate the risks posed by the Site to human health and ecological receptors.

Human Health

The HHRA estimates and evaluates the current and future potential risk to the different receptor populations outlined in the CSM (park visitor, NPS staff, future construction worker). Exposures for all potential human receptors were evaluated for surface (0 to 6 inches bgs) soils, and exposures for future construction workers were evaluated for subsurface (greater than 6 inches bgs) soils. Contaminants of potential concern (COPCs) were identified by comparing maximum detected concentrations in each media to the lowest appropriate risk-based screening levels which are based on a target excess lifetime cancer risk of 1 in 1 million (1E-06) and a target non-cancer hazard quotient (HQ) of 0.1 based on residential exposure. Four human health COPCs were identified for surface soil: arsenic, chromium, cobalt, and thallium. Two human health COPCs were identified for subsurface soil: arsenic and chromium.

Chronic exposures and risks to humans from COPCs were evaluated based on both cancer and non-cancer effects. Estimated total overall risks to Park visitors, NPS employees, and construction workers were below NPS's acceptable risk thresholds for non-cancer and cancer effects (i.e., cancer risks were at or below 1E-06 and non-cancer hazards were at or below 1). Based on this, it is concluded that Site-related chronic exposures to COPCs would not result in unacceptable risks for any current or future recreational and occupational receptor populations. Therefore, none of the COPCs for surface or subsurface soil were determined as Site contaminants of concern (COCs).

Ecological Risk

The SLERA comprises the first two steps in the USEPA ecological risk assessment process. The objective of the SLERA is to identify and document conditions that may warrant further evaluation (i.e., potential unacceptable risk). This involves the identification of contaminants of potential ecological concern (COPECs), based on a comparison of maximum concentrations to the lowest ecological screening levels.

The Site is assumed to contain several types of ecological receptors including birds, mammals, terrestrial plants, and soil invertebrates. Contamination has been detected in surface and subsurface soils at the Site, which may represent complete exposure pathways:

- Surface soil (0 to 6 inches bgs): Direct contact and incidental ingestion of contaminated soils while feeding or digging, as well as inhalation of dust are considered potentially complete pathways for birds and mammals. Direct contact is the primary exposure pathway for terrestrial invertebrates and terrestrial plants, with incidental ingestion also considered as a potentially complete pathway for terrestrial invertebrates.

- Subsurface soil (greater than 6 inches bgs): Direct contact, ingestion, and inhalation of dusts of subsurface soils are considered potentially complete pathways for burrowing mammals. For terrestrial plants, a potentially complete exposure pathway is direct contact of root structures with subsurface soils. For terrestrial invertebrates, direct contact and ingestion of subsurface soils are considered potentially complete pathways.

- Terrestrial biota: Ingestion of terrestrial biota which have bioaccumulated contamination through direct contact is considered a potentially complete exposure pathway for both birds and mammals, as well as terrestrial invertebrates.

The SLERA identified three COPECs for terrestrial plants (chromium, molybdenum, and vanadium), one COPEC for soil invertebrates (chromium), six COPECs for birds (copper, lead, mercury, molybdenum, and vanadium) and two COPECs for mammals (antimony and molybdenum).

Based on these results, a simplified BERA process was performed to further evaluate COPECs for the bird and mammal receptors. Hazard quotient (HQ) values were calculated through a dose evaluation, consisting of evaluating exposures via ingestion of food items, based on modeled concentrations, and comparing species-specific estimated exposure doses to toxicity reference values for select receptors of concern. HQ values greater than 1 typically suggest a potential impact on a population of receptors depending on a variety of factors, albeit with varying levels of uncertainty.

The BERA determined that none of the COPECs detected in Site soils are sufficiently elevated to be above the target level for risks to terrestrial plants and terrestrial invertebrate communities, bird feeding guilds or for herbivorous and carnivorous mammals. The BERA did find that for insectivorous mammals, represented by the shrew, threshold-based HQs were greater than 1 for one or more Site DUs for antimony and molybdenum in surface soil, subsurface soil, and terrestrial food items. For antimony, the

HQ range was 2-3 and for molybdenum, the HQ range was 3-7. These results suggest that shrews that are exposed to Site contaminants could experience adverse impacts.

However, several major uncertainties with the assessment of risks to the shrew from exposures to antimony and molybdenum in soil have been identified in the Uncertainty Assessment:

- Toxicity data are very limited for both metals and therefore the most stringent toxicity values, or the only toxicity value available, were used to estimate risks to shrews.

- Shrews were assumed to consume only earthworms in the BERA, yet they are known to consume a mix of worms and insects, and some plant material. It is likely that earthworms are limited at the high altitude Site, and may not even be present, and that shrews consume primarily insects. The intake of soil contaminants by earthworms is considerably higher than by insects, however, uptake factors are not available for insects for use as surrogate exposure and risk modeling. The assumptions that shrews consume only earthworms from the Site soils entails very high uncertainty.

- The modeled concentrations of antimony and molybdenum in the tissues of earthworms is highly uncertain. No value was recommended for molybdenum in the standard source, so the few available values from scientific literature were used to select one. No data were available for antimony, so the concentration of antimony in earthworm was assumed to be the same concentration as in soil.

- The size of the contaminated area is small (about 0.25 acres) and is about the size of an area that would support a pair or a few shrews, but not likely a population of shrews. Ecological risk assessment is intended to protect populations and communities of organisms, rather than individual organisms unless that organism is federally listed as endangered or threatened. For shrews at the Vogelsang site, whether exposures to contaminants from the small area is sufficient to present risks to a population is very uncertain.

The above reasons provide substantial uncertainties with the risk estimates at the Site, leading to the conclusion that the concentrations of antimony and molybdenum in Site soils are very unlikely to cause adverse effects to populations of insectivorous mammals, despite the exceedances of 1 by the threshold HQs. This analysis satisfies the USEPA Superfund ERA 8-step process (USEPA 1997) scientific management decision point that "Ecological threats are negligible." Thus, no contaminants, including antimony and molybdenum, are identified as contaminants of ecological concern (COECs) for the Site.

ES 4. Identification and Analysis of Applicable or Relevant and Appropriate Requirements

The identification of ARARs is a prerequisite to evaluating and selecting a cleanup action (USEPA 1992b). "Under circumstances where a non-time-critical removal action is expected to be the first and final action at the site, the selected removal action must satisfy all adopted ARARs" (USDOI 2016).

Other factors "to be considered" (TBCs) are non-promulgated criteria, advisories, guidance, and proposed standards issued by federal or state governments. TBCs are not enforceable and a response action is not required to attain TBCs but TBCs may be appropriate in shaping or guiding the development or implementation of a response action in certain circumstances, for example, where ARARs do not provide sufficient direction.

There are four basic criteria that define ARARs (NPS 2015; USEPA 1988). ARARs are (1) substantive rather than administrative, (2) applicable or relevant and appropriate, (3) promulgated, and (4) categorized as one of the following.

- Chemical-specific ARARs that address specific hazardous substances and are typically legal standards (numerical values) that cleanups must achieve.

- Location-specific ARARs that must be achieved because of the specific location of the release and the related response action (e.g., requirements that address the conduct of activities in sensitive areas such as national parks, floodplains, wetlands, and locations where endangered species or significant cultural resources are present). Location-specific ARARs often focus on protecting resources in a specific area. Therefore, NPS-specific ARARs generally fall within this category.

- Action-specific ARARs that are typically technology or activity-based requirements or limitations on actions conducted to respond to the release of specific hazardous substances. Action-specific ARARs generally prescribe *how* a selected alternative must be implemented rather than *what* alternative may be selected.

ARARs are discussed with more detail in Section 4 and a discussion of ARARs with respect to the removal action objectives is included in Appendix E.

ES 5. Removal Action Objectives

The removal action objectives (RAOs) define what the removal action is intended to accomplish. The RAOs for this EE/CA are the following:

- Prevent unacceptable risks to human and ecological receptors from exposure to Site contaminants in soil.

- Preserve the full enjoyment and utilization of park resources consistent with NPS mandates.

- Satisfy federal and state ARARs.

The general objective of a removal action, in accordance with CERCLA and NCP, is to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release of hazardous substances or pollutants or contaminants to the environment. Based on the results of the risk assessment, no contaminants were identified as COCs and COECs in Site soils such that may pose unacceptable risks to human and ecological receptors. Based on these conclusions, and compliance with ARARs, the RAOs for the Site have been met, and no further actions are necessary for the Site.

ES 6. Identification of Removal Action Alternatives

Based on the results of the risk assessment, the removal action alternative that could meet the RAOs is listed below:

1. No Action

During the risk assessment portion of the EE/CA, no contaminants that may pose unacceptable risks to human and ecological receptors were identified as COCs or COECs in Site soils. Based on these conclusions, this alternative is compliant with the applicable ARARs including the National Park Service Organic Act of 1916 as it would allow for full enjoyment and utilization of park resources. Alternative 1 achieves the RAOs for the Site.

ES 7. Detailed Analysis of Removal Action Alternatives

Alternative 1 was analyzed using the following evaluation criteria: effectiveness, implementability, and cost. The effectiveness of this alternative was evaluated by its protectiveness of human health and the environment; attainment of ARARs; reduction of toxicity, mobility, or volume through treatment; long-term effectiveness and permanence; and short-term effectiveness. The implementability criterion addresses the technical feasibility of implementing the response (including availability of services and materials), the administrative feasibility, and State and community acceptance. Projected costs were calculated using direct capital costs, indirect capital costs, and annual post-removal site control costs.

Based on the findings of the risk assessment for the Site, Alternative 1 is effective in its protection of human health and the environment, compliance with ARARs, as well as short-term and long-term effectiveness. The "no action" alternative is immediately implementable, with no special considerations required. Alternative 1 is projected to cost zero dollars as the "no action" alternative involves no capital or PRSC costs.

ES. 8 Recommended Removal Action Alternative

Alternative 1 is selected as the recommended removal action alternative based on the results of the risk assessment completed in Section 3 and the comparative analysis completed in Section 7, showing that there are no unacceptable risks posed by the Site to human or ecological receptors. Based on these results, no further action is necessary to address potential risks and a "no action" alternative complies with applicable ARARs and satisfies all the RAOs outlined in this report.

Once the EE/CA is finalized, it will be made available for public comment for 30 days to allow for public comment on the EE/CA and the Administrative Record supporting this EE/CA. Following receipt and evaluation of public comments, NPS will prepare an Action Memorandum. The Action Memorandum, as the decision document selecting a NTCRA, summarizes the need for the removal action, identifies the selected action, provides the rationale for the action, and addresses significant comments received from the public, including those received from other jurisdictions (e.g., states, tribes, USEPA).

1. Introduction

The purpose of Section 1 is to describe the National Park Service (NPS) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authority and the purpose of the Engineering Evaluation/Cost Analysis (EE/CA) Report.

This EE/CA Report has been prepared to evaluate the nature and extent of contamination at the Vogelsang Former Waste Disposal Area (the Site; see Figure 1), evaluate removal alternatives, and provide the basis for recommending a non-time-critical removal action for the Site located at Yosemite National Park (the Park) in the state of California. The Site is located within the eastern portion of the Park, approximately 100 feet southwest of the Vogelsang High Sierra Camp (HSC), one of the backcountry tented camping locations in the Park. The Site is located at latitude 37º 47' 42.1332" North and 119º 20' 42.6912" West. The Site was historically used as a waste disposal area for the Vogelsang HSC, with waste disposal activities reportedly occurring primarily between 1940 and 1965. See Figure 2 for a depiction of the Site Plan.

1.1. National Park Service CERCLA Authority

The NPS is authorized under CERCLA, 42 United States Code (USC) Section 9601 et seq., to respond as the lead agency to a release or threatened release of hazardous substances, or a release or threatened release of any pollutant or contaminant that may present an imminent and substantial danger to public health or the environment, on NPS-managed land. Section 104(b) of CERCLA, 42 USC Section 9604(b), authorizes NPS to conduct investigations and other studies to characterize the nature and extent of a release or threat of release, determine if response is necessary to protect public health or welfare or the environment, and evaluate response alternatives. Section 104(a) of CERCLA, 42 USC Section 9604(a), authorizes NPS to select and implement a response action when NPS determines a response is necessary.

CERCLA's implementing regulations, codified in the National Oil and Hazardous Substances Pollution Contingency Plan, commonly called the National Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300, establishes the framework for responding to such releases and threatened releases. The NCP authorizes and describes two processes for responding to releases: (1) a removal action process and (2) a remedial action process (see NCP Sections 300.400 through 300.440). Based on preliminary investigations at the Site, NPS determined that Site conditions warranted additional response to address the release or threatened release of hazardous substances and that a non-time-critical removal action may be appropriate at the Site as specified in 40 CFR Section 300.415(b). This determination was formalized in an EE/CA Approval Memorandum, signed on November 12, 2020 by the NPS Acting Regional Director for Interior Regions 8, 9, 10, and 12, and included in the Administrative Record for the Site.

This EE/CA Report was generated in accordance with CERCLA Section 104(b) and the NCP, 40 CFR Section 300.415(b)(4)(i), the U.S. Environmental Protection Agency (USEPA) *Guidance on*

Conducting Non-Time-Critical Removal Actions Under CERCLA (USEPA 1993a), and the U.S. Department of the Interior (USDOI) Environmental Compliance Memorandum (ECM) 16-3 (USDOI 2016).

1.2. EE/CA Purpose and Organizational Structure

This EE/CA Report is organized by the following topical headings, which also represent the overall objectives of the EE/CA:

- Characterize the nature and extent of contamination at the Site and conduct human health and ecological risk assessments (Sections 2 and 3).
- Identify applicable or relevant and appropriate requirements (ARARs) (Section 4).
- Develop removal action objectives (RAOs) and preliminary removal goals (PRGs) (Section 5).
- If needed, identify and analyze potential removal action alternatives (Section 6).
- Conduct a comparative evaluation of the removal action alternatives (Section 7).
- Recommend a removal action alternative (Section 8).

1.2.1. Impact of NPS-Specific Requirements and Policies on EE/CA Development

The NPS has several requirements and policies that must be satisfied when undertaking a response to the release of hazardous substances, or pollutants or contaminants, on NPS-managed land (see NPS 2015), including the NPS Organic Act of 1916 (Organic Act) (54 USC Sections 100101et seq.; 36 CFR Chapter 1, Part 1), which requires that the NPS manages parks to conserve the scenery, natural and historic objects, and wildlife and provide for their enjoyment by such means as will leave them unimpaired for the enjoyment of future generations. In accordance with this mandate, NPS strives to clean up contaminated sites with long-term, comprehensive solutions that do not rely on post-removal site controls (PRSCs) to the maximum extent practicable.

This EE/CA Report will be the basis for determining whether a NTCRA is needed and, if needed, selecting what is intended to be a final, permanent response action to address human health risk, ecological risk, and ARARs at the Site. Consequently, in accordance with NPS policy this EE/CA Report includes a baseline human health risk assessment (HHRA), a screening-level ecological risk assessment (SLERA), and a baseline ecological risk assessment (BERA).

1.2.2. *Park-Specific Considerations during EE/CA Development*

This document has been prepared in accordance with the Yosemite National Park Agreement (Agreement) (Docket HWCA: P1-99/00-006) effective date March 6, 2001, between the California Department of Toxic Substances Control (DTSC) and the NPS. Pursuant to the terms of the Agreement, this document is intended to comply with the requirements of CERCLA Sections 104 and 120 and of the State of California Hazardous Waste Management Program, which is codified in Chapter 6.5 of Division 20 of the California Health and Safety Code. The DTSC is authorized to administer the state's Hazardous Waste Management Program in lieu of the federal hazardous waste management requirements of the Resource Conservation and Recovery Act (RCRA), 42 USC Section 6901, et. seq.

2. Site Description, Investigation Results, and Conceptual Site Model

The purpose of Section 2 is to provide information on the extent of contamination and the physical characteristics of the Site and to present the CSM so that the location and fate and transport of contamination is understood.

This section includes a summary of site features, operational history, historical sources and releases of contaminants, the specific hazardous substances released at the Site, and other factors that influence contaminant migration such as hydrogeology, hydrology, climate, extent of contaminants in site media, and contaminant transport pathways and behavior. All these elements contribute to the development of the CSM, which is presented in Section 2.12 and shown in Figures 4 and 5.

2.1. Site Description

This section describes site features such as the physical and natural characteristics, previous and current use, geology, and hydrogeology. The Site is located within the eastern portion of the Park, approximately 100 feet southwest of the Vogelsang HSC, one of the backcountry tented camp areas in the Park. Vogelsang HSC is located at latitude 37º 47' 42.1332" North and 119º 20' 42.6912" West, at an elevation of 10,300 feet above sea level. The Site is accessed through an approximately 7.3-mile hike along the Rafferty Creek Trail via the parking lot for John Muir Trail near the Tuolumne Lodge located off of Highway 120 in the Tuolumne Meadows area of the Park. The Vogelsang HSC was established at its current location in 1940 as a high elevation tented camp location for hikers and backpackers within the Park. The Vogelsang HSC consists of 12 total guest tent cabins for a maximum capacity of 42 guests.

The Site is defined as roughly 0.65 acres of subalpine land within a grassy area of lodgepole pine trees and willow shrubs, located between granite outcrops. An ephemeral drainage extends northeast-southwest through the central portion of the Site, however no surface water has been observed within the drainage during Site investigations. There is no specific trail to the Site itself, and there are no amenities within the Site boundaries. However, the Site is located approximately 100 feet southwest of the Vogelsang HSC corral and is approximately 75 feet east-southeast from the trail to Merced Lake (Figure 2).

2.2. Operational History

The Vogelsang HSC was originally constructed in 1924 in a location near Boothe Lake. After temporarily relocating to a site near Tuolumne Pass in the early 1930s, Vogelsang HSC was moved to its current location along Rafferty Creek in 1940. Vogelsang is among five total backcountry HSCs (as well as the Tuolumne Meadows Lodge) located along an approximately 51-mile loop trail, which allows backpackers to traverse the backcountry portions of the Park with relatively comfortable amenities. Vogelsang HSC currently consists of 12 total guest cabins, a stone kitchen and attached tent dining room, a shower tent, a restroom, some storage buildings, a barn, and a corral. A leach field for sewage disposal was constructed in 1965, and a sewer mound was constructed about 1987. All solid waste generated at the camp is now hauled out by pack stock. Water is available at the camp and there is a dispersed backpackers' campground located to the north with a composting toilet.

Following completion of construction of the Vogelsang HSC at its current location in 1940, the Site was formerly utilized as a waste disposal area. The exact dates of waste disposal activities are not documented, but archaeological investigations have discovered debris believed to have been deposited between 1940 and 1965 (AE, 2019).

2.3. Historically and Culturally Significant Features

As noted in Section 2.1, the Site is located approximately 100 feet southwest of the Vogelsang HSC. On July 18, 2014, Vogelsang HSC was formally listed in the National Register of Historic Places under Criterion A "for its role in recreation/entertainment, conservation, and education as one of the high country camps, whose origin dates back to the earliest days of the NPS" (NPS, 2014). In addition to its historical significance, the Vogelsang HSC is a popular destination for backpackers and park visitors. More than 13,000 people stay at HSCs each year and several thousand backpackers stop by the camps for meals (Aramark, 2021).

Archaeological investigations, performed in conjunction with the 2002 Focused Site Inspection and 2019 Expanded Site Inspection, discovered surficial and subsurface debris located throughout the Site that, based on the date of origin of the debris, was attributed to historical waste disposal activities of the Vogelsang HSC between 1940 and 1965. The 2019 Archaeological Investigation Report for the Site determined that the Site itself is also eligible for the listing in the National Register of Historic Places due to its association with the Vogelsang HSC. The report added that the Site is also eligible for listing under Criterion D, "due to its sufficient quantity and variety of artifacts, clear historical association, and ability to provide meaningful research related to the period of significance (1940-1961)". The report recommended that any future proposed projects within the Site boundary adhere to Section 106 procedures and apply the Criteria of Adverse Effect (26 CFR 800.5) to determine whether the undertaking will alter the characteristics of the property in ways that would diminish the integrity of features or deposits that contribute to the significance of the archaeological finds within the Site (AE, 2019).

2.4. Waste Characteristics

As discussed in Section 2.2, the Site was historically used as a waste disposal area for the Vogelsang HSC, with waste disposal activities reportedly occurring primarily between 1940 and 1965. Waste and debris found at the Site has consisted of crushed and rusted metal cans, metal household objects, broken glass, and broken china. Debris associated with the historical waste disposal activities has primarily been discovered in small discrete piles, extending to depths less than 4 feet below ground surface (bgs), distributed throughout the Site. Surficial evidence of debris including glass, china, and metal debris is also visible throughout the Site. An initial risk-based evaluation of surface and subsurface soil collected during the CDM Smith ESI showed several chemicals were identified as chemicals of potential concern (COPCs) for human health and ecological receptors, including several metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, silver, thallium, vanadium, zinc, and mercury), dioxins/furans, and pentachlorophenol (PCP). An initial background comparison evaluation suggested that the identified COPCs are likely to be Site-related. The data supported the conclusion that surface and subsurface soils in the Site were impacted by the historical waste disposal activities leading to Site-related hazardous releases.

2.5. Geology and Hydrogeology

2.5.1. Regional and Local Geology

According to the 1983 Geologic Map of the Tuolumne Meadows Quadrangle, the regional geology in the vicinity of the Site is the Cathedral Peak granodiorite of the Tuolumne Intrusive Suite (Bateman, et. al, 1983).

Soils encountered during the 2019 ESI consisted primarily of silty sands and sandy silts with gravel. Bedrock was reportedly encountered at depths between 2.5 to 3.5 feet below ground surface (bgs).

2.5.2. Hydrogeology

No groundwater monitoring wells exist within or near the boundary of the Site. Groundwater was not encountered in any of the test pits excavated during the 2002 FSI. No groundwater was encountered in the borings during the 2019 ESI, and most borings met refusal on granite and bedrock within 2.5 to 3.5 feet bgs. Therefore, depth to groundwater is unknown at the Site.

<u>Groundwater Use</u>

The nearest drinking water well is located at the Tuolumne Meadows Ranger Station, 7.5 miles north of Vogelsang HSC in the Tuolumne River drainage system. The nearest drinking water wells near the Merced River drainage are at Yosemite Lodge, approximately 16 miles from the Site.

2.6. Site Surface Water

No surface water has been observed on the Site. However, an apparent ephemeral water drainage extends northeast-southwest through the central portion of the Site. During the 2002 FSI and 2019 ESI, no surface water drainage was observed. The field activities associated with these previous investigations were conducted in August, therefore, the probability of observing surface water flow in this drainage during these activities was low. It is likely that water would only be present in this drainage for a short period of time during snowmelt, and it therefore is not likely to provide any aquatic habitat. The Site is located approximately 350 feet northeast of Fletcher Creek and it is unclear whether the ephemeral drainage connects to Fletcher Creek. Topography in the vicinity of the Site slopes gently to the south-southwest, towards Fletcher Creek. Other nearby surface water bodies include Fletcher Lake located upgradient to the northeast, Vogelsang Lake located upgradient to the south-southeast, and Booth Lake to the north (Figure 1).

2.7. Local Climate

Yosemite receives 95% of its precipitation between the months of October and May, with snow blanketing the Park between the months of November through May. Tuolumne Meadows averages approximately 27.5 inches of rain annually and average monthly temperatures range from 72 degrees F in July to 10 degrees F in December through February (NPS, 2021b).

2.8. Ecological Setting

The Site is located in a pristine sub-alpine environment with Sierra lodgepole pine trees and dense ground cover of bunch grasses and sedges (Harris, 2020).

2.8.1. Special Status Species

According to the Harris Environmental habitat study performed in 2020, the area surrounding the Site was identified as potential habitat for the Sierra Nevada yellow-legged frog (Rana sierrae) and the Yosemite toad (Anaxyrus canorus) (Harris, 2020). The Sierra Nevada yellow-legged frog is listed as a Federal Endangered Species and a California Threatened Species and the Yosemite Toad is listed as a Federal Threatened Species (NPS, 2021a). Both species are known to frequent high-altitude locations, with habitats of less than 3.3 feet from permanent water for the Sierra Nevada yellow-legged frog, and less than 300 feet from permanent water for the Yosemite Toad (FWS, 2021a; 2021b). Based on this information, the Site does not contain the habitat to support these species and they are unlikely to be present on the Site. Another species potentially present at the Site is the Sierra Nevada bighorn sheep which is listed as a Federal Endangered species and a California Endangered and Fully Protected species (NPS, 2021a). Per conversations with NPS staff, Sierra Nevada bighorn sheep have been seen on a plateau within 1 mile of the Site (G. Stock, personal communication, February 18, 2021). However, this species has not been confirmed or noted as likely to be present on the Site.

2.9. Sensitive Environments

2.9.1. Terrestrial Sensitive Environments

National Parks and Wilderness Areas

The USEPA defines sensitive environments as “a terrestrial or aquatic resource, fragile natural setting, or other area with unique or highly valued environmental or cultural features” (USEPA 1991a). The Site is considered a sensitive environment because it is located inside the Park, and national parks are defined as sensitive environments by the USEPA (USEPA 1992a). It is also worth noting that the Vogelsang HSC is technically listed as a Potential Wilderness Addition due to the presence of the camp. Potential Wilderness Areas are also afforded protection to ensure no action that would diminish their wilderness eligibility is carried out (NPS, 2006).

Wetland Areas

The Site is located approximately 350 feet up-slope to the northeast of Fletcher Creek, which is a Palustrine, Emergent, Persistent, Seasonally Flooded wetland that flows from Fletcher Lake to the Merced River (Harris, 2020).

2.10. Previous Investigations and Response Actions

In 1998, California Department of Toxic Substances Control (DTSC) performed a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) for multiple sites located throughout Yosemite National Park, including the Site.

In 2001, NPS entered into a consent agreement with DTSC and agreed to determine the nature and extent of contamination at various sites throughout Yosemite National Park, including the Site. Under the agreement, NPS is exercising its CERCLA lead agency authority, and DTSC is exercising its RCRA corrective action authority.

In 2002, IT Corporation completed an FSI Report for the Site (IT Corporation, 2002). The report investigated the lateral and vertical extent of the surficial and subsurface debris at the Site. Subsurface soil samples were collected from test pits advanced throughout the Site and immediate vicinity and found concentrations of potential contaminants greater than preliminary screening levels. The report recommended that additional investigation be conducted at the Site to better define the nature and extent of potential impacts to soil at the Site.

In 2019, CDM Smith completed an ESI Report for the Site (CDM, 2019). In the report, additional investigation was performed at the Site to further characterize the extent of subsurface and surface debris as well as potential impacts to the soil. Discrete borings were advanced throughout the FWDA where surface debris was observed. Soil samples were collected from these discrete borings and observations recorded to determine the approximate extent of subsurface debris within the FWDA area. ISM sampling was conducted within decision units (DUs) which divided the Site (Figure 3). The primary DU was designed to encompass the portion of the Site where subsurface debris was observed during the discrete soil borings as well as previous investigations

(DU-1). DU-1 represented an area of approximately 8,271 ft^2 (0.19 acres). Additional ISM samples were collected encircling DU-1 by 15 to 30 feet (DU-2) and extending 80 to 90 feet down gradient of DU-2 (DU-3). DU-2 encompassed an area of approximately 9,326 ft^2 (0.21 acres) and was subdivided into three sample units (SUs), SU-1 (3,311 ft^2 or 0.076 acres), SU-2 (2,614 ft^2 or 0.060 acres), and SU-3 (3,398 ft^2 or 0.078 acres). DU-3 encompassed an area of approximately 10,224 ft^2 (0.23 acres) and was also subdivided into three SUs, SU-1 (3,180 ft^2 or 0.073 acres), SU-2 (2,962 ft^2 or 0.068 acres), and SU-3 (4,095 ft^2 or 0.094 acres). An additional background ISM sample was collected from an area away from the extent of subsurface and surface debris and determined to be consistent with the geology of the Site (DU-4). Locations of Site DUs are depicted in Figure 3. Concentrations of metals, petroleum, dioxins, and PAHs were detected at the Site. The report identified several contaminants of potential concern (COPCs) for human health and ecological receptors, including several metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, silver, thallium, vanadium, zinc, and mercury), dioxins/furans, and pentachlorophenol (PCP). The ESI recommended that a baseline human health and ecological risk assessment be performed to determine if there is potential for unacceptable risks to either human and/or ecological receptor populations.

2.10.1. Data Summary

The 2002 FSI soil sampling detected twelve metals, six of which (cadmium, copper, molybdenum, nickel, and zinc) reported concentrations greater than background concentrations. Only molybdenum reported a concentration greater than the human health preliminary residential screening level (IT Corporation, 2002). All detected concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PAHs, pesticides, polychlorinated biphenyls (PCBs), and diesel and heavy oil range petroleum hydrocarbons were below their respective human health preliminary screening levels. Additionally, the dioxins/furans Toxic Equivalency (TEQ) calculation reported a concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) TEQ greater than the human health preliminary residential screening level. A preliminary ecological risk assessment was also performed for the report to determine whether potential unacceptable ecological risks were present at the Site. Seven metals (cadmium, chromium, copper, lead, mercury, molybdenum, vanadium, and zinc) were detected at concentrations greater than their preliminary screening levels. Of these, cadmium, copper, lead, and molybdenum were determined to be greater than background concentrations. The 2,3,7,8-TCDD TEQ also reported a concentration greater than both background and preliminary ecological screening levels. Detailed information regarding the 2002 FSI is included in Appendix D.

The 2019 ESI soil sampling confirmed many of the discoveries from the 2002 FSI. Seventeen metals were detected in Site discrete borings and DUs, and three dioxins/furan congeners, eight PAHs/PCP, as well as both diesel and heavy oil range petroleum hydrocarbons were detected in Site DUs (DU-1, DU-2, and DU-3). Concentrations of detected contaminants were elevated in subsurface soils within DU-1 compared to surficial soils, and generally decreased with distance from DU-1 in Site DUs (DU-2 and DU-3). No PCBs, organochlorine (OC) pesticides, or SVOCs were detected in Site DUs, and petroleum detected in Site DUs reported concentrations generally consistent with background concentrations (DU-4). To determine Site COPCs, the maximum concentration detected of each contaminant from either discrete or ISM samples was compared to the most conservative preliminary screening level for both human health and ecological receptors. Concentrations of arsenic, chromium, cobalt, and thallium exceeded preliminary human health screening levels for Site surficial soil and concentrations of antimony, arsenic, chromium, cobalt, copper, lead, and thallium exceeded preliminary human health screening levels for subsurface soils at the Site. These analytes were carried forward as COPCs for human health. Concentrations of antimony, arsenic, barium, chromium, copper, lead, molybdenum, nickel, thallium, vanadium, zinc, mercury, dioxins/furans, and PCP exceeded preliminary ecological screening levels for Site surficial soils, and concentrations of antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, silver thallium, vanadium, zinc, and mercury exceeded preliminary ecological screening levels for subsurface soils at the Site. Detailed information regarding the 2019 ESI is included in Appendix B.

Table 1 presents the analytical results for the ISM soil sampling conducted during the 2019 ESI.

2.10.2. Previous Cleanup Actions

There have been no previous cleanup actions performed at the Site.

2.11. Site Contaminants

The media of concern at the Site is soil. As noted in Section 2.9, the 2019 ESI identified the following COPCs for Site surface and subsurface soil for human health and ecological receptors: antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, silver, thallium, vanadium, zinc, and mercury, dioxins/furans, and pentachlorophenol (PCP). To determine Site COPCs, the maximum concentration detected for each contaminant from either discrete or ISM samples was compared to the most conservative preliminary screening level for both human health and ecological receptors. COPCs for human health in surface soil included arsenic, chromium, cobalt, and thallium. COPCs for human health in subsurface soil included those for surface soil as well as antimony, copper, and lead. COPCs for ecological receptors in surface soil included antimony, arsenic, barium, chromium, copper, lead, molybdenum, nickel, thallium, vanadium, zinc, mercury, dioxins/furans, and PCP. COPCs for ecological receptors in subsurface soil included the same contaminants as for surface soil with the exception of PCP and dioxins/furans, and also included cadmium, cobalt, and silver.

2.12. Site-Specific Contaminant Fate and Transport

The Site was utilized as a waste disposal area for the Vogelsang HSC from 1940 through 1965. During this time, waste and other debris was deposited in small discrete piles throughout the boundaries of the area defined by the 2019 ESI DU-1. The waste materials and debris observed on the Site has consisted of crushed and rusted metal cans, metal household objects, broken glass, and broken chinaware. Over time these materials were broken down by the environment, releasing contaminants into both surficial and subsurface soils on the Site. Ash observed within the 2002 FSI test pits also suggests that some degree of waste burning occurred on the Site, contributing to the presence of dioxins/furans in Site soil.

The primary COPCs identified for Site surficial and subsurface soils are several metals, PAHs, and dioxins/furans, which are all relatively immobile in their environment. Furthermore, the shallow depth of bedrock and lack of encountered groundwater within the vicinity of the Site suggests that migration of contaminants to groundwater is not likely. However, the ephemeral drainage located on the Site does present the potential for contaminant migration by transport of contaminants in seasonal surface water that may be present during periods of snowmelt. To address this potential for down-gradient contaminant transport, DU-3 was designed with three sampling units, located at progressively greater distances down-gradient of DU-1 (the source area, see Figure 3), in an effort to determine the lateral extent of Site-related contamination in soil.

2.13. Current/Future Land Uses

The Site is located approximately 100 feet southwest of the Vogelsang HSC. The Vogelsang HSC was established at its current location in 1940 as a high elevation tented camp for hikers and backpackers within the Park. The Vogelsang HSC consists of 12 total guest cabins for a maximum capacity of 42 guests.

The Site is considered natural wilderness and will not be developed in the future per the Wilderness Act. No construction activities are anticipated in the future, although maintenance activities may be carried out at the Vogelsang HSC and associated facilities, as well as hiking trails in the vicinity.

2.14. Conceptual Site Model

Figures 4 and 5 present a CSM for human and ecological receptors, respectively. The CSM summarizes the current understanding of how chemical contaminants have been released to the environment, have migrated, and have resulted in exposure to human and ecological receptors. The main features of this CSM and the rationale for the decisions made regarding which receptors and pathways are identified for risk quantification in the risk assessment are discussed below.

2.14.1. Sources of Contamination

The Site was utilized as a waste disposal area for the Vogelsang HSC from 1940 through 1965. During this time, waste and other debris was deposited in small discrete piles throughout the FWDA area of the Site (DU-1). Site investigations have documented the presence of several metals, dioxins/furans, and PCP at concentrations greater than human health and ecological screening levels.

2.14.2. Potentially Complete Human Exposure Pathways

The Site is located in the vicinity of the Vogelsang HSC. The Vogelsang HSC is a popular destination for backpackers and park visitors. More than 13,000 people stay at HSCs each year and several thousand backpackers stop by the camps for meals. Additionally, NPS staff occasionally visit the HSCs. There is no specific trail to the Site itself, and there are no amenities within the Site boundaries. However, the Site is located approximately 100 feet southwest of the Vogelsang HSC corral and is approximately 75 feet east-southeast from the trail to Merced Lake (Figure 2).

Park visitors are the primary human population of concern for both current and future scenarios. Site visitor receptors are assumed to consist of young children (less than 6 years old), older children (6 to 16 years old), and adults (greater than 16 years old). NPS employees could occasionally visit the Site under both current and future conditions, with the possibility of conducting maintenance/construction projects at the Site. Although no construction activities are planned at the Site, restoration projects or construction activities could occur at the Vogelsang HSC and vicinity in the future; thus, a future construction worker scenario is evaluated. Park visitors and Park staff are assumed to only contact surface soils (0 to 6 inches bgs) at the Site. Construction workers, which could include Park staff under the same exposure assumptions as a construction worker, could be exposed to both surface and subsurface soils during maintenance/construction activities.

There are no surface water features at the Site, other than possible ephemeral water flows that would not likely be an exposure pathway for human receptors. Groundwater was not encountered prior to encountering bedrock during soil sampling events and is therefore not a current or future drinking water source. Both surface water and associated sediments, and groundwater media and exposure pathways are not considered in the CSM.

For current and future human receptors, the most plausible potential exposure routes identified by the CSM include the following:

- Incidental ingestion of surface soil – all human receptors
- Incidental ingestion of subsurface soil – Future construction worker
- Dermal (direct) contact with surface soil – all human receptors
- Dermal (direct) contact with subsurface soil – Future construction worker
- Inhalation of airborne particles from surface soil (dust) – all human receptors
- Inhalation of airborne particles from subsurface soil (dust) – Future construction worker

2.14.3. Potentially Complete Ecological Exposure Pathways

The Site is located in a pristine sub-alpine environment with Sierra lodgepole pine trees and dense ground cover of bunch grasses and sedges. Numerous species of mammals, birds, plants, and soil invertebrates may be present at the Site and exposed to Site-related contaminants. For the ecological risk assessment conducted as part of this EE/CA, ecological receptors are considered as groups (plants, invertebrates, birds, mammals) and feeding guilds rather than individual species. Threatened and endangered species have not been documented at the Site and while there exists the possibility that they could be present, as discussed in Section 2.8.1, most of these species are not anticipated to be present at the Site.

There are no surface water features at the Site, other than possible ephemeral water flows and groundwater was not encountered prior to encountering bedrock during soil sampling events. Both surface water and associated sediments, and groundwater media and exposure pathways are not considered in the CSM.

The following groups were considered as part of the ecological risk assessment:

Terrestrial Plants and Soil Invertebrates:

The structure and function of the terrestrial plant and invertebrate community is important because it provides a significant portion of the energy, organic matter, and nutrient inputs for terrestrial systems. Plant communities also provide habitat and forage for a variety of wildlife species. Terrestrial plants and soil organisms are good indicators of soil condition because they reside directly in the soil and are not mobile.

The primary exposure pathway for soil invertebrates is direct contact with (and ingestion of) contaminated soils. For terrestrial plants, the primary exposure pathway is direct contact of the roots with contaminants in soil. Although most terrestrial plants (e.g., ground cover and grasses) and invertebrates would only be exposed to surface soils (0 to 6 inches bgs), it is possible deeper soils could be encountered by plants with deeper roots (e.g., trees) and burrowing soil invertebrates.

The most plausible ecological exposure pathways identified for these receptor groups include:

- Incidental ingestion of, and/or direct contact with, surface soil – terrestrial plants and invertebrates
- Incidental ingestion of, and/or direct contact with, subsurface soil – terrestrial plants and invertebrates
- Ingestion of terrestrial biota (plants) – terrestrial invertebrates

Mammals and Birds

Birds and mammals may be exposed to site-related contaminants by two primary pathways: (1) ingestion of contaminants in or on food items and (2) incidental ingestion of soil while feeding or digging. Direct contact (i.e., dermal exposure) of birds and mammals to soil may occur in some cases, and inhalation exposure to volatile contaminants and airborne dusts is possible for all birds and mammals, but these exposure pathways (i.e., dermal and inhalation) are usually considered to be minor in comparison to exposures from ingestion (USEPA 2005b), and were not included in the exposure modeling.

The most plausible ecological exposure pathways identified for these receptor groups include:

- Incidental ingestion, direct contact, and inhalation of surface soil – birds and mammals
- Incidental ingestion, direct contact, and inhalation of subsurface soil – mammals
- Ingestion of terrestrial biota (plants, invertebrates, animals) – birds and mammals

3. Risk Assessment Summary

The purpose of Section 3 is to describe the risks to human health and ecological receptors posed by contamination at the Site.

Risk assessments provide an estimation of the potential threat to human health and the environment posed by site contaminants. The results of the risk assessment are used to determine if potential risks are unacceptable and, if so, to establish preliminary risk-based removal goals (PRGs).. EE/CA guidance (USEPA 1993a) discusses the use of streamlined risk evaluations for an EE/CA when used for interim response actions. However, when the EE/CA is the basis for selecting a final response action, streamlined risk evaluations are not sufficient. Instead, an HHRA and a SLERA are developed for the Site (USDOI 2016). A BERA may be required if the SLERA identifies the need to refine the ecological risk assessment with site-specific or receptor-specific information. In accordance with risk assessment guidance, a baseline risk assessment is to evaluate potential adverse effects caused by hazardous releases from a site in the absence of any actions to control or mitigate these releases (i.e., under an assumption of no action).

A baseline HHRA, SLERA, and a simplified BERA were completed for this Site. The detailed risk assessment report is provided as Appendix C. An overview of the risk assessment approach and risk characterization conclusions is presented in Section 3.1 (HHRA) and Section 3.2 (SLERA and BERA) below.

3.1. Baseline Human Health Risk Assessment

The HHRA was prepared according to USEPA guidance on conducting HHRAs at CERCLA sites (USEPA 1989). The data utilized in the HHRA is the data presented in the 2019 ESI for the Site (CDM, 2019). This report is included as Appendix B, and a summary of Site soil data is included in this report as Table 1.

The HHRA includes the following components (described in detail in the HHRA report; Appendix C):

- Hazard identification
- Exposure assessment
- Toxicity assessment
- Risk characterization

3.1.1. Hazard Identification

Contaminants of potential concern (COPCs) were identified by comparing maximum detected concentrations in each media to the lowest appropriate risk-based screening levels, which were identified in the sampling and analysis plan (SAP). These screening levels are based on a target excess lifetime cancer risk of 1 in 1 million (1E-06) and a target non-cancer hazard quotient (HQ) of 0.1 based on exposure assumptions derived from a residential exposure scenario. These conservative screening levels ensure that potential contaminants are not prematurely rejected and are carried through the risk assessment and ARARs analysis specific to the site.

Contaminants detected above these screening levels were identified as COPCs and carried forward in the risk assessment. Consistent with guidance, consideration of background concentrations for naturally occurring analytes (i.e., inorganics) will be factored into the final selection of COCs in the risk management section.

Table 2 presents a list of COPCs identified for surface soil and subsurface soil. In total, four human health COPCs were identified for surface soil: arsenic, chromium, cobalt, and thallium. Two human health COPCs were identified for subsurface soil: arsenic and chromium.

3.1.2. Exposure Assessment

The risk assessment estimates current and future potential risk to different receptor populations.

Human receptor populations are outlined in the human health exposure pathway diagram (Figure 4) and complete, incomplete, or not applicable exposure pathways are identified.

Exposure parameters are related to human behaviors that define the rates, time, frequency, and duration of exposure. It is expected there will be differences in the exposure between different individuals within a given receptor population due to differences in the exposure parameters. There may be a wide range of average daily exposures between different individuals of an exposed population. In the HHRA, attention is focused on exposures near the central portion of the range (e.g., mean, median) and on exposures near the upper end of the range (e.g., 95th

percentile). These two exposure estimates are referred to as central tendency exposure (CTE) and reasonable maximum exposure (RME), respectively.

In accordance with applicable guidance, site decisions are based on the RME estimates of exposure and risk. Standard default values for RME exposure parameters (USEPA 1993b, 2014) were used in the HHRA. When standard default values were not available, RME exposure parameters were determined based on other sources (e.g., USEPA 2008, 2011) and best professional judgment. The exposure parameters used in the HHRA are provided in Appendix C; frequency and duration parameters are summarized below:

Text Table 3.1 Frequency and Duration Parameters for Human Exposures

		Adult Employee		Construction Worker		Young Child Visitor		Older Child Visitor		Adult Visitor	
Exposure Parameter	**Units**	**CTE**	**RME**	**CTE**	**RME**	**CTE**	**RME**	**CTE**	**RME**	**CTE**	**RME**
Exposure frequency	days/yr	12	24	15	30	1	2	5	10	5	10
Exposure duration	yr	5	10	1	3	2	6	5	10	5	10
Exposure time	hr/day	4	8	8	10	0.5	2	0.5	2	0.5	2

Notes:
CTE = central tendency exposure
RME = reasonable maximum exposure

Exposure areas are defined based on the receptor, exposure medium, and the type and frequency of activities (USEPA 1989). The exposure area is the geographical area in which a receptor is randomly exposed to the contaminated medium for the assumed exposure duration, which is based on the frequency of visits to the Site by each type of receptor.

Because risk assessments are based on chronic health effects, the most appropriate expression for the exposure point concentration (EPC) is the long-term average concentration within the exposure area. Guidance states that "because of the uncertainty associated with estimating the true average concentration [of a contaminant] at a site, the 95 percent upper confidence limit (95

UCL) of the arithmetic mean should be used" as the EPC (USEPA 1992a). The EPCs for each medium and each exposure area evaluated in the HHRA are presented in Appendix C.

The ISM soil samples collected in during the 2019 ESI are used in this risk assessment to characterize potential exposures and risks for human and ecological receptors at the Site (CDM, 2019). The soil sampling results from the ISM sampling portion of the ESI were utilized for the risk assessment. All surface soil (0 to 6 inches bgs) data from the four Decision Units (DUs) were used to characterize exposures, including background. Subsurface soil (greater than 6 inches bgs) data collected from DU-1 were used to evaluate subsurface soil exposures. Data collected from discrete soil samples were not used to assess risks, since they were not collected for that purpose. The ISM sampling methodology was designed to provide data for evaluating receptor exposures for use in risk assessment; all exposures were evaluated based on those data. The Site data are presented in Appendix B.

For most receptors, given the long-term nature of the exposure scenario (i.e., multiple days and years of exposure), it is likely that human receptors would be exposed to soils across the Site. With the exception of the construction/excavation activities discussed below, it is unlikely receptors would spend the entirety of their exposure within a single DU. Nevertheless, to be conservative, for surface soil (0 to 6 inches bgs) exposures were evaluated both on a DU-by-DU basis and on a sitewide basis. For each DU-specific exposure area, 95UCLs were derived from the Incremental Sampling Methodology (ISM) triplicate results using the Chebyshev calculation method as recommended by ITRC (2012). The EPC was set equal to the recommended 95UCL (even when the 95UCL was higher than the maximum replicate concentration) (ITRC 2012). If one or two of the ISM replicates for a DU were non-detect, the EPC was set equal to the maximum detected replicate concentration. If all three ISM replicates for a DU were non-detect, no risks were calculated for that chemical in that DU.

The sitewide exposure area was set equal to the entire Site (i.e., DU-1 through DU-3). All surface soil data from those three DUs were used to calculate surface soil 95UCLs. Subsurface soils were only collected from DU-1, and sitewide subsurface data are not available; subsurface soil EPCs are based on the 95UCL on the three subsurface samples.

EPCs for surface soil were also calculated for the background DU (DU-4) using the same procedures as described above (i.e., 95UCLs were calculated from the ISM triplicate results). Background EPCs are used to provide a frame of reference for interpreting site risks, by comparing risks associated with background exposures.

The amount of a chemical ingested, inhaled, or absorbed through the skin is referred to as "intake" or "dose." The average daily dose (ADD) is the dose rate averaged over a pathway-specific period of exposure expressed as a daily dose on a per unit body weight basis. The calculated ADD for each receptor and each exposure pathway are provided in the HHRA in Appendix C.

Lead-specific Assessment

Exposure to lead is evaluated using a somewhat different approach than for most other chemicals. First, lead is widespread in the environment and exposure can occur by many different pathways. Thus, lead exposure assessment generally includes all exposure pathways rather than just those that are Site-related exposures. Second, studies of lead exposures and resultant health effects in humans are traditionally described in terms of blood lead level. The concentration of lead in the blood is expressed in units of micrograms of lead per deciliter of blood (µg/dL).

Lead was not identified as a human health COPC for surface or subsurface soil at the Vogelsang Site and therefore a lead-specific assessment is not applicable for the HHRA.

3.1.3. Toxicity Assessment

The objective of a toxicity assessment is to describe the adverse health effects caused by a chemical and identify how these adverse effects relate to exposure concentration. In addition, the toxic effects of a chemical frequently depend on the route of exposure (oral, inhalation) and the duration of exposure (subchronic, chronic, or lifetime).

There are typically major differences in the time course of action and the shape of the dose-response curve for cancer and non-cancer effects. Therefore, the toxicity assessment separates the non-cancer effects of chemicals from the cancer effects.

The potential for non-cancer effects was estimated by comparing a calculated exposure to a reference dose (RfD) for oral exposures or a reference concentration (RfC) for inhalation exposures for each individual chemical. The RfD and RfC represent a daily exposure that is designed to be protective of human health, even for sensitive individuals or subpopulations, over a lifetime of exposure.

For a given chemical, the dose or concentration that elicits no adverse effect when evaluating the most sensitive response in the most sensitive species is referred to as the no observed adverse effect level (NOAEL). The NOAEL was used to establish non-cancer toxicity values. The RfD and RfC represent a daily exposure level that is not expected to cause adverse non-cancer health effects.

Cancer effects were evaluated based on the assumption that any level of exposure to a carcinogenic compound can cause an effect. The USEPA extrapolated from observed laboratory animal data using a mathematical model known as the linear multi-stage model. This model plots a line back toward the origin, adjusting the background cancer rate in the control (unexposed) animal populations. For oral exposures, the cancer slope factor (CSF) is the 95 percent upper bound on the slope of the dose-response curve in the low dose region and has dimensions of risk of cancer per unit dose. For inhalation exposures, cancer risk is characterized by an inhalation unit risk (IUR) value, which represents the upper-bound excess lifetime cancer risk estimated to result from continuous lifetime exposure to a chemical at a concentration of 1 $\mu g/m^3$ in air.

Chemicals are classified as known, probable, or possible human carcinogens based on a USEPA weight-of-evidence scheme in which chemicals are systematically evaluated for their ability to cause cancer in humans or laboratory animals with the following descriptors: (1) carcinogenic to humans, (2) likely to be carcinogenic to humans, (3) suggestive evidence of carcinogenic potential, (4) inadequate information to assess carcinogenic potential, and (5) not likely to be carcinogenic to humans.

The USEPA Regional Screening Levels (RSLs) tables (USEPA, 2020) provide the latest toxicity values and physical and chemical properties for individual chemicals. Dioxin and furan exposure results were assessed by multiplying each individual dioxin or furan congener by a toxicity equivalency factor and the results summed to develop a 2,3,7,8-TCDD TEQ; the TEQ was compared with the screening level for 2,3,7,8-TCDD. The RfDs, RfCs, CSFs, and IURs identified for each COPC are provided in Appendix C.

3.1.4. Risk Characterization

Risk characterization is the process of quantifying the significance of chemicals in the environment in terms of their potential to cause adverse health effects. The quantitative estimates are expressed in terms of a probability statement for the potential excess lifetime cancer risk and an HQ for the likelihood of adverse non-cancer health effects. When there are multiple COPCs that cause non-cancer effects, the cumulative hazard index (HI) is calculated as the sum of HQs.

The NCP describes a potentially acceptable range of lifetime excess cancer risk between 10^{-4} and 10^{-6}, and expresses a preference for establishing the acceptable target cancer risk at or near the more protective end of this range. Similarly, non-cancer health effects generally should not exceed an HI of 1. NPS generally considers cancer risks exceeding 10^{-6} or non-cancer risks exceeding an HI of 1 to be unacceptable, absent compelling site-specific factors that preclude achieving these levels of protection.

Non-cancer effects are calculated for each non-carcinogenic chemical in each exposure pathway. The potential for non-cancer effects from site-related ingestion and dermal contact exposures is evaluated by comparing the estimated exposure from site media to an exposure level that is believed to be safe (USEPA 1989), in the form of a ratio of the former to the latter, called a hazard quotient (HQ). A similar process is used to assess the potential for non-cancer effects from inhalation exposures, where the concentration of the non-carcinogen in air is compared to the inhalation reference concentration that is believed to be safe. When there are multiple COPCs that cause non-cancer effects, the cumulative hazard index (HI) is calculated as the sum of HQs.

The general methodologies used for estimating cancer risks and non-cancer hazards are described in Appendix C.

Tables 3 and 4 summarize the risk results by exposure media for each receptor for potential non-cancer HIs greater than 1 (Table 3) and excess cancer risks greater that 1E-06 (Table 4).

Chronic exposures and risks to humans from COPCs were evaluated based on both cancer and non-cancer effects. Estimated total overall risks to Park visitors, NPS employees, and construction workers were below NPS's acceptable risk thresholds for cancer and non-cancer effects (i.e., cancer risks were at or below 1E-06 and non-cancer hazards were less than 1). Based on this, it is concluded that site-related chronic exposures to COPCs would not result in unacceptable risks for any current or future recreational and occupational receptor populations. Therefore, none of the COPCs for surface or subsurface soil were determined as Site COCs.

3.1.5. Uncertainty Assessment

A summary of the uncertainties inherent to each component of the HHRA process and how they may affect the quantitative risk estimates and conclusions of the risk analysis is provided here. Two types of uncertainty are addressed: (1) measurement uncertainty and (2) informational uncertainty.

Measurement uncertainty refers to the usual variance that accompanies scientific measurements such as the uncertainties associated with sampling and measurement variability.

Informational uncertainty stems from assumptions related to estimates of exposure and chemical toxicity. For example, in the HHRA, to account for uncertainties in the development of exposure assumptions, conservative assumptions are made to ensure estimated risks are protective of sensitive subpopulations or the maximum exposed individuals, resulting in a bias toward over-predicting both cancer and non-cancer risks.

Details of the specific uncertainties and assumptions made in estimating exposures relevant to the HHRA for this Site are described in Appendix C. The list below represents a summary of the uncertainties and assumptions made:

- *Exposure Pathways Not Evaluated.* Not all pathways were evaluated quantitatively in this HHRA. This is because the contribution of the pathways excluded from the quantitative assessment is believed to be minor compared to one or more other pathways that were evaluated. For example, ingestion and dermal contact exposures to surface water in the ephemeral flows are theoretically complete exposure pathways. However, due to the transient nature of the ephemeral flowing water, quantitation of exposures and risks associated with ingestion or dermal contact with the surface water would be highly uncertain and would not pose risks higher than other Site exposures.

- *Chemicals not evaluated quantitatively*. Chemicals that were never detected in Site soils but detection limits exceeded screening levels were not identified as COPCs and were excluded from quantitative evaluation in the HHRA. Excluding chemicals that are not detected is appropriate provided that the achieved detection limits were low enough to detect a chemical if it were present at a level of concern. Furthermore, the analytical methods employed in the investigation provide the best available detection limits using conventional analytical instruments.

- *Chemicals without toxicity factors.* Toxicity factors are available for all but a few chemicals detected at the Site. The absence of toxicity information for a chemical is most often because toxicological concern over that chemical is low. That is, chemicals that lack toxicity values have often not been well studied because existing data suggest relatively low toxicity to humans and researchers have focused their studies on chemicals with a higher potential for toxicity.

- *Exposure point concentrations.* In all exposure calculations, the desired input parameter is the true mean concentration of a contaminant within a medium, averaged over the area where random exposure occurs. However, because the true mean cannot be calculated based on a limited set of measurements, the 95UCL is used to calculate EPCs. While the 95UCL may be higher than the true mean, risk estimates were estimated to be low for the Site, so this is not a significant limitation in this HHRA.

- *Human Exposure Parameters.* Many of the required exposure parameters are not known with certainty and must be estimated from limited data or knowledge. For example, data are absent on the exposure frequency and amount of actual soil ingested by park visitors to the Site, and the US EPA (2011) *Exposure Factors Handbook* does not present data on recreational visitors, so the values used in the calculations are based mainly on professional judgment. In general, when exposure data were limited or absent, exposure parameters were chosen in a way that was intended to be conservative. In doing so, the values selected are thought to be more likely to overestimate than underestimate actual exposure and risk.

- *Chemical Absorption.* The risk from an ingested chemical depends on how much of the ingested chemical is absorbed from the gastrointestinal tract into the body. This issue is especially important for metals in soil because some of the metals may exist in poorly absorbable forms and failure to account for this may result in a substantial overestimation of exposure and risk. In this assessment, with the exception of arsenic and lead, it was assumed that the body absorbed 100% for all COPCs. Use of this assumption is likely to overestimate the true risk.

3.2. Ecological Risk Assessment

The screening-level ecological risk assessment (SLERA) comprises the first two steps in the ecological risk assessment process. The objective of the SLERA is to identify and document conditions that may warrant further evaluation (i.e., potential unacceptable risk). The goal is to eliminate insignificant hazards while identifying contaminants whose concentrations are sufficiently high to potentially pose unacceptable risks to ecological receptors. For a SLERA, it is important to minimize the chances of concluding that there is no risk when in fact a risk exists.

Thus, selected exposure and toxicity values and assumptions are consistently biased toward overestimating risk. This ensures sites that might pose an ecological risk are studied further, i.e., a SLERA is deliberately designed to be protective in nature, not predictive of effects.

The SLERA includes the identification of contaminants of potential ecological concern (COPECs), based on a comparison of maximum concentrations to lowest ecological screening levels. It is important to note the results of the COPEC selection are neither designed nor intended "to provide definitive estimates of actual risk or generate cleanup goals and, in general, are not based upon site-specific assumptions" (USEPA 2001). If any potentially significant exposure pathways are indicated from the SLERA, then these pathways are further evaluated in a more refined baseline ecological risk assessment (BERA), which employs modified but conservative exposure and effect assessment methods to determine potential risks. The level of refinement and evaluation in the BERA will depend upon the complexity of the Site. It can range from a "simple" BERA, which characterizes potential ecological risks based only on refined exposure and HQ estimates, to a "detailed" BERA, which employs multiple lines of evidence (e.g., refined HQs, toxicity tests, ecological community evaluations) to determine if the weight of evidence indicates the potential for unacceptable ecological risks.

An ecological risk assessment (both a SLERA and a BERA) includes the following components (described in detail in the SLERA/BERA report; Appendix C):

- Problem formulation
- Exposure and effects assessment
- Risk characterization (including an uncertainty analysis)

3.2.1. *Problem Formulation*

The Site is located at an elevation of 10,300 feet above sea level in a pristine sub-alpine environment with Sierra lodgepole pine trees and dense ground cover of bunch grasses and sedges. As noted in the Sections above, the Site is located in a backcountry portion of the Park, accessed by an approximately 7.3 mile hike from the nearest road. The Site is anticipated to contain several ecological receptors including birds, mammals, terrestrial plants, and terrestrial invertebrates. Contamination has been detected in surface and subsurface soils at the Site, which may represent complete exposure pathways:

- Surface soil: Surface soil (0 to 6 inches bgs) is a media of concern at the Site evaluated in this report. The primary exposure pathway for birds and mammals is direct contact and incidental ingestion of contaminated soils while feeding or digging. Inhalation of dust is also considered to represent a potentially complete pathway for birds and mammals. Direct contact is also the primary exposure pathway for terrestrial invertebrates and terrestrial plants, with incidental ingestion also considered as a potentially complete pathway for terrestrial invertebrates.

- Subsurface soil: Subsurface soil (greater than 6 inches bgs) is a media of concern at the Site evaluated in this report. Direct contact, ingestion, and inhalation of dusts of subsurface soils are considered potentially complete pathways for burrowing mammals. For terrestrial plants, a potentially complete exposure pathway is direct contact of root structures with subsurface soils. For terrestrial invertebrates, direct contact and ingestion of subsurface soils are considered potentially complete pathways.

- Terrestrial biota: Terrestrial biota, which have come into contact with contaminated soils and may have absorbed contamination through exposure to Site soils are considered a media of concern at the Site. Ingestion of terrestrial biota is considered a potentially complete exposure pathway for both birds and mammals, as well as terrestrial invertebrates.

Ecological receptors are outlined in the ecological pathway-receptor diagram (Figure 5), and complete, incomplete, or not applicable pathways are identified.

During the problem formulation, the goals, breadth, and focus of the ecological risk assessment are established through the selection and description of site-specific assessment and measurement endpoints. Measurement endpoints are quantifiable environmental or ecological characteristics that can be measured, interpreted, and related to the valued ecological components chosen as the assessment endpoints (USEPA 1997). The selected assessment and measurement endpoints for each ecological receptor type are described in Appendix C.

3.2.2. Screening-Level Ecological Risk Assessment

Identification of COPECs

In the SLERA, COPECs are determined by comparing the maximum concentrations of contaminants in environmental media (e.g., water, sediment, soil) to corresponding media-specific ecological screening values (ESVs) as provided in the *NPS Protocol for the Selection and Use of Ecological Screening Values for Non-Radiological Analytes* (NPS 2018b). The COPEC Selection ESVs, which are the lowest ESVs across multiple NPS-approved toxicity value sources, are used to identify COPECs.

For soil, maximum concentrations were compared to the lowest NPS COPEC selection soil ESV for terrestrial plants, soil invertebrates, birds, and mammals. While most terrestrial ecological receptors are primarily exposed to surface soil (0 to 6 inches bgs), for simplicity, COPECs were identified for both surface soil and subsurface soil (0.5 to 4 feet bgs) using the lowest soil ESV.

The full list of COPECs is included in Table 5 and is provided for each medium of interest below:

- Surface soil: antimony, arsenic, barium, chromium, copper, lead, mercury, molybdenum, nickel, thallium, vanadium, zinc, and pentachlorophenol (PCP)

- Subsurface soil: antimony, arsenic, chromium, copper, lead, mercury, molybdenum, thallium, vanadium, and zinc

Refined SLERA

HQs are calculated by dividing the estimated environmental concentration by a toxicity value for each receptor (e.g., the ESV).

HQ = EPC / ESV

In the refined SLERA, the maximum concentration for each COPEC in the environmental media is compared to the refined ESV for each receptor type, which are provided in the NPS (2018b) guidance. The SLERA is designed to minimize chances of eliminating a COPEC from further consideration when it may pose an actual ecological risk. Thus, the resulting risk calculation is expected to be an overestimate of actual risk and should not be used to derive response action cleanup levels (USEPA 1997). If the HQ less than or equal to 1, harmful effects are not likely and the exposure pathway can be eliminated from further evaluation. If the HQ greater than 1, that contaminant is a COPEC, and the exposure pathway will be further evaluated in a BERA.

The general methodologies used for the refined SLERA are described in Appendix C.

Tables 6 through 11 summarize the risk results by exposure media for each receptor and indicates which receptor scenarios have potential HQs greater than1.

Based on the refined SLERA, the following COPECs in soil were further evaluated in the BERA in one or more Site DUs:

- Terrestrial Plants: Chromium, molybdenum, vanadium

- Terrestrial invertebrates: Chromium

- Birds: Copper, lead, mercury, molybdenum, vanadium

- Mammals: Antimony, molybdenum

3.2.3. Baseline Ecological Risk Assessment

In the BERA, COPECs identified in the SLERA undergo further assessment in a simple BERA as directed by the NPS Protocols (NPS 2018a; NPS 2018b). Further assessment can include comparing media-specific concentrations to background to determine potential non-site-related concentrations of COPECs (both natural and anthropogenic) and/or comparing species-specific estimated exposure doses to toxicity reference values for select receptors of concern.

If the simple BERA shows one or more COPECs have the potential to result in unacceptable risks, a more detailed BERA may be performed to further refine the HQs (e.g., incorporating site-specific bioaccumulation factors or revised toxicity values) and evaluate other lines of evidence as part of the risk characterization. Examples of other lines of evidence may include laboratory or in situ toxicity tests, field-based assessments of community density and diversity, habitat evaluations, and tissue burden estimates. For this Site, a simple BERA was completed and is provided in Appendix C.

The general methodology follows the HQ approach described above for the SLERA, except that wildlife risks are estimated through a dose evaluation, which consists of evaluating exposures via ingestion of food items, as described more fully in subsequent sections. The assessment endpoint is based on the sustainability of exposed populations, and risks to some individuals in a population may be acceptable if the population is expected to remain healthy and stable. The HQ approach is intended to characterize population risks by quantifying individual HQ values that are greater than 1 and by the magnitude of the exceedances.

Exposure Assessment

Exposure areas are defined based on the receptor, home range, and area use. The exposure area is the geographical area in which a receptor is randomly exposed to the contaminated medium for the assumed exposure duration.

Exposure Areas and Area Use Factors: When designing the EE/CA soil investigations, the size of the Site surface soil DUs was specified such that each DU did not exceed about 0.25 acre because this represented the approximate home range size for a small bird or mammal (e.g., shrew). For the purposes of estimating risks to wildlife receptors from incidental ingestion of soil and ingestion of terrestrial prey items, exposures were assumed to occur entirely within each on-site DU (i.e., the area use factor (AUF) was assumed to be 1.0). Because most DUs are smaller in extent, this assumption is likely to overestimate potential exposures. This assumption is also likely to overestimate exposures for receptors with larger home ranges (e.g., hawk). For this reason, in addition to calculating DU-specific exposures, a Sitewide exposure area was also evaluated (across DUs 1-3).

EPCs: Wildlife receptors are likely to move at random across an exposure area. Therefore, exposure is best characterized as the arithmetic mean concentration across the exposure area. Because the true arithmetic mean concentration cannot be calculated with certainty from a limited number of measurements, USEPA recommends that the 95UCL of the arithmetic mean for each exposure area be used as the EPC when calculating exposure and risk (USEPA 1992b). The mathematical approach that is most appropriate for computing the 95UCL of a dataset depends on several factors, including the number of data points available, the shape of the distribution of the values, the amount of variance in the data, and the degree of censoring (USEPA 2002a). For each DU, 95UCLs were derived using the ISM triplicate results, calculated using the Chebyshev calculation method as recommended in ITRC's ISM guidance (ITRC 2012). When one or two of the triplicate results was non-detect, the EPC was set equal to the maximum replicate concentration. 95 UCLs were derived using the most recently available version of the USEPA program ProUCL v 5.1 (USEPA 2015a).

Except for burrowing mammals, most wildlife exposures to soil are likely to occur at the surface (i.e., in the upper 6 inches of soil). For burrowing mammals, it was assumed burrowing activities could occur at depths up to 4 feet. Table 4-10 (surface soil) and Table 4-11 (subsurface soil) of Appendix C summarizes the detailed EPCs for all soil COPECs in each soil DU and the Sitewide exposure area evaluated in the BERA.

Surrogate Receptors: It is not feasible to evaluate exposures and risks for every bird and mammal species potentially present at the Site. For this reason, surrogate species are selected to serve as representatives of birds and mammals. An effective way to group ecological receptors is according to their feeding guild. Feeding guilds are based on the type of food item that is mostly consumed by the receptor. The surrogate species selected in the EcoSSL guidance (USEPA 2005b) for each guild are the following:

- Avian herbivore: Mourning dove (Zenaida macroura)
- Avian insectivore: American woodcock (Scolopax minor)
- Avian carnivore: Red-tailed hawk (Buteo jamaicensis)
- Mammalian herbivore: Meadow vole (Microtus pennsylvanicus)
- Mammalian insectivore: Short-tailed shrew (Blarina brevicauda)
- Mammalian carnivore: Long-tailed weasel (Mustela frenata)

While these specific species may not necessarily occur at the Site, they serve as indicators for local species within the same feeding guild with similar home range sizes, such as those identified above.

Dietary Tissue Concentrations: Measured data on concentrations in terrestrial dietary items (plants, small mammals, invertebrates) are not available for the Site. Therefore, dietary concentrations were estimated using uptake factors and/or bioaccumulation models from the literature. Uptake factors, uptake equations, and bioaccumulation models were developed for the following dietary items:

- Soil to plant
- Soil to earthworm
- Soil to small mammal.

In general, tissue concentrations were estimated from soil using the same uptake model sources as those used in the development of the EcoSSLs (USEPA 2007). When EcoSSL uptake models were not available, literature-based bioaccumulation models developed by Los Alamos National Laboratory (LANL) and Oak Ridge National Laboratory for the purposes of establishing wildlife soil screening levels were employed. It is worth noting that most uptake values were not available for molybdenum and therefore, antimony was used as a surrogate source of values.

Toxicity Assessment

In the SLERA, risk estimates were based on the lowest ESV across multiple NPS-approved toxicity value sources. However, in the BERA, risk estimates are revised using more species-specific concentrations and/or dose-based toxicity values. Both no observed adverse effect level (NOAEL)-based toxicity reference values (TRVs) and low observed adverse effect level (LOAEL)-based TRVs were identified for receptor groups. The toxicity values used to calculate refined HQs for each receptor are described in Appendix C.

Risk Characterization

There are several different evaluation methods, or lines of evidence, available for determining the impact of site releases on ecological receptors (e.g., HQ estimates, toxicity tests, and habitat and community evaluations). Each of these lines of evidence has inherent advantages and limitations. For this reason, conclusions based on only one line of evidence may be misleading. Therefore, the best approach for reaching reliable conclusions about potential ecological risks is to combine the findings across all evaluation methods for which data are available, taking the relative strengths and weaknesses of each method into account. If the methods all yield similar conclusions, confidence in the conclusion is increased. If the methods all yield different conclusions, then a careful review must be performed to identify the basis of the discrepancy (if possible) and decide which method(s) provides the most reliable information.

For the present BERA at the Site, there is only one line of evidence (estimates of HQs) available for characterizing potential ecological risks. Thus, risk conclusions should be viewed as having substantial uncertainty, and HQ values presented in this risk assessment should generally be viewed as being more likely to overestimate than underestimate risk.

The general methodologies used for characterizing potential ecological risks at the Site are described in the BERA, Appendix C. Table 12 summarizes the results of the HQ calculations and shows the results of the BERA by exposure media for each receptor.

For plants and invertebrates, the HQ results show that none of the chemicals detected in Site soils have concentrations sufficiently elevated to result in adverse impacts for terrestrial plants and/or terrestrial invertebrate communities. Similarly, for the three bird feeding guilds and for herbivorous and carnivorous mammals, none of the chemicals detected in Site soils are sufficiently elevated to be above an HQ of 1.

For insectivorous mammals, threshold-based HQs were greater than 1 for one or more Site DUs, for antimony and molybdenum, for exposures to surface soil, subsurface soil, and terrestrial food items. That risk estimates are highest for insectivorous mammals is not unexpected since the bioaccumulation of contaminants into terrestrial invertebrate (earthworm) tissues often tends to be greater than into plants and small mammal tissue. Thus, if risk management decisions are based on this feeding guild, they will be adequately protective of other feeding guilds with lower exposures.

The list of COECs identified in the ecological risk assessment consist of the following:

- *Terrestrial Plants:* none.
- *Soil Invertebrates:* none
- *Wildlife:* antimony and molybdenum.

Soil concentrations of all of these COECs were higher in one or more DUs relative to background, which suggests on-site soil concentrations are attributable, at least in part, to Site-related impacts.

However, a number of major uncertainties with the assessment of risks to shrews from exposures to antimony and molybdenum in soil have been identified in the Uncertainty Assessment, discussed in Section 3.2.4.1 below.

Background Comparison

COEC concentrations in on-Site ISM soil samples were compared statistically to concentrations in the background area (DU4) using several two-sample hypothesis testing approaches recommended by USEPA (2002c) that have been demonstrated to work well with ISM datasets (Pooler et al. 2018). Hypothesis testing was performed based on a one-tailed Student's t-test, using both a Form 1 and Form 2 null hypothesis and an α of 0.05, and based on a two-tailed test with an α of 0.1 (USEPA 2002c).

Tables 13-1 and 13-2 presents the results of the background evaluation for surface soil for the wildlife COECs. Table 13-2 presents the ratio of the mean soil concentration in each DU to the mean background concentration (see Table 13-1) to provide information on the magnitude of the difference in soil concentrations when site levels are elevated. The elevations above background for surface soil concentrations are highest (exceeding 5 to 10-fold) for antimony in DU-1 and DU-2, and molybdenum in all three DUs. Surface soil concentrations of antimony and molybdenum were statistically higher in all three DUs relative to background, which suggests on-Site soil concentrations are attributable, at least in part, to site-related impacts.

3.2.4. Uncertainty

A summary of the uncertainties inherent to each component of the ecological risk assessment process and how they may affect the quantitative risk estimates and conclusions of the risk analysis is provided here. Details of the specific uncertainties and assumptions made in the ecological risk for this Site are described Appendix C. The list below represents a summary of the uncertainties and assumptions made:

- *Exposure Pathways Not Evaluated*: Not all exposure pathways and detected chemicals were evaluated quantitatively in the ERA. For example, wildlife exposures via inhalation and dermal contact pathways were not evaluated quantitatively. While these pathways are likely to be minor compared to the ingestion pathways, omission of these pathways will tend to lead to an underestimation of total risk.

- *Wildlife Exposure Parameters and Dose Modeling:* The intake (ingestion) rates for food and soil used to estimate exposure of wildlife at the Site are derived from the EcoSSL development document and the EPA Wildlife Exposure Factors Handbook, which present intake rates, body weights, and dietary compositions of receptors. These values may or may not serve as appropriate models for site-specific intake rates of typical wildlife receptors at this Site. Furthermore, it was assumed that wildlife exposures were continuous and receptor home ranges were located entirely within the Site DUs. This assumption likely overestimates exposures for receptors that have larger home ranges and/or migratory species that may not be exposed on-Site most of the time.

- *Concentrations in Tissues of Dietary Items:* Measured data on concentrations in dietary items are not available for the Site. Therefore, to estimate exposures to wildlife, dietary tissue concentrations were estimated using uptake factors and/or bioaccumulation models from the literature. Therefore, predictions of wildlife risk based on estimated tissue concentrations are considered uncertain and are likely to overestimate the actual exposures of wildlife to chemicals in dietary items.

- *Receptors Evaluated*: Risks to wildlife were assessed for a selected subset of avian and mammalian species that were representative of a feeding guild (i.e., insectivores, herbivores, carnivores) likely to be present at the Site. Although the wildlife receptors evaluated in the risk assessment were selected to represent species within this feeding guild, they may not represent the full range of sensitivities present. The species selected may be more or less sensitive to chemical exposure than typical species located within the area.

- *Selected Toxicity Values for Plants and Invertebrates*: The toxicity values used in HQ calculations for terrestrial plants and invertebrates are usually based on laboratory studies in which soluble forms of test metals are added to test soils. Thus, these values do not account for occurrence of metals in mineral forms in soil that are largely insoluble and do not contribute as much toxicity as soluble forms. Another limitation of the toxicity values is that they do not account for variations in environmental factors, such as pH and TOC content, which may influence the toxicity of metals in soils. In addition, the laboratory tests may not utilize test species that are likely to occur at the Site. Based on these considerations, risks are likely to be overestimated.

- *Selected Toxicity Values for Wildlife:* The TRVs used in the dose-based HQ calculations for the evaluation of wildlife exposures to contaminants in soil do not account for Site-specific environmental attributes that may influence uptake and toxicity. As noted above, these uncertainties in wildlife TRVs limit the reliability of the risk estimates and calculated HQs are more likely to overestimate than underestimate actual risk.

- *Extrapolation from Laboratory to Field Conditions:* Available toxicity data are usually generated under laboratory conditions, and extrapolation of those data to free-living receptors in the field is uncertain. One factor is that laboratory organisms are more homogeneous than wild populations. Because of these factors, extrapolation of dose-response data and toxicity factors from laboratory species to wild populations is uncertain.

- *Absence of Toxicity Data:* For chemicals without toxicity data, which occurs only for soil invertebrates in this risk assessment, the inability to quantify risks from these chemicals could result in an underestimation of total risk. However, for most chemicals, it is suspected that the magnitude of any underestimation of risk is likely to be low.

- *Chemical Interactions:* Most toxicity values are derived from studies of the adverse effects of a single contaminant. However, exposures to ecological receptors usually involve multiple contaminants, raising the possibility that synergistic or antagonistic interactions might occur. In accordance with USEPA guidance, effects from different chemicals are not added unless reliable data are available to indicate that the two (or more) chemicals act on the same target tissue by the same mode of action. In this risk assessment, risk estimates were not added across different COPECs.

- *Estimation of Population-Level Impacts*: *Assessment* endpoints for the receptors at this site are based on the sustainability of exposed populations (i.e., the ability of a population to maintain normal levels of diversity and density), and risks to some individuals in a population can occur and still allow for a healthy and stable population. However, even if it is possible to accurately characterize the distribution of risks or effects across the members of the exposed population, estimating the impact of those effects on the population is generally difficult and uncertain.

- *Contribution from Background:* All of the COECs identified in the ERA have the potential to be present at the Site because they are naturally occurring (e.g., metals). In the BERA, risk estimates were presented for the *S*ite-specific background area (DU4) to provide a frame of reference for interpreting site risks and distinguish between site-related contamination and levels consistent with local background conditions. In general, concentrations of COECs in Site soils are clearly elevated relative to background, indicating exposures are Site-related. However, there were also several instances where background conditions may be contributing to overall exposures and risks, suggesting a portion of the total risk may be attributable to natural contributions that are not *S*ite-related. An example at this Site is vanadium, where the concentrations in the background DU4 and the Site DUs are statistically not different, which indicates that vanadium at the Site is at background.

3.2.4.1 Uncertainties Specific to the Insectivorous Mammal

The shrew was selected as the representative species of concern for insectivorous mammals, and risks to shrew were estimated to be above a level of concern, due to exposures to antimony and molybdenum. Ecological risks are intended to estimate potential impacts on populations of organisms, or on communities, even though the toxicity values used to estimate risks are typically based on laboratory studies. Therefore, the endpoints of the laboratory toxicity studies are selected for potentially impacting a population of organisms, and generally consist of reproduction, growth, and mortality. However, whether a risk estimate with an HQ>1 suggests a potential impact on a population of receptors depends on a variety of factors, with varying levels of uncertainty.

The threshold-based HQs for shrews in this BERA range from 2 to 7, and suggest that shrews that are exposed to Site contaminants could experience adverse impacts. However, whether the risk estimates indicate that a population of shrews or other insectivorous mammals could be impacted at the Site is highly uncertain, for the following reasons:

- Risks to the shrew are largely driven by the soil concentrations of molybdenum. However, the toxicity of molybdenum to shrews is uncertain. The TRV that was used for molybdenum comes from the ORNL compilation of mammalian TRVs, in which only a couple of studies were deemed adequate for evaluation (see Sample et al. 1996). The final molybdenum TRV was based on a single reproductive study of mice, from which the LOAEL was derived. The low number of available studies and the reliance on a single dose to develop the TRV entails high uncertainty in the TRV for molybdenum.

- A second but lower driver of risks to the shrew is antimony. The TRV for antimony was selected as the lowest NOAEL available, derived from a study on rodent reproduction, out of over a dozen studies that passed USEPA criteria for inclusion in the soil EcoSSL development. The TRV for antimony has moderate certainty because of the available number of studies, but some uncertainty because of the number of studies that were precluded by USEPA as inadequate for their percentile approach to developing an EcoSSL.

- Earthworms are assumed to comprise 100% of the diet of shrew at the Site for the purpose of this BERA. Shrews typically consume a mix of insects and earthworms, rather than earthworms alone. However, insects are not modeled in the diet of shrew in this risk assessment because the uptake of metals from soils into insects has not been studied to the extent that intake into earthworms has. Therefore, modeling parameters for insects are not available to use in addition to the parameters for earthworms. The availability of earthworms as a food source at the Site, which is above 10,000 feet in elevation, is unknown. Based on these considerations, the assumption that the shrew consumes only earthworms at the Site adds uncertainty.

- The risks to shrew are driven by the ingestion of food, rather than soil, which as mentioned is assumed to be 100% earthworms. Data for modeling the uptake from soils to earthworm tissue are available for many metals; however, data are not available for modeling antimony uptake into earthworms, and are limited for modeling uptake of molybdenum. For antimony, it was conservatively assumed that the earthworm tissue concentrations would essentially be the same as the soil concentration. However, for the majority of metals, actual data show that earthworm tissue concentrations are much lower than the soil concentrations. For molybdenum, an uptake factor was not recommended in the compendium by Oak Ridge National Laboratory (Sample et al, 1998b), due to the limited number of samples (n=4), so the uptake factor was selected as the median of the four values presented in Table C-1, Appendix C, of the compendium, at which the earthworm tissue concentration is assumed to almost equal the soil concentration. Whether earthworms actually take up antimony or molybdenum from soils at the high rates assumed for this BERA, such that tissue concentrations are almost the same as soil concentrations, is highly uncertain.

- The size of the area of contamination where HQs were greater than 1 for the shrew is about 0.65 acres. This is about two to three times the size of the foraging range of typical shrews. This is usually interpreted to mean that a mated pair of shrews or possibly a few shrews, would be exposed to the soil contaminants at the Site. Whether impacts to such a small number of foraging shrews would in turn impact a reproducing population of shrews in the vicinity of the Site is unknown. The number of shrews that would constitute a population, and the size of an area necessary to maintain a population, in the High Sierras are both unknown. Hence, whether the DUs at the Site with HQs greater than 1 for the shrew present a risk to local populations of shrews or other small mammals is very uncertain.

3.2.5. Ecological Risk Assessment Conclusions

For insectivorous mammals, threshold-based HQs were greater than 1 for one or more site DUs, for antimony and molybdenum, for exposures to surface soil, subsurface soil, and terrestrial food items. That risk estimates are highest for insectivorous mammals is not unexpected since the bioaccumulation of contaminants into terrestrial invertebrate (earthworm) tissues often tends to be greater than into plants and small mammal tissue.

However, as discussed in Section 3.2.4.1, there are substantial uncertainties with the risk estimates at the Site with respect to insectivorous mammals. These uncertainties are such that they lead to the conclusion that the concentrations of antimony and molybdenum in Site soils are very unlikely to cause adverse effects to populations of insectivorous mammals, despite the exceedances of 1 by the threshold HQs. This analysis satisfies the USEPA Superfund ERA 8-step process (USEPA, 1997) scientific management decision point that "Ecological threats are negligible." Thus, no contaminants, including antimony and molybdenum, are identified as COECs for the Site.

3.3. Development of Preliminary Risk-Based Removal Goals (PRGs)

The purpose of this section is to identify risk-based PRGs. PRGs generally establish what are the concentrations of contaminants for each exposure medium that will not present unacceptable risk to human health or ecological receptors based on site-specific conditions.

3.3.1. Selection of Human Health Risk-Based Preliminary Removal Goals

The NCP establishes a risk range for excess cancer risk of between 10^{-6} and 10^{-4} and sets a threshold value for cumulative non-cancer adverse effects at an HI of 1. PRGs related to carcinogenic compounds are initially established at the 10^{-6} level. Final RGs can deviate from this "point of departure," if necessary, based on compelling site-specific factors relevant to risk management decisions. Risk-based PRGs are established using the same exposure parameters and toxicity values used in the HHRA but reversing the risk equation to solve for the EPC. Generally, PRGs are only developed for those chemicals that are identified as COCs in the risk assessment. COCs are defined as those chemicals for which the estimated cancer risk greater than 10^{-6} and/or the HQ greater than 1.

As discussed in Section 3.1.4, there were no surface or subsurface soil exposure scenarios that resulted in unacceptable risks. Therefore, no PRGs were established for human health risks.

3.3.2. Selection of Ecological Risk-Based Preliminary Removal Goals

Ecological risk-based PRGs are derived using the same exposure parameters and toxicity values used in the BERA but reversing the risk equation to solve for the EPC. Generally, PRGs are only developed for those chemicals that are identified as contaminants of ecological concern (COECs) in the risk assessment. COECs are defined as those chemicals for which the estimated HQ is greater than 1.

As discussed in Sections 3.2.4.1 and 3.2.5, due to the uncertainties surrounding the assessment of risks associated with insectivorous mammals at the Site, it was determined that concentrations of antimony and molybdenum in Site soils are very unlikely to cause adverse effects to populations of insectivorous mammals, and no contaminates were named as COECs for surface or subsurface soils at the Site. Therefore, no PRGs were established for ecological receptors.

4. Identification and Analysis of Applicable or Relevant and Appropriate Requirements

The purpose of Section 4 is to identify ARARs for the Site. ARARs include standards, requirements, criteria, or limitations under federal, or more stringent State, environmental law (CERCLA Section 121 (d)(2)(A)). To be adopted as an ARAR at an NPS CERCLA site, NPS must determine that the requirement is either “applicable” to conditions at the Site or, if not applicable, that it is both “relevant” and “appropriate” based on Site conditions. A requirement is applicable if compliance with it is legally required. A requirement is relevant and appropriate if NPS determines, based on its discretion, that the requirement is well suited to addressing Site conditions. In addition, State requirements are ARARs only if they are identified by the State in a timely manner.

The identification of ARARs is a prerequisite to evaluating and selecting a cleanup action (USEPA 1992b). “Under circumstances where a non-time-critical removal action is expected to be the first and final action at the site, the selected removal action must satisfy all adopted ARARs” (USDOI 2016). Should the evaluation of alternatives result in the selection of a “no action” alternative, ARARs must still be met by this alternative.

Other factors “to be considered” (TBCs) are non-promulgated criteria, advisories, guidance, and proposed standards issued by federal or state governments. TBCs are not enforceable and a response action is not required to attain TBCs but TBCs may be appropriate in shaping or guiding the development or implementation of a response action in certain circumstances, for example, where ARARs do not provide sufficient direction.

There are four basic criteria that define ARARs (NPS 2015; USEPA 1988). ARARs are (1) substantive rather than administrative, (2) applicable or relevant and appropriate, (3) promulgated, and (4) categorized as one of the following:

- Chemical-specific ARARs that address specific hazardous substances and are typically health or risk-based numerical values that cleanups must achieve.

- Location-specific ARARs that must be achieved because of the specific location of the release and the related response action (e.g., requirements that address the conduct of activities in sensitive areas such as national parks, floodplains, wetlands, and locations where endangered species or significant cultural resources are present). Location-specific

ARARs often focus on protecting resources in a specific area. Therefore, NPS-specific ARARs generally fall within this category.

- Action-specific ARARs that are typically technology or activity-based requirements or limitations on actions conducted to respond to the release of specific hazardous substances. Action-specific ARARs generally prescribe *how* a selected alternative must be implemented rather than *what* alternative may be selected.

Pursuant to its delegated CERCLA lead agency authority, NPS has identified ARARs and TBCs for the Vogelsang FWDA Site EE/CA. The results of the ARARs analysis, including state ARARs, are summarized in the following Text Tables 4.1, 4.2, and 4.3.

4.1. Chemical-Specific ARARs

Text Table 4.1 Chemical-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
FEDERAL ARAR			
Federal Ambient Water Quality Criteria	Clean Water Act 33 USC Section 1314, 40 CFR Part 131	Sets criteria for water quality based on toxicity to aquatic organisms and humans.	Neither applicable nor relevant and appropriate; Site surface water is not perennially present.
Federal Criteria for Priority Toxic Pollutants for the State of California	40 CFR 131.38	Sets criteria for surface water quality based on toxicity to aquatic organisms and humans, specific to the State of California.	Neither applicable nor relevant and appropriate; Site surface water is not perennially present.
California Toxics Rule	40 CFR Part 131	Used to establish acceptable standards for effluent discharge to surface water.	Neither applicable nor relevant and appropriate since investigations have not demonstrated that groundwater discharges to surface water. Additionally, removal alternatives would not include generation of effluent (such as decontamination water) that would be discharged to surface water.
National Primary Drinking Water Standards, Maximum Contaminant Levels (MCLs)	Safe Drinking Water Act 42 U.S.C. §§ 300f *et seq.*, 40 CFR Part 141	Human health-based drinking water standards, MCLs for public water systems.	Neither applicable nor relevant and appropriate; groundwater at the Site is not used as a drinking water supply.
National Secondary Drinking Water Standards, Secondary MCLs	Safe Drinking Water Act, 42 U.S.C. §§ 300f *et seq.*, 40 CFR Part 143	Establishes aesthetic drinking water standards (secondary MCLs) for public water systems.	Neither applicable nor relevant and appropriate; groundwater at the Site is not used as a drinking water supply.
Clean Air Act (CAA) - Air Quality and Emission Limitations and Implementing Regulations	42 USC 85-I § 7401 et seq. 40 CFR 50	Establishes limits for air emissions and air quality levels that protect public health. Only “major” sources are subject to requirements related to National Ambient Air Quality Standards.	Neither applicable nor relevant and appropriate; only “major” sources are subject to requirements related to National Ambient Air Quality Standards, defer to state regulation.

Text Table 4.1 Chemical-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites	USEPA Regional Guidance EPA/903/R-93-001	Establishes chemical-specific concentrations for contaminants in air, drinking water, and soil that may warrant further investigation or site cleanup.	TBC except where California standards are more stringent.
STATE AND COUNTY ARAR			
Permissible Exposure Limits	8 CCR 5155 [29 CFR 1910.1001]	Standards for worker exposure to airborne contaminants.	Applicable to the extent there are airborne contaminants which are readily absorbed through the skin, and that are designated with the “S” notation on the table AC-1 of the cited portion of CCR.
Air Basins and Air Quality Standards	17 CCR Div. 3, Chapter 1, Subchapter 1.5	Establishes California Air Basins and sets limits for air emissions and air quality levels that protect public health.	Applicable to the extent there are air pollutants emitted during the removal action that would trigger regulations.
California Primary Drinking Water Standards	22 CCR Div. 4, Chapter 15, Article 4 §64431 (Inorganic) Article 5.5, §64444 (Organic)	Primary drinking water maximum contaminant levels (MCLs). Primary MCLs are health based and are set as close to MCL goals as possible taking into consideration technology limitations.	Neither applicable nor relevant and appropriate since groundwater at the Site is not used as a drinking water supply. MCLs apply at the point of consumption.
California Secondary Drinking Water Standards	22 CCR Div. 4, Chapter 15, Article 16, §64449	Secondary drinking water maximum contaminant levels (MCLs). Secondary standards are not health based but take into consideration other factors such as taste and odor thresholds.	Neither applicable nor relevant and appropriate since groundwater at the Site is not used as a drinking water supply. Secondary MCLs apply at the point of consumption.
Hazardous Waste Determination - General	22 CCR Div. 4.5, Chapter 11, Article 1, §66261.2 §66261.3	A waste is classified as a RCRA hazardous waste if appears on a list and originates from either a non- specific or specific source. Defines a waste and outlines the process for determining whether a waste is also a hazardous waste.	Applicable to determine whether a waste generated during the course of the project (i.e., IDW) is a RCRA hazardous waste.

Text Table 4.1 Chemical-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Hazardous Waste Determination - Characteristic of Toxicity	22 CCR Div. 4.5, Chapter 11, Article 4, §66261.24(a)(1) §66261.24(a)(2)	A waste is classified as a RCRA hazardous waste if the extract produced by the Toxicity Characteristic Leaching Procedure (TCLP) exceeds specified levels. A waste is classified as a non-RCRA, State-only hazardous wastes if the total concentration exceeds the Total Threshold Limit Concentration (TTLC) or if the extract produced by application of the Waste Extraction Test (WET) exceeds the Soluble Threshold Limit Concentration (STLC).	Applicable to the extent that the selected alternative generates, removes and disposes of waste off-site.
RCRA Hazardous Waste Determination - Listed Wastes	22 CCR Div. 4.5, Chapter 11, Article 4, §66261.30 §66261.31 §66261.32	A waste is classified as a RCRA hazardous waste if it appears on a list and originates from a either a non-specific or specific source.	Applicable to the determination of whether a waste generated during the course of the project is a hazardous waste.
RCRA Hazardous Waste Determination	22 CCR Div. 4.5, Chapter 11, Article 4.1, §66261.100 §66261.101	Criteria for determining whether a waste is a RCRA, or non-RCRA California, hazardous waste. In order to be characterized as a non-RCRA California hazardous waste it must first be established that the waste is not a RCRA waste.	Applicable to the identification of any hazardous waste generated during the course of the project.
General Waste Analysis	22 CCR, Div. 4.5, Chapter 14, Article 2 §66264.13(a) §66264.13(b)	A generator must appropriately characterize a hazardous waste in accordance with a waste analysis plan.	Neither applicable nor relevant and appropriate; the Site no longer transfers, treats, stores, or disposes of hazardous waste.
Water Quality Monitoring and Response Programs for Permitted Waste Disposal Facilities	22 CCR, Div. 4.5, Chapter 14, Article 6	Requirements to ensure that hazardous constituents entering the groundwater from a regulated waste management unit do not exceed the concentration limits for contaminants of concern in the uppermost aquifer underlying the waste management area of concern at the point of compliance.	Neither applicable nor relevant and appropriate since investigations have not demonstrated that waste has created a condition of pollution within groundwater or surface water that requires clean-up or abatement.

Text Table 4.1 Chemical-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
California Land Disposal Restrictions	22 CCR Div. 4.5, Chapter 18, Article 4, §66268.40 §66268.48	Treatment standards that must be attained prior to land disposal of certain wastes. Establishes numerical universal treatment standards by chemical constituent that may not be exceeded under the land disposal restrictions (LDRs). Following excavation, contaminated soil determined to be a hazardous waste may be subject to LDRs if placed on land in a waste management unit outside the Area of Contamination from where the waste was generated.	Applicable to the extent that contaminated soil determined to be hazardous waste is placed on land outside of the area of contamination.
Waste Classification	27 CCR Div. 2, Sub-division 1, Chapter 3, Sub-chapter 2, Article 2 §20210	Definitions of designated waste, non-hazardous waste, and inert waste.	Applicable to the extent that the selected alternative will involve removal and disposal of waste off-site, and therefore require classification of waste for final disposal at an appropriate receiving facility.
Response Action Requirements	H&SC 25356.1.5	In addition to meeting NCP requirements, risk assessments and remedial goals established must include the most current sound scientific methods, knowledge, and practices of public health and environmental professionals.	Relevant and appropriate because CERCLA establishes risk assessment standards for EE/CAs and risk assessments were completed and are included within the EE/CA.
Water Quality	CWC 13241, 13246, 13263(a), 13269 & 13360	Authorizes the SWRCB and RWQCB to establish in water quality control plans beneficial uses and numerical and narrative standards to protect both surface water groundwater quality.	Neither applicable nor relevant and appropriate; Site groundwater is not currently used as drinking water and is not a potential beneficial use because it is not expected to have sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Text Table 4.1 Chemical-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Mariposa County Air Pollution Control Standards	Mariposa County Air Pollution Control District (APCD) Rules 202, 205, 207, 209, 210, 413, 414	Establishes rules for visible and/or nuisance emissions. Establishes emission standards for NO_x, CO, and particulate matter.	Applicable to the extent there are air pollutants emitted during the potential removal action that would trigger regulations.
Mariposa County Air Pollution Control Standards	APCD Regulation IV	Establishes emission standards for toxic air contaminants	Applicable to the extent there are air pollutants emitted during the removal action that would trigger regulations.
STATE TBC			
Sources of Drinking Water Policy	SWRCB Resolution 88-63	Designates all groundwater and surface waters of the state to be considered as suitable, or potentially, suitable, for municipal or domestic water supply, subject only to certain exceptions.	Not a TBC; Site groundwater is not currently used as drinking water and is not a potential drinking water source because it is not expected to have sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day. Also, it is a waste management area and will remain as such if containment is the selected alternative.
Abatement to Background Levels	SWRCB Resolution 92-49	Section III.G of this Resolution states in part that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of background water quality or the best water quality that is reasonable if background levels cannot be restored.	Not a TBC; investigations have not demonstrated that waste has created a condition of pollution within groundwater or surface water that requires clean-up or abatement.

Text Table 4.1 Chemical-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Human Health Screening Level Risk Assessment	California Human Health Screening Levels (CHHSLs)	Human health screening levels published by the Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA). The CHHSLs are concentrations of 54 hazardous constituents in soil or soil gas that Cal-EPA considers to be below thresholds of concern for risks to human health.	TBC.
Human Health Risk Assessment	Human and Ecological Risk Office Human (HERO) Guidance for Human Health Risk Assessments	DTSC guidance on human health risk assessments.	TBC.
Human Health Risk Assessment	Human and Ecological Risk Office (HERO) Human Health Risk Assessment (HHRA) Notes 1, 2, and 3	DTSC policy on default human health exposure parameters (Note 1), use of U.S. EPA Regional Screening Levels (Note 2), and source of human health screening levels (Note 3).	TBC.
Ecological Risk Assessment	HERO Guidance for Ecological Risk Assessments	DTSC guidance on ecological risk assessments. Provides for a phased evaluation including a Phase I Predictive Assessment, a Phase II Validation Study and Phase III Impact Assessment.	TBC.
Ecological Risk Assessment	HERO Ecological Risk Assessment EcoNOTES 1 through 6	DTSC policy on various matters relevant to ecological risk assessments.	TBC.

4.2. Location-Specific ARARs

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
FEDERAL ARAR			
NPS mandate to ensure non-impairment of national park resources for the enjoyment of future generations and the non-derogation of national park values and purposes	National Park Service Organic Act of 1916 16 U.S.C. §§ 1 *et seq.* 36 CFR Part 1 General Authorities Act, as amended	The Organic Act directs the National Park Service "to promote and regulate the use of … national parks … by such means and measures as conform to the fundamental purpose of the said parks … which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The General Authorities Act, Section 1a-1, further provides that "the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established."	Applicable to all NPS decisions and Site activities that may impact park resources. Prior to selection of a remedy, NPS must determine that the remedy will leave the Site in an unimpaired condition based on an analysis of Section 1.4 of the 2006 NPS Management Policies.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Yosemite National Park enabling legislation	16 U.S.C. §§ 47-1 *et seq*.	"The Secretary of the Interior shall make and publish such general rules and regulations as he may deem necessary and proper for the management and care of the park and for the protection of the property therein, especially for the preservation from injury or spoliation of all timber, mineral deposits other than those legally located prior to the date of passage of the respective Acts creating and establishing said parks, natural curiosities or wonderful objects within said parks, and for the protection of the animals in the park from capture or destruction, and to prevent their being frightened or driven from the said parks ."	Applicable to all NPS decisions and Site activities in Yosemite National Park.
Restrictions on solid waste disposal sites in National Parks	16 U.S.C. § 460*l*-22(c) 36 CFR Part 6	Prohibits operation of any solid waste disposal site that was not in operation on September 1, 1984, except for sites used only for disposal of wastes generated within the park unit, so long as such site will not degrade any natural or cultural resources of the park unit. Prohibits the operation of any solid waste disposal site, except as specifically provided for by the regulations. 36 CFR § 6.4 specifies 12 conditions that must be met before a new solid waste disposal site may be authorized in a National Park, including the condition that there will be no disposal of the site of solid waste containing hazardous waste, polychlorinated biphenyls (PCBs), or radioactive materials.	Applicable if creation and operation of solid waste disposal sites within park unit boundaries.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
NPS restrictions of public use and recreation activities to protect national park resources	36 CFR Part 2: Resource Protection, Public Use and Recreation	Prohibits specific public use and recreational activities in national parks in order to protect park resources. For example, 36 CFR § 2.1(a) prohibits "(1) Possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state: (i) wildlife or fish (ii) Plants or the parts or products thereof [or] (2) Introducing plants into a park area ecosystem." 36 CFR § 2.2(a)(2) prohibits "feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding or other activities." 36 CFR § 2.14(a) prohibits "(1) Disposing of refuse in other than refuse receptacles (6) Polluting or contaminating park area waters or water courses."	Relevant and appropriate to on-site response action activities that may impact park resources or otherwise entail a restricted or prohibited activity. Relevant and appropriate because the restrictions on disposal of refuse is meant to restrict future disposal activities not past disposal actions.
NPS restrictions of commercial and private operations in national parks, including the prohibition of nuisances	36 CFR Part 5 36 CFR § 5.13	Regulates commercial use of national parks and the resources therein (e.g., commercial notices, advertisements, photography, business operations). Prohibits the creation or maintenance of a nuisance upon federal or private lands within a park area.	Relevant and appropriate to on-site response action activities that may create a nuisance or that may involve commercial or private use of a park unit. Relevant and appropriate because there are no commercial or private operations at the Site that have created a nuisance.
Floodplain Management Order	Executive Order No. 11988	Requires consideration of impacts to areas within the 100- year floodplain in order to reduce flood loss risks, minimize flood impacts on human health, safety and welfare and preserve and/or restore floodplain values.	Neither applicable nor relevant and appropriate; the Site is not located within a 100-year floodplain.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site

Standard, Requirement, Criteria, or Limitation	Citation	Requirement Description	Applicable or Relevant and Appropriate or TBC?
Protection of Wetlands Order and Section 404 of the Clean Water Act	Executive Order No. 11990 33 U.S.C. § 1344(b)(1), 40 CFR Parts 230 and 231	Requires consideration of impacts to wetlands in order to minimize their destruction, loss or degradation and to preserve/enhance wetland values. Also prohibits the discharge of dredged or fill material into waters of the United States.	Neither applicable nor relevant and appropriate; wetlands are not present at or near the Site.
National Historic Preservation Act	16 U.S.C. §§ 470 *et seq.* 36 CFR Part 800	Requires federal agencies to consider the effect of any federally assisted undertaking on any district, site building, structure, or object that is included in, or eligible for, the Register of Historic Places and to minimize or mitigate reasonably unavoidable effects. Indian cultural and historical resources must be evaluated, and effects avoided, minimized, or mitigated.	Applicable to the extent that response action activities at the vicinity of the Site impact historic or cultural resources.
Historic Sites, Buildings, and Antiquities Act	16 U.S.C. §§ 461 *et seq.*	Requires federal agencies to consider the existence and location of historic or prehistoric sites, buildings, objects, and properties of national historical or archaeological significance when evaluating removal alternatives.	Applicable to the extent that response action activities at the vicinity of the Site impact areas of historical or archaeological significance.
Archaeological and Historic Preservation Act	16 U.S.C. §§ 469 *et seq.*	Establishes requirements for evaluation and preservation of historical and archaeological data, including Indian cultural and historic data, which may be destroyed through alteration of terrain as a result of federal construction projects, *inter alia*. If eligible scientific, pre-historical, or archaeological data are discovered during site activities, such data must be preserved in accordance with these requirements.	Applicable to the extent that response action activities at the vicinity of the Site result in the discovery of archeological or historical resources.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Archaeological Resources Protection Act	16 U.S.C. §§ 470aa-ii *et seq*. 43 CFR §§ 7.1 *et seq*.	Provides for the protection of archeological resources located on public and tribal lands. Establishes criteria that must be met for the land manager's approval of any excavation or removal of archaeological resources if a proposed activity involves soil disturbances.	Applicable to the extent that response action activities at the vicinity of the Site result in the discovery of archeological resources.
Native American Graves Protection and Repatriation Act (NAGPRA)	25 U.S.C. § 3001 25 U.S.C. § 3002(d) 43 CFR §§ 10.1 – 10.17	Provides for the disposition of Native American remains and objects inadvertently discovered on federal or tribal lands after November 1990. If the response activities result in the discovery of Native American human remains or related objects, the activity must stop while the head of the federal land management agency (in this case, NPS) and appropriate Indian tribes are notified of the discovery. After the discovery, the response activity must cease and a reasonable effort must be made to protect the Native American human remains or related objects. The response activity may later resume (43 CFR Section 10.4).	Applicable to the extent that response action activities at the vicinity of the Site find Native American remains and objects.
Fish and Wildlife Coordination Act	16 U.S.C. §§ 661 *et seq*.	Requires consideration of impacts to wildlife resources resulting from the modification of waterways.	Neither applicable nor relevant and appropriate; no diversion or other modification of waterway is contemplated by any of the removal action alternatives.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Migratory Bird Treaty Act	16 U.S.C.§§ 703 *et seq*.	Establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation by NPS with the USFWS during response action design and construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds.	Neither applicable nor relevant and appropriate; No migratory birds have been identified in the vicinity of the Site.
Responsibilities of Federal Agencies to Protect Migratory Birds	Executive Order 13186, 66 Fed. Reg. 3853 (Jan. 17, 2001)	This Order directs executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act, including supporting the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.	Neither applicable nor relevant and appropriate; No migratory birds have been identified in the vicinity of the Site.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Endangered Species Act	16 U.S.C. §§ 1531 – 1544 50 CFR Part 402	No federal activity or federally authorized activity may jeopardize the continued existence of any threatened or endangered species known to live or to have lived in the affected environment; nor may any federal activity destroy or adversely modify a critical habitat. This ARAR requires NPS to ensure that the selected remedy is sufficiently protective of the environment containing the threatened or endangered species, with an emphasis on reducing the risks from the contaminants of concern to the listed species described in the ecological risk assessment to an acceptable level, with consideration given to the special status of the listed or threatened species. Also requires that NPS ensure that the selected remedy is implemented in a manner such that effects on any existing threatened or endangered species are avoided or mitigated.	Applicable to the extent that these species and/or their habitat are located on or near the Site. As discussed in the Section 2.8, no federally threatened or endangered species are expected to be present at the Site.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Wild and Scenic Rivers	Wild and Scenic Rivers Act of 1968	The Wild and Scenic Rivers Act requires comprehensive planning for a Wild and Scenic River to provide for the protection of the river's free-flowing condition, water quality, and outstandingly remarkable values, collectively referred to as "river values." The Tuolumne Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement (listed below) describes how the National Park Service fulfills this mandate. The Final Revised Guidelines for Eligibility, Classification and Management of River Areas (Federal Register, 1982) interpret Section 10(a) as a non-degradation and enhancement policy for all designated river areas, regardless of their classification as wild, scenic, or recreational.	Not applicable or relevant and appropriate, the Site is not located within the river corridor and no impacts from the Site on the river are known or anticipated.
Wilderness Act	16 U.S.C. §§ 1131 – 1136	Requires that federally-owned, designated Wilderness Areas be administered in such manner as will leave them unimpaired for future use and enjoyment, and to protect and preserve the wilderness character of these areas. Requires that there shall be no commercial enterprise or permanent road within designated wilderness areas, and, except as necessary to meet minimum requirements for the administration of the wilderness area for the purpose of the Act (including measures to protect public health and safety), no temporary roads, use of motorized equipment, landing of aircraft, mechanical transport, or installation of any structures should be used or constructed in these areas.	Applicable, as the Site is located within an area designated as Potential Wilderness Addition.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
FEDERAL TBC			
NPS policy on implementation of the non-impairment standard	2006 NPS Management Policies, Section 1.4	**NPS MP § 1.4.5:** "The impairment that is prohibited . . . is an impact that . . . would harm the integrity of the park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact, the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is: necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; or key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or identified in the park's general management plan or other relevant NPS planning documents as being of significance. An impact would be less likely to constitute an impairment if it is an	TBC.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
NPS and California State Agreement regarding Historic Properties at Yosemite National Park	Programmatic Agreement Among the National Park Service at Yosemite, The California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding Planning, Design, Operations and Maintenance, Yosemite National Park, California. Updated and finalized 2020 on file Yosemite National Park, CA.	Agreement between the Park and SHPO, which acknowledges and allows the Park to evaluate and make determinations regarding the historic significance of properties that may be affected by an undertaking, at its discretion the Park may consult with the signatories to the PA or with other Interested Persons regarding effect determinations for individual undertakings.	TBC.
Final Tuolumne River Plan/EIS	Tuolumne Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement	The Tuolumne River Plan describes how NPS will fulfill the mandate by the Wild and Scenic Rivers Act to provide comprehensive planning for the Tuolumne River in order to protect the river's free-flowing condition, water quality and outstandingly remarkable values.	TBC.
Final Merced River Plan/EIS	Merced Wild and Scenic River Final Comprehensive Management Plan and Environmental Impact Statement	The Merced River Plan describes how NPS will fulfill the mandate by the Wild and Scenic Rivers Act to provide comprehensive planning for the Tuolumne River in order to protect the river's free-flowing condition, water quality and outstandingly remarkable values.	TBC.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
NPS Policies for Restoration of Natural Systems	2006 MP § 4.1.5 http://www.nps.gov/policy/MP2006.pdf	Section 4.1.5 provides: "The Service will reestablish natural functions and processes in parks unless otherwise directed by Congress. Impacts on natural systems resulting from human disturbances include the introduction of exotic species; the contamination of air, water, and soil; changes to hydrologic patterns and sediment transport; the acceleration of erosion and sedimentation; and the disruption of natural processes. The Service will seek to return such disturbed areas to the natural conditions and processes characteristic of the ecological zone in which the damaged resources are situated. The Service will use the best available technology, within available resources, to restore the biological and physical components of these systems, accelerating both their recovery and the recovery of landscape and biological community structure and function."	TBC.
NPS Policies for Managing Wildlife and Plant Resources	2006 MP § 4.4.1 http://www.nps.gov/policy/MP2006.pdf	Section 4.4.1 provides that NPS "will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems [by] preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; restoring native plant and animal populations in parks when they have been extirpated by past human- caused actions; and minimizing human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them."	TBC.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
NPS Policies for Managing Species of Special Concern	2006 MP § 4.4.2.3 http://www.nps.gov/policy/MP2006.pdf	Section 4.4.2.3 requires that NPS "inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. The NPS also is required to "inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and manage them to maintain their natural distribution and abundance."	TBC.
NPS Policies for Managing Cultural Resources	2006 MP § 5f http://www.nps.gov/policy/MP2006.pdf	Section 5f addresses research on cultural resources and traditional associated peoples; planning to ensure that management processes "integrate information about cultural resources and provide for consultation and collaboration with outside entities;" and reservation, protection, and the making available for public understanding of cultural resources.	TBC.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
NPS Employee Guidance for Managing Cultural Resources	NPS Director's Order #28: Cultural Resource Management NPS-28: Cultural Resource Management Guideline	Director's Order #28 provides that "[t]he NPS will protect and manage cultural resources in its custody through effective research, planning, and stewardship and in accordance with the policies and principles contained in the NPS Management Policies' (Section 3.1) and requires that the NPS comply with the Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation (Section 3.2). NPS-28 Cultural Resource Management Guideline addresses park cultural resource management programs, compliance with Section 106 of the National Historic Preservation Act, and issues related to archaeological resources, cultural landscapes, structures, museum objects, and ethnographic resources. "Cultural resources" are defined as "the material evidence of past human activities" (NPS-28, Introduction).	TBC.
NPS Employee Guidance of Managing Natural Resources	Reference Manual-77 http://www.nature.nps.gov/rm77	RM-77 offers comprehensive guidance to NPS employees responsible for managing, conserving, and protecting the natural resources found in park units. It addresses management of natural resources (including air, disturbed land, endangered, threatened and rare species, geologic resources, vegetation, etc.), resource uses, and planning (e.g., emergency management and environmental compliance).	TBC.
STATE ARAR			

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Work in the 100-Year Flood Plain Impacting a Water Body	California Fish and Game Code (FGC) 1600 et seq.	Requires notification of DFG and action to mitigate impacts on any channel, bed or bank of any river, stream, or lake.	Neither applicable nor relevant and appropriate since the Site is not located within the 100-year floodplain.
Aquatic Species and Habitat	FGC 5650(a), 5650(b), 5650(f)	This section prohibits depositing or placing where it can pass into water of the state any petroleum products (Section 5650(a)(1), factory refuse (section 5650(a)(4)), sawdust, shavings, slabs or edgings (section 5650(a)(3)), and any substance deleterious to fish, mammals, plant life or bird life (section 5650(a)(6)).	Neither applicable nor relevant and appropriate, as surface water or groundwater with Site contamination are not expected to reach or impact the nearest surface water bodies.
Central Valley RWQCB Basin Plan	Water Quality Control Plan (Basin Plan)	Establishes beneficial uses of surface and groundwater and specifies numerical water quality objectives. Establishes municipal supply as a beneficial use of groundwater, i.e., not otherwise exempted.	Neither applicable nor relevant and appropriate; Site surface water is not perennially present. Groundwater at the Site is not used as a drinking water supply.
Rare or Endangered Native Plants	FGC 1908 (Added by Stats. 1977, c. 1181, p. 3869, section 8) / 14 CCR §670.2	Section 1908 imposes a substantive requirement by prohibiting any person" from taking rare or endangered native plants. California Code of Regulations Title 14 section 670.2 provides a listing of Threatened, Endangered, or Rare plants in California. FGC 67 provides the definition of "person" as any natural person or any partnership, corporation, limited liability company, trust, or other type of association. “Take” or “taking” is defined by FGC 86 to include killing.	Relevant and appropriate only to the extent that there are rare or endangered plants on or near the Site. As discussed in Section 2.8, no state threatened, endangered, or sensitive plant species are expected to be present at the Site.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Endangered Species	FGC 2080 (Added by Stats. 1984, c. 1240, section 2), FGC 2081(b)	This section prohibits the take, possession, purchase or sale within the state, any species (including rare native plant species), or any product thereof, that the commission determines to be an endangered or threatened species, or the attempt of any of these acts. This section prohibits releases and/or actions that would have a deleterious effect on species or their habitat. The Department may authorize, by permit, the take of endangered or threatened species if the take is incidental to an otherwise lawful activity and the impacts are minimized and fully mitigated.	Relevant and appropriate only to the extent that there are State endangered or threatened species and/or their habitat located on or near the Site. No such species or habitat have been identified (see Section 2.8 of the report).
Wildlife Species	FGC 3005 (Stats. 1957, c. 456, p. 1353 section 3005)	This code section prohibits the taking of birds and mammals, including taking by poison. "Poison" is not defined in the code. Although there is no state authority on this point, federal law recognizes that poison, such as Strychnine, may affect incidental taking. (*Defenders of Wildlife v. Administrator, EPA (1989) 882. F. 2d. 1295)*.	Relevant and appropriate only to the extent that birds and mammals in the area are exposed to Site contaminants that have the potential of "poisoning" or "taking" by killing.
Birds	FGC 3503	This section prohibits the take, possession, or needless destruction of the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.	Relevant and appropriate only to the extent that birds and/or their habitat are located on or near the Site. Extent is expected to be limited because habitat that supports these species is not known to be present at the Site.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Birds of Prey	FGC 3503.5 (Added by Stats. 1985, c. 1334, section 6)	This section prohibits the take, possession, or destruction of any birds in the orders of Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.	Relevant and appropriate only to the extent that such American Peregrine Falcon, Long-eared Owl, Great Grey Owl, California Spotted Owl, and/or their eggs are located on or near the Site.
Migratory Birds	FGC 3513	This section makes it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act.	Relevant and appropriate only to the extent that migratory nongame birds are located on or near the Site.
Fully protected bird species / habitat	FGC 3511 (Added by Stats. 1970, c. 1036, p. 1848 section 4)	It is unlawful to take or possess fully protected birds, the following of which have been identified within the Park and may be located on or near the Site: American Peregrine Falcon, Golden Eagle, Southern Bald Eagle	Relevant and appropriate only to the extent that a fully state-protected bird or its habitat are located on or near the Site. Extent is expected to minimal because it is not expected that there is a habitat present at the Site to support these species.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Fully protected Mammals	FGC 4700 (Added by Stats. 1970, c. 1036, p. 1848 section 6)	This section prohibits the take or possession of fully protected mammals or their parts. The following are fully protected mammals are located within the Park: Bighorn sheep, California wolverine, Ring-tailed cat.	Relevant and appropriate only to the extent that these fully state-protected mammal species or its habitat are located on or near the Site. Extent is expected to be minimal because it is not expected that there is a habitat present at the Site to support these species.
Specially Protected Mountain Lion	FGC 4800 et. seq.	Mountain lions are specially protected mammals in California. It is unlawful to take, injure, possess, transport, or sell any mountain lion or any part or product thereof.	Relevant and appropriate only to the extent that mountain lions and/or their habitat are located on or near the Site.
Fully protected Reptiles and Amphibians	FGC 5050	Prohibits the take or possession of certain fully protected species of reptiles and amphibians.	Relevant and appropriate to the extent that these species and/or their habitat are located on or near the Site. Relevant and appropriate because it is not expected that there is a habitat present at the Site to support these species.
Fully Protected Fish	FGC 5515	Prohibits the take or possession of certain fully protected species of fish.	Neither applicable nor relevant and appropriate since fish species are not located on the Site due to lack of perennially present Site surface water.
Furbearing Mammals	14 CCR Div. 1, Sub-division 2, Chapter 5, §460	Regulation makes it unlawful to take fisher, marten, river otter, desert kit fox, and red fox.	Relevant and appropriate only to the extent that these species and/or their habitat are located on or near the Site.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Wetlands	Fish and Game Commission Wetlands Policy (adopted 1987) included in FGC Addenda	This policy seeks to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California. Further, it opposes any development or conversion of wetland that would result in a reduction of wetland acreage or habitat value. It adopts the USFWS definition of a wetland which utilizes hydric soils, saturation or inundation, and vegetation criteria, and requires the presence of at least one of these criteria (rather than all three) in order to classify an area as a wetland.	Neither applicable nor relevant and appropriate since none of the wetland criteria are met at the Site.
STATE AND COUNTY ARAR			
Permissible Exposure Limits	8 CCR 5155 [29 CFR 1910.1001]	Standards for worker exposure to airborne contaminants.	Applicable to the extent there are airborne contaminants which are readily absorbed through the skin, and that are designated with the "S" notation on the table AC-1 of the cited portion of CCR.
Air Basins and Air Quality Standards	17 CCR Div. 3, Chapter 1, Subchapter 1.5	Establishes California Air Basins and sets limits for air emissions and air quality levels that protect public health.	Applicable to the extent there are air pollutants emitted during the removal action that would trigger regulations.
California Primary Drinking Water Standards	22 CCR Div. 4, Chapter 15, Article 4 §64431 (Inorganic) Article 5.5, §64444 (Organic)	Primary drinking water maximum contaminant levels (MCLs). Primary MCLs are health based and are set as close to MCL goals as possible taking into consideration technology limitations.	Neither applicable nor relevant and appropriate since groundwater at the Site is not used as a drinking water supply. MCLs apply at the point of consumption.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
California Secondary Drinking Water Standards	22 CCR Div. 4, Chapter 15, Article 16, §64449	Secondary drinking water maximum contaminant levels (MCLs). Secondary standards are not health based but take into consideration other factors such as taste and odor thresholds.	Neither applicable nor relevant and appropriate since groundwater at the Site is not used as a drinking water supply. Secondary MCLs apply at the point of consumption.
Hazardous Waste Determination - General	22 CCR Div. 4.5, Chapter 11, Article 1, §66261.2 §66261.3	A waste is classified as a RCRA hazardous waste if appears on a list and originates from either a non- specific or specific source. Defines a waste and outlines the process for determining whether a waste is also a hazardous waste.	Applicable to determine whether a waste generated during the course of the project (i.e., IDW) is a RCRA hazardous waste.
Hazardous Waste Determination - Characteristic of Toxicity	22 CCR Div. 4.5, Chapter 11, Article 4, §66261.24(a)(1) §66261.24(a)(2)	A waste is classified as a RCRA hazardous waste if the extract produced by the Toxicity Characteristic Leaching Procedure (TCLP) exceeds specified levels. A waste is classified as a non-RCRA, State-only hazardous wastes if the total concentration exceeds the Total Threshold Limit Concentration (TTLC) or if the extract produced by application of the Waste Extraction Test (WET) exceeds the Soluble Threshold Limit Concentration (STLC).	Applicable to the extent that the selected alternative generates, removes and disposes of waste off-site.
RCRA Hazardous Waste Determination - Listed Wastes	22 CCR Div. 4.5, Chapter 11, Article 4, §66261.30 §66261.31 §66261.32	A waste is classified as a RCRA hazardous waste if it appears on a list and originates from a either a non-specific or specific source.	Applicable to the determination of whether a waste generated during the course of the project is a hazardous waste.
RCRA Hazardous Waste Determination	22 CCR Div. 4.5, Chapter 11, Article 4.1, §66261.100 §66261.101	Criteria for determining whether a waste is a RCRA, or non-RCRA California, hazardous waste. In order to be characterized as a non-RCRA California hazardous waste it must first be established that the waste is not a RCRA waste.	Applicable to the identification of any hazardous waste generated during the course of the project.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
General Waste Analysis	22 CCR, Div. 4.5, Chapter 14, Article 2 §66264.13(a) §66264.13(b)	A generator must appropriately characterize a hazardous waste in accordance with a waste analysis plan.	Neither applicable nor relevant and appropriate; the Site no longer transfers, treats, stores, or disposes of hazardous waste.
Water Quality Monitoring and Response Programs for Permitted Waste Disposal Facilities	22 CCR, Div. 4.5, Chapter 14, Article 6	Requirements to ensure that hazardous constituents entering the groundwater from a regulated waste management unit do not exceed the concentration limits for contaminants of concern in the uppermost aquifer underlying the waste management area of concern at the point of compliance.	Neither applicable nor relevant and appropriate since investigations have not demonstrated that waste has created a condition of pollution within groundwater or surface water that requires clean-up or abatement.
California Land Disposal Restrictions	22 CCR Div. 4.5, Chapter 18, Article 4, §66268.40 §66268.48	Treatment standards that must be attained prior to land disposal of certain wastes. Establishes numerical universal treatment standards by chemical constituent that may not be exceeded under the land disposal restrictions (LDRs). Following excavation, contaminated soil determined to be a hazardous waste may be subject to LDRs if placed on land in a waste management unit outside the Area of Contamination from where the waste was generated.	Applicable to the extent that contaminated soil determined to be hazardous waste is placed on land outside of the area of contamination.
Waste Classification	27 CCR Div. 2, Sub-division 1, Chapter 3, Sub-chapter 2, Article 2 §20210	Definitions of designated waste, non-hazardous waste, and inert waste.	Applicable to the extent that any potentially removed material will require classification of waste for final disposal at an appropriate receiving facility.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Response Action Requirements	H&SC 25356.1.5	In addition to meeting NCP requirements, risk assessments and remedial goals established must include the most current sound scientific methods, knowledge, and practices of public health and environmental professionals.	Relevant and appropriate because CERCLA establishes risk assessment standards for EE/CAs and risk assessments were completed and are included within the EE/CA.
Water Quality	CWC 13241, 13246, 13263(a), 13269 & 13360	Authorizes the SWRCB and RWQCB to establish in water quality control plans beneficial uses and numerical and narrative standards to protect both surface water groundwater quality.	Neither applicable nor relevant and appropriate; Site groundwater is not currently used as drinking water and is not a potential beneficial use because it is not expected to have sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day. Also, removal alternatives are not proposing any discharges to waters of the state or waivers for other CWA provisions. Lastly, the Site is a waste management area that will remain as such if containment is the selected alternative.
Tuolumne County Air Pollution Control Standards	Tuolumne County Air Pollution Control District (APCD) Rules 202, 205, 207, 209, 210, 413, 414	Establishes rules for visible and/or nuisance emissions. Establishes emission standards for NO_x, CO, and particulate matter.	Applicable to the extent there are air pollutants emitted during the removal action that would trigger regulations.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Tuolumne County Air Pollution Control Standards	APCD Regulation IX	Establishes emission standards for toxic air contaminants	Applicable to the extent there are air pollutants that may be emitted during the removal action that would trigger regulations.
STATE TBC			
Sources of Drinking Water Policy	SWRCB Resolution 88-63	Designates all groundwater and surface waters of the state to be considered as suitable, or potentially, suitable, for municipal or domestic water supply, subject only to certain exceptions.	Not a TBC; Site groundwater is not currently used as drinking water and is not a potential drinking water source because it is not expected to have sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day. Also, it is a waste management area and will remain as such if containment is the selected alternative.
Abatement to Background Levels	SWRCB Resolution 92-49	Section III.G of this Resolution states in part that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of background water quality or the best water quality that is reasonable if background levels cannot be restored.	Not a TBC; investigations have not demonstrated that waste has created a condition of pollution within groundwater or surface water that requires clean-up or abatement.

Text Table 4.2 Location-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Human Health Screening Level Risk Assessment	California Human Health Screening Levels (CHHSLs)	Human health screening levels published by the Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA). The CHHSLs are concentrations of 54 hazardous constituents in soil or soil gas that Cal-EPA considers to be below thresholds of concern for risks to human health.	TBC.
Human Health Risk Assessment	Human and Ecological Risk Office Human (HERO) Guidance for Human Health Risk Assessments	DTSC guidance on human health risk assessments.	TBC.
Human Health Risk Assessment	Human and Ecological Risk Office (HERO) Human Health Risk Assessment (HHRA) Notes 1, 2, and 3	DTSC policy on default human health exposure parameters (Note 1), use of U.S. EPA Regional Screening Levels (Note 2), and source of human health screening levels (Note 3).	TBC.
Ecological Risk Assessment	HERO Guidance for Ecological Risk Assessments	DTSC guidance on ecological risk assessments. Provides for a phased evaluation including a Phase I Predictive Assessment, a Phase II Validation Study and Phase III Impact Assessment.	TBC.
Ecological Risk Assessment	HERO Ecological Risk Assessment EcoNOTES 1 through 6	DTSC policy on various matters relevant to ecological risk assessments.	TBC.

4.3. Action-Specific ARARs

Text Table 4.3 Action-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
FEDERAL ARAR			
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40 CFR 264 Subpart I (§264.170 - §264.179)	Provides requirements for use and management of containers for storage of RCRA hazardous waste.	Relevant and Appropriate for alternatives that generate waste for storage in containers on Site prior to disposal. Relevant and appropriate because the Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility.
STATE ARAR			
General Hazardous Waste Disposal Facility Standards	22 CCR, Division 4.5, Chapter 14, Article 2: §66264.15 and §66264.19(c)(1 and 2)	§66264.15 provides substantive general inspection requirements applying to all hazardous waste facilities. §66264.19(c)(1 and2) provides substantive requirements for a Construction Quality Assurance (CQA) program including inspection and testing.	Relevant and Appropriate (for components of removal alternatives that involve construction of covers). Relevant and appropriate because the Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility
General Water Quality Monitoring and System Requirements	22 CCR, Division 4.5, Chapter 14, Article 6 §66264.97 (b) (1 and 2, 4-8), §66264.97 (d) (2-7)	General water quality monitoring requirements for groundwater monitoring systems and unsaturated zone monitoring systems.	Neither applicable nor relevant and appropriate since investigations have not demonstrated that waste has created a condition of pollution within groundwater or surface water that requires clean- up or abatement.

Text Table 4.3 Action-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Post-closure Care and Use of Property	22 CCR, Division 4.5, Chapter 14, Article 7 §66264. 117 (b through d)	Provides requirements for post-closure care, security requirements, and restriction on disturbance for facilities, where contaminated materials and contaminated soils are left in place during closure.	Relevant and Appropriate for alternatives that contain waste on Site. Relevant and appropriate because the Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility.
Use and Management of Containers	22 CCR, Division 4.5, Chapter 14, Article 9 §66264. 178	Provides requirements for decontamination of remaining containers.	Relevant and Appropriate for alternatives that generate waste for storage in containers prior to disposal. Relevant and appropriate because the Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility.
Monitoring and Inspection of Landfill	22 CCR, Division 4.5, Chapter 14, Article 14 §66264. 303 (a: 1 through 2)	Provides requirements for monitoring and inspection of landfill during installation and operation	Relevant and Appropriate for alternatives that contain waste in- place with covers at the Site. Relevant and appropriate because the Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility.
Construction Quality Assurance Requirements	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 2, Article 4, §20324 (e through i)	§20324 (e through i) provides substantive requirements for a Construction Quality Assurance (CQA) program including inspection and testing.	Relevant and Appropriate (for components of removal alternatives that involve construction of covers). Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.

Text Table 4.3 Action-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Precipitation and Drainage Controls	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 2, Article 4, §20365 (a through d and f)	Provides requirements for precipitation and drainage controls for waste management units and containment structures.	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.
Seismic Design	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 2, Article 4, §20370	Provides criteria for seismic design structures within waste management unit	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.
General Closure and Post-Closure Maintenance Standards Applicable to Waste Management Units (Units) for Solid Waste	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 1, §20950 (a (2), c through e)	Provides performance standards and requirements for closure of waste management units for solid waste, including surveying, monuments, and vegetation.	Relevant and Appropriate for alternatives that contain waste in place using vegetative covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.
Closure and Post-Closure Maintenance Requirements for Solid Waste Landfills	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21090	Provides closure and post-closure maintenance requirements for solid waste landfill.	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.

Text Table 4.3 Action-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Final Cover	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21140(a)	Provides requirements for final cover for disposal site and landfill	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.
Final Grading	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21142(a)	Provides requirements for final grading for disposal site and landfill	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.
Slope Stability	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21145(a)	Provides requirements for slope stability for disposal site and landfill	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.
Drainage and Erosion Control	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21150(a and c)	Provides requirements for drainage and erosion control for disposal site and landfill	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.
Post-closure Maintenance	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21180(b)	Provides that non-liquid waste exposed during post-closure maintenance maybe returned to the landfill provided the integrity of the final cover is maintained	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.

Text Table 4.3 Action-Specific ARARs: Vogelsang Former Waste Disposal Area Site			
Standard, Requirement, Criteria, or Limitation	**Citation**	**Requirement Description**	**Applicable or Relevant and Appropriate or TBC?**
Post-closure Land Use	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21190(a (1 and 2) and e (2 and 4 through 7))	Provides requirements for post-closure use of land where the disposal site and landfill is located	Relevant and Appropriate for alternatives that contain waste in place using covers. Relevant and appropriate because disposal of wastes occurred prior to promulgation of this regulation.

5. Removal Action Objectives

The purpose of Section 5 is to present the RAOs and scope for the non-time-critical removal action (NTCRA) (e.g., remove contaminated soils that pose unacceptable risk to human health and the environment). The RAOs should be as specific as possible but not so specific that the range of alternatives that can be developed is unduly limited.

RAOs define what the removal action is intended to accomplish. Specific RAOs are presented in Section 5.1. Other aspects of the RAOs are described therein. Applying the understanding of the CSM (Section 2), understanding of risk levels (Section 3), and ARARs (Section 4) to the scope of the NTCRA as defined in Section 5.1.1 (Determination of Removal Action Scope).

5.1. Identification of Removal Action Objectives

The RAOs for this EE/CA are as follows:

- Prevent unacceptable risks to human and ecological receptors from exposure to Site contaminants in soil.
- Preserve the full enjoyment and utilization of park resources consistent with NPS mandates.
- Satisfy federal and state ARARs.

5.1.1. Determination of Removal Action Scope

The general objective of a removal action, in accordance with CERCLA and NCP, is to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release of hazardous substances or pollutants or contaminants to the environment. Based on the results of the risk assessment, no contaminants that may pose unacceptable risks to human and ecological receptors were identified as COCs or COECs in Site soils. Based on these conclusions, and compliance with ARARs, the RAOs for the Site have been met, and no further actions are necessary for the Site.

5.2. Risk Management: Removal Action Goals Selection

Removal action goals (RGs) are selected by comparing the all PRGs and selecting the most stringent. To ensure cleanup will be technically feasible and cost effective, the PRGs also are compared to background for naturally-occurring COCs and COECs, as well as reference locations for anthropogenic COCs and COECs, in all media at the Site.

5.2.1. Background and Reference Concentrations

To ensure any potential cleanup will be technically feasible and cost effective and to reduce the potential for recontamination of clean areas from surrounding sources, the PRGs are typically compared to background values for naturally occurring constituents (e.g., metals) in all media at the site and may be compared to reference values for environmentally ubiquitous anthropogenic constituents (e.g., polycyclic aromatic hydrocarbons, polychlorinated biphenyls, dioxins,).

As noted in Section 5.1.1, because no unacceptable human health or ecological risks were estimated for this Site, and COCs and COECs were not identified, PRGs were not developed in this report.

5.2.2. Removal Goal Selection

A comparison of the human health risk-based PRGs, ecological risk-based PRGs, ARAR-based PRGs, and representative background and reference concentrations is typically presented in this portion of the report, culminating in the selection of RGs. However, because no unacceptable human health or ecological risks were estimated for this Site, and COCs and COECs were not identified, PRGs were not developed, and no RGs were selected for the Site.

6. Identification of Removal Action Alternatives

The purpose of this section it to present the removal action alternatives proposed to achieve the RAOs identified in Section 5.

The selected removal action must meet the RAOs and comply with ARARs. The location of the Site within a unit of the National Park System must be considered when evaluating removal alternatives. Based on the results of the risk assessment the following removal action alternatives were retained for further analysis:

1. No Action

This alternative is described in the following subsections. Cost estimate details for the alternative is provided in Section 7.3.

6.1. Alternative 1: No Action/No Further Action

Consistent with the NCP and CERCLA guidance, a “no action” alternative is considered as an alternative. Under this alternative, no additional monitoring or maintenance would be performed.

During the risk assessment portion of the EE/CA, no contaminants that may pose unacceptable risks to human and ecological receptors were identified as COCs or COECs in Site soils. Based on these conclusions, this alternative is compliant with the applicable ARARs including the National Park Service Organic Act of 1916 as it would allow for full enjoyment and utilization of park resources. Alternative 1 achieves the RAOs for the Site.

7. Detailed Analysis of Removal Action Alternative

The purpose of Section 7 is to provide a comparative analysis against each of the evaluation criterion of the alternative presented in Section 6. This will identify the advantages and disadvantages of this alternative.

Pursuant to the NCP, the alternative described above was analyzed using the following evaluation criteria: effectiveness, implementability, and cost. The effectiveness of this alternative was evaluated by its protectiveness of human health and the environment; attainment of ARARs; reduction of toxicity, mobility, or volume through treatment; long-term effectiveness and permanence; and short-term effectiveness. The implementability criterion addresses the technical feasibility of implementing the response (including availability of services and materials), the administrative feasibility, and State and community acceptance. Projected costs were calculated using direct capital costs, indirect capital costs, and annual post-removal site control costs. Consistent with guidance, the costs presented are estimated using current costs of labor and materials, and actual costs are expected to range from 30 percent below to 50 percent above the costs presented. The projected costs presented for the EE/CA removal action alternatives are estimates only for the sole purpose of comparing alternatives and should not be considered design-level cost estimates. Details that formed the basis for the removal action alternative cost projections are provided in Section 7.3.

7.1. Effectiveness

This section evaluates the alternative's ability to meet the RAOs as identified in Section 5; in particular, its ability to achieve the criteria of protectiveness of human health and the environment and to attain ARARs. Other factors that affect the overall protectiveness of a removal action include preference for treatment to reduce contaminant toxicity, mobility, or volume for principal threats, short-term effectiveness, and long-term effectiveness/permanence. Details regarding the effectiveness evaluation criteria are presented in the following subsections.

7.1.1. Overall Protection of Human Health and the Environment

Alternative 1 provides overall protection of human health and the environment due to the determination in the risk assessment that concentrations of contaminants in Site soil do not pose unacceptable risks to human and ecological receptors. Due to the absence of identified risk associated with on-Site soils, the "no action" alternative achieves the RAO to prevent unacceptable risks to human and ecological receptors from exposure to Site contaminants in soil.

7.1.2. Compliance with ARARs

This section summarizes the key ARARs. A detailed analysis of how compliance with all ARARs is achieved by Alternative 1 is presented in Appendix E. Under Alternative 1, no action would be taken to address the contaminated soil and ecological risks at the Site. Because no action is taken, no chemical- or action-specific ARARs are triggered. Alternative 1 would provide compliance with the location-specific ARAR outlined by the NPS Organic Act non-impairment requirement. The non-impairment requirement is fulfilled because Site soils do not pose an unacceptable risk to human health or the environment, and therefore, no action is necessary to preserve the full utilization of park resources.

7.1.3. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 would not provide any reduction of toxicity, mobility, or volume as no treatment is utilized in the "no-action" alternative.

7.1.4. Short-Term Effectiveness

Alternative 1 is effective immediately as there are presently no adverse risks posed by contamination in on-Site soils to human or ecological receptors. Furthermore, the "no-action" alternative provides no short-term impacts to potential park visitors, park personnel, and Vogelsang HSC staff.

7.1.5. Long-Term Effectiveness

Alternative 1 is effective in the long-term as there are presently no adverse risks posed by contamination in on-Site soils to human or ecological receptors. This alternative also immediately achieves the human health-based RAOs and will result in no residual human health or ecological risks.

7.2. Implementability

This section provides an evaluation of the technical and administrative feasibility of implementing the alternative and the materials and services that would be required for its implementation.

7.2.1. Technical Feasibility

Technical Implementation Considerations

Alternative 1 is immediately implementable as no action is required. There are no special considerations to be made associated with the implementation of the "no action" alternative.

Availability of Services and Materials

Alternative 1 does not require any services or materials as no action is required.

7.2.2. Administrative Feasibility

This section provides an evaluation of the activities needed for coordination with other offices and agencies. Under CERCLA, federal, state, and local permits are not required for on-site CERCLA response actions; however, the substantive requirements of all permits that would otherwise be required must be met (40 CFR Section 300.400(e)).

State (Support Agency) Acceptance

An assessment of the state acceptance of removal action alternatives will not be completed until comments on the EE/CA are submitted to the NPS by the DTSC.

Community Acceptance

An assessment of the community acceptance will be completed after the NPS receives public comments on the final EE/CA during the public commenting period.

7.3. Cost

This section provides an evaluation of the costs associated with implementing the removal action alternative. Cost estimates are based on currently available costs and approximate time and materials requirements developed for the sole purpose of comparing alternatives. The EE/CA cost estimates should not be considered design-level estimates. They are representative within −30 to +50 percent.

The estimated cost of Alternative 1 is zero dollars as the “no action” alternative involves no capital or PRSC costs.

8. Recommended Removal Action Alternative

The purpose of Section 8 is to describe the recommended removal action alternative and the reason for the selection.

Taking into consideration the conclusions made in the risk assessment and the evaluation criteria presented in this EE/CA, the recommended removal action alternative for the Site is Alternative 1. Alternative 1 includes a "no action" response at an estimated cost of $0.

Alternative 1 is selected as the recommended removal action alternative based on the results of the risk assessment completed in Section 3 and the comparative analysis completed in Section 7, showing that there are no unacceptable risks posed by the Site to human or ecological receptors. Based on these results, no further action is necessary to address potential risks and a "no action" alternative complies with applicable ARARs and satisfies all the RAOs outlined in this report.

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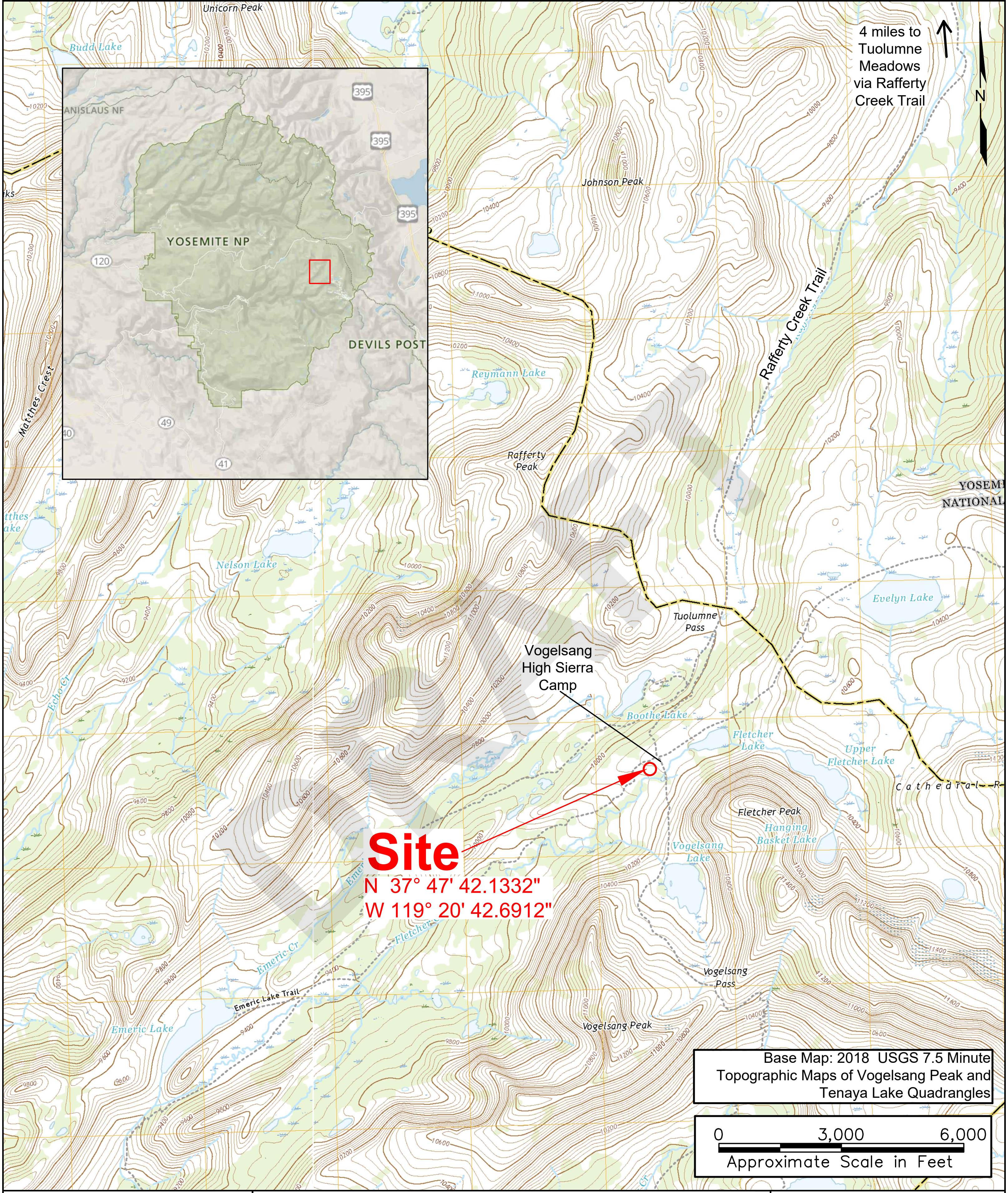
FIGURES

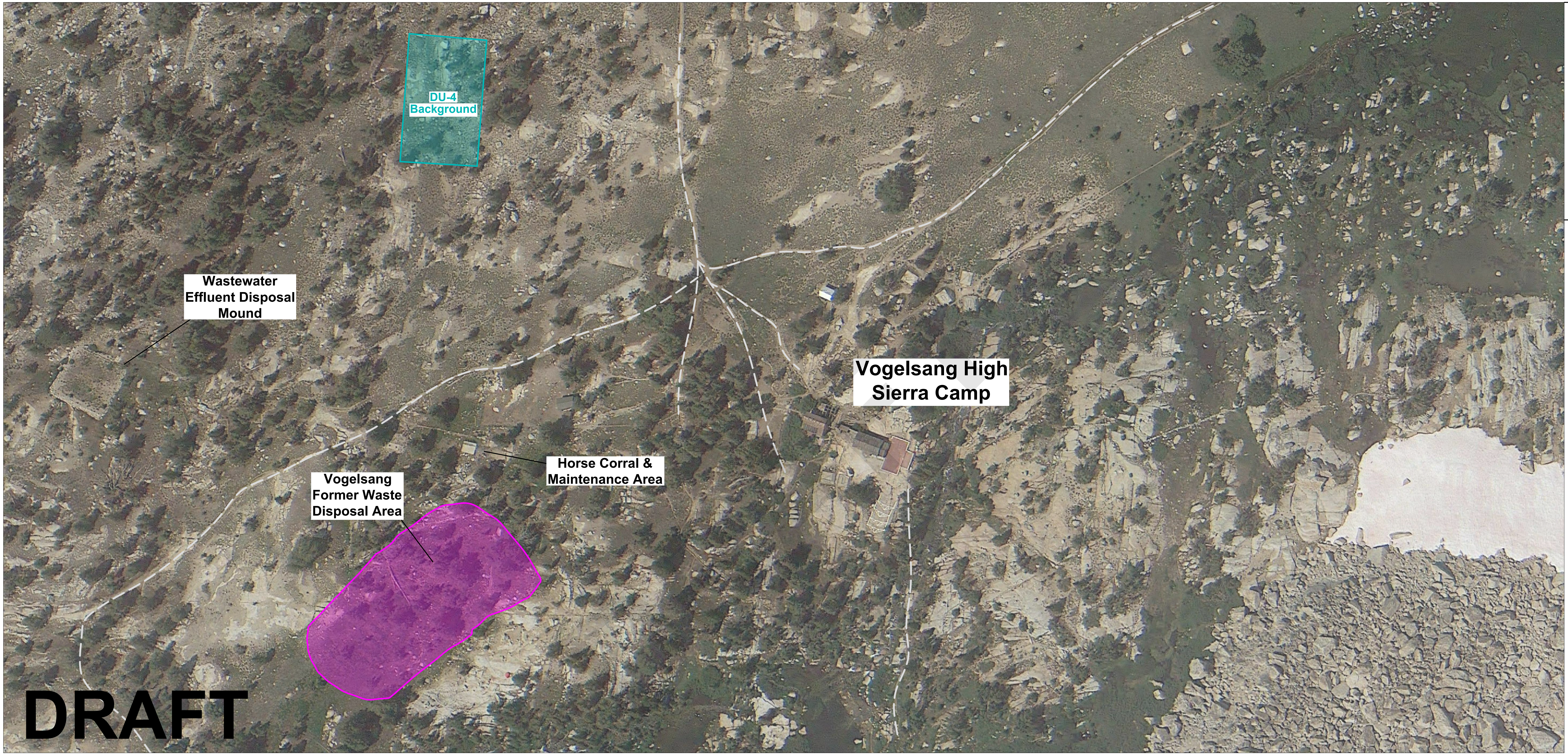


KANE ENVIRONMENTAL INC

Project No. 49723-2

Eningeering Evaluation / Cost Analysis
Vogelsang Former Waste Disposal Area Site
Yosemite National Park, California

Figure 1
Vicinity Map



LEGEND

Approximate location of Site

Approximate location of background sampling area (DU-4)

Approximate location of hiking trail

0 100 200
Approximate Scale in Feet

N

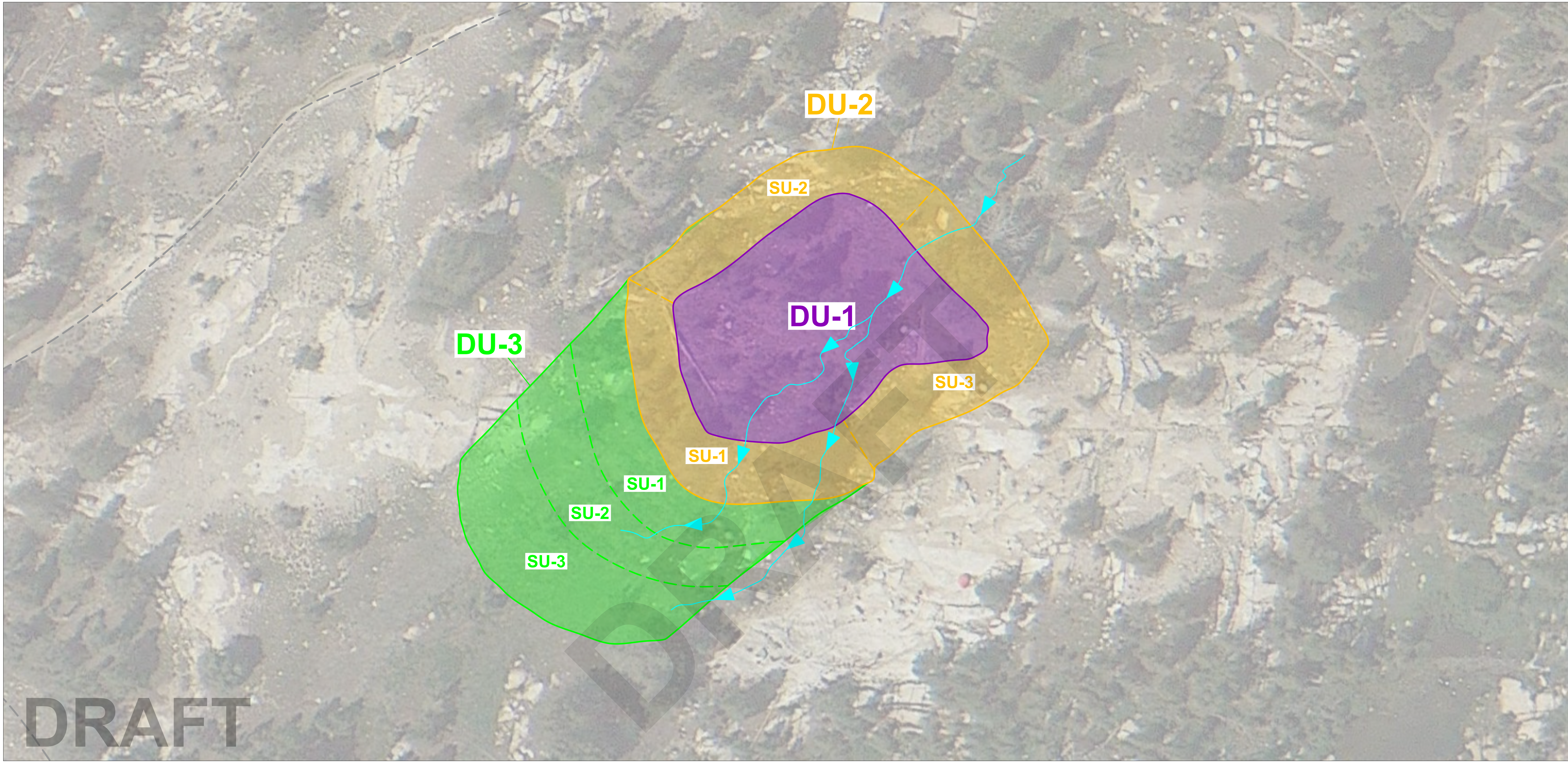
Aerial source: Google Earth - August 11, 2017

KANE ENVIRONMENTAL INC

Project No. 47923-2

DRAFT Engineering Evaluation Cost Analysis
Vogelsang Former Waste Disposal Area Site
Yosemite National Park, California

Figure 2
Site Plan



LEGEND

- Approximate location of Site DU-1
- Approximate location of Site DU-2
- Approximate location of Site DU-3
- Approximate location of hiking trail
- Approximate location and flow direction of ephemeral drainage

0 40 80
Approximate Scale in Feet

N

Aerial source: Google Earth - August 11, 2017

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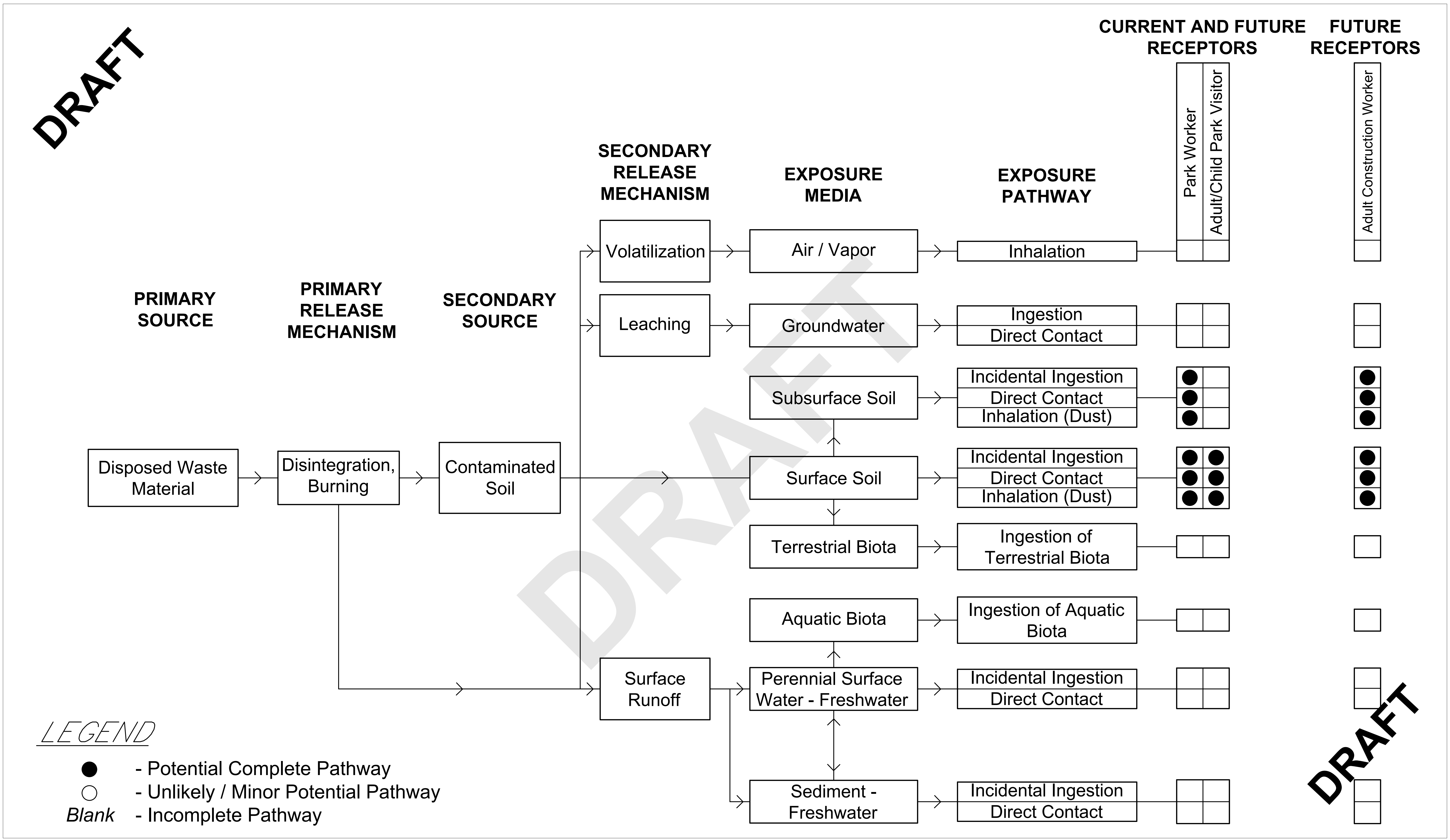
Project No. 47923-2

DRAFT Engineering Evaluation Cost Analysis
Vogelsang Former Waste Disposal Area Site
Yosemite National Park, California

Figure 3
Site Plan Detail



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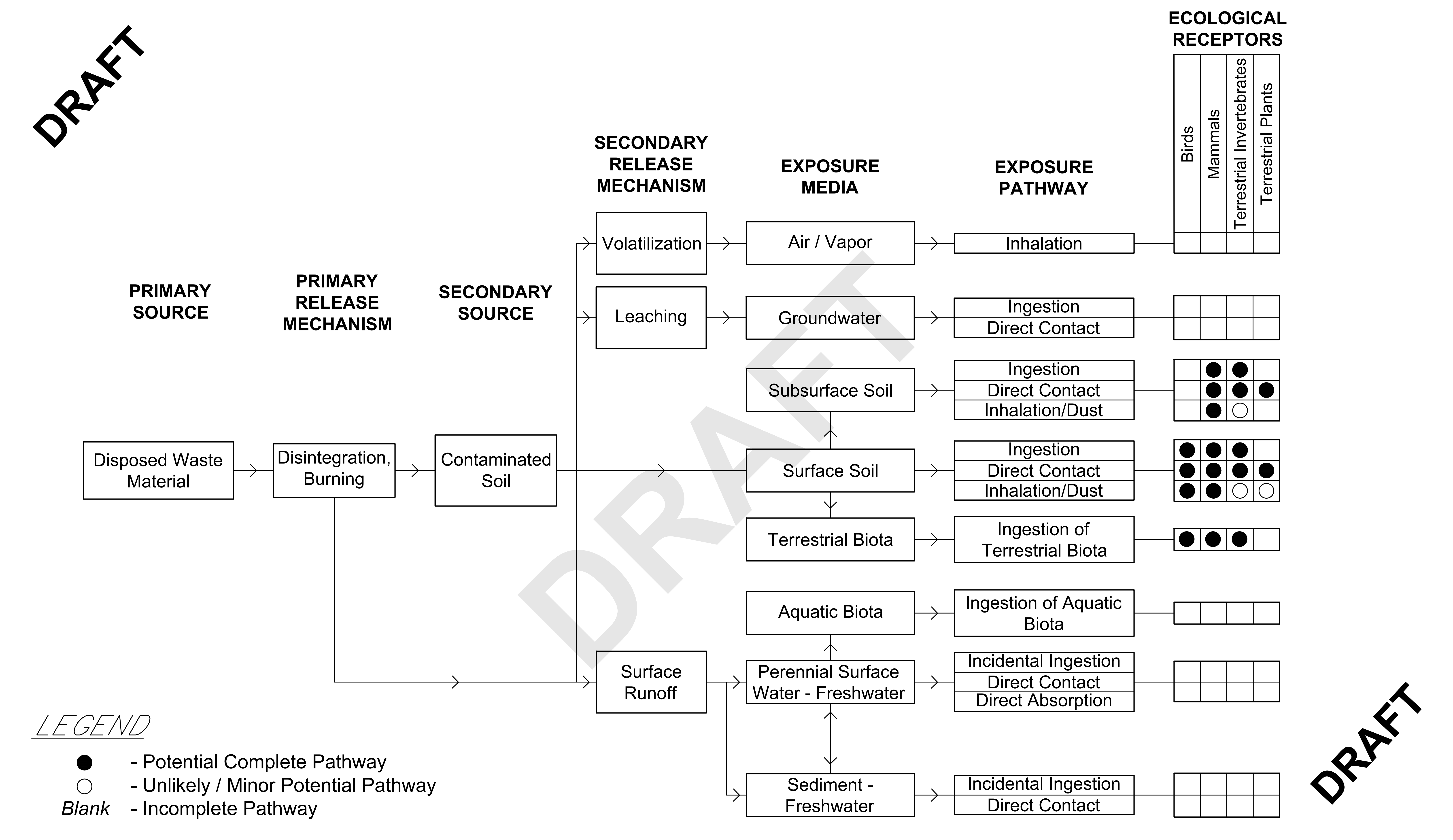
Project #49723-2

Engineering Evaluation / Cost Analysis
Vogelsang Former Waste Disposal Area Site
Yosemite National Park, California

Figure 4
Conceptual Site Model
For Human Exposures



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Project #49723-2

Engineering Evaluation / Cost Analysis
Vogelsang Former Waste Disposal Area Site
Yosemite National Park, California

Figure 5
Conceptual Site Model
For Ecological
Exposures

TABLES

Table 1
Soil Sampling Analytical Results

			Decision Unit	DU-1						DU-2			DU-3			DU-4 (Background)		
			Soil Type	Subsurface			Surface			Surface			Surface			Surface		
			ISM Replicate	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	SU01	SU02	SU03	SU01	SU02	SU03	Rep 1	Rep 2	Rep 3
			Sample Date	8/30/2018	8/30/2018	8/30/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Chemical Name	CASRN	HH SL	Eco SL	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Metals																		
ANTIMONY	7440-36-0	3.1	0.25	**0.46** J+	**1**	**1.8**	**0.5** J+	**0.57** J+	**1.6**	**1**	**0.29** J+	0.07 U	**0.34** J+	**0.2** J+	0.07 U	0.07 U	0.07 U	0.07 U
ARSENIC	7440-38-2	0.110	0.25	**2.1**	**1.8**	**1.9**	**1.3**	**1.4**	**1.4**	**1.3**	**1**	**1.3**	**1.3**	**1.2**	**1.2**	**1.6**	**1.6**	**1.4**
BARIUM	7440-39-3	1500	17	**18.5** J	**17.3**	**21.1**	**20.2**	**20.8**	**24.3**	**26.1**	**18.1**	**24.1**	**17.7**	**18.9**	**18**	**15.8**	**18**	**14.3**
BERYLLIUM	7440-41-7	15	2.4	**0.2** J	**0.22** J	**0.2** J	**0.2** J	**0.21** J	**0.21** J	**0.24** J	**0.13** J	**0.26** J	**0.26** J	**0.26** J	**0.27** J	**0.15** J	**0.18** J	**0.14** J
CADMIUM	7440-43-9	5.2	0.27	**0.12**	**0.15**	**0.17**	**0.1**	**0.088** J	**0.18**	**0.15**	**0.12**	**0.073** J	**0.064** J	**0.056** J	**0.041** J	**0.037** J	**0.038** J	**0.033** J
CHROMIUM	7440-47-3	0	0.34	**4.3**	**4.3**	**4.7**	**2.5**	**3.1**	**3.7**	**3.5**	**2.3**	**2.9**	**2.6**	**2.7**	**2.7**	**2.8**	**3.4**	**2.5**
COBALT	7440-48-4	2.3	13	**2**	**2**	**2**	**1.8**	**1.7**	**1.8**	**2**	**1.8**	**2.5**	**1.7**	**1.7**	**1.7**	**1.8**	**1.7**	**1.6**
COPPER	7440-50-8	310	14	**24.8**	**23**	**56.8**	**14.5**	**17.4**	**33.3**	**32.2**	**10.8** J+	**8.7** J+	**18.1**	**14.1**	**11.5**	**7.6** J+	**8.6** J+	**7.4** J+
LEAD	7439-92-1	80	0.94	**16.5**	**17.7**	**29.4**	**8.7**	**11.5**	**19.1**	**23**	**18**	**5.2**	**5.4**	**4.9**	**4.7**	**4.7**	**5.3**	**4.3**
MERCURY	7439-97-6	1.0	0.013	0.02 U	0.02 U	0.02 U	0.02 U	**0.021** J	0.02 U	0.02 U	**0.021** J	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
MOLYBDENUM	7439-98-7	39	0.52	**12.4**	**13.3**	**13.9**	**9.2**	**10.8**	**10.5**	**15.9**	**4.7**	**8.3**	**25.4**	**20.9**	**15.8**	**1**	**1.4**	**1.2**
NICKEL	7440-02-0	150	10	**3.4**	**3**	**4.1**	**10**	**23.3**	**11.2**	**14.2**	**7.3**	**9.5**	**9.1**	**10.5**	**7.9**	**8**	**12.3**	**9.5**
SELENIUM	7782-49-2	39	0.33	**0.089** J	**0.12** J	**0.11** J	**0.079** J	**0.078** J	**0.079** J	**0.061** J	0.05 U	**0.074** J	**0.072** J	**0.097** J	**0.1** J	**0.068** J	**0.074** J	**0.076** J
SILVER	7440-22-4	39	2.0	**0.076** J	**0.11**	**0.1**	**0.053** J	**0.093** J	**0.11**	**0.12**	**0.075** J	**0.041** J	**0.07** J	**0.077** J	**0.053** J	**0.033** J	**0.039** J	**0.033** J
THALLIUM	7440-28-0	0.078	0.027	**0.042** J	**0.069** J	**0.057** J	**0.04** J	**0.047** J	**0.043** J	**0.065** J	**0.06** J	**0.082** J	**0.059** J	**0.067** J	**0.064** J	**0.072** J	**0.083** J	**0.064** J
VANADIUM	7440-62-2	39	0.71	**19.7**	**20.9**	**20**	**15.8**	**17.8**	**17.8**	**19**	**13.4**	**18.7**	**20.9**	**18.8**	**17.4**	**16.8**	**19**	**15.9**
ZINC	7440-66-6	2300	6.6	**39.1** J	**41.6**	**56.2**	**31.4**	**31.8**	**50.2**	**58.3**	**29.2**	**24**	**27.7**	**24**	**20.3**	**19.7**	**21.3**	**17.8**
Dioxins / Furans																		
1,2,3,4,6,7,8-HPCDD	35822-46-9	---	---	**12.0** J	---	---	**21**	---	---	7.5 U	---	---	0.77 U	---	---	0.2 U	---	---
1,2,3,4,6,7,8-HPCDF	67562-39-4	---	---	**1.9**	---	---	6.4 J	---	---	1.8 U	---	---	0.47 U	---	---	0.16 U	---	---
1,2,3,4,7,8,9-HPCDF	55673-89-7	---	---	**2.0** U	---	---	0.57 U	---	---	0.84 U	---	---	0.36 U	---	---	0.2 U	---	---
1,2,3,4,7,8-HXCDD	39227-28-6	---	---	**0.46** U	---	---	0.63 U	---	---	0.58 U	---	---	0.59 U	---	---	0.17 U	---	---
1,2,3,4,7,8-HXCDF	70648-26-9	---	---	**0.65** U	---	---	0.75 U	---	---	0.21 U	---	---	0.12 U	---	---	0.083 U	---	---
1,2,3,6,7,8-HXCDD	57653-85-7	---	---	**0.75** U	---	---	0.4 U	---	---	0.54 U	---	---	0.54 U	---	---	0.18 U	---	---
1,2,3,6,7,8-HXCDF	57117-44-9	---	---	**0.59** U	---	---	0.67 U	---	---	0.2 U	---	---	0.11 U	---	---	0.074 U	---	---
1,2,3,7,8,9-HXCDD	19408-74-3	---	---	**0.97** U	---	---	0.81 U	---	---	0.55 U	---	---	0.56 U	---	---	0.19 U	---	---
1,2,3,7,8,9-HXCDF	72918-21-9	---	---	**0.77** U	---	---	0.88 U	---	---	0.25 U	---	---	0.12 U	---	---	0.097 U	---	---
1,2,3,7,8-PECDD	40321-76-4	---	---	**0.76** U	---	---	0.38 U	---	---	0.48 U	---	---	0.17 U	---	---	0.27 U	---	---
1,2,3,7,8-PECDF	57117-41-6	---	---	**0.46** U	---	---	0.52 U	---	---	0.32 U	---	---	0.13 U	---	---	0.12 U	---	---
2,3,4,6,7,8-HXCDF	60851-34-5	---	---	**5.20** U	---	---	16 U	---	---	3.4 U	---	---	0.84 U	---	---	0.34 U	---	---
2,3,4,7,8-PECDF	57117-31-4	---	---	**0.47** U	---	---	0.53 U	---	---	0.33 U	---	---	0.13 U	---	---	0.13 U	---	---
2,3,7,8-TCDD	1746-01-6	---	---	**0.20** U	---	---	0.08 U	---	---	0.19 U	---	---	0.07 U	---	---	0.13 U	---	---
2,3,7,8-TCDF	51207-31-9	---	---	**0.31** U	---	---	0.27 U	---	---	0.44 U	---	---	0.12 U	---	---	0.26 U	---	---
OCDD	3268-87-9	---	---	**71.0**	---	---	**130**	---	---	**45**	---	---	**11** J	---	---	**3.4** J	---	---
OCDF	39001-02-0	---	---	**3.7** U	---	---	15 U	---	---	2.2 U	---	---	1.8 U	---	---	0.22 U	---	---
TEQ	TEQ	5	0.29	**0.14**	---	---	**0.31**	---	---	**0.014**	---	---	**0.0033**	---	---	**0.0010**	---	---
PAHs																		
1-METHYLNAPHTHALENE	90-12-0	18	---	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U	0.041 U	0.021 U	0.021 U	0.021 U	0.042 U	0.02 U	0.02 U	0.02 U
2-METHYLNAPHTHALENE	91-57-6	24	16	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
ACENAPHTHENE	83-32-9	360	0.25	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U	0.041 U	0.021 U	0.021 U	0.021 U	0.042 U	0.02 U	0.02 U	0.02 U
ACENAPHTHYLENE	208-96-8	---	120	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
ANTHRACENE	120-12-7	1800.0	6.8	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.033 U	0.033 U	0.017 U	0.017 U	0.017 U	0.034 U	0.016 U	0.016 U	0.016 U
BENZO(A)ANTHRACENE	56-55-3	1.10	0.73	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	**0.023** J	0.019 U	**0.072** J	0.038 U	0.018 U	0.018 U	0.018 U
BENZO(A)PYRENE	50-32-8	0.110	62	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	**0.059** J	0.038 U	0.018 U	0.018 U	0.018 U
BENZO(B)FLUORANTHENE	205-99-2	1.10	18	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.046 U	0.045 U	0.023 U	0.023 U	0.023 U	0.047 U	0.022 U	0.022 U	0.023 U
BENZO(GHI)PERYLENE	191-24-2	---	2.0	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	0.053 U	0.027 U	0.027 U	**0.04** J	0.055 U	0.027 U	0.026 U	0.027 U
BENZO(K)FLUORANTHENE	207-08-9	11.0	71	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U	0.041 U	0.021 U	0.021 U	**0.036** J	0.042 U	0.02 U	0.02 U	0.02 U
CHRYSENE	218-01-9	110.0	3.1	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.033 U	0.033 U	0.017 U	0.017 U	**0.086** J	0.034 U	0.016 U	0.016 U	0.016 U
DIBENZ(A,H)ANTHRACENE	53-70-3	0.110	14	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
FLUORANTHENE	206-44-0	240	10	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.049 U	0.025 U	0.025 U	**0.095** J	0.051 U	0.025 U	0.024 U	0.025 U
FLUORENE	86-73-7	240.0	3.7	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U	0.041 U	0.021 U	0.021 U	0.021 U	0.042 U	0.02 U	0.02 U	0.02 U
INDENO(1,2,3-CD)PYRENE	193-39-5	1.10	71	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
NAPHTHALENE	91-20-3	3.8	1.0	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
PENTACHLOROPHENOL	87-86-5	1.0	0.36	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.33 U	0.33 U	**0.54**	0.17 U	0.170 U	0.34 U	0.16 U	0.16 U	0.16 U
PHENANTHRENE	85-01-8	---	5.5	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.046 U	0.045 U	0.023 U	0.023 U	0.023 U	0.047 U	0.022 U	0.022 U	0.023 U
PYRENE	129-00-0	180	10	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.049 U	0.025 U	0.025 U	**0.085** J	0.051 U	0.025 U	0.024 U	0.025 U

Notes:
Metals and PAHs concentrations are in milligrams per kilogram (mg/kg).
Dioxins/Furans concentrations are in picograms per gram (pg/g).
Detect results are shown in **Bold**
Values greater than the lowest SL are highlighted in gray.
--- = screening level not available or not analyzed
DU = Decision Unit
Eco = ecological
HH = human health
SL = screening level
Result Qualifiers:
J = estimated value
U = analyte not detected above the laboratory reporting limit.

Table 2. COPC Selection Summary for Human Health

Chemical Group	Chemical Name	CASRN	Human Health	
			Surface Soil	Subsurface Soil
Metals	Arsenic	7440-38-2	x	x
	Chromium	7440-47-3	x	x
	Cobalt	7440-48-4	x	
	Thallium	7440-28-0	x	

Notes:

CASRN = Chemical Abstracts Service Registry Number

COPC - Chemcial of Potential Concern

Table 3. Summary of NonCancer Hazard Quotients

Route of Exposure	Adult Park Worker		Construction/Restoration Worker		Young Child Visitor Scenario		Older Child Visitor Scenario		Adult Visitor Scenario	
	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME
Decision Unit 1 - Surface Soil										
Incidental Ingestion of Surface Soil	3.4E-04	1.4E-03	1.4E-03	5.6E-03	3.0E-04	1.2E-03	2.6E-04	1.0E-03	1.4E-04	5.7E-04
Dermal Contact with Surface Soil	3.1E-06	1.5E-04	3.7E-04	7.5E-04	8.6E-06	2.4E-05	8.2E-06	3.2E-05	4.5E-06	1.8E-05
Inhalation of Particles from Surface Soil	2.3E-03	9.2E-03	5.7E-03	1.4E-02	2.4E-05	1.9E-04	1.2E-04	9.6E-04	1.2E-04	9.6E-04
Hazard Index	2.6E-03	1.1E-02	7.5E-03	2.1E-02	3.4E-04	1.4E-03	3.9E-04	2.0E-03	2.7E-04	1.5E-03
Decision Unit 1 - Subsurface Soil										
Incidental Ingestion of SubSurface Soil	NE	NE	6.6E-04	2.6E-03	NE	NE	NE	NE	NE	NE
Dermal Contact with SubSurface Soil	NE	NE	5.7E-04	1.1E-03	NE	NE	NE	NE	NE	NE
Inhalation of Particles from SubSurface Soil	NE	NE	2.1E-03	5.3E-03	NE	NE	NE	NE	NE	NE
Hazard Index	NE	NE	3.3E-03	9.1E-03	NE	NE	NE	NE	NE	NE
Decision Unit 2										
Incidental Ingestion of Surface Soil	5.2E-04	2.1E-03	2.1E-03	8.6E-03	4.6E-04	1.8E-03	3.9E-04	1.6E-03	2.2E-04	8.7E-04
Dermal Contact with Surface Soil	3.3E-06	1.6E-04	4.1E-04	8.1E-04	9.3E-06	2.6E-05	8.8E-06	3.5E-05	4.9E-06	1.9E-05
Inhalation of Particles from Surface Soil	3.3E-03	1.3E-02	8.4E-03	2.1E-02	3.5E-05	2.8E-04	1.7E-04	1.4E-03	1.7E-04	1.4E-03
Hazard Index	3.9E-03	1.6E-02	1.1E-02	3.0E-02	5.1E-04	2.2E-03	5.8E-04	3.0E-03	4.0E-04	2.3E-03
Decision Unit 3										
Incidental Ingestion of Surface Soil	3.6E-04	1.4E-03	1.5E-03	6.0E-03	3.2E-04	1.3E-03	2.7E-04	1.1E-03	1.5E-04	6.0E-04
Dermal Contact with Surface Soil	2.8E-06	1.4E-04	3.4E-04	6.8E-04	7.8E-06	2.2E-05	7.5E-06	2.9E-05	4.1E-06	1.6E-05
Inhalation of Particles from Surface Soil	2.1E-03	8.2E-03	5.1E-03	1.3E-02	2.1E-05	1.7E-04	1.1E-04	8.6E-04	1.1E-04	8.6E-04
Hazard Index	2.4E-03	9.8E-03	7.0E-03	2.0E-02	3.5E-04	1.5E-03	3.9E-04	2.0E-03	2.6E-04	1.5E-03
Decision Units 1-3										
Incidental Ingestion of Surface Soil	4.1E-04	1.6E-03	1.7E-03	6.8E-03	3.7E-04	1.5E-03	3.1E-04	1.2E-03	1.7E-04	6.9E-04
Dermal Contact with Surface Soil	2.9E-06	1.4E-04	3.6E-04	7.2E-04	8.2E-06	2.3E-05	7.8E-06	3.1E-05	4.3E-06	1.7E-05
Inhalation of Particles from Surface Soil	2.6E-03	1.0E-02	6.4E-03	1.6E-02	2.7E-05	2.1E-04	1.3E-04	1.1E-03	1.3E-04	1.1E-03
Hazard Index	3.0E-03	1.2E-02	8.5E-03	2.4E-02	4.0E-04	1.7E-03	4.5E-04	2.3E-03	3.1E-04	1.8E-03
Decision Unit 4 Background Area										
Incidental Ingestion of Surface Soil	4.6E-04	1.8E-03	1.9E-03	7.6E-03	4.1E-04	1.6E-03	3.5E-04	1.4E-03	1.9E-04	7.6E-04
Dermal Contact with Surface Soil	3.7E-06	1.8E-04	4.5E-04	9.0E-04	1.0E-05	2.9E-05	9.9E-06	3.9E-05	5.4E-06	2.1E-05
Inhalation of Particles from Surface Soil	2.4E-03	9.8E-03	6.1E-03	1.5E-02	2.6E-05	2.0E-04	1.3E-04	1.0E-03	1.3E-04	1.0E-03
Hazard Index	2.9E-03	1.2E-02	8.5E-03	2.4E-02	4.4E-04	1.9E-03	4.8E-04	2.4E-03	3.2E-04	1.8E-03

Notes:

HI - Non-cancer risks are expressed as a Hazaard Index, which is the cumulative risk across all routes of exposure for the particular scenario.

NE - Pathway not evaluated under this exposure scenario.

CTE =Central Tendency Exposure

RME = Reasonable Maximum Exposure

Table 4. Summary of Excess Lifetime Cancer Risk Estimates

Route of Exposure	Adult Park Worker		Construction/Restoration Worker		Young Child Visitor Scenario		Older Child Visitor Scenario		Adult Visitor Scenario	
	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME
Decision Unit 1 - Surface Soil										
Incidental Ingestion of Surface Soil	3.3E-09	2.7E-08	2.7E-09	3.3E-08	1.2E-09	1.4E-08	2.5E-09	2.0E-08	1.4E-09	1.1E-08
Dermal Contact with Surface Soil	9.9E-11	9.6E-09	2.4E-09	1.4E-08	1.1E-10	9.4E-10	2.6E-10	2.1E-09	1.4E-10	1.1E-09
Inhalation of Particles from Surface Soil	8.7E-09	7.0E-08	4.3E-09	3.3E-08	3.6E-11	8.7E-10	4.5E-10	7.2E-09	4.5E-10	7.2E-09
Cumulative Risk Across All Routes of Exposure	1.E-08	1.E-07	9.E-09	8.E-08	1.E-09	2.E-08	3.E-09	3.E-08	2.E-09	2.E-08
Decision Unit 1 - Subsurface Soil										
Incidental Ingestion of SubSurface Soil	NE	NE	4.2E-09	5.1E-08	NE	NE	NE	NE	NE	NE
Dermal Contact with SubSurface Soil	NE	NE	3.7E-09	2.2E-08	NE	NE	NE	NE	NE	NE
Inhalation of Particles from SubSurface Soil	NE	NE	1.5E-09	1.1E-08	NE	NE	NE	NE	NE	NE
Cumulative Risk Across All Routes of Exposure	NE	NE	9.E-09	8.E-08	NE	NE	NE	NE	NE	NE
Decision Unit 2										
Incidental Ingestion of Surface Soil	3.6E-09	2.9E-08	3.0E-09	3.6E-08	1.3E-09	1.5E-08	2.7E-09	2.2E-08	1.5E-09	1.2E-08
Dermal Contact with Surface Soil	1.1E-10	1.0E-08	2.6E-09	1.6E-08	1.2E-10	1.0E-09	2.8E-10	2.2E-09	1.6E-10	1.2E-09
Inhalation of Particles from Surface Soil	1.3E-08	1.0E-07	6.4E-09	4.8E-08	5.3E-11	1.3E-09	6.6E-10	1.1E-08	6.6E-10	1.1E-08
Cumulative Risk Across All Routes of Exposure	2.E-08	1.E-07	1.E-08	1.E-07	1.E-09	2.E-08	4.E-09	3.E-08	2.E-09	2.E-08
Decision Unit 3										
Incidental Ingestion of Surface Soil	3.0E-09	2.4E-08	2.5E-09	3.0E-08	1.1E-09	1.3E-08	2.3E-09	1.8E-08	1.3E-09	1.0E-08
Dermal Contact with Surface Soil	9.0E-11	8.8E-09	2.2E-09	1.3E-08	1.0E-10	8.6E-10	2.4E-10	1.9E-09	1.3E-10	1.0E-09
Inhalation of Particles from Surface Soil	7.8E-09	6.2E-08	3.9E-09	2.9E-08	3.2E-11	7.8E-10	4.0E-10	6.5E-09	4.0E-10	6.5E-09
Cumulative Risk Across All Routes of Exposure	1.E-08	1.E-07	9.E-09	7.E-08	1.E-09	1.E-08	3.E-09	3.E-08	2.E-09	2.E-08
Decision Units 1-3										
Incidental Ingestion of Surface Soil	3.2E-09	2.5E-08	2.6E-09	3.1E-08	1.1E-09	1.4E-08	2.4E-09	1.9E-08	1.3E-09	1.1E-08
Dermal Contact with Surface Soil	9.5E-11	9.2E-09	2.3E-09	1.4E-08	1.1E-10	9.0E-10	2.5E-10	2.0E-09	1.4E-10	1.1E-09
Inhalation of Particles from Surface Soil	9.7E-09	7.8E-08	4.9E-09	3.7E-08	4.1E-11	9.7E-10	5.1E-10	8.1E-09	5.1E-10	8.1E-09
Cumulative Risk Across All Routes of Exposure	1.E-08	1.E-07	1.E-08	8.E-08	1.E-09	2.E-08	3.E-09	3.E-08	2.E-09	2.E-08
Decision Unit 4 Background Area										
Incidental Ingestion of Surface Soil	4.0E-09	3.2E-08	3.3E-09	4.0E-08	1.4E-09	1.7E-08	3.0E-09	2.4E-08	1.7E-09	1.3E-08
Dermal Contact with Surface Soil	1.2E-10	1.2E-08	2.9E-09	1.7E-08	1.3E-10	1.1E-09	3.2E-10	2.5E-09	1.7E-10	1.4E-09
Inhalation of Particles from Surface Soil	9.2E-09	7.4E-08	4.6E-09	3.5E-08	3.8E-11	9.2E-10	4.8E-10	7.7E-09	4.8E-10	7.7E-09
Cumulative Risk Across All Routes of Exposure	1.E-08	1.E-07	1.E-08	9.E-08	2.E-09	2.E-08	4.E-09	3.E-08	2.E-09	2.E-08

Notes:

NE - Pathway not evaluated under this exposure scenario.

The excess lifetime cancer risk were rounded to one significant figure.

CTE =Central Tendency Exposure

RME = Reasonable Maximum Exposure

Table 5. COPEC Selection Summary for Ecological Receptors

			Surface Soil		Subsurface Soil	
Chemical Group	Chemical Name	CASRN	Plants/Inverts COPEC	Birds/Mammals COPEC	Plants/Inverts COPEC	Birds/Mammals COPEC
EPA 6020A	ANTIMONY	7440-36-0	--	x	--	x
Metals	ARSENIC	7440-38-2	--	x	--	x
	BARIUM	7440-39-3	--	x	--	x
	CHROMIUM	7440-47-3	x	--	x	--
	COPPER	7440-50-8	--	x	x	x
	LEAD	7439-92-1	--	x	--	x
	MOLYBDENUM	7439-98-7	x	x	x	x
	Nickel	7440-02-0	--	x	--	--
	THALLIUM	7440-28-0	x	x	x	x
	VANADIUM	7440-62-2	x	x	x	x
	ZINC	7440-66-6	x	x	x	x
EPA 7471A	MERCURY	7439-97-6	--	x	--	x
EPA 8270C (SVOCs)	PENTACHLOROPHENOL	87-86-5	--	x	--	--
EPA 8290 Dioxins/Furans	TEQ	TEQ	--	x	--	--

Notes:

x = selected as COPEC

CASRN = Chemical Abstracts Service Registry Number

COPEC - Chemcial of Potential Ecological Concern

EPA = Environmental Protection Agency

SVOC = semi-volatile organic compound

TEQ = toxic equivalent

Table 6. Refined COPEC and COEC Selection for Terrestrial Plants, Surface Soil

COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	Refined ESV-Based Hazard Quotient	Terrestrial Plants Refined COPEC Surface Soil	95 UCL Surface Soil Conc. (mg/kg)	LANL Low-Effect ESL (mg/kg)	Threshold ESL (mg/kg)	Low-Effect-Based Hazard Quotient	Terrestrial Plants COEC Surface Soil
Decision Unit 1										
Metals										
Chromium, total	7440-47-3	3.7	1	4	Chromium, total	4.6	4.7	2	1	--
Molybdenum	7439-98-7	10.8	2	5	Molybdenum	12.3	200	20	0.06	--
Vanadium	7440-62-2	17.8	2	9	Vanadium	20.0	80	13	0.3	--
Zinc	7440-66-6	50.2	160	0.3	--	Not COPEC	810	360	NA	--
Decision Unit 2										
Metals										
Chromium, total	7440-47-3	3.5	1	4	Chromium, total	4.4	4	2	1	--
Molybdenum	7439-98-7	15.9	2	8	Molybdenum	24.0	200	20	0.1	--
Thallium	7440-28-0	0.1	1	0.08	--	Not COPEC	3.2	2	NA	--
Vanadium	7440-62-2	19.0	2	10	Vanadium	25.0	80	13	0.3	--
Zinc	7440-66-6	58.3	160	0.4	--	Not COPEC	810	360	NA	--
Decision Unit 3										
Metals										
Chromium, total	7440-47-3	2.70	1	3	Chromium, total	2.8	4	2	0.7	--
Molybdenum	7439-98-7	25.40	2	13	Molybdenum	32.8	200	20	0.2	--
Vanadium	7440-62-2	20.9	2	10	Vanadium	23.5	80	13	0.3	--
Zinc	7440-66-6	27.7	160	0.2	--	Not COPEC	810	360	NA	--
Decision Unit 4 (Background)										
Metals										
Chromium, total	7440-47-3	3.4	1	3	Chromium, total	3.6	4	2	0.9	--
Thallium	7440-28-0	0.083	1	0.08	--	Not COPEC	3.2	2	NA	--
Vanadium	7440-62-2	19	2	10	Vanadium	20.8	80	13	0.3	--
Zinc	7440-66-6	21.3	160	0.1	--	Not COPEC	810	360	NA	--

Notes:

Refined SLERA ESVs from NPS 2018, except where noted; low-level effect ESLs are from LANL (2017)

Threshold ESVs are calculated as the geometric mean of the Refined ESV and the LANL Low-Level ESL

COPECs selected where Maximum Concentration > Refined ESV

COECs selected where 95 UCL (or maximum if lower) > Threshold-Based ESL

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESL = ecological screening level

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

NC - Not calculated

a. LANL Low-Effect ESL value for molybdenum is not available; Low Effect screening level is the Dutch Intervention Soil Screening Benchmark, which is the concentration expected to be hazardous to 50% of the species in the ecosystem. Site concentrations between Target Values (no effect levels) and Intervention Values suggests further investigation or restrictions may be warranted (ORNL 2020).

Table 7. Refined COPEC Selection for Terrestrial Plants, Subsurface Soil

COPEC	CASRN	Maximum Subsurface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	LANL Low-Effect ESL (mg/kg)	Hazard Quotient (HQ) Refined ESV-Based HQ	Hazard Quotient (HQ) Low Effect-Based HQ	Terrestrial Plants Refined COPEC	Terrestrial Plants COEC
Decision Unit 1								
Metals								
Chromium, total	7440-47-3	4.70	1	4.7	5	1.0	Chromium, total	--
Copper	7440-50-8	56.80	70	497	1	0.1	--	--
Molybdenum	7439-98-7	13.90	2	200	7	0.1	Molybdenum	--
Thallium	7440-28-0	0.07	1	3.2	0	0.0	--	--
Vanadium	7440-62-2	20.90	2	80	10	0.3	Vanadium	--
Zinc	7440-66-6	56.20	160	810	0	0.1	--	--

Notes:

Refined SLERA ESVs from NPS (2018); except molybdenum [a] and dioxin TEQ are from LANL (2017)

Low-effect ESLs are from the LANL (2017) database

EPC based on the lower of maximum concentrations or 95UCL on mean concentrations

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

a. LANL Low-Effect ESL value not available; Low Effect screening level is the Dutch Intervention Soil Screening **Benchmark, which is the concentration expected** to be hazardous to 50% of the species in the ecosystem. Site concentrations between Target Values (no effect levels) and Intervention Values suggests further investigation or restrictions may be warranted. (ORNL 2020)

Table 8. Refined COPEC and COEC Selection for Soil Invertebrates, Surface Soil

COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	Refined ESV-Based Hazard Quotient	Soil Invertebrates Refined COPEC Surface Soil	95 UCL Surface Soil Conc. (mg/kg)	LANL Low-Effect ESL (mg/kg)	Threshold ESL (mg/kg)	Low-Effect-Based Hazard Quotient	Soil Invertebrates COEC Surface Soil
Decision Unit 1										
Metals										
Chromium, total	7440-47-3	3.7	0.4	9	Chromium, total	4.6	3.4	1.2	1	--
Molybdenum	7439-98-7	10.8	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	17.8	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	50.2	120	0.4	--	Not COPEC	930	334	NA	--
Decision Unit 2										
Metals										
Chromium, total	7440-47-3	3.5	0.4	9	Chromium, total	4.4	3.4	1.2	1	--
Molybdenum	7439-98-7	15.9	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Thallium	7440-28-0	0.1	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	19.0	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	58.3	120	0.5	--	Not COPEC	930	334	NA	--
Decision Unit 3										
Metals										
Chromium, total	7440-47-3	2.70	0.4	7	Chromium, total	2.8	3.4	1.2	1	--
Molybdenum	7439-98-7	25.40	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	20.9	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	27.7	120	0.2	--	Not COPEC	930	334	NA	--
Decision Unit 4 (Background)										
Metals										
Chromium, total	7440-47-3	3.4	0.4	9	Chromium, total	3.6	3.4	1.2	1	--
Thallium	7440-28-0	0.083	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	19	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	21.3	120	0.2	--	Not COPEC	930	334	NA	--

Notes:

Refined SLERA ESVs from NPS (2018); except molybdenum and dioxin TEQ are from LANL (2017)
Low-effect ESLs are from the LANL (2017) database
EPC based on the maximum concentration
CASRN = Chemical Abstracts Service Registry Number
COPEC = chemical of potential ecological concern
COEC - chemical of ecological concern
ESV = ecological screening value
mg/kg = millgrams per kilogram
SLERA = Screening level ecological risk assessment

Table 9. Refined COPEC Selection for Soil Invertebrates, Subsurface Soil

COPEC	CASRN	Maximum Subsurface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	LANL Low-Effect ESL (mg/kg)	Hazard Quotient (HQ)		Soil Invertebrates Refined COPEC	Soil Invertebrates COEC
					Refined ESV-Based HQ	Low Effect-Based HQ		
Decision Unit 1								
Metals								
Chromium, total	7440-47-3	4.70	0.4	3.4	12	1	Chromium, total	--
Copper	7440-50-8	56.80	80	530	0.7	0.1	--	--
Molybdenum	7439-98-7	13.90	No ESV	No ESL	NA	NA	--	--
Thallium	7440-28-0	0.07	No ESV	No ESL	NA	NA	--	--
Vanadium	7440-62-2	20.90	No ESV	No ESL	NA	NA	--	--
Zinc	7440-66-6	56.20	120	930	0.5	0.06	--	--

Notes:

Refined SLERA ESVs from NPS (2018); except molybdenum and dioxin TEQ are from LANL (2017)

Low-effect ESLs are from the LANL (2017) database

EPC based on the maximum concentration

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

COEC - chemical of ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

Table 10. Refined COPEC Selection for Birds and Mammals, Surface Soil

COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)		Screening Level Hazard Quotient (HQ)		Birds Refined COPEC Surface Soil	Mammals Refined COPEC Surface Soil
			Birds	Mammals	Birds	Mammals		
Decision Unit 1								
Metals								
Antimony	7440-36-0	1.6	No ESV	0.27	NA	**6**	--	Antimony
Arsenic	7440-38-2	1.4	43	46	0.03	0.03	--	--
Copper	7440-50-8	33.3	28	49	1	0.7	--	--
Lead	7439-92-1	19.1	36.3	56	1	0.3	--	--
Molybdenum	7439-98-7	10.8	15	0.52	0.7	**21**	--	Molybdenum
Nickel	7440-02-0	23.3	210	130	0.1	0.2	--	--
Thallium	7440-28-0	0.047	6.3	0.22	0.01	0.2	--	--
Vanadium	7440-62-2	17.8	7.8	280	**2**	0.06	Vanadium	--
Zinc	7440-66-6	50.2	46	79	1	0.6	--	--
Metals								
Mercury	7439-97-6	0.02	0.013	1.7	**2**	0.01	Mercury	--
Decision Unit 2								
Metals								
Antimony	7440-36-0	1.0	No ESV	0.27	NA	**4**	--	Antimony
Arsenic	7440-38-2	1.3	43	46	0.03	0.03	--	--
Barium	7440-39-3	26.1	820	2000	0.03	0.01	--	--
Copper	7440-50-8	32.2	28	49	1	0.7	--	--
Lead	7439-92-1	23.0	11	56	**2**	0.4	Lead	--
Molybdenum	7439-98-7	15.9	15	0.52	1	**31**	--	Molybdenum
Thallium	7440-28-0	0.1	6.3	0.22	0.01	0.4	--	--
Vanadium	7440-62-2	19.0	7.8	280	**2**	0.07	Vanadium	--
Zinc	7440-66-6	58.3	46	79	1	0.7	--	--
Metals								
Mercury	7439-97-6	0.021	0.013	1.7	**2**	0.01	Mercury	--
PAHs / PCP								
Pentachlorophenol	87-86-5	0.54	2.1	2.8	0.3	0.2	--	--
Decision Unit 3								
Metals								
Arsenic	7440-38-2	1.30	43	46	0.03	0.03	--	--
Lead	7439-92-1	5.40	11	56	0.5	0.1	--	--
Molybdenum	7439-98-7	25.40	15	0.52	**2**	**49**	Molybdenum	Molybdenum
Thallium	7440-28-0	0.07	6.3	0.22	0.01	0.3	--	--
Vanadium	7440-62-2	20.9	7.8	280	**3**	0.07	Vanadium	--
Zinc	7440-66-6	27.7	46	79	0.6	0.4	--	--
Metals								
Mercury	7439-97-6	0.02	0.013	1.7	**2**	0.01	Mercury	--
Decision Unit 4 (Background)								
Metals								
Antimony	7440-36-0	0.07	No ESV	0.27	NA	0.3	--	--
Arsenic	7440-38-2	1.6	43	46	0.04	0.03	--	--
Copper	7440-50-8	8.6	28	49	0.3	0.2	--	--
Lead	7439-92-1	5.3	11	56	0.5	0.09	--	--
Molybdenum	7439-98-7	1.4	15	0.52	0.09	**3**	--	Molybdenum
Thallium	7440-28-0	0.083	6.3	0.22	0.01	0.38	--	--
Vanadium	7440-62-2	19	7.8	280	**2**	0.07	Vanadium	--
Zinc	7440-66-6	21.3	46	79	0.5	0.3	--	--
Metals								
Mercury	7439-97-6	0.02	0.013	1.7	**2**	0.01	Mercury	--

Notes:

Refined SLERA ESVs from NPS 2018; except lead ESV for Birds is from Sample et al 2019, and dioxin TEQ ESVs are from LANL 2017

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

PAHs/PCP = polycyclic aromatic hydrocarbons/pentachlorophenol

SLERA = Screening level ecological risk assessment

TEQ = toxicity equivalency quotient

HQ>1

Table 11. Refined COPEC Selection for Birds and Mammals, Subsurface Soil

COPEC	CASRN	Maximum Subsurface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)		Screening Level Hazard Quotient (HQ)		Birds Refined COPEC Subsurface Soil	Mammals Refined COPEC Subdurface Soil
			Birds	Mammals	Birds	Mammals		
Decision Unit 1								
Metals								
Antimony	7440-36-0	1.80	No ESV	0.27	NA	7	--	Antimony
Arsenic	7440-38-2	2.10	43	46	0.05	0.05	--	--
Barium	7440-39-3	21.10	820	2000	0.03	0.01	--	--
Copper	7440-50-8	56.80	28	49	2	1.2	Copper	Copper
Lead	7439-92-1	29.40	11	56	3	0.5	Lead	--
Molybdenum	7439-98-7	13.90	15	0.52	0.9	27	--	Molybdenum
Thallium	7440-28-0	0.07	6.3	0.22	0.01	0.3	--	--
Vanadium	7440-62-2	20.90	7.8	280	3	0.07	Vanadium	--
Zinc	7440-66-6	56.20	46	79	1.2	0.7	Zinc	--
Metals								
Mercury	7439-97-6	0.02	0.013	1.7	2	0.01	Mercury	--

Notes:

Refined SLERA ESVs from NPS 2018; except molybdenum is from LANL (2017)

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

Table 12. Summary of Risks to Birds and Mammals

COPEC	Threshold-Based HQ					
	Birds			Mammals		
	Herbivore	Insectivore	Carnivore	Herbivore	Insectivore	Carnivore
Decision Unit 1						
Antimony		**--- Not a COPEC ---**		0.1	**2**	0.1
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum		**Not a COPEC**		0.1	**3**	0.1
Vanadium	0.4	0.7	0.04		**--- Not a COPEC ---**	
Decision Unit 2						
Antimony		**--- Not a COPEC ---**		0.04	**2**	0.04
Lead	0.3	1	0.1		**--- Not a COPEC ---**	
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum		**Not a COPEC**		0.1	**5**	0.1
Vanadium	0.5	0.9	0.1		**--- Not a COPEC ---**	
Decision Unit 3						
Antimony		**--- Not a COPEC ---**		0.01	0.5	0.01
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum		**--- Not a COPEC ---**		0.1	**7**	0.2
Vanadium	0.5	0.8	0.05		**--- Not a COPEC ---**	
Decision Unit 1-3						
Antimony		**--- Not a COPEC ---**		0.03	1	0.0
Lead	0.2	0.7	0.05		**--- Not a COPEC ---**	
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum		**--- Not a COPEC ---**		0.11	**5**	0.1
Vanadium	0.4	0.7	0.04		**Not a COPEC for Mammals**	
Decision Unit 4 - Background						
Antimony		**--- Not a COPEC ---**		0.002	0.1	0.002
Lead	0.1	0.2	0.03		**--- Not a COPEC ---**	
Mercury	0.1	0.7	0.00		**--- Not a COPEC ---**	
Molybdenum		**--- Not a COPEC ---**		0.01	0.4	0.01
Vanadium	0.5	0.7	0.04		**--- Not a COPEC ---**	
Decision Unit 1 - Subsurface Soils						
Antimony		NC		NC	**3**	NC
Molybdenum		NC		NC	**4**	NC

Notes:

bold Identified as a COEC for selected receptor and soil type, based on the Threshold-Based HQ>1

COPEC - Chemical of Potential Ecological Concern

SVOC - Semi-Volatile Organic Chemical

TEQ - Toxicity Equivalents

NC - Not calculated, not exposed to subsurface soils

Table 13-1. Background Statistical Analyses - Background (DU4)

COEC	(mg/kg) Rep 1	Rep 2	Rep 3	Mean (mg/kg)	Standard Deviation	95 UCL (mg.kg)
Antimony	0.07	0.07	0.07	0.07	0	NC
Molybdenum	1	1.4	1.2	1.2	0.20	1.7

Notes:

Non-detect

NC - not calculated

COEC = chemical of ecological concern

ISM - Incremental Sample Method

Rep - Replicate

Table 13-2. Background Statistical Analyses - Site DUs

COEC	DU	ISM Replicate Result (mg/kg)			Mean (mg/kg)	Standard Deviation	Ratio Mean Site:Bkg	1-tail, Form 2 Hypothesis H0: S>=B		2-tail, Hypothesis H0: S=B		1-tail, Form 1 Hypothesis H0: S<=B	
		Rep 1	Rep 2	Rep 3				p value	Outcome?	p value	Outcome?	p value	Outcome?
Antimony	DU1	0.5	0.57	1.6	0.89	0.62	13	0.982	Site>=Bkg	0.0369	Site<>Bkg	0.0185	Site>Bkg
	DU2	1.0	0.3	0.07	0.45	0.49	**6**	0.939	Site>=Bkg	0.121	Site=Bkg	0.0607	Site>Bkg
	DU3	0.34	0.20	0.07	0.20	0.14	**3**	0.939	Site>=Bkg	0.121	Site=Bkg	0.0607	Site>Bkg
Molybdenum	DU1	9.2	10.8	10.5	10.2	0.85	**8**	1.000	Site>=Bkg	0.000	Site<>Bkg	0.000	Site>Bkg
	DU2	15.9	4.7	8.3	9.6	5.72	**8**	0.938	Site>=Bkg	0.125	Site=Bkg	0.062	Site>Bkg
	DU3	25.4	20.9	15.8	20.7	4.80	17	0.990	Site>=Bkg	0.019	Site<>Bkg	0.010	Site>Bkg

Notes:

Non-detect

Ratio >1, <5

Ratio >5, <10

Ratio >10

Site>Bkg

Test results with all detects were based on Student's t test

Test results with nondetects were based on Gehan test

COEC = chemical of ecological concern

DU - Decision Unit

H0 - Null hypothesis

ISM - Incremental Sample Method

Rep - Replicate

APPENDICES

Appendix A – Photographic Log

Photo 1 – View of Vogelsang HSC. Orientation: Southeast.

Date: 10/21/20. Time: 1326.

Photo 2 – View of Vogelsang HSC. Orientation: South.

Date: 10/21/20. Time: 1325.

Photo 3 – View looking down on Site. Orientation: South.

Date: 10/21/20. Time: 1127.

Photo 4 – View of Site. Orientation: Southwest.

Date: 10/21/20. Time: 1130.

 Photo 5 – View of waste burial area. Note: debris against tree trunk. Orientation: Northeast. Date: 10/21/20. Time: 1217.	 Photo 6 – View of ephemeral drainage through Site. Orientation: North. Date: 10/21/20. Time: 1218.

Appendix B – Site Investigation Report

NPS Site Inspection Report

Yosemite National Park

Vogelsang Former Waste Disposal Area
EDL #: 5PWR169

Prepared by

CDM Smith

2/15/2019

Signatories:

LCDR Gary Riley, P.E., BCEE	Nicole Athearn, PhD, MBA	Stephen J. Mitchell, P.E.
[Print Park Point-of-Contact (POC) Name/Title]		[Print Regional Environmental Point-of-Contact (POC) Name/Title]
GARY RILEY Digitally signed by GARY RILEY Date: 2019.03.29 13:58:58 -07'00'	NICOLE ATHEARN Digitally signed by NICOLE ATHEARN Date: 2019.03.29 11:20:32 -07'00'	Stephen J Mitchell Digitally signed by Stephen J Mitchell Date: 2019.03.21 13:57:49 -07'00'
[POC Signature]	[Signature]	[POC Signature]
[Date]	[Date]	[Date]

By signing above, the signatories verify that they understand and concur with the information and recommendations presented herein.

NPS Final Site Inspection Report

Vogelsang Former Waste Disposal Area
Yosemite National Park
National Park Service

Document Date: February 15, 2019

Prepared by: CDM Federal Programs Corporation (CDM Smith)
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Preparation Date: February 15, 2019

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Natalie Ross Date

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List of Abbreviations and Acronyms

°F	degrees Fahrenheit
APPL	Agriculture & Priority Pollutants Laboratories, Inc.
ASTM	American Society for Testing and Materials International
bgs	below ground surface
BMP	best management practice
CDM Smith	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	chemical of potential concern
DQI	data quality indicator
DQO	data quality objective
DTSC	California Department of Toxic Substances Control
DU	decision unit
EE/CA	engineering evaluation/cost analysis
EDL	Environmental and Disposal Liabilities
ESI	expanded site inspection
ESL	environmental screening level
ESV	ecological screening value
FSI	focused site inspection
ft^2	square feet
FWDA	Former Waste Disposal Area
GPS	global positioning system
HERO	Office of Human and Ecological Risk
HHRA	human health risk assessment
HQ	hazard quotient
HSC	High Sierra Camp
ISM	incremental sampling methodology
ITRC	Interstate Technology & Regulatory Council
MDL	method detection limit
mg/kg	milligram per kilogram
MS/MSD	matrix spike/matrix spike duplicate
NCP	National Oil and Hazardous Substances Pollution Contingency Plan (aka National Contingency Plan)

NFG	National Function Guidelines

List of Abbreviations and Acronyms (continued)

NPS	National Park Service
OC	organochlorine
PA	preliminary assessment
PAH	polycyclic aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
Park	Yosemite National Park
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PQL	practical quantitation limit
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RL	reporting limit
RSL	Regional Screening Level
RWQCB	San Francisco Bay Regional Water Quality Control Board
SAP	sampling and analysis plan
Site	Vogelsang FWDA
SOP	standard operating procedure
SU	sampling unit
SVOC	semi-volatile organic compound
TEQ	toxicity equivalent
TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WAA	Waste Accumulation Area

1. Introduction

This document is an expanded site inspection (ESI) report for the Vogelsang Former Waste Disposal Area (FWDA) Site (the Site) in Yosemite National Park (Park), California (Environmental and Disposal Liabilities [EDL] #5PWR176). This ESI was prepared by CDM Federal Programs Corporation (CDM Smith) on behalf of the National Park Service (NPS). The purpose of this report is to evaluate the available site data to determine if there is evidence of a hazardous release and to make recommendations as to whether further action is warranted at the Site and, if so, what that action would entail.

1.1. CERCLA and NPS Authority

NPS is authorized under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S. Code Section 9601 et seq., to respond as the lead agency to a release or a threatened release of hazardous substances and/or a release or threatened release of any pollutant or contaminant that may present an imminent and substantial danger to public health or the environment on NPS land.

CERCLA's implementing regulations, codified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations Part 300, establish the framework for responding to such releases and threatened releases. The NCP prescribes two similar processes for responding to releases; removal actions and remedial actions (see NCP Sections 300.400 through 300.440). Under either process, the initial step is to perform a preliminary assessment (PA). If the PA does not: 1) conclude that a release or threat of release exists, 2) confirm whether the contaminants releases include "hazardous substances," or 3) determine whether these contaminants pose a threat to public health or the environment, then environmental sampling is warranted under a site inspection. See NCP Sections 300.410 and 300.420.

This ESI is predicated upon the initial finding(s) of the focused site inspection (FSI) (IT Corporation 2002). The purpose of this ESI is to investigate suspected soil contamination potentially associated with waste disposal activities at the Vogelsang FWDA in order to determine whether a release or potential release of hazardous substances, pollutants, or contaminants has occurred or could occur and provide the basis for NPS to determine whether conditions at the Site warrant further investigation or a no further action determination (i.e., poses no risk to human health or the environment). See NCP Sections 300.410 and 300.420. Evaluations are focused on past and present practices and processes related to the storage, use, and disposal of hazardous substances at the Site. Emphasis is placed on activities that routinely or non-routinely may have led or may lead to releases of hazardous substances into the environment.

1.2. Site Overview

In 1998, California Department of Toxic Substances Control (DTSC) prepared a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) for multiple locations at Yosemite National Park (DTSC 1999). However, due to its remote location, the Site was not inspected during the visual site inspections conducted by DTSC.

Following the completion of the RFA, in August 2001, IT Corporation conducted an FSI of the Vogelsang FWDA[1] to determine potential impacts to soil as a result of waste accumulation at the Site. According to the FSI, the investigation was conducted to determine the nature and extent of chemicals in

[1] The Site is referred to as the Vogelsang Waste Accumulation Area (WAA) in the FSI and other site documents.

the soil as a result of waste accumulation from the Vogelsang High Sierra Camp (HSC) from the early 1930s to the late 1960s or early 1970s (IT Corporation 2002). As part of the FSI, data presented in the RFA were used to complete the Potential Hazardous Waste Site PA Form (provided in Appendix A of the FSI). The FSI concluded site soil had the potential to be adversely impacted but recommended further investigation to better define the nature and extent of these impacts (IT Corporation 2002).

In 2001, NPS entered into a consent agreement with DTSC. NPS agreed to determine the nature and extent of contamination at various sites within the Park, including the Vogelsang FWDA. Under the agreement, NPS is exercising its CERCLA lead agency authority, and DTSC is exercising its RCRA corrective action authority.

In August 2018, an ESI was conducted by CDM Smith to address the data gaps identified in the FSI. The results of the ESI are summarized and evaluated in this report.

1.3. Report Organization

In addition to this introduction, this ESI includes the following sections:

Section 2 provides a detailed site description and history, summarizes previous investigations and response actions, and describes the contamination sources and waste characteristics.

Section 3 briefly describes the sampling and analysis plan (SAP) and the associated data quality objectives (DQOs) of the recent sampling efforts completed in support of this ESI.

Section 4 summarizes the recent field and sample collection activities conducted in support of this ESI and evaluates these data relative to the established DQOs.

Section 5 presents a screening level risk-based evaluation of data collected during the ESI to determine preliminary chemicals of potential concern (COPCs) and evaluate which COPCs are present at concentrations higher than local background/reference[2] levels.

Section 6 provides an evaluation of the potentially contaminated media and associated exposure pathways present at the Site. An evaluation of the potential for a hazardous substance release to each medium is also presented.

Section 7 presents overall conclusions about hazardous substance releases at the Site and provides recommendations as to whether further action is warranted and, if so, what those actions would entail.

Section 8 provides full citations for all guidance documents, reports, analytical methods, site-related documents, and scientific publications referenced in this ESI.

All cited tables, figures, appendices, and attachments are provided at the end of this report.

2. Site Description, Operational History, and Waste Characteristics

This section provides a physical and operational description of the Site and information regarding locations where waste storage, handling, disposal, and deposition may have occurred. The information

[2] The term “background” is typically used to describe naturally occurring chemicals, whereas the term “reference” is used to describe chemicals that are ubiquitous due to anthropogenic (but not site-related) impacts. For simplicity, the term background will be used herein, but should be interpreted as meaning “background/reference.”

presented in this section is primarily derived from the FSI (IT Corporation 2002) and supplemented with more recent data gathered as part of the ESI conducted in August 2018.

2.1. Site Description

2.1.1. Site Location and Description

The Site is in a wilderness area within the Cathedral Range south of Tuolumne Meadows at an elevation of approximately 10,300 feet above mean sea level. The Site is located within a sparsely vegetated subalpine pine forest and is accessed from Tuolumne Meadows via a 6.9-mile hiking trail along Rafferty Creek. The FWDA is about 100 feet southwest of the Vogelsang HSC in a grassy ephemeral drainage between two low granite outcrops. It is bordered by Fletcher Creek to the south, a meadow and leach field to the west, a corral for pack animals to the north, and a granite outcrop to the east. The FWDA encompasses less than 0.25 acre, with most of the subsurface debris concentrated in several depressions. **Figure 2-1** shows the site location.

Appendix A presents photographs of the Site, as collected during the ESI.

2.1.2. Site Geology and Hydrogeology

The following description of site geology is from the 2002 FSI (IT Corporation 2002):

> *The Vogelsang FWDA is located within the Sierra Nevada granitic batholith. The native soil at the site consists mostly of sand and silt with minor clay and gravel. The soil materials are primarily granitic in origin with lesser amounts derived from local metamorphic rocks. The depth to bedrock within the main portion of the FWDA varied between 2.5 and 3.5 feet below ground surface (bgs).*

No evidence of surface drainage or ponding was observed on the Vogelsang FWDA during the FSI in August 2001. No surface water was noted during the ESI in August 2018; however, there was visual evidence of an ephemeral drainage across the FWDA from the northeast to the southwest.

The nearest down-slope surface water occurrence is Fletcher Creek, approximately 350 feet southwest of the FWDA (see **Figure 2-1**). Fletcher Creek flows southwest into the Merced River drainage. Other nearby surface water bodies include Fletcher Lake, Vogelsang Lake, and Boothe Lake; of which only Boothe Lake is downslope from the Site.

2.1.3. Site Hydrology

No groundwater monitoring wells exist within or near the boundary of the FWDA. Groundwater was not encountered in any of the test pits excavated during the FSI. No groundwater was encountered in the borings during the ESI, and most borings met refusal on granite and bedrock within 2 to 3 feet bgs. Therefore, depth to groundwater is unknown at the Site.

The nearest drinking water well is located at the Tuolumne Meadows Ranger Station, 7.5 miles north of Vogelsang in the Tuolumne River drainage system. The nearest drinking water wells near the Merced River drainage are at Yosemite Lodge, approximately 16 miles from the FWDA.

2.1.4. Local Climate

Average total annual precipitation at the Park is 36 inches, with the wet season spanning November to April. The 25-year 24-hour maximum rainfall is 6.51 inches. Average total annual snowfall at the Park is 65 inches, with the heaviest snowfall occurring from December through March. Monthly maximum temperature ranges from 47 to 89 degrees Fahrenheit (°F), and monthly minimum temperature ranges from 25 to 53°F.

2.1.5. Current and Future Property Use Scenarios

The Site is considered natural wilderness and will not be developed in the future per the Wilderness Act. No construction activities are anticipated in the future.

The Vogelsang HSC, which consists of several tent cabins, a kitchen and dining tent, and stable facilities, was established in 1940 as a refuge for backpackers and hikers. The Vogelsang HSC continues to be used as a basecamp for hikes to the surrounding alpine lakes, including Evelyn Lake, Ireland Lakes, Booth Lake, Emeric Lake, and Vogelsang Lake. There is no direct access road into the camp; recreational users access the camp on foot and by horseback.

2.2. Operational History

The NPS archeological report entitled *Victory Culture* (Burton et al. 2003) contains a section on the Vogelsang FWDA. The following discussion of the site operational history is taken from this report.

In an effort to relieve the overcrowding of the Yosemite Valley and to encourage people to visit other parts of the Park, the NPS authorized the Desmond Company to construct “mountain chalets” in the Yosemite backcountry in 1916. The original lodges were built at Merced Lake, Tenaya Lake, and Tuolumne Meadows. Two additional camps, at Little Yosemite Valley and Boothe Lake, were opened in 1924. The Boothe Lake camp was subject to drainage and mosquito problems and was moved in the 1930s to the junction of the Vogelsang, Rafferty Creek, and Lyell Fork trails, and the name was changed to Vogelsang, after the adjacent peak and pass. In 1940, the Vogelsang HSC was moved again, this time to its current location on Fletcher Creek. Today, the Vogelsang camp is open from approximately July to September. Facilities include a stone kitchen with an attached tent dining area and store, 12 tent cabins to accommodate up to 42 guests, a shower tent, a restroom, some storage buildings, a barn, and a corral. A leach field for sewage disposal was constructed in 1965, and a sewer mound was constructed about 1987. All solid waste generated at the camp is now hauled out by pack stock. Water is available at the camp and there is a dispersed backpackers’ campground nearby with a composting toilet.

The Site was formerly used as a waste disposal area; however, disposal records verifying exact dates and uses of the site were not kept. Although NPS archeologists’ investigations (Burton et al. 2003) did not yield any 1940s era trash, it is likely that the era of disposal spanned from 1940 to 1965 and that other waste from this earlier period may be found in other “untested” portions of the Site. During the ESI, an archeological evaluation of the debris was performed; results of this evaluation will be summarized in another forthcoming report.

2.3. Previous Investigations and Response Actions

The NPS conducted a PA site visit in 1998 (“Yosemite National Park Landfill Inventory Report Form”) (NPS 1998). Soil core samples from depths of 2 feet or less at four locations were combined into a single composite soils sample that was analyzed for extractable petroleum hydrocarbons, volatile organic compounds (VOCs), organochlorine (OC) pesticides, polychlorinated biphenyls (PCBs), and metals. All detections were less than default human health screening levels except arsenic, which exceeded the residential soil screening level but was less than the industrial soil screening level; no ecological screening was conducted.

The Site is discussed within DTSC's 1999 RFA (DTSC 1999). However, due to its remote location, the Site was not inspected during the visual site inspections conducted by DTSC.

In August 2001, IT Corporation conducted an FSI at the Site. Due to the Site being within the confines of wilderness, IT Corporation field personnel hand-excavated four test pits within the main debris area at the Site. FSI sampling locations and site characteristics are illustrated in **Figure 2-2**. Supplies were carried in by mules and no heavy equipment or mechanized tools were used. As each test pit was excavated, the site geologist described the soil exposed in the test pit sidewall on a test pit log. The native soil was composed mainly of medium to dark red-brown sand with varying amounts of silt and/or clay and scattered pebbles. Subsurface debris was noted in test pits TP02, TP03, and TP04; these test pits were terminated on bedrock at 2.6 feet, 2.6 feet, and 3.6 feet, respectively. Bedrock was not encountered in TP01 nor at any of the three up-slope test pits or three down-slope test pits (**Figure 2-2**), all of which were terminated at 1 foot bgs because they contained no debris. The three test pits containing subsurface debris (TP02, TP03, TP04) defined a roughly triangular area. Based on an assumption the subsurface debris was continuous between these three test pits and extended several feet beyond their localized area, the FSI estimated the lateral extent of the subsurface debris as approximately 1,800 square feet (ft^2). The FSI noted waste was observed on the surface over lateral extent of about 19,500 ft^2 (see dotted line in **Figure 2-2**) (IT Corporation 2002). Unfortunately, no land survey was performed and no global positioning system (GPS) coordinates were collected during the FSI.

In September 2011, NPS personnel visited the Site and collected information about the extent of surface debris, the nature of the debris, the condition of vegetation at the Site, and the proximity of the Site to surface water and developments associated with the Vogelsang HSC. These findings were documented in a letter to DTSC (NPS 2011). The conclusion of the letter was the nature and extent of the debris at the Site was consistent with what was reported in the 2002 FSI report.

On August 17, 2018, NPS personnel performed a site reconnaissance to collect additional information on the location and extent of the waste piles in preparation for the ESI sampling event. During this reconnaissance, a magnetic utility locator identified eight areas with concentrated metal that aligned with depressions or flat areas with sparse vegetation. Field sketches from this site reconnaissance are presented in **Figure 2-3**. As shown by the red dashed line in **Figure 2-3**, the area encompassed by these eight potential waste areas was estimated to be less than about 0.25 acre in size. Field personnel also noted the ground often sounded hollow underneath these eight areas when placing stakes to mark their location and it was observed the waste areas appeared to be small discrete pits (approximately 10 feet in diameter) (C. Fehrman, personal communication 2018). This observation on the discrete pattern of waste areas is similar to what was noted in the *Victory Culture* report (Burton et al. 2003).

In late August 2018, an ESI was conducted to provide an expanded assessment of site conditions and address data gaps in the FSI (CDM Smith 2018). Sections 3 and 4 summarize the objectives and results of the ESI sampling program.

To date, there have been no response actions conducted at the Site to address potential impacts from the FWDA.

2.4. Known and Potential Source Areas

According to the 2002 FSI, debris was scattered in the surface across the Site (0.45 acre), with a portion of debris extending to the subsurface. The maximum known depth of subsurface debris is 3.5 feet bgs (IT Corporation 2002). The subsurface debris acreage estimated in the FSI assumed a contiguous debris zone; however, during the ESI, debris was observed in small, discrete piles at depths less than 3.5 feet bgs.

The primary medium of potential concern is soil. Given the elevation of the Site, the presence of bedrock at a shallow depth (less than 4 feet bgs), the relatively shallow extent of debris (less than 3.5 feet bgs), and the absence of groundwater at these shallow depths, groundwater is assumed to be not of concern at this Site. Although an ephemeral drainage is present, no surface water has been observed during any of the site investigations. Thus, it is expected water is only present in this drainage during snowmelt and does not provide any aquatic habitat, though it may cause contaminant migration.

Appendix B provides the detailed analytical results, as originally presented in the FSI tables, for the test pit soil samples collected during the FSI. Sample results for soils collected from the FWDA as part of the ESI are summarized and discussed in Section 4.3.

2.5. Waste Characteristics

Waste debris at the Site includes crushed and rusted metal cans, metal household objects, broken glass, and broken china. This debris was observed both during the FSI and the ESI. As noted above, an archeological evaluation of the debris was performed during the ESI and will be summarized in a forthcoming report. Other than what can be deduced from field observations, documentation of waste disposal activities is not available. Waste areas appear to be a series of small discrete pits across the FWDA, with each pit approximately 10 feet in diameter and up to 4 feet in depth.

Based on site knowledge of potential contaminants, the following classes of contaminants may be of potential concern in the source area:

- Metals (including mercury)
- PCBs
- OC pesticides
- Semi-volatile organic compounds (SVOCs)
- Polycyclic aromatic hydrocarbons (PAHs)/pentachlorophenol (PCP)
- Total petroleum hydrocarbon (TPH) for diesel and motor oil
- Dioxins/Furans

Section 5.1 presents a detailed risk-based evaluation of the COPCs for human health and ecological receptors.

2.6. Conceptual Site Exposure Model

The Site is located 100 feet southwest of the Vogelsang HSC, which is one of five HSCs in the Park and features 12 cabins with a total capacity of 42 guest beds. More than 13,000 visitors stay at the HSCs every year and several thousand backpackers stop at the camps for meals[3]. NPS personnel visit the Vogelsang HSC periodically, especially during the peak tourist season (July to September).

Numerous species are present in the Park[4]; however, specific information on species present at the Site is not available. Several species of mammals, birds, plants, and soil invertebrates adapted to high elevation climates are expected to be present at the Site. As described in the FSI, Montane shrew, Trowbridge's shrew, and American robin may be present at the Site. The shrews and the robin have small home ranges, relatively high metabolisms, and elevated food intake per unit body weight. These species also prey on soil invertebrates, which could bioaccumulate some of the chemicals previously detected in site soils. Therefore, these three species were selected as sensitive representative wildlife receptors for the purposes of the screening level ecological risk assessment performed in the FSI (IT Corporation 2002).

Figure 2-4 illustrates the conceptual site exposure model and presents the human and ecological exposure scenarios of potential concern. As seen, human receptors include NPS personnel and recreational visitors. Complete exposure pathways for these human receptors include inhalation of ambient air and ingestion of and dermal contact with surface soil (0 to 6 inches bgs). Due to the Site's age, any volatile organics would likely have volatilized. Therefore, exposure through inhalation of volatile contaminants is likely to be low or negligible. The complete pathway to human receptors with the highest potential to be an important contributor to total risk is ingestion of surface soil.

Ecological receptors of interest include birds, mammals, soil invertebrates, and terrestrial plants. Complete and potentially important exposure pathways for birds and mammals include ingestion of surface soils (0 to 6 inches bgs), subsurface soils[5] (6 inches to 4 feet bgs), and terrestrial dietary items. Direct contact (i.e., dermal exposure) of birds and mammals to soils may occur in some cases, but these exposures are usually considered to be minor in comparison to exposures from ingestion (United States Environmental Protection Agency [USEPA] 2005). Although inhalation exposures are possible for all birds and mammals, as noted above, it is not expected volatile contaminants would be present in ambient air. The inhalation pathway is generally considered to be minor compared to ingestion pathways (USEPA 2005), and inhalation-based toxicity information is lacking.

Complete and potentially important exposure pathways for terrestrial plants and soil invertebrates include direct contact with surface and subsurface soils. Although most terrestrial plants (e.g., ground cover and grasses) and invertebrates would only be exposed to surface soils (0 to 6 inches bgs), it is possible deeper soils (up to 4 feet bgs) could be encountered by plants with deeper roots (e.g., trees) and burrowing soil invertebrates. For terrestrial plants, exposure may also occur from deposition of dust on foliar (leaf) surfaces; however, this pathway is believed to be small compared to root exposures.

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[3] This information is attributed to the following website: https://www.travelyosemite.com/lodging/high-sierra-camps/#vogelsang
[4] Source: https://www.nps.gov/yose/learn/nature/npspecies.htm
[5] Subsurface soils would only be encountered by burrowing mammals.

3. Sampling and Analysis Plan and Data Quality Objectives Summary

This section provides a summary of the SAP and DQOs that guided the collection of data under the ESI.

3.1. Sampling and Analysis Plan

Information in the FSI provides useful data on the visual extent of debris (in the subsurface only[6]); however, it is possible that chemical contamination may extend beyond the area of visual debris. The FSI data were not adequate to determine the nature and extent of chemical contamination, characterize potential human and ecological risks, or evaluate if chemical contamination is a consequence of site-related activities. Therefore, it was determined additional soil concentration data were needed define the nature and extent of contamination at the Site and to establish site-specific background conditions.

The purpose of the ESI sampling program was to complete data collection activities that would adequately characterize the nature and extent of contamination, support assessment of human health and ecological risks (if required), and determine whether a response action would be required at the Site. The SAP proposed specific activities to supplement existing data and fill gaps in current understanding of contamination at the Site. The following activities were recommended:

- Further investigation to determine the extent of chemical concentrations in soil, including:
  - Delineation of the lateral extent of debris in surface soils (estimated to be 19,500 ft^2 in the FSI) and subsurface soils (estimated to be 1,800 ft^2 in the FSI)
  - Delineation of the vertical extent of debris in subsurface soils (estimated to be 3 to 4 feet bgs in the FSI)
  - Collection of surface soil samples from within the surface debris-containing area
  - Collection of subsurface soil samples from within the subsurface debris-containing area in the FWDA
  - Collection of surface soil samples to determine if chemicals have migrated outside the FWDA footprint[7]
- Collection of a localized background dataset for baseline comparison of chemical detections in Site soil

The ESI was performed in accordance with the final *NPS Sampling and Analysis Plan, Yosemite National Park, Vogelsang Former Waste Disposal Area* (CDM Smith 2018), hereafter referred to as the *ESI SAP*. Activities conducted and samples generated as part of this investigation were collected, documented, and handled in accordance with sample collection and analysis methods and standard operating procedures (SOPs) specified in the SAP. Issues and deviations from the SAP occurring during the site investigation are discussed in Section 4.3.2 of this report.

All field activities followed best management practices (BMPs) as described in the *Standard Guide for Greener Cleanups* (American Society for Testing and Materials International [ASTM] 2014) and CDM Smith SOPs. BMPs applicable to investigation activities at the Site are presented in **Table 3-1**. These BMPs were prioritized based on potential positive impact and subsequently either included or excluded for implementation following further evaluation per the rationale provided in the table.

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[6] Surface debris was observed during the FSI; however, only the extent of the subsurface debris was delineated.
[7] The "FWDA footprint" is identified as the surface debris area within the dotted line presented on **Figure 2-2.**

3.2. Data Quality Objectives

Detailed DQOs for the ESI were defined in Section 4 of the *ESI SAP*. Although the primary objective of this investigation was to support the ESI, DQOs were developed such that the resulting data would be adequate to support baseline human health and ecological risk assessments as part of an engineering evaluation/cost analysis (EE/CA) based on the potential the ESI could show further site characterization and risk assessment may be warranted. The ESI DQOs are summarized in Sections 3.2.1 through 3.2.5 below. An evaluation of whether the collected ESI data meet these stated DQOs is presented in Section 4.4.

3.2.1. Investigation Questions

The principal investigation questions for the ESI, as established in the DQOs, were as follows:

- **E1 (Lateral and Vertical Extent of Debris).** What is the lateral and vertical extent of debris in surface and subsurface soils around the FWDA footprint?
- **E2 (Lateral Extent of Chemical Contamination in Surface and Subsurface Soil).** What is the lateral extent of chemical contamination in surface and subsurface soil within and around the FWDA footprint?
- **D1 (Site Soil versus Background).** Are site surface and subsurface soil chemical concentrations higher than local background levels?

3.2.2. Information Inputs

The DQOs identified the following data for collection to address these investigation questions:

Lateral and Vertical Extents of Debris (E1) – The following information is needed to document the lateral and vertical extents of debris in surface and subsurface soils:

- Visual inspection of soil borings of surface (0 to 6 inches) and subsurface soils (6 inches to 4 feet)
- GPS coordinates for the location of debris and of each soil boring

Lateral Extent of Contamination (E2) – The following information is needed to document the lateral extent of chemical contamination in surface soil:

- Measured concentrations of site-related contaminants[8] in surface and subsurface soil samples collected within the FWDA footprint and in areas surrounding the footprint
- GPS coordinates for the location of the boundaries of each decision unit (DU) and sampling unit (SU)

Soil versus Background (D1) – The following information is needed to perform a statistical comparison of site surface and subsurface soil concentrations to local background levels:

- Measured concentrations of site-related contaminants in soil samples collected within human and ecological exposure areas for the Site

[8] Potentially site-related contaminants include metals, PAHs, TPH, PCBs, dioxins/furans, SVOCs, and OC pesticides.

- Measured concentrations of naturally occurring chemicals (e.g., metals) and ubiquitous anthropogenic chemicals (e.g., dioxins) in surface soil[9] samples collected from a nearby location that has not been impacted by site activities

3.2.3. Spatial and Temporal Bounds

Spatial Bounds

The DQOs established both lateral and vertical bounds for the soil investigation. The Site is located within a 0.45-acre sparsely vegetated subalpine pine forest. The results of the 2002 FSI provide information on the extent of visual surface debris (see **Figure 2-2**). The bottom of the debris layer was estimated to be less than 3.5 feet bgs in the FSI. For purposes of the ESI, the lateral bounds for the subsurface soil collection included areas where debris was present. The lateral bounds for the surface soil collection included the debris footprint and extended around this footprint and beyond the footprint in the downgradient (southwest) direction. Focus was placed on the downgradient (southwest) direction, rather than in the upgradient (northeast) or cross-gradient directions, based on the assumption that, if physical transport of debris and debris-related chemical contamination was occurring, it would likely be due to surface runoff.

The target depth of soil sampling was determined based upon the interval to which each receptor could be exposed. For human health, receptors may include NPS personnel and recreational visitors (hikers, campers) who are likely to be exposed only to surface soils (0 to 6 inches bgs). No construction activities are anticipated in the future. For ecological receptors, most are likely to be exposed to surface soil (0 to 6 inches bgs), but some ecological receptors may be exposed to deeper (subsurface) soil, such as burrowing animals and plants with deeper roots. Because the debris layer in subsurface soil was assumed to be less than 3.5 feet bgs, bedrock is present at a shallow depth (less than 4 feet bgs) and, to be consistent with other contaminated site investigations conducted within the Park, the DQOs specified a depth interval of 0 to 4 feet bgs for receptors exposed to subsurface soil. Although the default recommended by DTSC for burrowing animals is 6 feet (DTSC 1998), a depth of 4 feet was selected to avoid biasing measured soil concentrations due to the inclusion of deeper, less contaminated soils.

The DQOs also established that, when selecting an appropriate background soil location, the goal was to identify an area 1) not influenced by site activities, 2) representative of naturally occurring levels and anthropogenic (but not site-related) influences in the local area, and 3) having soil characteristics (i.e., geology, particle size) similar to the Site.

Temporal Bounds

It is not expected chemical concentrations in soil would vary substantially over time (i.e., seasonal variation is not expected). Therefore, there were no temporal constraints established for the soil investigation.

[9] Only surface soil is proposed for the background area because it is anticipated that in the absence of a contamination source chemical concentrations generally should be similar for surface and subsurface soil.

Decision Unit Sizes

A DU is the smallest user-defined area for which a decision will be made (e.g., to clean up or not clean up) based on sampling. A DU may consist of one or more SUs. SUs are user-defined areas from which samples are collected to determine a representative concentration for that area.

Because of the Site's small extent (less than an acre), the exposure area for human receptor populations is likely to encompass the entire Site (i.e., the DU for human health would be the entire Site). For ecological receptors, the exposure area varies, depending upon the home range size of the receptor. To ensure the resulting ESI data were adequate to support risk estimates for multiple receptor types, including receptors with both small and large home range sizes, the DQOs established the minimum DU size be set equal to the home range size for the smallest surrogate wildlife species home range (e.g., shrew or robin), which is typically about 0.25 acre in size.

For purposes of delineating the lateral extent of chemical contamination within a DU, smaller SUs were needed to allow for the determination of spatial patterns. Based on the 2018 site reconnaissance, the waste areas appeared to be small discrete pits (approximately 10 feet in diameter); thus, the DQOs established the SU size should not be larger than about 200 ft^2 (approximately 0.005 acre) for locations within the debris area. The DQOs also established the SU sizes could be larger (up to about 0.1 acre in size) outside the debris area, where chemical contamination (if present) would be from transport via surface runoff and expected to be more contiguous in nature.

3.2.4. Performance and Acceptance Criteria

The DQOs presented both acceptable limits on estimation uncertainty and tolerable limits for decision errors.

Lateral and Vertical Extents of Debris (E1) – The estimate of the lateral and vertical extents of debris in surface and subsurface soil will be mapped using information from soil borings as determined through GPS coordinates. The DQOs specified GPS coordinate data be reported as latitude and longitude, and the coordinate point be accurate within 10 feet.

Lateral Extent of Chemical Contamination (E2) – Estimates of the lateral extent of chemical contamination in surface and subsurface soil will be mapped using information on the DU and SU boundaries as determined through GPS coordinates. The DQOs specified that GPS coordinate data be reported as latitude and longitude, and the coordinate point be accurate within 10 feet.

Soil versus Background (D1) – The DQOs specified comparisons of site concentrations to background concentrations employ two-sample hypothesis testing. The form of this hypothesis test will assume that concentrations are site-related until proven otherwise (i.e., Form 2 background test [USEPA 2002]). As specified in the DQOs, the probability of a Type I error was not to exceed 10 percent ($\alpha = 0.10$), and the probability of a Type II error was not to exceed 20 percent ($\beta = 0.2$). The minimum number of samples needed to perform a two-sample hypothesis test is three samples from each area (three samples from the Site and three samples from the background). In addition, the DQOs required samples from each area be collected using the same sampling methodology.

3.2.5. Quality Assurance/Quality Control Criteria

The data quality indicators (DQIs) and the associated measurement performance criteria specific for each analytical method were presented in Table 3 of the *ESI SAP*. The DQIs include precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) and are determined based on results from field and laboratory quality control samples (e.g., field duplicates, rinsate blanks, matrix spike/matrix spike duplicates [MS/MSD], calibration verification standards, laboratory blanks) and a review of the reported field sample data.

As specified in the *ESI SAP*, 20 percent of the analytical data collected from the ESI were evaluated by checklist format. Chemical analytical data were evaluated according to the laboratory-specific limits and methodology, *Contract Laboratory Program National Functional Guidelines (NFG) for Organic Superfund Methods Data Review* (USEPA 2017a), and *Contractor Laboratory Program NFG for Inorganic Superfund Methods Data Review* (USEPA 2017b). If the measurement performance criteria for the DQIs were not met, data were either qualified as estimated or rejected per the NFG guidance (USEPA 2017a, 2017b). Qualified results may be used to support site decision-making, with caution, while rejected results cannot be used. **Appendix C** summarizes the results of the data validation. Some analyses were J-qualified (estimated) and two analyte results were rejected (R-qualified) (see Section 4 for sample-specific results). The J-qualified data are usable for the intended ESI purpose, but R-qualified data are not used.

4. Field Activities and Deviations from the Sampling and Analysis Plan

This section provides a summary of the field activities conducted during the ESI and documents any deviations from the SAP that occurred during sampling and/or analysis.

4.1. Field Activities and Sample Collection

The ESI field activities were conducted by CDM Smith from August 28 to 30, 2018. As described in the *ESI SAP*, the planned investigation included:

- Surface and subsurface discrete soil sampling
- Surface and subsurface soil sampling using an incremental sampling methodology (ISM)
- Differential GPS of sampling locations

Figure 4-1 provides an overview of each of the investigation boring, DU, and SU locations. As shown, 17 soil borings were advanced at the beginning of the field investigation to delineate the extent of subsurface waste and collect discrete surface and subsurface soil samples. The soil investigation included ISM sampling of three primary site DU areas (DU-1 through DU-3), which encompassed the areas potentially impacted by waste, and one background DU (DU-4). For the purposes of further delineating the lateral extent of chemical contamination, DU-2 and DU-3 were subdivided into three SUs. Boring logs and ISM sampling forms are provided in **Appendix D**.

Surface soil sampling was performed at each DU using an ISM approach (Interstate Technology & Regulatory Council [ITRC] 2012). A detailed description of the ISM sample collection and field documentation procedures is provided in the *ESI SAP*. The following provides a summary of each component of the sampling performed:

Discrete Soil Borings: Seventeen soil borings were advanced in the vicinity of the FWDA. The placement of each boring was selected in the field preferentially sampling areas with visual observations of waste along the surface, areas with previous detection of metal debris (during the site reconnaissance using a metal detector), or in areas of shallow depressions. Each soil boring was attempted to a depth of 4 feet bgs using a hand auger; however, due to refusal on shallow bedrock, the maximum depth achieved was 3 feet bgs (boring B11). If debris was encountered within the borehole, the discrete soil sample was collected near the middle of the debris depth interval. If no debris was present, a surface sample was collected from 0 to 6 inches bgs. A total of 17 discrete soil boring samples were collected and analyzed for CA Title 22 metals (CAM 17) by EPA Method 6020A/7471A. Observations of debris in the soil borings were used to delineate the boundary of DU-1.

DU-1: DU-1 encompassed the extent of the FWDA with subsurface debris present with an area of approximately 8,271 ft^2 (0.19 acres). The DU was divided into 30 equal area increments with three surface (0 to 6 inches bgs) and three subsurface (6 inches to 4 feet bgs) replicates collected. For surface sampling, 28 of 30 increments were collected for each of three replicates (2 of 30 were not collected due to refusal at the surface). For subsurface sampling, between 17 and 19 increments out of 30 were successfully collected for each of three replicates, with missing increments due to shallow refusal on bedrock.

DU-2: DU-2 encircled the DU-1 area by approximately 15 to 30 feet in all directions with an area of approximately 9,326 ft^2 (0.21 acres). DU-2 was subdivided into three roughly equal SU areas, with SU-1 located in the downgradient direction, and SU-2/SU-3 located in the up/cross gradient direction. One ISM sample of 30 increments was collected in each SU area. Several shallow refusals in SU-2 and SU-3 were encountered on the surface due to exposed bedrock in these areas. The approximate size of each SU area in DU-2 is as follows:

- SU-1: 3,311 ft^2 (0.076 acre)
- SU-2: 2,614 ft^2 (0.060 acre)
- SU-3: 3,398 ft^2 (0.078 acre)

DU-3: DU-3 extended beyond DU-2 by approximately 80 to 90 feet in the downgradient direction with an area of approximately 10,224 ft^2 (0.23 acre). DU-3 was subdivided into three roughly equal SU areas with SU-1, SU-2, and SU3 located at increasing distance in the downgradient direction. One ISM sample of 30 increments was collected in each SU area. Shallow refusals at DU-3 were generally not encountered due to more well-developed soil. The approximate size of each SU area in DU-3 is as follows:

- SU-1: 3,180 ft^2 (0.073 acre)
- SU-2: 2,962 ft^2 (0.068 acre)
- SU-3: 4,095 ft^2 (0.094 acre)

4.1.1.Potential Source Samples

The main source of contamination at the Site is waste debris. As described above, the FWDA was divided into three site DUs (see **Figure 4-1**). Samples from DU-1 are expected to represent potential source samples. Three ISM replicate soil samples were collected from each of two depth intervals in DU-1. The subsurface soil boring samples (i.e., the 10 samples where visual debris was noted) are expected to represent potential source samples.

Samples from DU-2 and DU-3 may contain impacted soils, depending upon the extent of FWDA contamination outside of DU-1. Three ISM surface soil samples were collected from DU-2 and DU-3, one from each SU.

4.1.2. Exposure Pathway Samples

As illustrated in the conceptual site model for exposure (see **Figure 2-4**), there are several potentially complete exposure pathways for human and ecological receptor populations. For human receptors, the exposure pathway with the highest potential to be an important contributor to total risk is incidental ingestion of surface soil (0 to 6 inches bgs).

Ecological receptors of interest include birds, mammals, soil invertebrates, and terrestrial plants. Complete and potentially important exposure pathways for birds and mammals include ingestion of surface soil (0 to 6 inches bgs), subsurface soil (6 inches to 4 feet bgs), and dietary items. Complete and potentially important exposure pathways for terrestrial plants and soil invertebrates include direct contact with surface soil (0 to 6 inches bgs) and subsurface soil (6 inches to 4 feet bgs).

Surface and subsurface ISM soil samples collected from the site DUs (DU-1 to DU-3; see **Figure 4-1**) provide measured data to evaluate human and ecological exposures to soil at the FWDA.

4.1.3. Background Samples

As noted above, the background DU (DU-4; see **Figure 4-1**) is in an area without surface or subsurface debris and which exhibited similar characteristics, soil composition, and geology as the FWDA (prior to waste disposal operations). DU-4 was approximately 10,698 ft^2 (0.25 acre). During the ESI, an NPS staff archaeologist was present to confirm there were no known archeological, cultural, or ethnographic sites present within the background unit. DU-4 was divided into 30 equal area increments and three ISM replicate surface soil samples (0 to 6 inches bgs) were collected from the background DU using the same sampling methods as used in site DU-1. These background samples provide measured data to determine if soil concentrations in the site DUs are attributable to FWDA-related activities.

4.2. Analytical Methods

All discrete soil boring and incremental soil samples were sent to Agriculture & Priority Pollutants Laboratories, Inc. (APPL) for sample preparation and the analysis of metals, PAHs, PCP, OC pesticides, PCBs (as Aroclors), SVOCs, and TPH diesel and motor oil (with and without silica gel cleanup). One surface soil and one subsurface soil ISM replicate from DU-1, the surface soil ISM sample from SU-1[10] for DU-2 and DU-3, and one surface soil ISM replicate from DU-4 were analyzed for dioxin/furan congeners.

[10] SU-1 samples were selected because they represent the closest SU downgradient of DU-1.

4.3. Results

Tables 4-1 to **4-8** present the detailed analytical results, including any data qualifiers, for every soil sample collected during the ESI (one table per chemical group, i.e., metals, dioxins/furans, OC pesticides). **Appendix E** provides the detailed laboratory reports for all samples collected during the ESI.

4.3.1. Nature and Extent of Chemical Detections

This section presents a brief summary of the detected chemicals for soil samples collected during the ESI. These soil sample results are evaluated and discussed further in Sections 5 and 6.

Metals (Table 4-1). Seventeen metals were detected in one or more soil boring samples. Concentrations tended to be higher in subsurface samples (where debris was observed) than the surface samples (where no debris was observed). Concentrations of antimony, copper, lead, and silver in subsurface soil samples were more than 10 times greater than concentrations in surface soil samples. Inspection of the metal concentrations for the boring samples shows lead may be a useful indicator metal for debris-associated chemical contamination and that the highest lead concentrations are associated with elevated concentrations of other metals. **Figure 4-2** illustrates the measured soil concentration of lead in each boring sample. As shown, when no debris was observed (shown as circle symbols on the map), soil lead concentrations were less than 80 milligrams per kilogram (mg/kg). However, with one exception, where debris was observed (shown as triangle symbols on the map), soil lead concentrations exceeded 80 mg/kg and were as high as 581 mg/kg.

Metals (**Table 4-2**). Seventeen metals were detected in one or more ISM soil samples. Concentrations of several metals appear elevated in DU-1 relative to the other site DUs and the background area (DU-4). Concentrations of antimony, cadmium, copper, lead, and molybdenum in DU-1 appear to be higher than other metals when compared to the background area. In addition, the spatial pattern of contamination for these metals in DU-2 and DU-3 generally shows decreasing soil concentrations with increasing distance from DU-1. See Section 5.2 for further comparisons of concentrations in site soils to local background levels.

Dioxins/Furans (**Table 4-3**). The dioxin toxicity equivalent (TEQ) concentrations for site soils appear elevated compared to the background area (DU-4). There were three dioxin/furan congeners detected in DU-1, and reported TEQ concentrations were about 300 times higher than the background area (DU-4). Similar to metals, the spatial pattern of TEQ contamination in DU-2 and DU-3 shows decreasing soil concentrations with increasing distance from DU-1.

PAHs/PCP (**Table 4-4**). Eight PAHs and PCP were detected in two soil samples from two site DUs (DU-2 and DU-3). The detection frequency and reported concentrations tended to be higher in DU-3 compared to the other site DUs. No PAHs were detected in DU-1 or the background area (DU-4).

PCBs (**Table 4-5**). No PCBs were detected in the site DUs (DU-1 to DU-3) or the background area (DU-4).

OC Pesticides (**Table 4-6**). No OC pesticides were detected in site DUs (DU-1 to DU-3) or the background area (DU-4).

SVOCs (**Table 4-7**). No SVOCs were detected in site DUs (DU-1 to DU-3) or the background area (DU-4).

TPH (**Table 4-8**). TPH diesel fuel and TPH motor oil was detected in all samples. Concentrations in the site DUs appear to be generally consistent with reported levels in the background area (DU-4).

In general, results from the ESI are consistent with results from the FSI. In both investigations, debris was identified in the subsurface locations downgradient of the FWDA. Metals, dioxin/furan congeners, and TPHs were detected in subsurface soil samples collected during the FSI and ESI. VOCs, SVOCs, and pesticides were detected in one or more test pits collected during the FSI; however, these chemicals were not detected from samples collected during the ESI. During the FSI, soil samples were collected from the subsurface only; therefore, a comparison of surface soil samples collected during the ESI cannot be made.

4.3.2. Deviations from the Sampling and Analysis Plan

All activities conducted during the 2018 field investigation were performed according to the *ESI SAP*, with the following exceptions:

- Several refusals were encountered due to shallow bedrock that reduced the number of increments collected for some ISM replicates. These refusals were documented on the ISM field sampling forms (see **Appendix D**).

- The extent of DU-3 was expanded to approximately 80 to 90 feet beyond DU-2 rather than 30 to 50 feet as stated in the *ESI SAP*. The basis for this decision was to increase the total area of the DU to achieve the target area of 0.25 acre per DU. Additionally, the downgradient area was narrower than depicted in the *ESI SAP* and therefore required a longer distance in the downgradient direction.

- DU-4 was moved approximately 400 feet west from the original location identified in the *ESI SAP*. This was due to the original location being in close proximity to several NPS-identified archeological sites and a high volume of hiker traffic from the Vogelsang HSC.

4.4. Data Quality Objectives Evaluation

The DQOs established in the *ESI SAP* were summarized in Section 3.2. The ESI soil sampling was designed to provide data to: 1) quantify chemical exposures in site soil (surface and subsurface) for use in human health and ecological risk assessment, 2) establish the lateral extent of chemical contamination in surface soil around the FWDA footprint, and 3) determine if site chemical soil concentrations are higher than local background levels. The DQOs set forth the requirements for appropriate soil sampling procedures, required analytical methods, spatial (both vertically and horizontally) and temporal limits, DU acreage limits, and minimum sample requirements. The *ESI SAP* also established DQI measurement performance criteria, which were assessed by the CDM Smith data validator in accordance with the NFG guidance (USEPA 2017a, 2017b). As appropriate, data qualifiers were assigned to alert data users to potential data quality issues. **Appendix C** summarizes the results of the validation. **Tables 4-1** to **4-8** include the assigned data qualifiers; some samples were J-qualified, and results for two SVOC analytes in one sample were rejected (R-qualified). Results for 3/4-methylphenol and 4-chlorophenyl phenyl ether, analyzed in subsurface soil boring sample (DU01-SB-02) from DU-1, were rejected. These two SVOCs were not detected in either of the two co-located ISM replicate samples for DU-1; thus, the rejection of these two results is not expected to impact data interpretation for DU-1.

A review of the ESI soil results shows the soil investigation achieved the stated DQOs and data will be adequate to address the study objectives for soil (see Section 3.2).

5. Screening Level Evaluation

This section presents a screening level evaluation of data collected during the ESI to: 1) determine COPCs for each exposure medium, 2) evaluate analytical method detection limit adequacy to support risk assessment, and 3) evaluate which site COPCs are higher than background. The risk-based evaluation of soil is presented in Section 5.1 and the background evaluation is presented in Section 5.2.

5.1. Risk-based Evaluation

5.1.1.Human Health Risk Evaluation

Several human receptor populations are anticipated to be present at the Site, including NPS personnel and recreational visitors (hikers, campers). There are multiple media types and exposure pathways by which human receptors may be exposed to contaminants at the Site (see the conceptual site model for exposure in **Figure 2-4**).

Selection of Chemicals of Potential Concern

This COPC selection was based on the data collected in the ESI (see **Tables 4-1** to **4-8**). Human health COPCs were identified for soil by comparing the maximum concentration across all DUs to the established project screening levels for human health (CDM Smith 2018). Although it is recognized that residential receptors are not present at the Site and are not anticipated to be present in the future, the screening level risk evaluation was performed based on residential screening levels because these are the most conservative values. The following sources were used for the selection of project screening levels:

- USEPA Regional Screening Levels (RSLs) (USEPA 2018) for residential soil[11] with a target cancer risk of 1E-06 and a target hazard quotient (HQ) of 0.1
- DTSC Human and Ecological Risk Office (HERO) Human Health Risk Assessment (HHRA) Note 3 (DTSC 2018)
- San Francisco Bay Regional Water Quality Control Board (RWQCB) environmental screening levels (ESLs) for residential shallow soil (less than 3 meters bgs) (RWQCB 2019)[12]

The lowest screening level, across all three sources, was used to select human health COPCs.

Table 5-1 summarizes the results of the soil COPC selection for human health; detailed COPC selection tables are presented in **Appendix F**. Human health COPCs were identified for surface soil and subsurface soil[13] for several metals. In total, seven human health COPCs were identified for soil: antimony (subsurface only), arsenic, chromium, cobalt, copper (subsurface only), lead (subsurface only), and thallium

[11] The residential soil RSL is protective of incidental ingestion of soil/dust, dermal contact with soil, and inhalation of air.
[12] There are no USEPA or DTSC screening levels for TPH-DRO or TPH-MO. The RWQCB ESLs were the screening level source for TPHs but were not applied for other chemicals.
[13] Although it is not anticipated human receptors would be exposed to subsurface soil, this COPC selection included both depth intervals for completeness.

Evaluation of Laboratory Limits

There are two different types of laboratory limits identified in the laboratory deliverables—method detection limit (MDL) and reporting limit (RL). The MDL is defined as the minimum concentration of a chemical that can be measured and reported with 99 percent confidence it is present above zero. The Code of Federal Regulations (CFR) defines how to calculate the MDL (40 CFR, Chapter 1, Subchapter D, Part 36, Appendix B). The RL is an arbitrary number defined by the laboratory and is sometimes set equal to the practical quantitation limit (PQL) by the laboratory. PQLs are often equal to the lowest laboratory standard level within the sample set and are normally about 3 to 10 times higher than the MDL. Confidence in reported concentrations above the PQL is higher than for concentrations between the MDL and the PQL. .

For the soil analysis results, the detect/non-detect status (i.e., U-qualified) for a chemical was determined based on the MDL. If the chemical was not present at a level above the MDL, the result was reported as non-detect (i.e., U-qualified). When the chemical was present at a concentration between the MDL and the RL, the result was reported as an estimated concentration (i.e., J-qualified). When the chemical was present at a concentration above the RL, there was no qualifier assigned to the reported concentration. J-qualified data are considered acceptable for use in risk assessments.

The adequacy of the MDL for each chemical was determined by comparing the maximum MDL (across all non-detect samples) to the lowest available human health screening level (see **Appendix F**). For those chemicals where the maximum MDL is higher than the lowest available screening level and there is a low detection frequency (less than 10 percent), the MDL was deemed to be inadequate. **Table 5-2** summarizes the analytes with inadequate detection limits relative to the human health screening levels.

The maximum MDL for 10 SVOCs for soil were inadequate for this screening level human health evaluation. However, the use of residential screening levels to identify COPCs for a recreational exposure scenario is conservative, and it is possible that the achieved MDLs may be adequate to support risk management decision-making in a baseline HHRA. The MDLs for all other analytes in soil were deemed to be adequate to support a screening level human health evaluation.

5.1.2.Ecological Risk Evaluation

Several ecological receptors are anticipated to be present at the Site, including birds, mammals, terrestrial plants, and soil invertebrates. There are multiple media types and exposure pathways by which ecological receptors may be exposed to contaminants at the Site (see **Figure 2-4**) as described below:

- Soil – The primary medium of concern is soil, both surface (0 to 6 inches bgs) and subsurface (greater than 6 inches bgs). The primary exposure pathway for birds and mammals is incidental ingestion of soil while feeding or digging. The primary exposure pathway for terrestrial plants and soil invertebrates is direct contact with soil. Most wildlife and soil invertebrates are likely to be exposed only at the surface, but burrowing mammals and deeper plant roots may be exposed to subsurface soils at depths up to 4 feet.
- Food items – Ingestion of terrestrial food items (e.g., plants, invertebrates, prey items) that may have taken up contaminants into their tissues from soil exposure is of potential concern for birds and mammals at the Site.

Selection of Chemicals of Potential Concern

This COPC selection was based on the soil data collected in the ESI (see **Tables 4-1** to **4-8**). Ecological COPCs were identified by comparing the maximum concentration across all DUs to the established project screening levels for ecological receptors. Project screening levels are based on the ecological screening values (ESVs) presented in *NPS Protocol for the Selection and Use of Ecological Screening Values for Non-Radiological Analytes (Revision 3)* (NPS 2018) for COPC selection.

The lowest soil ESV, across available values for terrestrial plants/soil invertebrates and birds/mammals[14], was used to select ecological COPCs for soil. **Table 5-1** summarizes the results of the COPC selection for ecological receptors; detailed COPC selection tables are presented in **Appendix F**. Ecological COPCs were identified for surface soil and subsurface for several metals and PCP. In total, there were 14 ecological COPCs identified for surface soil (**Appendix F1**): antimony, arsenic, barium, chromium, copper, lead, mercury, molybdenum, nickel, thallium, vanadium, zinc, PCP, and TEQ (dioxins/furans). There were 15 ecological COPCs identified for subsurface soil (**Appendix F2**). The list of ecological COPCs for subsurface soil is the same as for surface soil, but with the addition of cadmium, cobalt, and silver and with the exclusion of PCP and TEQ (dioxins/furans).

Evaluation of Laboratory Limits

As noted above, there are two different types of laboratory limits identified in the laboratory deliverables—MDL and RL. See Section 5.1.1 above for a brief discussion of the differences between and interpretation of these two laboratory limits. The adequacy of the MDL for each chemical was determined by comparing the maximum MDL to the lowest ESV (see **Appendix F**). For those chemicals where the maximum MDL is greater than the lowest ESV and there is a low detection frequency (less than 10 percent), the MDL was deemed to be inadequate.

Table 5-2 summarizes the analytes with inadequate detection limits relative to the ecological screening levels. As shown, there were 22 analytes, including mercury and several SVOCs, with reported MDLs that were inadequate relative to the lowest ESV. This detection limit issue was recognized at the time of the SAP development (CDM Smith 2018), and the analytical methods employed in the investigation provide the best available detection limits using conventional analytical instruments. The MDLs for all other analytes were deemed to be adequate to support a screening-level ecological receptor evaluation.

5.2. Background Evaluation

Metals are naturally occurring in soil. In addition, some metals (e.g., lead) and organic chemicals (e.g., PAHs, dioxins) may be present in soil due to anthropogenic, but non-site related impacts. Therefore, the ESI included the collection of data on background concentrations in soil to distinguish between site-related contamination and concentrations that are consistent with background.

Concentrations of metal COPCs in site soil samples (DU-1 to DU-3) were statistically compared to concentrations in the background area (DU-4) using a one-tailed Student's t-test (Form 2[15]; $\alpha = 0.10$), which is one of the two-sample hypothesis testing approaches recommended by USEPA (2002) and has

[14] The ESVs for birds and mammals are protective of both ingestion of dietary items and incidental ingestion of soil.
[15] The null hypothesis of a Form 2 test assumes site concentrations are greater than or equal to background, until there is significant evidence to reject this assumption.

been demonstrated to work well with ISM datasets (Pooler et al. 2018). As recommended in Pooler et al., datasets were log-transformed prior to evaluation. Detailed results of this statistical evaluation are presented in **Appendix G** and are summarized in **Table 5-3.** As shown, with few exceptions, metal concentrations in soil for most of the site DUs were statistically higher than the background area (DU-4). However, it is possible that, while concentrations are deemed statistically different (based on a Form 2 hypothesis test), they may not be meaningfully different from a risk management perspective. For example, the mean lead concentration in surface soil was 5.0 mg/kg in DU-3 and 4.8 mg/kg in DU-4. Thus, while concentrations in DU-3 may be elevated relative to the mean background level, because the values are so close, it is possible concentrations in the site DUs are within the range of expected local background concentrations. It is recommended additional background evaluations be performed, as part of a baseline risk assessment, using either a Form 1 approach and/or a Form 2 approach and specifying an appropriate substantial difference (S) in the statistical comparison (USEPA 2002).

As recommended in the ITRC ISM guidance (ITRC 2012), background evaluations should not rely solely upon statistical evaluations but should consider multiple evaluation methods, including qualitative methods such as graphical illustrations. **Appendix H** provides a graphical presentation of the comparison of metal COPC concentrations in soil for each DU. In these figures, the reported concentrations for each soil sample for the three site DUs (DU-1 to DU-3) and the background area (DU-4) are presented. Discrete soil samples (in DU-1 only) are shown as triangles and ISM soil samples are shown as circles; surface and subsurface samples are shown in different colors. The lowest human health and ecological project screening levels are also shown for reference. **Figure 5-1** presents two examples of these graphs for illustration—arsenic (Panel A) and lead (Panel B).

Inspection of **Appendix H** shows soil concentrations of several COPCs are elevated in DU-1 relative to the other site DUs (DU-2 and DU-3) and the background area (DU-4) (see **Figure 4-1**). In general, soil concentrations for DU-2 and DU-3, while elevated, are usually within a factor of 3 of the background area (DU-4). There are two metals—antimony and molybdenum—where soil concentrations in the site DUs are more than 10 times higher than the background area (DU-4). There are three metals—cadmium, copper, and lead—where soil concentrations in the Site DUs are more than 4 times higher than the background area (DU-4).

As noted previously, dioxin TEQ concentrations for site soils appear elevated compared to the background area (DU-4). Concentrations in DU-1 were about 100 to 300 times higher than background area (DU-4), and TEQ levels were lower in DU-3 compared to DU-2, which suggests concentrations decrease with increasing distance from DU-1.

This background evaluation supports the conclusion that soil concentrations of several metals and dioxins/furans at the FWDA are elevated and these impacts appear to be from, at least in part, site-related activities.

6. Exposure Pathway and Environmental Hazard Assessment

This section provides an evaluation of the potentially contaminated media and associated exposure pathways and sensitive environments known and/or suspected at the Site. An evaluation of the potential for a hazardous substance release to each medium is also presented. See also Appendix A of the FSI for the site PA form completed during the FSI.

6.1. Soil

Soil can become contaminated if it encounters waste debris that is leaching contamination within the FWDA. This subsection presents an assessment to determine if there has been a release or if there is potential for release of hazardous substances to soil from the waste debris at the FWDA.

6.1.1. Potential Receptors

The Site is located 100 feet southwest of the Vogelsang HSC, which is frequented by backpackers and hikers. NPS personnel visit the Vogelsang HSC periodically, especially during the peak tourist season (July to September). The Site is located within a sparsely vegetated subalpine pine forest in a wilderness area within the Cathedral Range south of Tuolumne Meadows at an elevation of approximately 10,300 feet above mean sea level. The Site provides terrestrial habitat for a variety of birds, mammals, plants, and soil invertebrates.

The Site does not include any aquatic habitat but is bordered to the south by Fletcher Creek. Other nearby surface water bodies include Fletcher Lake, Vogelsang Lake, and Boothe Lake, of which only Boothe Lake is downslope from the Site.

6.1.2. Sensitive Environments

The FWDA is located within a national park, which is identified as a sensitive environment in ecological risk assessment guidance (USEPA 1997). There are no specific sensitive environments (e.g., buildings, threatened or endangered species aquatic habitats) within 200 feet of the FWDA that have the potential to be impacted by site soil.

6.1.3. Hazardous Substance Release Determination

The Site was formerly used as a waste disposal area from about 1940 to 1965. Waste debris at the Site includes crushed and rusted metal cans, metal household objects, broken glass, and broken china. As noted previously, during the ESI, soil borings were advanced to delineate the extent of the debris pile in DU-1, which was estimated at approximately 8,200 ft^2. However, the presence of debris was not observed throughout the entirety of DU-1. Rather, small discrete debris piles were observed within DU-1.

As discussed in Section 5, based on the soil data collected during the ESI, several COPCs were identified for both surface and subsurface soil that could result in unacceptable exposures for both human health and ecological receptors. COPCs included several metals, PCP, diesel fuel, and dioxins/furans. A comparison of site soil concentrations to local background levels indicates that elevated levels of several metals and dioxins/furans in soil appear to be site-related. These data support the conclusion that surface and subsurface soils in the FWDA are impacted by site-related hazardous releases. However, the determination of the effect of these releases on human health and the environment and the extent of unacceptable risks would require performing a baseline risk assessment.

6.2. Groundwater

Groundwater can become contaminated if it encounters waste debris and/or contaminated soil within the FWDA. This subsection presents an assessment to determine if there has been a release or if there is potential for release of hazardous substances to groundwater from the waste debris at the FWDA.

6.2.1.Local Geologic and Hydrogeologic Setting

The Vogelsang FWDA is located within the Sierra Nevada granitic batholith. The native soil at the Site consists mostly of sand and silt with minor clay and gravel. The soil materials are primarily granitic in origin with lesser amounts derived from local metamorphic rocks. The depth to bedrock within the main portion of the FWDA varied between 2.5 and 3.5 feet bgs.

No monitoring wells are known to exist within or in the vicinity of the FWDA. The presumptive direction of groundwater flow, if present, is based on site topography. The downgradient direction is located southwest of the FWDA and the upgradient direction is located northeast of the FWDA. Groundwater was not encountered in any of the test pits excavated during the FSI (August 2001) nor in any of the soil borings during the ESI (August 2018). The lack of groundwater during these investigations along with the shallow depth to bedrock suggests groundwater is not present in the FWDA.

6.2.2.Groundwater Use

There is no groundwater at the Site; therefore, no groundwater use is occurring.

6.2.3.Hazardous Substance Release Determination

Given the Site's elevation, the presence of bedrock at a shallow depth (less than 4 feet bgs), the relatively shallow extent of debris (less than 3.5 feet bgs), and the absence of groundwater at these shallow depths, groundwater is assumed to be not of concern at this Site.

6.3. Surface Water

Surface water can become contaminated if waste debris at the FWDA has resulted in contamination of soil, which can become a source for runoff and erosion during precipitation events. This subsection presents an assessment to determine if there has been a release or if there is potential for release of hazardous substances to surface water from the waste debris at the FWDA.

6.3.1.Local Hydrologic Setting

Although an ephemeral drainage was noted during the ESI (see **Figure 4-1**), no evidence of surface drainages or ponding has been observed during any investigations or past site reconnaissance efforts. It is expected water would only be present in this drainage for a short period of time during snowmelt, and it does not provide any aquatic habitat.

The nearest down-slope surface water occurrence is Fletcher Creek, approximately 350 feet southwest of the FWDA (see **Figure 2-1**). Fletcher Creek flows southwest into the Merced River.

6.3.2.Drinking Water Intakes

The nearest drinking water well is located at the Tuolumne Meadows Ranger Station, 7.5 miles north of Vogelsang in the Tuolumne River drainage system. The nearest drinking water wells near the Merced River are at Yosemite Lodge, approximately 16 miles from the Site.

6.3.3.Local Fisheries

As noted above, the nearest permanent surface water downslope from the Site is the Fletcher Creek, approximately 350 feet southwest of the Site (see **Figure 2-1**) (IT Corporation 2002). There is no information on whether this creek provides adequate habitat or flow to support fish populations.

6.3.4. Sensitive Environments

As noted previously, the FWDA is located within a national park, which is identified as a sensitive environment in ecological risk assessment guidance (USEPA 1997). There are no specific sensitive environments (e.g., threatened or endangered species aquatic habitats) downstream of the Site that have the potential to be impacted by site surface water.

6.3.5. Hazardous Substance Release Determination

There is the potential for surface water in the ephemeral drainage to be impacted by site-related contamination. It is unclear if this ephemeral drainage connects to Fletcher Creek. No surface water has been observed during past investigations, and no samples have been collected to determine if hazardous substances are present. However, it is unlikely water from this drainage would be an important source of contamination to Fletcher Creek and surface water is assumed to be not of concern at this Site.

6.4. Air

Air can become contaminated if volatile chemicals are released to air and/or if chemicals in soil become airborne due to either natural (e.g., wind) or human-caused soil disturbance activities. This subsection presents an assessment to determine if there has been a release or if there is potential for release of hazardous substances to air from the waste debris at the FWDA.

6.4.1. Potential Receptors

As noted previously, the Site is located 100 feet southwest of the Vogelsang HSC, which is frequented by backpackers and hikers. NPS personnel visit the Vogelsang HSC periodically, especially during the peak tourist season (July to September). The Site is located within a sparsely vegetated subalpine pine forest in a wilderness area within the Cathedral Range south of Tuolumne Meadows at an elevation of approximately 10,300 feet above mean sea level. The Site provides terrestrial habitat for a variety of birds, mammals, plants, and soil invertebrates.

6.4.2. Sensitive Environments

As noted previously, the FWDA is located within a national park, which is identified as a sensitive environment in ecological risk assessment guidance (USEPA 1997). There are no specific sensitive environments (e.g., threatened or endangered species habitats) within 4 miles of the Site that have the potential to be impacted by site air.

6.4.3. Hazardous Substance Release Determination

More than 50 years has elapsed since the FWDA was used. Thus, if volatile chemicals were present in the waste debris, any volatilization to air is likely to have already occurred. This assumption is further supported by the lack of SVOC detections in soil (see **Table 4-7**). As noted above, surface and subsurface soils in the FWDA are impacted by site-related hazardous releases. Wind and human disturbances of surface soil could release airborne dust particulates into air. Therefore, there is the potential for release of hazardous substances to air from the waste debris at the FWDA. For the COPCs identified in soil, ingestion exposures are likely to be more important than inhalation exposures; however, the determination of the effect of any airborne releases on human health and the environment and the extent of unacceptable risks would require performing a baseline risk characterization.

7. Conclusions and Recommendations

The Vogelsang FWDA is a former trash dump used by the HSC from the early 1930s to the late 1960s or early 1970s.Waste debris at the Site includes crushed, rusted metal cans; metal household objects; broken glass; and broken china.

The DQOs established in the *ESI SAP* were summarized in Section 3.2. The ESI soil sampling was designed to provide data to 1) quantify chemical exposures in site soil (surface and subsurface) for use in human health and ecological risk assessment, 2) establish the lateral extent of chemical contamination in surface soil around the FWDA footprint, and 3) determine if site chemical soil concentrations are higher than local background levels. A review of the ESI soil results shows the soil investigation achieved the stated DQOs, and data are adequate to address the study objectives for soil (see Section 3.2).

An initial risk-based evaluation of surface and subsurface soil collected during the ESI shows several chemicals were identified as COPCs for human health and ecological receptors, including several metals, dioxins/furans, and PCP. An initial background comparison evaluation suggests many COPCs are likely to be site-related. These data support the conclusion surface and subsurface soils in the FWDA are impacted by site-related hazardous releases. The Site may be visited by NPS personnel and recreational visitors (e.g., hikers, campers), and there are several ecological receptors that may be present, which could come into contact with contaminated soil. Therefore, it is recommended a baseline human health and ecological risk assessment be conducted to determine if there are unacceptable risks due to soil exposures at the Site.

The risk-based evaluation presented in this document (Section 5.1) is a screening level assessment, which is intentionally conservative, for the purposes of identifying media and chemicals requiring further evaluation in a baseline risk assessment. The recommended baseline human health and ecological risk assessments should be performed in accordance with standard risk assessment guidance and should include the following:

- Risk calculations for receptor populations expected to be present at the FWDA using site-specific exposure parameters tailored for each receptor type (e.g., recreational visitors, selected wildlife surrogate species).
- Risk calculations specific to the soil depth intervals that are likely to be encountered by each receptor population. For example, it is not reasonably expected that a recreational visitor or most wildlife would be exposed to subsurface soil; thus, exposure and risk estimates would be based on surface soil only.
- Risk calculations for appropriate exposure areas, recognizing that some ecological receptors have home ranges that will be limited to a single DU (e.g., terrestrial plants, some small mammals) and other receptors (e.g., humans) may have exposure areas that encompass multiple DUs.
- Risk estimates using exposure point concentrations for the exposure area calculated as the 95 percent upper confidence limit on the mean rather than the maximum concentration.
- For wildlife, perform risk evaluation for selected surrogate receptors using dose-based toxicity values and food uptake models instead of soil concentration-based screening levels.

- For ecological receptors, calculate risk estimates for a range of effects thresholds to determine the range of potential risks and, if necessary, employ multiple lines of evidence to support a weight of evidence-based conclusion for the determination of unacceptable ecological risks.
- Perform additional background evaluations to determine if COPCs are related to the Site or if they are present at levels comparable to the background conditions. Note: Comparisons to the background should be used to provide context for site risks but should not be used to exclude COPCs or exposure pathways from further evaluation in the risk assessment.
- Perform additional evaluations of the adequacy of laboratory limits (MDL, RL) relative to the risk assessment process outlined above and subsequent risk management decisions that may be made.

If the baseline risk assessments conclude there is the potential for unacceptable risks to either human and/or ecological receptor populations, the results of these risk assessments can be used to provide information on the extent and magnitude of these risks to inform risk management decision-making.

8. References

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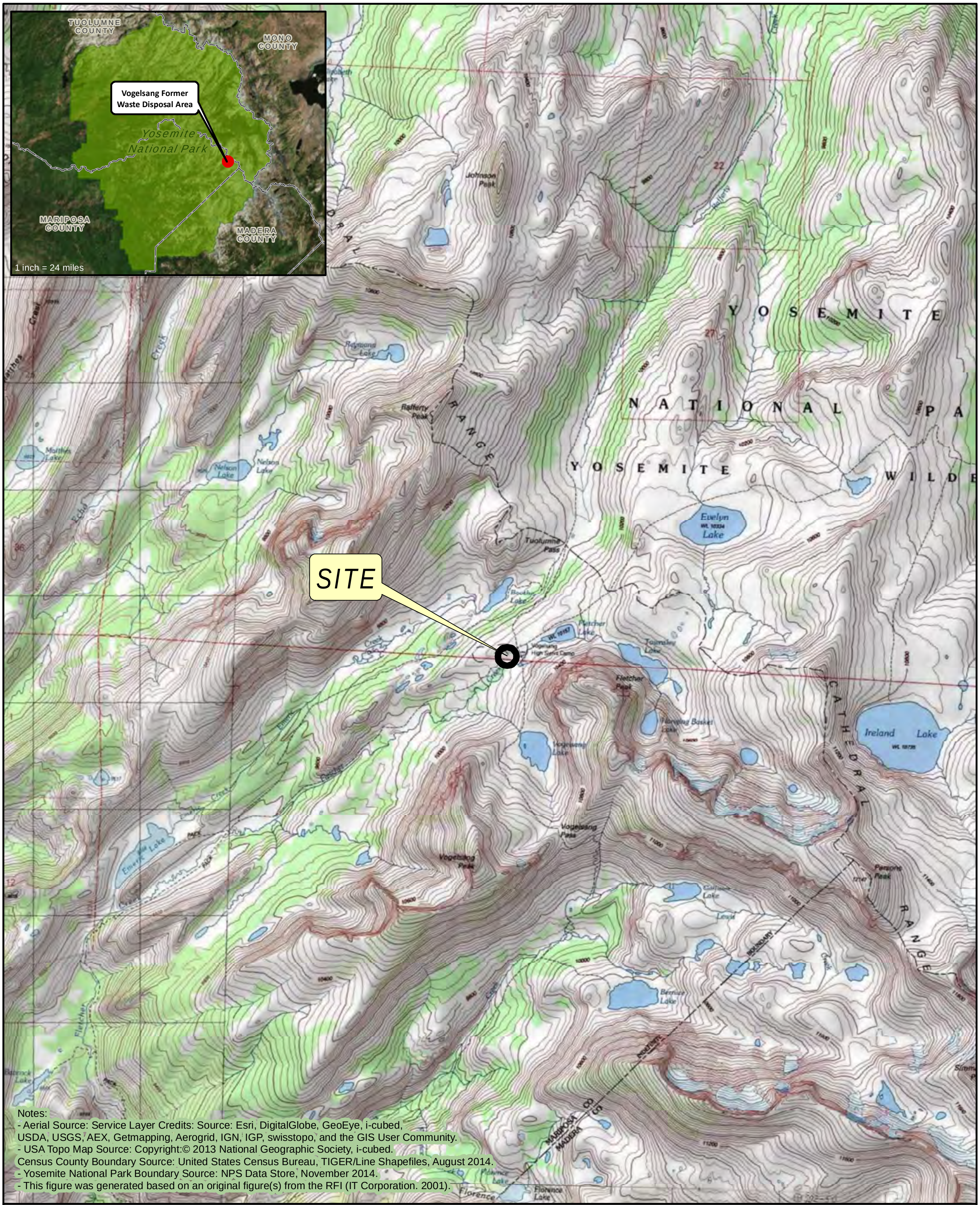
Figures



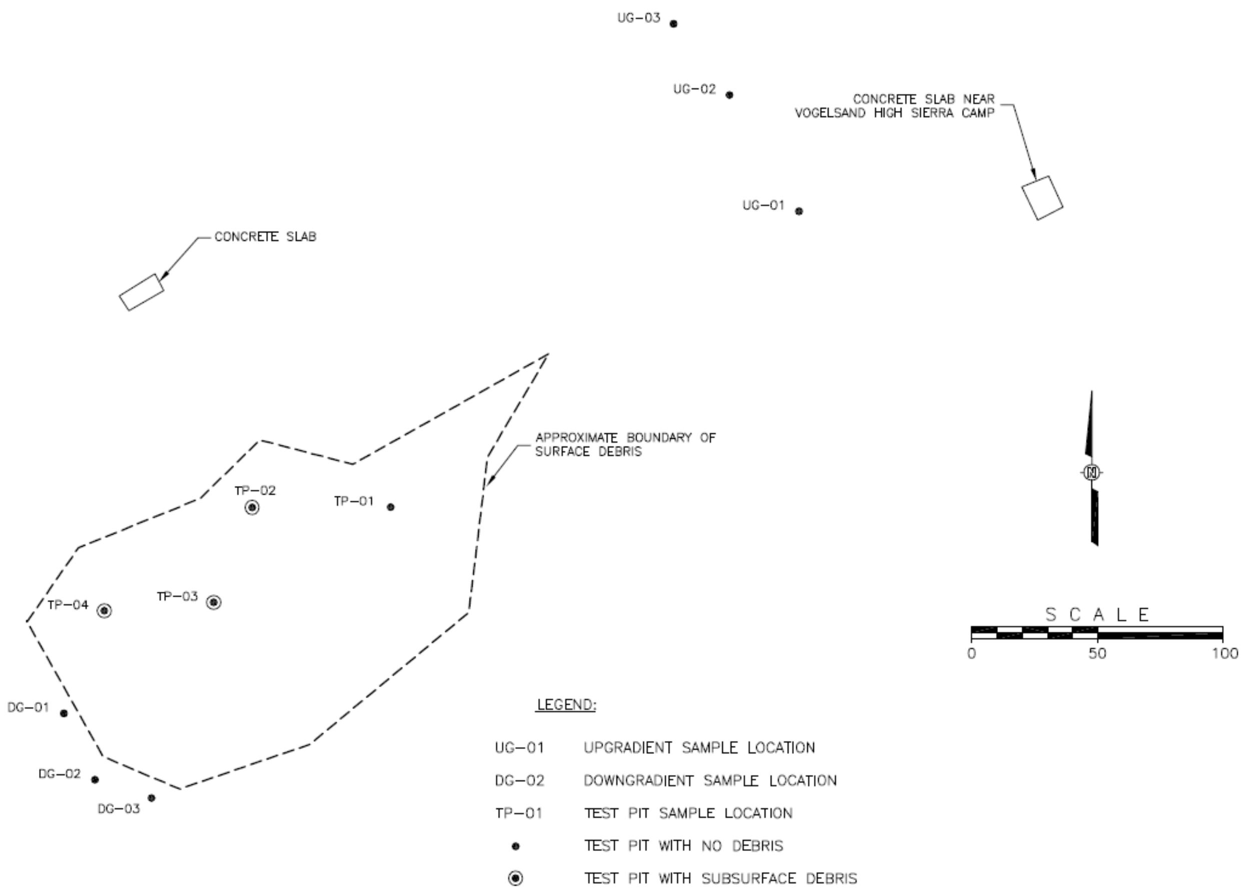
N

0 4,000 8,000 Feet

Figure 2-1
Site Location Map
Vogelsang Former Waste Disposal Area,
Yosemite National Park, California

CDM Smith

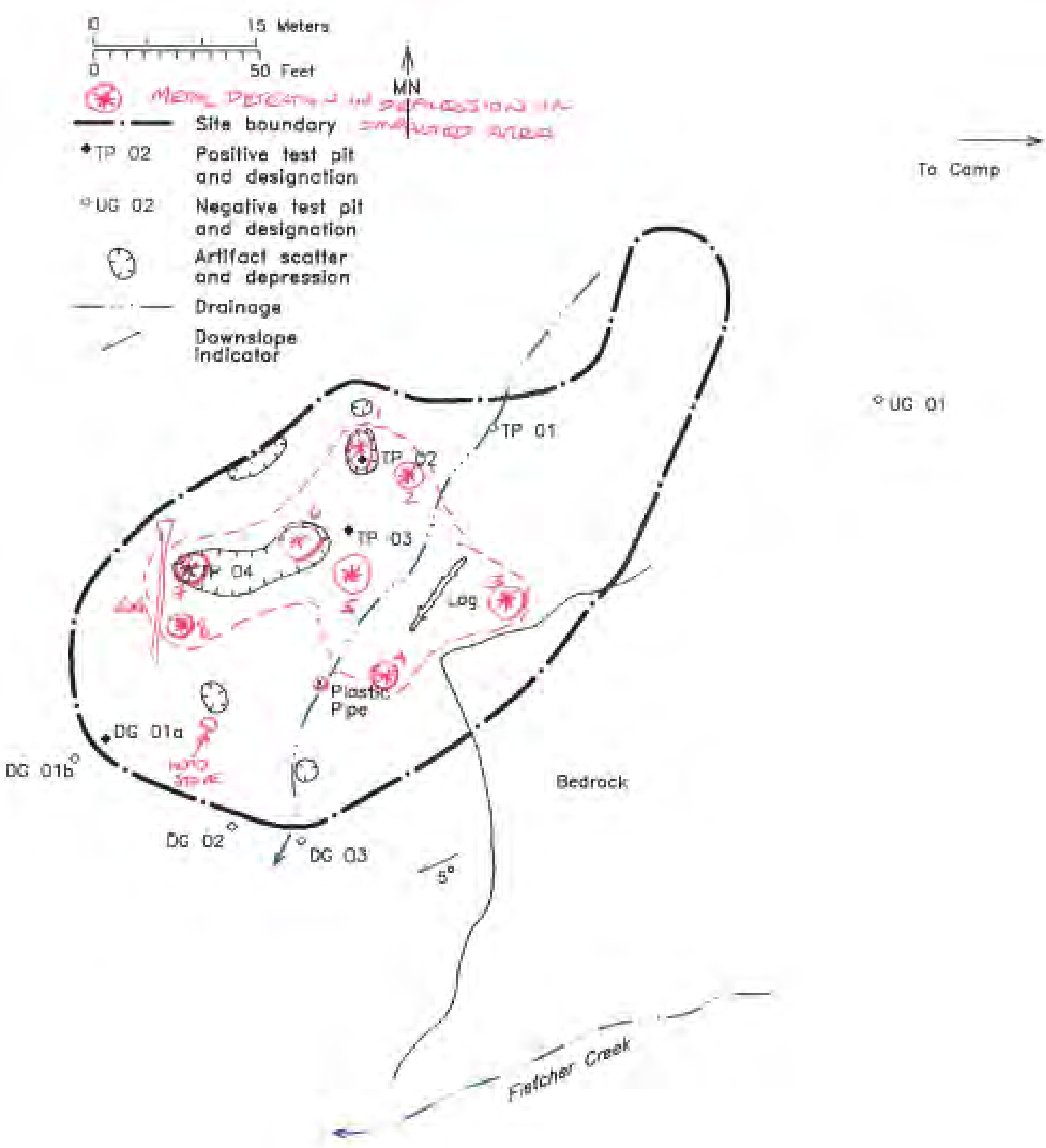
FIGURE 2-2
FSI SAMPLING LOCATION MAP
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California



Notes:
Source: IT Corporation (2002)
FSI = focused site inspection

Figure 2-3. Field Sketch and Notes from 2018 Site Reconnaissance

***Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park*, California**



Note: Base map source is Figure 7.2 from the *Victory Culture* report (Burton et al. 2003)

FIGURE 2-4
CONCEPTUAL SITE MODEL FOR EXPOSURE OF HUMAN AND ECOLOGICAL RECEPTORS
Vogelsang Former Waste Disposal Area, Yosemite National Park, California

Exposure Source	Exposure Media	Exposure Routes	Terrestrial Ecological Receptors of Interest: Terrestrial Plants	Soil Invertebrates	Birds	Mammals	Human Receptors of Interest: NPS Personnel	Recreational Visitors
Former Waste Disposal Area (FWDA)	Ambient air	Inhalation	X	X	O	O	● [1]	● [1]
Debris disposal on the surface, historical spills	Surface soil [0-6 inches] (resuspension/ volatilization, deposition to and from Ambient air)	Ingestion	X	X	●	●	●	●
		Direct/Dermal Contact	●	●	O	O	● [1]	● [1]
	Terrestrial Dietary Items *(Plants, Invertebrates, Birds, Mammals)* (uptake into tissues from Surface soil)	Ingestion	X	X	●	●	X	X
Debris disposal/burial, historical spills	Subsurface Soil [>6 inches - 4 feet]	Ingestion	X	X	● [2]	● [2]	X	X
		Inhalation	X	X	O [2]	O [2]	X	X
		Direct/Dermal Contact	●	●	O [2]	O [2]	X	X

LEGEND

●	Pathway is believed to be complete and may be an important contribution to the total risk to the receptor.
O	Pathway is believed to be complete but is unlikely to be a major contributor to the total risk to the receptor (in comparison to one or more other pathways that are evaluated).
X	Pathway is incomplete or believed to be negligible

[1] It is anticipated inhalation and dermal contact exposures are likely to be minor, but these pathways will be evaluated quantitatively to demonstrate this assumption.

[2] Burrowing animals may be exposed to subsurface soils while digging both via incidental ingestion, inhalation, and dermal contact. However, available exposure and toxicity data are too limited to perform a quantitative evaluation of inhalation and dermal exposures.

Document Path: C:_projects\National Park Service\Yosemite\GIS\MXD\Vogelsang\Figure_4-1_NPS_Yosemite_Vogelsang_SBs_DUs_20180925.mxd

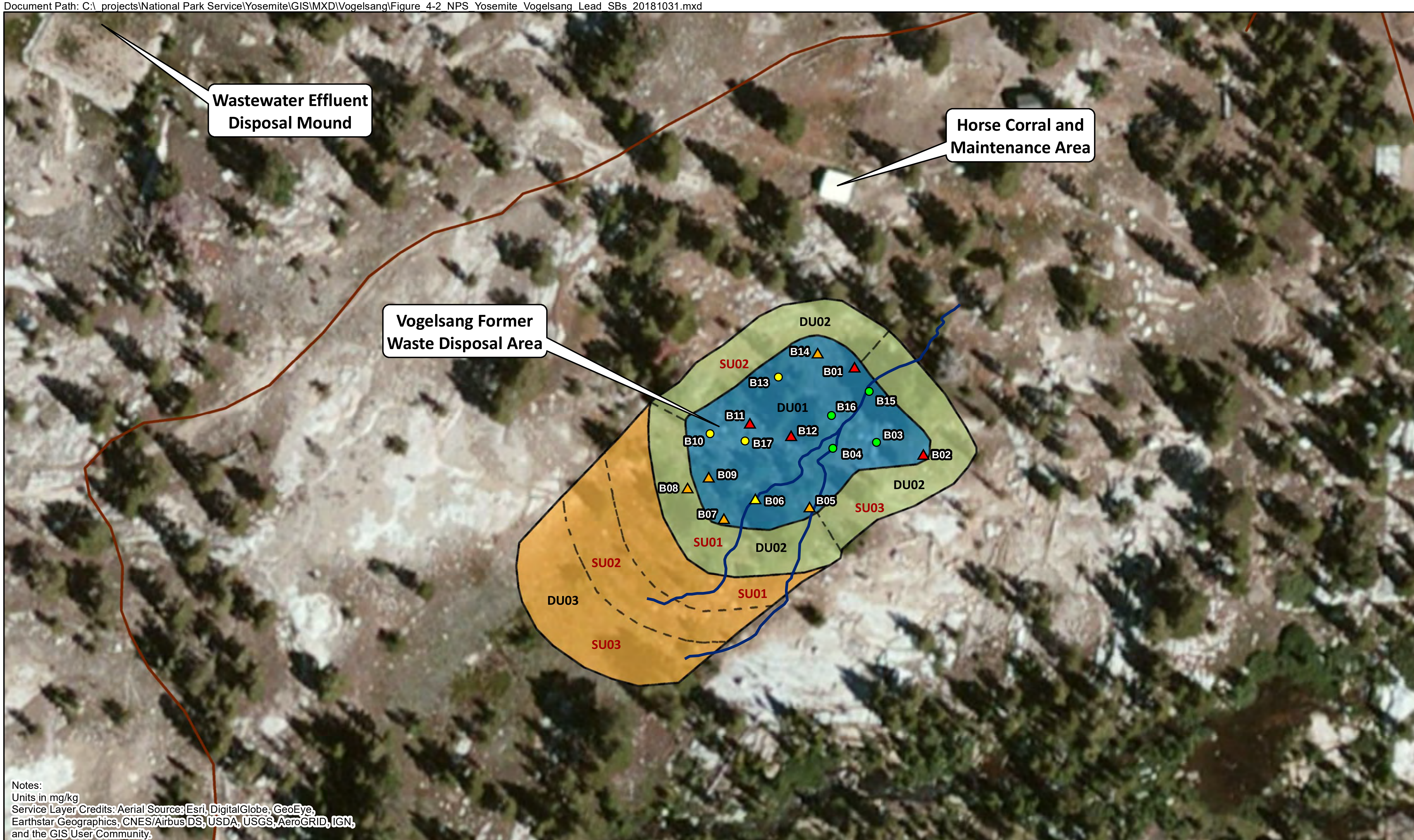
Legend

- Discrete Soil Boring Location
- Hiking Trail
- Surface Water Drainage
- Sampling Unit
- DU01
- DU02
- DU03
- DU04 (Background)

0 80 160 Feet

Figure 4-1
ESI Sampling Location Map
Vogelsang Former Waste Disposal Area,
Yosemite National Park, California

Document Path: C:_projects\National Park Service\Yosemite\GIS\MXD\Vogelsang\Figure_4-2_NPS_Yosemite_Vogelsang_Lead_SBs_20181031.mxd



Legend

- ○ Surface Soil (No Debris)
- △ Subsurface Soil (Debris)
- Hiking Trail
- Surface Water Drainage
- Sampling Unit

Lead

- Lead ≤10 mg/kg
- Lead >10 - 80 mg/kg
- Lead >80-400 mg/kg
- Lead >400 mg/kg

- DU01
- DU02
- DU03
- DU04 (Background)

0 50 100 Feet

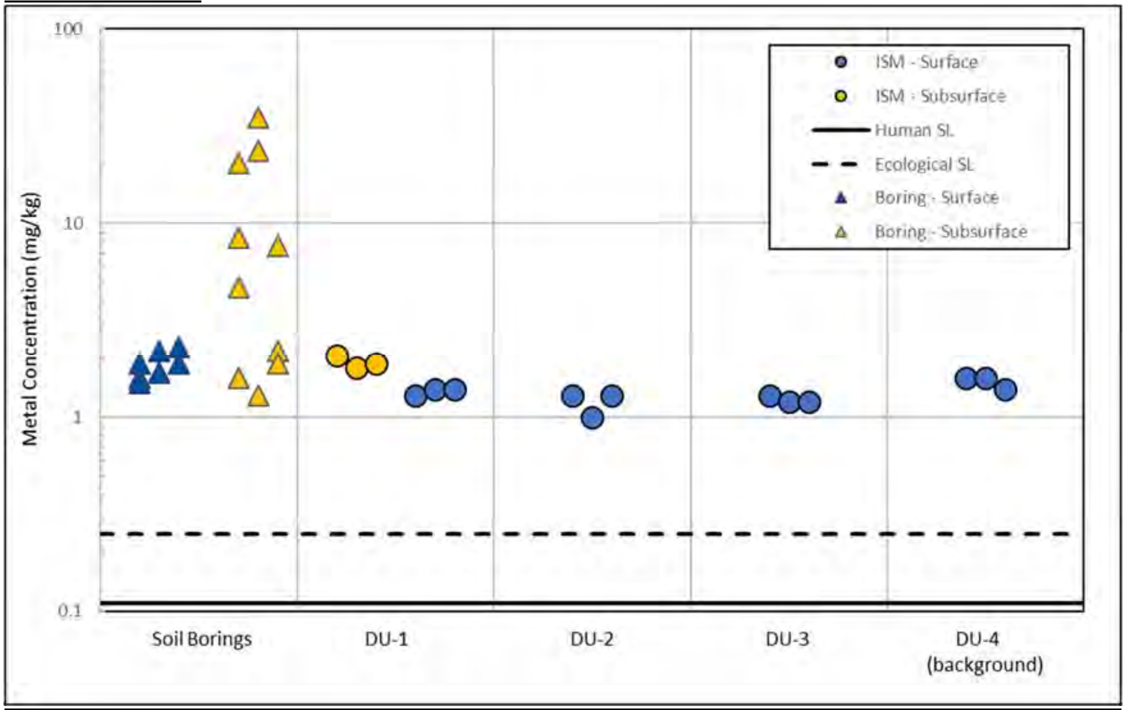
N

Figure 4-2
Soil Boring Locations – Lead
Vogelsang Former Waste Disposal Area,
Yosemite National Park, California

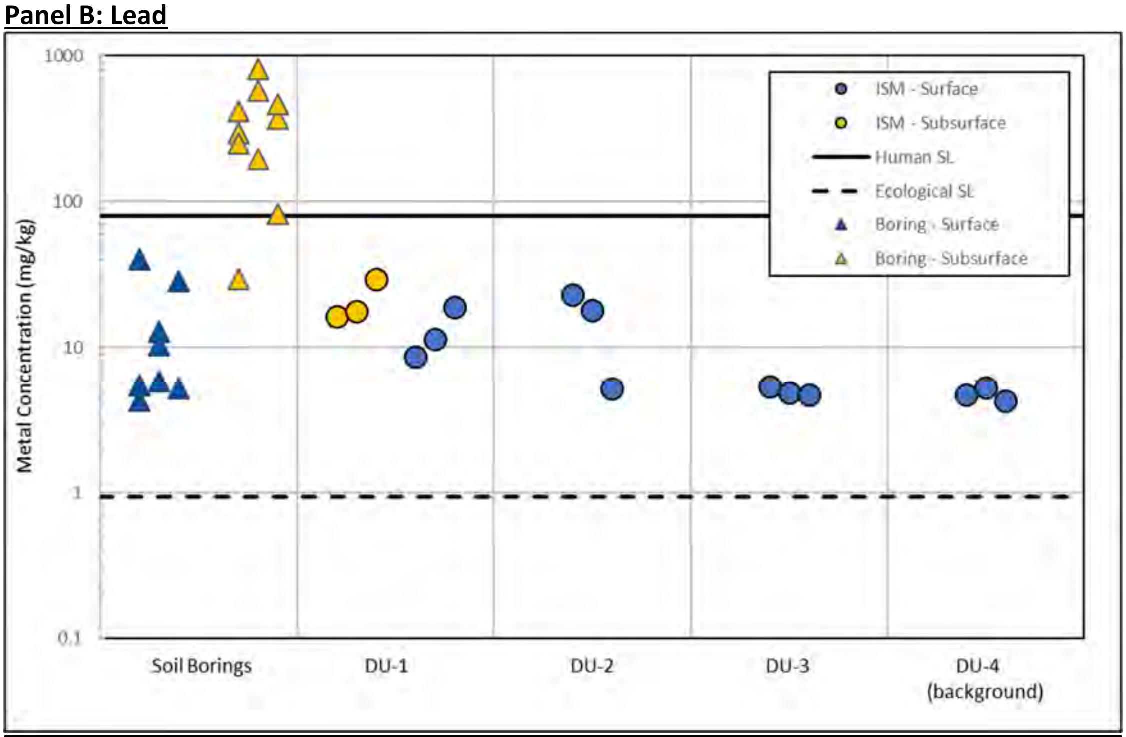
CDM Smith

FIGURE 5-1
METAL CONCENTRATIONS FOR ARSENIC AND LEAD STRATIFIED BY DU*
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Panel A: Arsenic



Panel B: Lead



Notes:
*See Appendix H for graphs of all metal COPCs
Non-detects reported at the MDL.
COPC = chemical of potential concern
ISM = incremental sampling methodology
mg/kg = milligram per kilogram
DU = decision unit
MDL = method detection limit
SL = screening level

Tables

TABLE 3-1
BEST MANAGEMENT PRACTICES FOR GREENER CLEANUPS
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

		BMP Process			
Category	**Best Management Practice**	**Priority (High, Medium, Low)**	**Selected for Implementation? (Y/N)**	**Rationale for Selection**	**Comment**
Materials	Use products, packing material, and equipment that can be reused or recycled	Medium	Y	Recyclable materials will be used where possible	Coolers and any plastic used during field work recycled.
Materials	Prepare, store, and distribute documents electronically using an environmental information management system	Medium	Y	Electronic data management is already in use	
Materials	Recycle as much non-usable/spent equipment/materials as possible following completion of project	Medium	Y	Recyclable materials will be recycled when possible	Items such as plastic and cardboard were recycled as much as possible. Some CDM Smith owned equipment was used, other equipment was rented.
Project Planning and Team Management	Use local staff (including subcontractors) when possible to minimize resource consumption	High	Y	Local staff are being used whenever possible	CDM Smith staff included two scientists from the Concord, CA office, and the archaeologist subcontractor consisted of local staff from San Luis Obispo and Fresno Counties.
Project Planning and Team Management	Establish green requirements (for example, SMPs and BMPs) as evaluation criteria in the selection of contractors and include language in RFPs, RFQs, subcontracts, contracts, etc.	High	Y	Include green requirements in future subcontractor RFPs	
Sampling and Analysis	Use local laboratory to minimize impacts from transportation	High	Y	A local laboratory is of high priority because samples are time-sensitive.	A local laboratory was used in Fresno County.
Sampling and Analysis	Use stressed vegetation to locate contaminant hotspots to guide development of sampling and analysis plans and optimize design of monitoring well network	Medium	Y	Stressed vegetation area was used to determine investigation areas	
Site Preparation/Land Restoration	Minimize clearing of trees throughout investigation and cleanup	High	Y	NPS priority to preserve trees	No living trees or logs were cleared during sampling.
Site Preparation/Land Restoration	Minimize soil compaction and land disturbance during site activities by restricting traffic to confined corridors and protecting ground surfaces with biodegradable covers, where applicable	High	Y	NPS priority to preserve natural areas	All equipment and materials were transported by foot within the Site. Equipment and materials were brought to a staging area by pack mule located 200 yards from the Site boundary.
Site Preparation/Land Restoration	Use on site or nearby sources of backfill material for excavated areas, if shown to be free of contaminants	High	Y	will be backfilling with excavated materials regardless of contamination	All excavated materials were returned to original soil pit or boring location and ground surface was restored to original condition.
Site Preparation/Land Restoration	When canopy closure has reached high percentage (for example, +75%) allow naturalization to occur (that is, do not remove downed trees/branches except for safety/access issues, allow leaf litter to lay to create forest floor providing natural mulching and weed control)	Medium	Y	NPS priority to preserve natural areas	
Site Preparation/Land Restoration	Design systems to allow natural volunteer growth/spreading to fill in entire target area over time (minimize initial planting; fill in over time), if time permits	Medium	Y	Top soil of backfilled area will be backfilled with top soil from before excavation	

Notes:
1. BMPs presented in this table are BMPs from the ASTM Standard Guide for Greener Cleanups (ASTM 2014) Table X3.2. Only BMPs applicable to investigation activities at the Gaylor Former Waste Disposal Area are included.

List of Acronyms
BACT = best available control technology
BMP = best management practice
DPT = direct-push technology
MACT = maximum achievable control technology
REC = renewable energy credit
RFP = request for proposal
RFQ = request for quotation
SMP = standard management practice
SVOC = semi-volatile organic compound
VOC = volatile organic compound
TBD = to be determined
Y/N = yes/no

TABLE 4-1
SOIL BORING SAMPLING ANALYTICAL RESULTS - METALS
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Soil Type	Subsurface	Subsurface	Surface	Surface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
			Lab ID	AZ79161	AZ79162	AZ79163	AZ79164	AZ79165	AZ79166	AZ79167	AZ79168	AZ79169
			Sample Type	Field	Field	Field	Field	Field	Field	Field	Field	Field
			Sample ID	B01-SB-01	B02-SB-01	B03-SS-01	B04-SS-01	B05-SB-01	B06-SB-01	B07-SB-01	B08-SB-01	B09-SB-01
			Sample Date	8/28/2018	8/28/2018	8/28/2018	8/28/2018	8/28/2018	8/28/2018	8/28/2018	8/28/2018	8/28/2018
Chemical Name	**CASRN**	**HH SL**	**Eco SL**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
ANTIMONY	7440-36-0	3.100	0.248	**2.9**	**3**	0.07 U	**0.27** J+	**4.2**	**1.2**	**32.4**	**103**	**1.9**
ARSENIC	7440-38-2	0.110	0.25	**20.3**	**23.6**	**1.6**	**2.2**	**2.2**	**1.6**	**1.3**	**1.9**	**8.4**
BARIUM	7440-39-3	1500	17	**23.2**	**17.4**	**18.5**	**23.2**	**25.6**	**64.4** J	**108**	**152**	**21.7**
BERYLLIUM	7440-41-7	15	2.4	**0.23** J	**0.27** J	**0.3** J	**0.4** J	**0.31** J	**0.26** J	**0.22** J	**0.22** J	**0.2** J
CADMIUM	7440-43-9	5.2	0.27	**0.44**	**0.25**	**0.039** J	**0.069** J	**0.39**	**0.41**	**0.59**	**0.91**	**0.25**
CHROMIUM	7440-47-3	0	0.34	**53.3**	**68.7**	**6**	**7.2**	**4.8**	**9.2**	**11**	**36.7**	**10.7**
COBALT	7440-48-4	2.3	13	**20**	**11.3**	**2.4**	**2.8**	**6**	**1.8**	**2.5**	**4.9**	**5.7**
COPPER	7440-50-8	310	14	**142**	**127**	**10.2**	**14**	**1170**	**486** J	**191**	**519**	**36.1**
LEAD	7439-92-1	80	0.94	**416**	**815**	**4.3**	**5.8**	**82.6**	**29.4**	**195**	**372**	**298**
MERCURY	7439-97-6	1.0	0.013	**0.11** J	**0.13** J	**0.11** J	**0.12** J	**0.21** J	**0.027** J	**0.042** J	**0.057** J	**0.027** J
MOLYBDENUM	7439-98-7	39	0.52	**15.4**	**23.4**	**10.1**	**13.4**	**20.8**	**24.4**	**8.5**	**13.1**	**19.8**
NICKEL	7440-02-0	150	10	**54.4**	**58.2**	**3.9**	**5**	**10.9**	**5.6**	**5.5**	**78.8**	**14.3**
SELENIUM	7782-49-2	39	0.33	**0.25** J	**0.17** J	**0.12** J	**0.16** J	**0.17** J	**0.18** J	**0.17** J	**0.17** J	**0.12** J
SILVER	7440-22-4	39	2.0	**0.11**	**0.27**	**0.057** J	**0.063** J	**0.14**	**0.092** J	**0.75**	**8**	**0.19**
THALLIUM	7440-28-0	0.078	0.027	**0.14**	**0.12**	**0.1**	**0.092** J	**0.081** J	**0.062** J	**0.098** J	**0.13**	**0.08** J
VANADIUM	7440-62-2	39	0.71	**20.1**	**20**	**23.4**	**29.8**	**25.5**	**23.3**	**17.9**	**24**	**24.3**
ZINC	7440-66-6	2300	6.6	**167**	**74.2**	**29.4**	**35.2**	**165**	**54.4** J	**115**	**301**	**131**

TABLE 4-1
SOIL BORING SAMPLING ANALYTICAL RESULTS - METALS
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Soil Type	Surface	Surface	Subsurface	Subsurface	Surface	Subsurface	Surface	Surface	Surface
			Lab ID	AZ79170	AZ79171	AZ79172	AZ79173	AZ79174	AZ79175	AZ79176	AZ79177	AZ79178
			Sample Type	Field	Field	Field	Field	Field	Field	Field	Field	Field
			Sample ID	B10-SS-01	B10-SS-02	B11-SB-01	B12-SB-01	B13-SS-01	B14-SB-01	B15-SS-01	B16-SS-01	B17-SS-01
			Sample Date	8/28/2018	8/28/2018	8/28/2018	8/28/2018	8/28/2018	8/28/2018	8/29/2018	8/29/2018	8/29/2018
Chemical Name	**CASRN**	**HH SL**	**Eco SL**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
ANTIMONY	7440-36-0	3.100	0.248	**0.96** J+	**0.95** J+	**320**	**28.3**	**2.2**	**1.8**	0.07 U	**0.51** J+	**1.4**
ARSENIC	7440-38-2	0.110	0.25	**1.9**	**1.9**	**35.1**	**7.7**	**1.7**	**4.7**	**2.3**	**1.5**	**1.7**
BARIUM	7440-39-3	1500	17	**20.9**	**24.5**	**190**	**108**	**26.2**	**44**	**16.7**	**23.7**	**22.9**
BERYLLIUM	7440-41-7	15	2.4	**0.22** J	**0.25** J	**0.19** J	**0.17** J	**0.24** J	**0.16** J	**0.41** J	**0.23** J	**0.23** J
CADMIUM	7440-43-9	5.2	0.27	**0.14**	**0.23**	**0.56**	**1.2**	**0.22**	**0.74**	**0.035** J	**0.11**	**0.1**
CHROMIUM	7440-47-3	0	0.34	**5.1**	**6.8**	**26.4**	**60.2**	**13.3**	**24.9**	**9.8**	**4.8**	**3.4**
COBALT	7440-48-4	2.3	13	**2.1**	**2.2**	**12**	**29.8**	**2.4**	**12.4**	**2.7**	**2.4**	**1.7**
COPPER	7440-50-8	310	14	**86.9**	**111**	**1990**	**240**	**14.2**	**113**	**16**	**6.6** J+	**13.4**
LEAD	7439-92-1	80	0.94	**28.7**	**40.3**	**581**	**469**	**10.3**	**249**	**5.2**	**5.5**	**12.8**
MERCURY	7439-97-6	1.0	0.013	0.02 U	**0.026** J	**0.1** J	**0.33** J	0.02 U	0.02 U	0.02 U	**0.026** J	0.02 U
MOLYBDENUM	7439-98-7	39	0.52	**13.4**	**12.8**	**19.1**	**22.2**	**7.6**	**10.4**	**14**	**11.4**	**22.2**
NICKEL	7440-02-0	150	10	**3.2**	**3**	**29.8**	**77.9**	**7**	**26**	**5.8**	**3.1**	**2.3**
SELENIUM	7782-49-2	39	0.33	**0.15** J	**0.18** J	**0.17** J	**0.31** J	**0.11** J	**0.17** J	**0.13** J	**0.08** J	**0.11** J
SILVER	7440-22-4	39	2.0	**0.19**	**0.39**	**0.57**	**1.4**	**0.069** J	**0.71**	**0.059** J	**0.052** J	**0.1**
THALLIUM	7440-28-0	0.078	0.027	**0.07** J	**0.068** J	**0.074** J	**0.08** J	**0.072** J	**0.062** J	**0.088** J	**0.075** J	**0.065** J
VANADIUM	7440-62-2	39	0.71	**26.8**	**25.4**	**28.9**	**17.5**	**22.8**	**20.5**	**32.4**	**23.3**	**23.8**
ZINC	7440-66-6	2300	6.6	**62.2**	**89.1**	**294**	**341**	**52.6**	**293**	**36.6**	**29**	**30.5**

Notes:
All concentrations are in milligrams per kilogram (mg/kg).
Detect results are shown in **Bold**
Values greater than the lowest SL are highlighted in gray.
--- = screening level not available
DU = Decision Unit
Eco = ecological
HH = human health
SL = screening level

Result Qualifiers:
J = estimated value
U = analyte not detected above the laboratory reporting limit.

TABLE 4-2
INCREMENTAL SOIL SAMPLING ANALYTICAL RESULTS - METALS
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Decision Unit	DU-1						DU-2			DU-3			DU04 (Background)		
			Soil Type	Subsurface			Surface			Surface			Surface			Surface		
			Lab ID	AZ79149	AZ79150	AZ79151	AZ79146	AZ79147	AZ79148	AZ79152	AZ79153	AZ79154	AZ79155	AZ79156	AZ79157	AZ79158	AZ79159	AZ79160
			ISM Replicate	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	SU01	SU02	SU03	SU01	SU02	SU03	Rep 1	Rep 2	Rep 3
			Sample ID	DU01-SB-01	DU01-SB-02	DU01-SB-03	DU01-SS-01	DU01-SS-02	DU01-SS-03	DU02-SS-01	DU02-SS-02	DU02-SS-03	DU03-SS-01	DU03-SS-02	DU03-SS-03	DU04-SS-01	DU04-SS-02	DU04-SS-03
			Sample Date	8/30/2018	8/30/2018	8/30/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Chemical Name	CASRN	HH SL	Eco SL	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
ANTIMONY	7440-36-0	3.1	0.25	**0.46** J+	**1**	**1.8**	**0.5** J+	**0.57** J+	**1.6**	**1**	**0.29** J+	0.07 U	**0.34** J+	**0.2** J+	0.07 U	0.07 U	0.07 U	0.07 U
ARSENIC	7440-38-2	0.110	0.25	**2.1**	**1.8**	**1.9**	**1.3**	**1.4**	**1.4**	**1.3**	**1**	**1.3**	**1.3**	**1.2**	**1.2**	**1.6**	**1.6**	**1.4**
BARIUM	7440-39-3	1500	17	**18.5** J	**17.3**	**21.1**	**20.2**	**20.8**	**24.3**	**26.1**	**18.1**	**24.1**	**17.7**	**18.9**	**18**	**15.8**	**18**	**14.3**
BERYLLIUM	7440-41-7	15	2.4	**0.2** J	**0.22** J	**0.2** J	**0.2** J	**0.21** J	**0.21** J	**0.24** J	**0.13** J	**0.26** J	**0.26** J	**0.26** J	**0.27** J	**0.15** J	**0.18** J	**0.14** J
CADMIUM	7440-43-9	5.2	0.27	**0.12**	**0.15**	**0.17**	**0.1**	**0.088** J	**0.18**	**0.15**	**0.12**	**0.073** J	**0.064** J	**0.056** J	**0.041** J	**0.037** J	**0.038** J	**0.033** J
CHROMIUM	7440-47-3	0	0.34	**4.3**	**4.3**	**4.7**	**2.5**	**3.1**	**3.7**	**3.5**	**2.3**	**2.9**	**2.6**	**2.7**	**2.7**	**2.8**	**3.4**	**2.5**
COBALT	7440-48-4	2.3	13	**2**	**2**	**2**	**1.8**	**1.7**	**1.8**	**2**	**1.8**	**2.5**	**1.7**	**1.7**	**1.7**	**1.8**	**1.7**	**1.6**
COPPER	7440-50-8	310	14	**24.8**	**23**	**56.8**	**14.5**	**17.4**	**33.3**	**32.2**	**10.8** J+	**8.7** J+	**18.1**	**14.1**	**11.5**	**7.6** J+	**8.6** J+	**7.4** J+
LEAD	7439-92-1	80	0.94	**16.5**	**17.7**	**29.4**	**8.7**	**11.5**	**19.1**	**23**	**18**	**5.2**	**5.4**	**4.9**	**4.7**	**4.7**	**5.3**	**4.3**
MERCURY	7439-97-6	1.0	0.013	0.02 U	0.02 U	0.02 U	0.02 U	**0.021** J	0.02 U	0.02 U	**0.021** J	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
MOLYBDENUM	7439-98-7	39	0.52	**12.4**	**13.3**	**13.9**	**9.2**	**10.8**	**10.5**	**15.9**	**4.7**	**8.3**	**25.4**	**20.9**	**15.8**	**1**	**1.4**	**1.2**
NICKEL	7440-02-0	150	10	**3.4**	**3**	**4.1**	**10**	**23.3**	**11.2**	**14.2**	**7.3**	**9.5**	**9.1**	**10.5**	**7.9**	**8**	**12.3**	**9.5**
SELENIUM	7782-49-2	39	0.33	**0.089** J	**0.12** J	**0.11** J	**0.079** J	**0.078** J	**0.079** J	**0.061** J	0.05 U	**0.074** J	**0.072** J	**0.097** J	**0.1** J	**0.068** J	**0.074** J	**0.076** J
SILVER	7440-22-4	39	2.0	**0.076** J	**0.11**	**0.1**	**0.053** J	**0.093** J	**0.11**	**0.12**	**0.075** J	**0.041** J	**0.07** J	**0.077** J	**0.053** J	**0.033** J	**0.039** J	**0.033** J
THALLIUM	7440-28-0	0.078	0.027	**0.042** J	**0.069** J	**0.057** J	**0.04** J	**0.047** J	**0.043** J	**0.065** J	**0.06** J	**0.082** J	**0.059** J	**0.067** J	**0.064** J	**0.072** J	**0.083** J	**0.064** J
VANADIUM	7440-62-2	39	0.71	**19.7**	**20.9**	**20**	**15.8**	**17.8**	**17.8**	**19**	**13.4**	**18.7**	**20.9**	**18.8**	**17.4**	**16.8**	**19**	**15.9**
ZINC	7440-66-6	2300	6.6	**39.1** J	**41.6**	**56.2**	**31.4**	**31.8**	**50.2**	**58.3**	**29.2**	**24**	**27.7**	**24**	**20.3**	**19.7**	**21.3**	**17.8**

Notes:
All concentrations are in milligrams per kilogram (mg/kg).
Detect results are shown in **Bold**
Values greater than the lowest SL are highlighted in gray.
--- = screening level not available
DU = Decision Unit
Eco = ecological
HH = human health
SL = screening level
Result Qualifiers:
J = estimated value
U = analyte not detected above the laboratory reporting limit.

TABLE 4-3

INCREMENTAL SOIL SAMPLING ANALYTICAL RESULTS - DIOXINS/FURANS

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Decision Unit	DU-1		DU-2	DU-3	DU-4 (Background)
			Soil Type	Subsurface	Surface	Surface	Surface	Surface
			Lab ID	AZ79149	AZ79146	AZ79152	AZ79155	AZ79158
			ISM Replicate	Rep 1	Rep 1	SU1	SU1	Rep 1
			Sample ID	DU01-SB-01	DU01-SS-01	DU02-SS-01	DU03-SS-01	DU04-SS-01
			Sample Date	8/30/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018
Chemical Name	CASRN	**HH SL**	**Eco SL**	**Result**	**Result**	**Result**	**Result**	**Result**
1,2,3,4,6,7,8-HPCDD	35822-46-9	---	---	**12** J	**21**	7.5 U	0.77 U	0.2 U
1,2,3,4,6,7,8-HPCDF	67562-39-4	---	---	1.9 U	**6.4** J	1.8 U	0.47 U	0.16 U
1,2,3,4,7,8,9-HPCDF	55673-89-7	---	---	2 U	0.57 U	0.84 U	0.36 U	0.2 U
1,2,3,4,7,8-HXCDD	39227-28-6	---	---	0.46 U	0.63 U	0.58 U	0.59 U	0.17 U
1,2,3,4,7,8-HXCDF	70648-26-9	---	---	0.65 U	0.75 U	0.21 U	0.12 U	0.083 U
1,2,3,6,7,8-HXCDD	57653-85-7	---	---	0.75 U	0.4 U	0.54 U	0.54 U	0.18 U
1,2,3,6,7,8-HXCDF	57117-44-9	---	---	0.59 U	0.67 U	0.2 U	0.11 U	0.074 U
1,2,3,7,8,9-HXCDD	19408-74-3	---	---	0.97 U	0.81 U	0.55 U	0.56 U	0.19 U
1,2,3,7,8,9-HXCDF	72918-21-9	---	---	0.77 U	0.88 U	0.25 U	0.12 U	0.097 U
1,2,3,7,8-PECDD	40321-76-4	---	---	0.76 U	0.38 U	0.48 U	0.17 U	0.27 U
1,2,3,7,8-PECDF	57117-41-6	---	---	0.46 U	0.52 U	0.32 U	0.13 U	0.12 U
2,3,4,6,7,8-HXCDF	60851-34-5	---	---	5.2 U	16 U	3.4 U	0.84 U	0.34 U
2,3,4,7,8-PECDF	57117-31-4	---	---	0.47 U	0.53 U	0.33 U	0.13 U	0.13 U
2,3,7,8-TCDD	1746-01-6	---	---	0.2 U	0.08 U	0.19 U	0.07 U	0.13 U
2,3,7,8-TCDF	51207-31-9	---	---	0.31 U	0.27 U	0.44 U	0.12 U	0.26 U
OCDD	3268-87-9	---	---	**71**	**130**	**45**	**11** J	**3.4** J
OCDF	39001-02-0	---	---	3.7 U	15 U	2.2 U	1.8 U	0.22 U
TEQ	TEQ	4.8	0.29	**0.14**	**0.31**	**0.014**	**0.0033**	**0.0010**

Notes:

All concentrations are in picograms per gram (pg/g).

--- = screening level not available

Detect results are shown in **Bold**

Values greater than the lowest SL are highlighted in gray.

DU = Decision Unit

Eco = ecological

HH = human health

SL = screening level

Result Qualifiers:

J = estimated value

U = analyte not detected above the laboratory reporting limit.

TABLE 4-4

INCREMENTAL SOIL SAMPLING ANALYTICAL RESULTS - POLYCYCLIC AROMATIC HYDROCARBONS

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Decision Unit	DU-1						DU-2			DU-3			DU-4 (Background)		
			Soil Type	Subsurface			Surface			Surface			Surface			Surface		
			Lab ID	AZ79149	AZ79150	AZ79151	AZ79146	AZ79147	AZ79148	AZ79152	AZ79153	AZ79154	AZ79155	AZ79156	AZ79157	AZ79158	AZ79159	AZ79160
			ISM Replicate	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	SU01	SU02	SU03	SU01	SU02	SU03	Rep 1	Rep 2	Rep 3
			Sample ID	DU01-SB-01	DU01-SB-02	DU01-SB-03	DU01-SS-01	DU01-SS-02	DU01-SS-03	DU02-SS-01	DU02-SS-02	DU02-SS-03	DU03-SS-01	DU03-SS-02	DU03-SS-03	DU04-SS-01	DU04-SS-02	DU04-SS-03
			Sample Date	8/30/2018	8/30/2018	8/30/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Chemical Name	CASRN	HH SL	Eco SL	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1-METHYLNAPHTHALENE	90-12-0	18	---	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U	0.041 U	0.021 U	0.021 U	0.021 U	0.042 U	0.02 U	0.02 U	0.02 U
2-METHYLNAPHTHALENE	91-57-6	24	16	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
ACENAPHTHENE	83-32-9	360	0.25	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U	0.041 U	0.021 U	0.021 U	0.021 U	0.042 U	0.02 U	0.02 U	0.02 U
ACENAPHTHYLENE	208-96-8	---	120	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
ANTHRACENE	120-12-7	1800.0	6.8	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.033 U	0.033 U	0.017 U	0.017 U	0.017 U	0.034 U	0.016 U	0.016 U	0.016 U
BENZO(A)ANTHRACENE	56-55-3	1.10	0.73	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	**0.023** J	0.019 U	**0.072** J	0.038 U	0.018 U	0.018 U	0.018 U
BENZO(A)PYRENE	50-32-8	0.110	62	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	**0.059** J	0.038 U	0.018 U	0.018 U	0.018 U
BENZO(B)FLUORANTHENE	205-99-2	1.10	18	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.046 U	0.045 U	0.023 U	0.023 U	0.023 U	0.047 U	0.022 U	0.022 U	0.023 U
BENZO(GHI)PERYLENE	191-24-2	---	2.0	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.027 U	0.054 U	0.053 U	0.027 U	0.027 U	**0.04** J	0.055 U	0.027 U	0.026 U	0.027 U
BENZO(K)FLUORANTHENE	207-08-9	11.0	71	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U	0.041 U	0.021 U	0.021 U	**0.036** J	0.042 U	0.02 U	0.02 U	0.02 U
CHRYSENE	218-01-9	110.0	3.1	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U	0.033 U	0.033 U	0.017 U	0.017 U	**0.086** J	0.034 U	0.016 U	0.016 U	0.016 U
DIBENZ(A,H)ANTHRACENE	53-70-3	0.110	14	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
FLUORANTHENE	206-44-0	240	10	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.049 U	0.025 U	0.025 U	**0.095** J	0.051 U	0.025 U	0.024 U	0.025 U
FLUORENE	86-73-7	240.0	3.7	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.042 U	0.041 U	0.021 U	0.021 U	0.021 U	0.042 U	0.02 U	0.02 U	0.02 U
INDENO(1,2,3-CD)PYRENE	193-39-5	1.10	71	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
NAPHTHALENE	91-20-3	3.8	1.0	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.038 U	0.037 U	0.019 U	0.019 U	0.019 U	0.038 U	0.018 U	0.018 U	0.018 U
PENTACHLOROPHENOL	87-86-5	1.0	0.36	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.33 U	0.33 U	**0.54**	0.17 U	0.17 U	0.34 U	0.16 U	0.16 U	0.16 U
PHENANTHRENE	85-01-8	---	5.5	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.046 U	0.045 U	0.023 U	0.023 U	0.023 U	0.047 U	0.022 U	0.022 U	0.023 U
PYRENE	129-00-0	180	10	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.05 U	0.049 U	0.025 U	0.025 U	**0.085** J	0.051 U	0.025 U	0.024 U	0.025 U

Notes:

All concentrations are in milligrams per kilogram (mg/kg).

--- = screening level not available

Detect results are shown in **Bold**

Values greater than the lowest SL are highlighted in gray.

DU = Decision Unit

Eco = ecological

HH = human health

SL = screening level

Result Qualifiers:

J = estimated value

U = analyte not detected above the laboratory reporting limit.

TABLE 4-5

INCREMENTAL SOIL SAMPLING ANALYTICAL RESULTS - POLYCHLORINATED BIPHENYLS

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Decision Unit	DU-1						DU-2			DU-3			DU-4 (Background)		
			Soil Type	Subsurface			Surface			Surface			Surface			Surface		
			Lab ID	AZ79149	AZ79150	AZ79151	AZ79146	AZ79147	AZ79148	AZ79152	AZ79153	AZ79154	AZ79155	AZ79156	AZ79157	AZ79158	AZ79159	AZ79160
			ISM Replicate	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	SU01	SU02	SU03	SU01	SU02	SU03	Rep 1	Rep 2	Rep 3
			Sample ID	DU01-SB-01	DU01-SB-02	DU01-SB-03	DU01-SS-01	DU01-SS-02	DU01-SS-03	DU02-SS-01	DU02-SS-02	DU02-SS-03	DU03-SS-01	DU03-SS-02	DU03-SS-03	DU04-SS-01	DU04-SS-02	DU04-SS-03
			Sample Date	8/30/2018	8/30/2018	8/30/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Chemical Name	CASRN	HH SL	Eco SL	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
AROCLOR 1221	11104-28-2	0.20	---	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
AROCLOR 1232	11141-16-5	0.17	---	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
AROCLOR 1242	53469-21-9	0.23	0.041	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
AROCLOR 1248	12672-29-6	0.23	0.0073	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
AROCLOR 1254	11097-69-1	0.12	0.041	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
AROCLOR 1260	11096-82-5	0.24	0.88	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
AROCLOR 1262	37324-23-5	---	---	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
AROCLOR 1268	11100-14-4	---	---	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U
TOTAL PCBs	1336-36-3	0.23	40	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U

Notes:

All concentrations are in milligrams per kilogram (mg/kg).
--- = screening level not available
Detect results are shown in **Bold**
Values greater than the lowest SL are highlighted in gray.
DU = Decision Unit
Eco = ecological
HH = human health
PCB = polychlorinated byphenyl
SL = screening level

Result Qualifiers:

U = analyte not detected above the laboratory reporting limit.

TABLE 4-6
INCREMENTAL SOIL SAMPLING ANALYTICAL RESULTS - PESTICIDES
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Decision Unit	**DU-1**						**DU-2**			**DU-3**			**DU-4 (Background)**		
			Soil Type	**Subsurface**			**Surface**			**Surface**			**Surface**			**Surface**		
			Lab ID	**AZ79149**	**AZ79150**	**AZ79151**	**AZ79146**	**AZ79147**	**AZ79148**	**AZ79152**	**AZ79153**	**AZ79154**	**AZ79155**	**AZ79156**	**AZ79157**	**AZ79158**	**AZ79159**	**AZ79160**
			ISM Replicate	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**SU01**	**SU02**	**SU03**	**SU01**	**SU02**	**SU03**	**Rep 1**	**Rep 2**	**Rep 3**
			Sample ID	**DU01-SB-01**	**DU01-SB-02**	**DU01-SB-03**	**DU01-SS-01**	**DU01-SS-02**	**DU01-SS-03**	**DU02-SS-01**	**DU02-SS-02**	**DU02-SS-03**	**DU03-SS-01**	**DU03-SS-02**	**DU03-SS-03**	**DU04-SS-01**	**DU04-SS-02**	**DU04-SS-03**
			Sample Date	**8/30/2018**	**8/30/2018**	**8/30/2018**	**8/29/2018**	**8/29/2018**	**8/29/2018**	**8/29/2018**	**8/29/2018**	**8/29/2018**	**8/30/2018**	**8/30/2018**	**8/30/2018**	**8/30/2018**	**8/30/2018**	**8/30/2018**
Chemical Name	CASRN	**HH SL**	**Eco SL**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
4,4'-DDD	72-54-8	0.19	0.0063	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U
4,4'-DDE	72-55-9	2.0	0.021	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U	0.0016 U
4,4'-DDT	50-29-3	1.9	0.021	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
ALDRIN	309-00-2	0.039	0.0033	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
ALPHA-BHC	319-84-6	0.086	0.10	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
ALPHA-CHLORDANE	5103-71-9	---	0.27	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
BETA-BHC	319-85-7	0.30	0.0040	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
DELTA-BHC	319-86-8	---	0.10	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
DIELDRIN	60-57-1	0.03400	0.0045	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
ENDOSULFAN I	959-98-8	---	---	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
ENDOSULFAN II	33213-65-9	---	---	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
ENDOSULFAN SULFATE	1031-07-8	---	---	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
ENDRIN	72-20-8	1.90000	0.0014	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
ENDRIN ALDEHYDE	7421-93-4	---	---	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
ENDRIN KETONE	53494-70-5	---	---	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
GAMMA-BHC	58-89-9	0.5700	0.0050	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
GAMMA-CHLORDANE	5566-34-7	---	---	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
HEPTACHLOR	76-44-8	0.13000	0.059	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
HEPTACHLOR EPOXIDE	1024-57-3	0.07	---	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
METHOXYCHLOR	72-43-5	32	5.1	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
TOXAPHENE	8001-35-2	0.49000	4.1	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U

Notes:
All concentrations are in milligrams per kilogram (mg/kg).
--- = screening level not available
Detect results are shown in **Bold**
Values greater than the lowest SL are highlighted in gray.
DU = Decision Unit
Eco = ecological
HH = human health
SL = screening level
Result Qualifiers:
J = estimated value
U = analyte not detected above the laboratory reporting limit.

TABLE 4-7

INCREMENTAL SOIL SAMPLING ANALYTICAL RESULTS - SEMI-VOLATILE ORGANIC COMPOUNDS

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Decision Unit	DU-1						DU-2			DU-3			DU-4 (Background)		
			Soil Type	Subsurface			Surface			Surface			Surface			Surface		
			Lab ID	AZ79149	AZ79150	AZ79151	AZ79146	AZ79147	AZ79148	AZ79152	AZ79153	AZ79154	AZ79155	AZ79156	AZ79157	AZ79158	AZ79159	AZ79160
			ISM Replicate	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	SU01	SU02	SU03	SU01	SU02	SU03	Rep 1	Rep 2	Rep 3
			Sample ID	DU01-SB-01	DU01-SB-02	DU01-SB-03	DU01-SS-01	DU01-SS-02	DU01-SS-03	DU02-SS-01	DU02-SS-02	DU02-SS-03	DU03-SS-01	DU03-SS-02	DU03-SS-03	DU04-SS-01	DU04-SS-02	DU04-SS-03
			Sample Date	8/30/2018	8/30/2018	8/30/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Chemical Name	CASRN	HH SL	Eco SL	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1,2,4-TRICHLOROBENZENE	120-82-1	5.8	0.27	1 U	1 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	1 U	1 U	2.1 U	1 U	0.98 U	1 U
1,2-DICHLOROBENZENE	95-50-1	180	0.92	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.1 U	2.1 U	1.1 U	1.1 U	1.1 U	2.2 U	1 U	1 U	1 U
1,3-DICHLOROBENZENE	541-73-1	---	0.74	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.1 U	2.1 U	1.1 U	1.1 U	1.1 U	2.2 U	1 U	1 U	1 U
1,4-DICHLOROBENZENE	106-46-7	3	0.89	1 U	1 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	1 U	1 U	2.1 U	1 U	0.98 U	1 U
2,4,5-TRICHLOROPHENOL	95-95-4	630.00	4.0	1.3 U	1.3 U	1.3 U	1.3 U	1.2 U	1.2 U	2.5 U	2.5 U	1.2 U	1.3 U	1.3 U	2.5 U	1.2 U	1.2 U	1.2 U
2,4,6-TRICHLOROPHENOL	88-06-2	6.3	10	1 U	1 U	1 U	1 U	1 U	0.99 U	2 U	2 U	0.99 U	1 U	1 U	2 U	0.98 U	0.96 U	0.98 U
2,4-DICHLOROPHENOL	120-83-2	19	---	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.1 U	2.1 U	1.1 U	1.1 U	1.1 U	2.2 U	1 U	1 U	1 U
2,4-DIMETHYLPHENOL	105-67-9	130	0.010	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.91 U	1.8 U	1.8 U	0.91 U	0.92 U	0.92 U	1.9 U	0.9 U	0.88 U	0.9 U
2,4-DINITROPHENOL	51-28-5	13	20	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.3 U	2.2 U	1.1 U	1.1 U	1.1 U	2.3 U	1.1 U	1.1 U	1.1 U
2,4-DINITROTOLUENE	121-14-2	1.7	6.0	1.3 U	1.3 UJ	1.3 U	1.3 U	1.3 U	1.3 U	2.7 U	2.6 U	1.3 U	1.3 U	1.3 U	2.7 U	1.3 U	1.3 U	1.3 U
2,6-DINITROTOLUENE	606-20-2	0.36	4.0	1.3 U	1.3 UJ	1.3 U	1.3 U	1.3 U	1.3 U	2.5 U	2.5 U	1.3 U	1.3 U	1.3 U	2.6 U	1.2 U	1.2 U	1.2 U
2-CHLORONAPHTHALENE	91-58-7	480	---	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.2 U	2.1 U	1.1 U	1.1 U	1.1 U	2.2 U	1.1 U	1 U	1.1 U
2-CHLOROPHENOL	95-57-8	39	0.39	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U	0.91 U	1.8 U	1.8 U	0.91 U	0.92 U	0.92 U	1.9 U	0.9 U	0.88 U	0.9 U
2-METHYLPHENOL	95-48-7	320	0.67	0.94 U	0.95 U	0.95 U	0.94 U	0.94 U	0.93 U	1.9 U	1.8 U	0.93 U	0.94 U	0.94 U	1.9 U	0.92 U	0.9 U	0.92 U
2-NITROANILINE	88-74-4	63	5.3	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	2.6 U	2.5 U	1.3 U	1.3 U	1.3 U	2.6 U	1.3 U	1.2 U	1.3 U
2-NITROPHENOL	88-75-5	---	7.0	1 U	1 U	1 U	1 U	1 U	0.99 U	2 U	2 U	0.99 U	1 U	1 U	2 U	0.98 U	0.96 U	0.98 U
3,3´-DICHLOROBENZIDINE	91-94-1	1.2	---	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.3 U	2.3 U	1.2 U	1.2 U	1.2 U	2.4 U	1.1 U	1.1 U	1.1 U
3/4-METHYLPHENOL	m,p-Cresols,	---	---	0.96 U	0.97 R	0.97 U	0.96 U	0.96 U	0.95 U	1.9 U	1.9 U	0.95 U	0.96 U	0.96 U	1.9 U	0.94 U	0.92 U	0.94 U
3-NITROANILINE	99-09-2	---	---	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	2.5 U	2.5 U	1.3 U	1.3 U	1.3 U	2.6 U	1.2 U	1.2 U	1.2 U
4,6-DINITRO-2-METHYLPHENOL	534-52-1	0.51	---	1.2 U	1.2 UJ	1.2 U	1.2 U	1.2 U	1.2 U	2.3 U	2.3 U	1.2 U	1.2 U	1.2 U	2.4 U	1.1 U	1.1 U	1.1 U
4-BROMOPHENYL PHENYL ETHER	101-55-3	---	---	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.4 U	2.3 U	1.2 U	1.2 U	1.2 U	2.4 U	1.2 U	1.1 U	1.2 U
4-CHLORO-3-METHYLPHENOL	59-50-7	630	---	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.5 U	2.4 U	1.2 U	1.2 U	1.2 U	2.5 U	1.2 U	1.2 U	1.2 U
4-CHLOROANILINE	106-47-8	2.7	1.0	0.35 U	0.36 U	0.36 U	0.35 U	0.35 U	0.35 U	0.71 U	0.7 U	0.35 U	0.35 U	0.36 U	0.72 U	0.35 U	0.34 U	0.35 U
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	---	---	1.3 U	1.3 R	1.3 U	1.3 U	1.3 U	1.3 U	2.5 U	2.5 U	1.3 U	1.3 U	1.3 U	2.6 U	1.2 U	1.2 U	1.2 U
4-NITROANILINE	100-01-6	25	---	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	3.1 U	3 U	1.5 U	1.5 U	1.5 U	3.1 U	1.5 U	1.5 U	1.5 U
4-NITROPHENOL	100-02-7	---	7.0	1.3 U	1.3 U	1.3 U	1.3 U	1.2 U	1.2 U	2.5 U	2.5 U	1.2 U	1.3 U	1.3 U	2.5 U	1.2 U	1.2 U	1.2 U
BENZOIC ACID	65-85-0	25000	---	0.63 U	0.63 UJ	0.63 U	0.63 U	0.62 U	0.62 U	1.3 U	1.2 U	0.62 U	0.63 U	0.63 U	1.3 U	0.61 U	0.6 U	0.61 U
BENZYL ALCOHOL	100-51-6	630	---	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.3 U	2.3 U	1.2 U	1.2 U	1.2 U	2.4 U	1.1 U	1.1 U	1.1 U
BIS (2-CHLORETHOXY) METHANE	111-91-1	19	---	1 U	1.1 U	1.1 U	1 U	1 U	1 U	2.1 U	2.1 U	1 U	1 U	1 U	2.1 U	1 U	1 U	1 U
BIS (2-CHLOROETHYL) ETHER	111-44-4	0.23	---	1 U	1.1 U	1.1 U	1 U	1 U	1 U	2.1 U	2.1 U	1 U	1 U	1 U	2.1 U	1 U	1 U	1 U
BIS (2-CHLOROISOPROPYL) ETHER	39638-32-9	---	---	0.98 U	0.99 U	0.99 U	0.98 U	0.98 U	0.97 U	2 U	1.9 U	0.97 U	0.98 U	0.98 U	2 U	0.96 U	0.94 U	0.96 U
BIS (2-ETHYLHEXYL) PHTHALATE	117-81-7	39	0.020	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	2.6 U	2.5 U	1.3 U	1.3 U	1.3 U	2.6 U	1.3 U	1.2 U	1.3 U
BUTYL BENZYL PHTHALATE	85-68-7	290	90	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.3 U	2.3 U	1.2 U	1.2 U	1.2 U	2.4 U	1.1 U	1.1 U	1.1 U
CARBAZOLE	86-74-8	---	79	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	3.4 U	3.4 U	1.7 U	1.7 U	1.7 U	3.5 U	1.7 U	1.6 U	1.7 U
DIBENZOFURAN	132-64-9	7.3	6.1	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.4 U	2.3 U	1.2 U	1.2 U	1.2 U	2.4 U	1.2 U	1.1 U	1.2 U
DIETHYL PHTHALATE	84-66-2	5100	100	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	2.6 U	2.5 U	1.3 U	1.3 U	1.3 U	2.6 U	1.3 U	1.2 U	1.3 U
DIMETHYL PHTHALATE	131-11-3	---	10	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	2.6 U	2.6 U	1.3 U	1.3 U	1.3 U	2.7 U	1.3 U	1.3 U	1.3 U
DI-N-BUTYL PHTHALATE	84-74-2	630	0.011	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	2.8 U	2.7 U	1.4 U	1.4 U	1.4 U	2.8 U	1.3 U	1.3 U	1.4 U
DI-N-OCTYL PHTHALATE	117-84-0	63	0.91	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.4 U	2.4 U	1.2 U	1.2 U	1.2 U	2.5 U	1.2 U	1.2 U	1.2 U
HEXACHLOROBENZENE	118-74-1	0.21	0.079	1.3 U	1.3 U	1.3 U	1.3 U	1.2 U	1.2 U	2.5 U	2.5 U	1.2 U	1.3 U	1.3 U	2.5 U	1.2 U	1.2 U	1.2 U
HEXACHLOROBUTADIENE	87-68-3	1.2	---	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.2 U	2.1 U	1.1 U	1.1 U	1.1 U	2.2 U	1.1 U	1 U	1.1 U
HEXACHLOROETHANE	67-72-1	1.8	---	1 U	1.1 U	1.1 U	1 U	1 U	1 U	2.1 U	2.1 U	1 U	1 U	1 U	2.1 U	1 U	1 U	1 U
ISOPHORONE	78-59-1	570	---	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	2.4 U	2.3 U	1.2 U	1.2 U	1.2 U	2.4 U	1.2 U	1.1 U	1.2 U
NITROBENZENE	98-95-3	5.1	2.2	1 U	1.1 U	1.1 U	1 U	1 U	1 U	2.1 U	2.1 U	1 U	1 U	1 U	2.1 U	1 U	1 U	1 U
N-NITROSODIMETHYLAMINE	62-75-9	0.002	---	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	3.6 U	3.6 U	1.8 U	1.8 U	1.8 U	3.7 U	1.8 U	1.7 U	1.8 U
N-NITROSODI-N-PROPYLAMINE	621-64-7	0.078	---	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	2.3 U	2.3 U	1.1 U	1.1 U	1.2 U	2.3 U	1.1 U	1.1 U	1.1 U
N-NITROSODIPHENYLAMINE	86-30-6	110	20	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.1 U	2.1 U	1.1 U	1.1 U	1.1 U	2.2 U	1 U	1 U	1 U
PHENOL	108-95-2	1900	0.79	0.9 U	0.9 U	0.9 U	0.9 U	0.89 U	0.89 U	1.8 U	1.8 U	0.89 U	0.9 U	0.9 U	1.8 U	0.88 U	0.86 U	0.88 U

Notes:

All concentrations are in milligrams per kilogram (mg/kg).

--- = screening level not available

Detect results are shown in **Bold.**

Values greater than the lowest SL are highlighted in gray.

DU = Decision Unit

Eco = ecological

HH = human health

SL = screening level

Result Qualifiers:

J = estimated value

U = analyte not detected above the laboratory reporting limit

TABLE 4-8

INCREMENTAL SOIL SAMPLING ANALYTICAL RESULTS - TOTAL PETROLEUM HYDROCARBONS

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

			Decision Unit	DU-1						DU-2			DU-3			DU-4 (Background)		
			Soil Type	Subsurface			Surface			Surface			Surface			Surface		
			Lab ID	AZ79149	AZ79150	AZ79151	AZ79146	AZ79147	AZ79148	AZ79152	AZ79153	AZ79154	AZ79155	AZ79156	AZ79157	AZ79158	AZ79159	AZ79160
			ISM Replicate	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	SU01	SU02	SU03	SU01	SU02	SU03	Rep 1	Rep 2	Rep 3
			Sample ID	DU01-SB-01	DU01-SB-02	DU01-SB-03	DU01-SS-01	DU01-SS-02	DU01-SS-03	DU02-SS-01	DU02-SS-02	DU02-SS-03	DU03-SS-01	DU03-SS-02	DU03-SS-03	DU04-SS-01	DU04-SS-02	DU04-SS-03
			Sample Date	8/30/2018	8/30/2018	8/30/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Chemical Name	CASRN	HH SL	Eco SL	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
DIESEL FUEL (C10-24)	TPH-DRO	226	---	**33**	**35**	**38** J	**80**	**250**	**91**	**91**	**190**	**110**	**57**	**71**	**69**	**81**	**140**	**48**
MOTOR OIL (C24-C36)	TPH-Motor Oil	5143	---	**70** J+	**75** J+	**76** J+	**160** J+	**330** J+	**160** J+	**190** J+	**370** J+	**200** J+	**140** J+	**180** J+	**170** J+	**130** J+	**210**	**87** J+
DIESEL FUEL	TPH-DRO	226	---	**3.4** J	**3.5** J	**3.7** J	**4.3** J	**15**	**2.7** J	**3.9** J	**8**	**6.2**	**4.2** J	**4.8** J	**5.4**	**3.6** J	**18**	**4.8** J
MOTOR OIL	TPH-Motor Oil	5143	---	**7.5** J	**9.7** J	**7.1** J	**7** J	**12** J	**4.8** J	**8.3** J	**9.8** J	**6.1** J	**12** J	**14** J	**13** J	3.6 U	**7.1** J	**4.5** J

Notes:
All concentrations are in milligrams per kilogram (mg/kg).
--- = screening level not available
Detect results are shown in **Bold**
DU = Decision Unit
Eco = ecological
HH = human health
SL = screening level

Result Qualifiers:
J = estimated value
U = analyte not detected above the laboratory reporting limit.

TABLE 5-1
COPC SELECTION SUMMARY FOR HUMAN HEALTH AND ECOLOGICAL RECEPTORS
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Ecological		Human Health	
				Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
EPA 6020A	Metals	ANTIMONY	7440-36-0	x	x		x
		ARSENIC	7440-38-2	x	x	x	x
		BARIUM	7440-39-3	x	x		
		CADMIUM	7440-43-9		x		
		CHROMIUM	7440-47-3	x	x	x	x
		COBALT	7440-48-4		x	x	x
		COPPER	7440-50-8	x	x		x
		LEAD	7439-92-1	x	x		x
		MOLYBDENUM	7439-98-7	x	x		
		NICKEL	7440-02-0	x	x		
		SILVER	7440-22-4		x		
		THALLIUM	7440-28-0	x	x	x	x
		VANADIUM	7440-62-2	x	x		
		ZINC	7440-66-6	x	x		
EPA 7471A	Metals	MERCURY	7439-97-6	x	x		
8270C-LL	PAHs / PCP	PENTACHLOROPHENOL	87-86-5	x			
EPA 8290	Dioxin / Furan	TEQ	TEQ	x			

Notes:
CASRN = Chemical Abstracts Service Registry Number
COPC = chemical of potential concern
PCB = polychlorinated biphenyl
SVOC = semi-volatile organic compound
TEQ = toxicity equivalency quotient

TABLE 5-2

SUMMARY OF INADEQUATE METHOD DETECTION LIMITS RELATIVE TO SCREENING LEVELS

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Ecological		Human Health	
				Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
EPA 7471A	Metals	MERCURY	7439-97-6	x	x		
EPA 8270C	SVOCs	1,2,4-TRICHLOROBENZENE	120-82-1	x	x		
		1,2-DICHLOROBENZENE	95-50-1	x	x		
		1,3-DICHLOROBENZENE	541-73-1	x	x		
		1,4-DICHLOROBENZENE	106-46-7	x	x		
		2,4-DIMETHYLPHENOL	105-67-9	x	x		
		2,4-DINITROTOLUENE	121-14-2			x	
		2,6-DINITROTOLUENE	606-20-2			x	x
		2-CHLOROPHENOL	95-57-8	x	x		
		2-METHYLPHENOL	95-48-7	x	x		
		3,3´-DICHLOROBENZIDINE	91-94-1			x	
		4,6-DINITRO-2-METHYLPHENOL	534-52-1			x	x
		BIS (2-CHLOROETHYL) ETHER	111-44-4			x	x
		BIS (2-ETHYLHEXYL) PHTHALATE	117-81-7	x	x		
		DI-N-BUTYL PHTHALATE	84-74-2	x	x		
		DI-N-OCTYL PHTHALATE	117-84-0	x	x		
		HEXACHLOROBENZENE	118-74-1	x	x	x	x
		HEXACHLOROBUTADIENE	87-68-3			x	
		HEXACHLOROETHANE	67-72-1			x	
		N-NITROSODIMETHYLAMINE	62-75-9			x	x
		N-NITROSODI-N-PROPYLAMINE	621-64-7			x	x
		PHENOL	108-95-2	x	x		

Notes:

x = maximum MDL is inadequate relative to the human health or ecological screening level

CASRN = Chemical Abstracts Service Registry Number

MDL = method detection limit

PAH = polycyclic aromatic hydrocarbon

SVOC = semi-volatile organic compound

TABLE 5-3
COMPARISON OF SITE SOIL TO BACKGROUND SOIL
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

COPC	DU-1				DU-2		DU-3	
	Surface Soil		Subsurface Soil		Surface Soil		Surface Soil	
	Higher than DU-4?	Ratio Site: Bkg	Higher than DU-4?	Ratio Site: Bkg	Higher than DU-4?	Ratio Site: Bkg	Higher than DU-4?	Ratio Site: Bkg
Antimony	Yes	13	Yes	16	Yes*	6.5	Yes*	2.9
Arsenic	Yes	0.89	No	1.3	No	0.78	No	0.80
Barium	Yes	1.4	Yes*	1.2	Yes	1.4	Yes*	1.1
Cadmium	Yes	3.4	Yes	4.1	Yes	3.2	Yes	1.5
Chromium	Yes*	1.1	Yes	1.5	Yes*	1.0	Yes*	0.92
Cobalt	Yes*	1.0	Yes	1.2	Yes*	1.2	Yes*	1.0
Copper	Yes	2.8	Yes	4.4	Yes*	2.2	Yes	1.9
Lead	Yes	2.7	Yes	4.4	Yes	3.2	Yes*	1.0
Mercury	Yes*	1.0	No	1.0	Yes*	1.0	No	1.0
Molybdenum	Yes	8.5	Yes	11	Yes	8.0	Yes	17
Nickel	No	1.5	No	0.35	Yes*	1.0	Yes*	0.92
Silver	Yes	2.4	Yes	2.7	Yes	2.2	Yes	1.9
Thallium	No	0.59	No	0.77	No	0.95	Yes*	0.87
Vanadium	Yes*	1.0	Yes	1.2	Yes*	1.0	Yes*	1.1
Zinc	Yes	1.9	Yes	2.3	Yes*	1.9	Yes*	1.2

Notes:
*Concentrations were statistically different using the Form 2 background test (USEPA 2002) but were not statistically different using the Form 1 background test.
Bkg = background (DU-4)
COPC = chemical of potential concern
DU = decision unit

Appendices

Appendix A

ESI Site Photographs

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APPENDIX A
ESI SITE PHOTOGRAPHS
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Photo 1: View of DU-01 (yellow string and flags) looking south (downgradient).
Date: 8/29/2018 11:09AM.

Photo 2: View of DU-01 looking northwest. Seasonal watershed drainage visible in foreground.
Date: 8/29/2018 15:06PM.

Photo 3: View of DU-02 (pink flags and string) on south side of Site. Bedrock in midground represents farthest extent of the DU to the south. Date: 8/29/2018 18:20PM

Photo 4: View of DU-02 on north side of Site, looking west. Bedrock on right of frame represents the farthest extent of the DU to the north. Yellow flags are the edge of DU-01. Date: 8/29/2018 18:20PM

Photo 5: Borehole 02 extent of debris. Refusal at 18 inches below ground surface (bgs).
Date: 8/28/2018 11:13AM

Photo 6: Borehole 11 extent of debris. Refusal at 3 feet bgs.
Date: 8/28/2018 14:38PM

APPENDIX A
ESI SITE PHOTOGRAPHS
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Photo 7: Borehole 9 located in thick debris. Refusal at 18 inches bgs.
Date: 8/28/2018 14:41PM

Photo 8: Borehole 10 beyond the extent of debris. Refusal on bedrock at 2 feet bgs.
Date: 8/28/2018 14:30PM

Photo 9: Decontamination materials including alconox spray, rinse water, scrub brush, 5-gallon bucket, and paper towels. Date: 8/30/2018 8:46AM

Photo 10: Decontaminated equipment including hand auger, step sampler, and trowel on clean visqueen. Date: 8/30/2018 8:46AM

Photo 11: View to the southwest of two boring locations in DU-01.
Date: 8/28/2018 11:16AM

Photo 12: Archeologist pit in DU-02 during excavation.
Date: 8/28/2018 11:17AM

Appendix B

FSI Data Evaluation Tables (as provided by IT Corporation 2002)

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TABLE 4-1: INORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO PRELIMINARY REMEDIATION GOALS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	CAM 17 Metals by EPA Methods 6010B and 7470A (mg/kg)																	EPA Method 7196 (mg/kg)
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Hexavalent Chromium
YWV-UG01-SO-1019	08/21/2001	0.5	<5.2	**2.2**	**21.4**	<0.21	**0.0096 J^**	**1.6**	**3.3**	**11.8**	**3.5**	**0.075 J^**	**0.61**	**1.8**	<0.52	<0.52	<0.52	**15.5**	**21.8**	<0.52 UJ
YWV-UG02-SO-1020	08/21/2001	0.5	<5.3	**0.92**	**4.2**	<0.21	<0.11	**1.2**	**1**	**4**	**1.4**	**0.13 J^**	**0.34**	**0.59**	<0.53	<0.53	<0.53	**10.3**	**11.4**	<0.53 UJ
YWV-UG03-SO-1021	08/21/2001	0.5	<22	**2.5**	**43.6**	**0.59 J^**	**0.25 J^**	**6.5**	**4.6**	**27.7**	**8.7**	**0.13 J^**	**1.3**	**5.3**	<2.2	<2.2	<2.2	**20.7**	**31.6**	<0.54 UJ
YWV-TP01-SO-1033	08/22/2001	0.5	<21	**2.9**	**13.5**	<0.86	<0.43	**3.1**	**2.9**	**16**	**4.3**	**0.13 J^**	**19.6**	**1.9**	<2.1	<2.1	<2.1	**31.9**	**24**	<0.54 UJ
YWV-TP01-SO-1034 (FD)	08/22/2001	0.5	<21	**3.2**	**13**	<0.86	<0.43	**2.9**	**2.8**	**16.1**	**4.2**	**0.23**	**21.3**	**1.6**	<2.1	<2.1	<2.1	**35**	**21.9**	<0.54 UJ
YWV-TP02-SO-1031	08/22/2001	0.7	<23	**6.4**	**28.1**	<0.91	**0.3 J^**	**7.8**	**8.8**	**163**	**64.6**	**0.25**	**5.5**	**26**	<2.3	<2.3	<2.3	**23.5**	**233**	<0.57 UJ
YWV-TP02-SO-1032	08/22/2001	2	<21	**3.6**	**11.1**	<0.85	**0.13 J^**	**4.7**	**3.4**	**152**	**13.4**	**0.16 J^**	**25.8**	**3.5**	<2.1	<2.1	<2.1	**25.3**	**80**	<0.53 UJ
YWV-TP03-SO-1026	08/21/2001	0.7	<22	**2.3**	**32.6**	<0.86	**14.8**	**3.6**	**8.4**	**31.4**	**9.7**	**0.13 J^**	**20**	**10.1**	<2.2	<2.2	<2.2	**26.2**	**128**	<0.54 UJ
YWV-TP03-SO-1027	08/21/2001	2	<22	**3.1**	**26.3**	<0.87	**1**	**3.5**	**5.9**	**46.1**	**91.5**	**0.66**	**24.3**	**8.2**	<2.2	<2.2	<2.2	**28.9**	**456**	<0.54 UJ
YWV-TP04-SO-1030	08/22/2001	1.1	<5.7	**2.9**	**27.2**	<0.23	**0.28**	**4.2**	**3.8**	**373**	**8.9**	**0.14 J^**	**10.6**	**5.4**	<0.57	<0.57	<0.57	**25.9**	**102**	<0.57 UJ
YWV-TP04-SO-1028	08/21/2001	2.8	<22	**1.9**	**32.9**	<0.89	**0.45**	**2.7**	**3.1**	**262**	**29.4**	**0.15 J^**	**4**	**5.2**	<2.2	<2.2	<2.2	**16**	**131**	<0.56 UJ
YWV-DG01-SO-1022	08/21/2001	0.5	<24	**2.7**	**17.2**	<0.98	<0.49	**3.2**	**3.5**	**23.9**	**5.3**	**0.25**	**88.6**	**4.5**	<2.4	<2.4	<2.4	**34.6**	**61.5**	<0.61 UJ
YWV-DG02-SO-1023	08/21/2001	0.5	<23	**2.3**	**15.2**	<0.93	<0.46	**3.4**	**3.3**	**18.3**	**5**	**0.11 J^**	**32.5**	**2.5**	<2.3	<2.3	<2.3	**27.9**	**29.2**	<0.58 UJ
YWV-DG03-SO-1024	08/21/2001	0.5	<21	**2.9**	**18.2**	<0.85 U	<0.43	**4.3**	**3.1**	**15.5**	**5.2**	**0.24**	**22.7**	**2.8**	<2.1	<2.1	<2.1	**28.1**	**24.5**	<0.53 UJ
Preliminary Remediation Goals (Res. Soil):			31	0.39	5400	150	9	210	4700	2900	400	23	390	150	390	390	5.2	550	23000	0.2
Preliminary Remediation Goals (Ind. Soil):			820	2.7	1E+05	2200	810	450	1E+05	76000	750	610	10000	41000	10000	10000	130	14000	1E+05	64
Yosemite UTL Background Statistic:			28.8	19.4	211	1.12	0.46	13.8	18.5	50.9	33.9	1.2	1.32	8.48	2.93	2.95	2.44	76.1	84.1	0.7

(FD): field duplicate
fbgs: feet below ground surface
Res. Soil: Residential Soil
Ind. Soil: Industrial Soil

J^ Reported between method detection limit and practical quantitation limit
U The analyte was analyzed for, but was not detected above the reporting limit.
UJ The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
Detections shown in bold, circled if above Residential Preliminary Remediation Goals, boxed if above Industrial Preliminary Remediation Goals, and underlined if above UTL Background Statistic.

TABLE 4-2: TOTAL PETROLEUM HYDROCARBONS IN SOIL SAMPLES
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	Moisture Content (%)	EPA METHOD 8015B (mg/kg)			
				TPH-diesel	TPH-diesel (SGC)	TPH-motor oil	TPH-motor oil (SGC)
YWV-UG01-SO-1019	08/21/2001	0.5-1	3.1	**3 J^**	**5 J^**	**24**	**21**
YWV-UG02-SO-1020	08/21/2001	0.5-1	5.4	**7 J^**	**6 J^**	**81**	**56**
YWV-UG03-SO-1021	08/21/2001	0.5-1	7	**6 J^**	**5 J^**	**51**	**41**
YWV-TP01-SO-1033	08/22/2001	0.5-1	6.8	**24**	**9 J^**	**160**	**87**
YWV-TP01-SO-1034 (FD)	08/22/2001	0.5-1	7	**8 J^**	**5 J^**	**69**	**48**
YWV-TP02-SO-1031	08/22/2001	0.7-1.2	12.2	**57**	**38**	**160**	**110**
YWV-TP02-SO-1032	08/22/2001	2-2.5	5.5	<11	<11	**17**	**13**
YWV-TP03-SO-1026	08/21/2001	0.7-1.2	7.4	**16**	**9 J^**	**110**	**73**
YWV-TP03-SO-1027	08/21/2001	2-2.5	7.9	**43**	**29**	**73**	**50**
YWV-TP04-SO-1030	08/22/2001	1.1-1.6	11.7	**11**	**7 J^**	**55**	**34**
YWV-TP04-SO-1028	08/21/2001	2.8-3.3	10.1	**12**	**8 J^**	**56**	**39**
YWV-DG01-SO-1022	08/21/2001	0.5-1	18	**14**	**8 J^**	**62**	**37**
YWV-DG02-SO-1023	08/21/2001	0.5-1	14	**18**	**6 J^**	**83**	**42**
YWV-DG03-SO-1024	08/21/2001	0.5-1	6.3	**12**	**6 J^**	**74**	**37**
MADEP Cleanup Standards for soil:				5,000	5,000	5,000	5,000
RWQCB Risk Based Screening Level:				500	500	1,000	1,000

(FD): field duplicate
fbgs: feet below ground surface
SGC: with silica gel cleanup
MADEP: Massachusetts Department of Environmental Protection
RWQCB: Regional Water Quality Control Board

J The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U The analyte was analyzed for, but was not detected above the reporting limit.

TABLE 4-3: ORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO PRELIMINARY REMEDIATION GOALS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	VOCs (µg/kg) EPA Method 8260						SVOCs (µg/kg) EPA Method 8270	PAHS (µg/kg) EPA Method 8310	Pesticides/PCBs (µg/kg) EPA Method 8081					
			1,2-Dichlorobenzene	Acetone	Methyl ethyl ketone	Methyl isobutyl ketone	Methylene chloride	Toluene	Bis(2-ethylhexyl) phthalate	Chyrsene	DDD44	DDE44	DDT44	Dieldrin	Heptachlor epoxide	PCB-1260 (Aroclor 1260)
YWV-UG01-SO-1019	8/21/2001	0.5-1	<5.8	<58	<58	<5.8	<12 U	**0.8 J^**	<340	<340	<2.1	<2.1	<2.1	<2.1	<1	<26
YWV-UG02-SO-1020	8/21/2001	0.5-1	<6.5	<65	<65	<6.5	<13 U	<6.5	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<26
YWV-UG03-SO-1021	8/21/2001	0.5-1	<7.6	<76	<76	<7.6	<15 U	<7.6	<350	**6.7**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	<27
YWV-TP01-SO-1033	8/22/2001	0.5-1	<350	<110	<110	<11	<23 U	**4 J^**	<350	**6.2**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP01-SO-1034 (FD)	8/22/2001	0.5-1	<7.6	**51 J**	**9 J^**	<7.6	<15 U	**0.9 J^**	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP02-SO-1031	8/22/2001	0.7-1.2	<7.9	**370 J**	**18 J^**	**1 J^**	<16 U	<7.9	**85 J^**	**4**	**31 J-**	**22 J-**	<2.3 UJ	**2 J-**	**0.7 J-**	**45**
YWV-TP02-SO-1032	8/22/2001	2-2.5	<6	<60	<60	<6	<12 U	<6	<350	<350	<2.1	**0.4 J^**	<2.1	<2.1	<1.1	**11 J^**
YWV-TP03-SO-1026	8/21/2001	0.7-1.2	<7	**110 J**	<70	<7	<14 U	<7	<360	**12**	<2.2	<2.2	<2.2	<2.2	<1.1	<27
YWV-TP03-SO-1027	8/21/2001	2-2.5	<6.8	**79 J**	<68	<6.8	<14 U	<6.8	<360 UJ	**5.3**	<2.2	<2.2	**2 J^**	<2.2	<1.1	**13 J^**
YWV-TP04-SO-1030	8/22/2001	1.1-1.6	**1 J-**	<71	<71	<7.1	<14 U	<7.1	<370	**5.2**	<2.3 UJ	**0.5 J-**	<2.3 UJ	**0.5 J-**	<1.1 UJ	<28
YWV-TP04-SO-1028	8/21/2001	2.8-3.3	<7	**61 J**	**8 J^**	<7	<14 U	**1 J^**	<370	**4**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	**17 J^**
YWV-DG01-SO-1022	8/21/2001	0.5-1	<7.1	<71	<71	<7.1	<14 U	<7.1	**240 J^**	**52**	<2.4 UJ	<2.4 UJ	<2.4 UJ	<2.4 UJ	<1.2 UJ	<30
YWV-DG02-SO-1023	8/21/2001	0.5-1	<8.1	**31 J**	<81	<8.1	<16 U	<8.1	<380	**25**	<2.3 UJ	<2.3 UJ	<2.3 UJ	<2.3 UJ	<1.2 UJ	<29
YWV-DG03-SO-1024	8/21/2001	0.5-1	<8.8	<88	<88	<8.8	<18 U	<8.8	<350	**16**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
Preliminary Remediation Goals: (Res. Soil):			2E+06	370000	7E+06	790000	8900	520000	35000	6100	2400	1700	1700	30	53	220
Preliminary Remediation Goals: (Ind. Soil):			6E+06	370000	3E+07	3E+06	21000	520000	180000	290000	17000	12000	12000	150	270	1000

(FD): field duplicate
fbgs: feet below ground surface
Res. Soil Residential Soil
Ind. Soil Industrial Soil

J^: Reported between method detection limit and practical quantitation limit
J: The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U: The analyte was analyzed for, but was not detected above the reporting limit.
UJ: The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- Bias low
Detections shown in bold.

Appendix C

ESI Data Validation Reports

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Vogelsang Former Waste Disposal Area
Yosemite National Park
Data Validation Report

Laboratory: APPL Labs, Inc

Matrix: Soil/Rinsate

Sample Delivery Group (SDG) Number and Samples in SDG:
(Validated samples in bold type)

SDG	Samples			
86766	**DU01-SS-01**	B03-SS-01		Samples in bold were validated
	DU01-SS-02	B04-SS-01		
	DU01-SS-03	B05-SB-01		
	DU01-SB-01	B06-SB-01		
	DU01-SB-02	B07-SB-01		
	DU01-SB-03	B08-SB-01		
	DU02-SS-01	B09-SB-01		
	DU02-SS-02	B10-SS-01		
	DU02-SS-03	B10-SS-02		
	DU03-SS-01	B11-SB-01		
	DU03-SS-02	B12-SB-01		
	DU03-SS-03	B13-SS-01		
	DU04-SS-01	B14-SB-01		
	DU04-SS-02	B15-SS-01		
	DU04-SS-03	B16-SS-01		
	B01-SB-01	B17-SS-01		
	B02-SB-01	G-11-SS-04	Rinsate	

Collection Dates: August 29 and 30, 2018

Validation of the data was performed in accordance with the methods, the Final SAP, National Functional Guidelines for Organic Superfund Methods Data Review (January 2017), and National Functional Guidelines for Inorganic Superfund Methods Data Review (January 2017).

Semivolatiles and PAH by SW8270C and SIM method SW8270C

Precision:	**Yes No N/A**
Were the Field Duplicate relative percent differences (RPD) ≤ 50%?	**N/A**
Were the Matrix Spike Duplicate RPDs ≤ 30% (SVOA) and ≤20% (Sim PAH) ?	**No**
Were the Laboratory Control Spike Duplicate RPD ≤ 30% (SVOA) and 20% (SIM PAH)?	**N/A**

Comments (note deviations): None

MS/MSD	**8270C**	**RPD (%)**	**Limit (%)**	**Qualifier**	**Samples**
	Benzoic Acid	130.8	30	None, sample result is ND	**DU01-SB-02**

Accuracy:	**Yes No N/A**
Was the Matrix Spike/Matrix Spike Duplicate criteria met? (frequency ≥ 5% and laboratory control limits)	**No**
Was the Laboratory Control Sample criteria met?	**Yes**
Were the Laboratory Method Blank results all < PQL?	**Yes**
Were the Equipment Blanks results all < PQL?	**Yes**
Was the ICAL criteria met - Method requirement: SPCCs meet minimum average response factor, CCCs RSD ≤ 30%? Validation limit %RSD per Table 34 in NFG or linear, average response factor per Table 34 in NFG.	**Yes**
Were the ICV/CCV criteria met - Method requirement: SPCCs >0.05, CCCs %D ≤ 20%? Validation limit %RSD per Table 34 in NFG or linear, average response factor per Table 34 in NFG.	**Yes**
Was the Tuning criteria met?	**Yes**
Were the Surrogate % recoveries within laboratory determined control limits?	**Yes**
Were the Internal Standard areas within ± 50 - 150%?	**Yes**

Comments (note deviations): None

MS/MSD	SIM 8270C	%R	Limits (%)	Qualifiers	Samples
	2,4-Dinitrophenol	336 / 339	15 - 130	None, result is ND	DU01-SB-02
	2,4-Dinitotoluene	47.0 / 57.3	50 - 110	**UJ**	
	2,6-Dinitrotoluene	45.5 / 57.8	50 - 110	**UJ**	
	3/4-Methylphenol	0.0 / 0.0	40 - 105	**R**	
	4,6-Dinitro-2-methylphenol	20.7 / 24.2	30 / 135	**UJ**	
	4-Chlorophenyl phenylether	0.0 / 0.0	45 / 110	**R**	
	Benzoic acid	0.9 / 4.3	10 / 110	**UJ**	

Field Blank	8270C	Result (µg/L)	Qualifiers	Samples
	Benzyl Alcohol	7.9 J	None, all sample results are ND	All samples
	Dimethyl phthalate	2.5 J		
	SIM 8270C	**Result (µg/L)**	**Qualifiers**	**Samples**
	2-Methylnaphthalene	1.4	None, all sample results are ND	All samples

---

Organochlorine Pesticides by Method SW8081B

Precision:	Yes No NA
Were the Field Duplicate relative percent difference (RPD) criteria met ? (control limits RPD ≤ 25% or an absolute difference of the quantitation limit if either detection is less than 5x the quantitation limit).	**N/A**
Were the Matrix Spike Duplicate RPDs within limits?	**Yes**
Laboratory Control Spike Duplicates RPD within limits?	**NA**

Comments (note deviations): See below

Accuracy:	Yes No NA
Was the Matrix Spike/Matrix Spike Duplicate criteria met? (frequency ≥ 5% and laboratory determined control limits)	**Yes**
Laboratory Control Sample criteria met?	**Yes**
Were the Laboratory Method Blank results all < Method Reporting Limit (MRL)?	**Yes**
Were the Equipment Blanks results all < MRL?	**Yes**
Was the initial calibration criteria met? (relative response factors ≤20% RSD, quadratic or linear calibration)	**Yes**
Was the continuing calibration criteria met? (lab limits of ≤ 20% difference from average response factor or curve, average over all analytes ≤20%)	**Yes**
Was the DDT/DDE breakdown criteria met?	**Yes**
Was a GPC and florisil cleanup performed?	**No**
Were the surrogate recoveries within control limits?	**Yes**

Comments (note deviations): Individual peaks in the toxaphene exceeded % D in one of the two columns in one ICAL standard, the ICV, and a CCV. Toxaphene was not detected in any of the samples and no data were qualified.

Polychlorinated Biphenyls SW8082A

Precision:	Yes No NA
Were the Field Duplicate relative percent difference (RPD) criteria met ? (control limits RPD ≤ 25% or an absolute difference of the quantitation limit if either detection is less than 5x the quantitation limit).	**N/A**
Were the Matrix Spike Duplicate RPDs within limits?	**Yes**
Laboratory Control Spike Duplicates RPD within limits?	**N/A**

Comments (note deviations): See below

Accuracy:	Yes No NA
Was the Matrix Spike/Matrix Spike Duplicate criteria met? (frequency ≥ 5% and laboratory determined control limits)	**Yes**
Laboratory Control Sample criteria met?	**Yes**
Were the Laboratory Method Blank results all < Method Reporting Limit (MRL)?	**Yes**
Were the Equipment Blanks results all < MRL?	**Yes**
Was the initial calibration criteria met? (relative response factors ≤20% RSD, quadratic or linear calibration)	**Yes**
Was the continuing calibration criteria met? (lab limits of ≤ 20% difference from average response factor or curve, average over all analytes ≤20%)	**Yes**
Was an acid cleanup performed?	**No**
Were the surrogate recoveries within control limits?	**Yes**

Comments (note deviations): None

Petroleum Hydrocarbons by SW-846 8015B

Precision:	**Yes No N/A**
Field Duplicates relative percent difference (RPD) criteria met ? (control limits RPD ≤ 25% (Water) or ≤ 35% (Sediment)?	**N/A**
Matrix Spike/Matrix Spike Duplicates (MS/MSD) RPD criteria of 20% met?	**No**
Lab Control Sample/Lab Control Sample Duplicate (LCS/LCSD) RPD criteria of 25% met?	**NA**

Comments (note deviations): None

MS/MSD	**8015B**	**RPD (%)**	**Limit (%)**	**Qualifier**	**Samples**
	Diesel Fuel (C10-24)	42.2	35	**J**	**DU01-SB-03**

Accuracy:	**Yes No N/A**
Was the Matrix Spike/Matrix Spike Duplicate criteria met? (frequency ≥ 5% and laboratory determined control limits)	**No**
Percent RSDs for the Initial Calibration Verification ≤ 20%?	**Yes**
Were the ICV/CCV % Ds within 20%?	**Yes**
Were the method blank results < the PQL?	**Yes**
Were the equipment blank results < the PQL?	**Yes**
Lab Control Sample recoveries meet the control limits?	**Yes**
Surrogate recoveries meet control limits?	**No**

Comments (note deviations): Motor oil results for most of the non-silica gel cleaned analyses were qualified estimated with a high bias (J+) for high surrogate recoveries.

MS/MSD	**8015B**	**%R's**	**Limits (%)**	**Qualifiers**	**Samples**
	Diesel Fuel (C10-24)	81.3 / 37.3	64-122	**J**	**DU01-SB-03**
Surrogates	**8015B**	**%R**	**%R**	**Qualifiers**	**Samples**
	Octacosane	219	51-128	**J+**	**DU01-SS-01**
	Octacosane	192	51-128	**J+**	**DU01-SS-02**
	Octacosane	214	51-128	**J+**	**DU01-SS-03**
	Octacosane	164	51-128	**J+**	**DU01-SB-01**
	Octacosane	202	51-128	**J+**	**DU01-SB-02**
	Octacosane	163	51-128	**J+**	**DU01-SB-03**
	Octacosane	207	51-128	**J+**	**DU02-SS-01**
	Octacosane	265	51-128	**J+**	**DU02-SS-02**
	Octacosane	232	51-128	**J+**	**DU02-SS-03**
	Octacosane	189	51-128	**J+**	**DU03-SS-01**
	Octacosane	238	51-128	**J+**	**DU03-SS-02**
	Octacosane	225	51-128	**J+**	**DU03-SS-03**
	Octacosane	200	51-128	**J+**	**DU04-SS-01**
	Octacosane	195	51-128	**J+**	**DU04-SS-03**

Metals (6020, 7471)

Precision:	**Yes No N/A**
Were the Field Duplicate relative percent differences (RPD) ≤ 35% ?	**N/A**
Were the MS/MSD RPDs ≤ 20% (Water) or ≤35% (Sediment)?	**Yes**
Were the Laboratory Control Spike Duplicate RPDs ≤ 30%?	**N/A**

Comments (note deviations): None

Accuracy:	**Yes No N/A**
Was the Serial Dilutions ± 10% met when analyte concentration were greater than 50x the IDL?	**Yes**
Were the Matrix Spike/Matrix Spike Duplicates criteria met? (frequency 20% and control limits-QAPP defined)	**No**
Was the Post Digestion Spike criteria met (if applicable)?	**Yes**
Was the Laboratory Control Sample criteria met?	**Yes**
Were the Equipment Blanks results all < MRL?	**No**
Laboratory Blank results all < the PQL?	**Yes**
Were the ICV/CCV % Recoveries within 90-110%?	**Yes**
Were the ICSA/ICSAB % Recoveries acceptable?	**Yes**
Were % recoveries in the low standard check within criteria?	**Yes**
Was the Tune %RPD <5% (Peak width < 0.90)?	**Yes**
Were the Internal Standard recoveries within criteria?	**Yes**

Comments (note deviations): None

MS/MSD	**6020**	**%R's**	**Limits (%)**	**Qualifiers**	**Samples**
(Soil)	Antimony	46.9 / 47.5	75-125	**J/UJ**	
	Barium	14.2 / 14.1	75-125	**J/UJ**	
	Beryllium	72.0 / 71.1	75-125	**J/UJ**	**DU01-SB-01**
	Selenium	71.8 / 74.8	75-125	**J/UJ**	
	Zinc	72.1 / 70.8	75-125	**J/UJ**	
	6020	**%R's**	**Limits (%)**	**Qualifiers**	**Samples**
	Barium	65.2 / 61.8	75-125	**J/UJ**	
	Copper	826 / 150	75-125	**J/UJ**	**B06-SB-01**
	Zinc	74.2 / 73.2	75-125	**J/UJ**	
Equipment Blank	**6020**	**Result (ug/L)**	**Result (mg/kg)**	**Qualifiers**	**Samples**
	Antimony	0.57 J	0.0057 J (ISM) / 0.057 J (Discrete)	**0.50 J+** **0.57 J+** **0.46 J+** **0.29 J+** **0.2 U** **0.34 J+** **0.2 J+** **0.2 U** **0.2 U** **0.2 U** **0.2 U** **0.27 J+** **0.96 J+** **0.95 J+** **0.2 U** **0.51 J+**	**DU01-SS-01** **DU01-SS-02** **DU01-SB-01** **DU02-SS-02** **DU02-SS-03** **DU03-SS-01** **DU03-SS-02** **DU03-SS-03** **DU04-SS-01** **DU04-SS-02** **B03-SS-01** **B04-SS-01** **B10-SS-01** **B10-SS-02** **B15-SS-01** **B16-SS-01**
	Barium	0.45 J	0.045 J		
	Copper	30.6	0.306 J	None	Sample detections all greater than 5x RL
	Lead	2.7 J	0.027 J		
	Zinc	73.1	0.731 J		
Preparation Blank	**6020B**		**Result (mg/L)**	**Qualifiers**	**Samples**
180911-3010 (Water)	Copper		1.2 J	None, sample result is 15 times the PQL	G-11-SS-04
	Molybdenum		0.20 J	None, sample result is ND	

ICB/CCB (Soil and Water)	**6020B**	**Result (ug/L)**	**Result (mg/kg)**	**Qualifiers**	**Samples**
CCB on 9/13 @ 16:17	Antimony	0.40 J	0.040 J	**0.2 U** **0.27 J+** **0.96 J+** **0.95 J+** **0.2 U** **0.51 J+**	**B03-SS-01** **B04-SS-01** **B10-SS-01** **B10-SS-02** **B15-SS-01** **B16-SS-01**
CCB on 9/14/18 @ 12:56	Antimony	0.45 J	0.0045 J	**0.50 J+** **0.57 J+** **0.46 J+**	**DU01-SS-01** **DU01-SS-02** **DU01-SB-01**
CCB on 9/14/18 @ 14:46	Antimony	0.48 J	0.0048 J	**0.50 J+** **0.57 J+** **0.46 J+**	**DU01-SS-01** **DU01-SS-02** **DU01-SB-01**
CCB on 9/14/18 @ 17:03	Antimony	0.48 J	0.0048 J	None	
CCB on 9/14/18 @ 18:21	Antimony	0.39 J	0.0039 J	None	Sample detections all greater than 5x RL
CCB on 9/18/18 @18:55	Molybdenum	0.10 J	0.0010 J	None	DU04-SS-01 DU04-SS-02 DU04-SS-03
	Antimony	0.53 J	0.0053 J	**0.29 J+** **0.34 J+** **0.2 J+** **0.2 U** **0.2 U** **0.2 U**	**DU02-SS-02** **DU03-SS-01** **DU03-SS-02** **DU03-SS-03** **DU04-SS-01** **DU04-SS-02**
CCB on 9/18/18 @ 19:57	Molybdenum	0.10 J	0.0010 J	None	DU04-SS-01 DU04-SS-02 DU04-SS-03
	Antimony	0.60 J	0.0060 J	**0.29 J+** **0.34 J+** **0.2 J+** **0.2 U** **0.2 U** **0.2 U**	**DU02-SS-02** **DU03-SS-01** **DU03-SS-02** **DU03-SS-03** **DU04-SS-01** **DU04-SS-02**

For blank detections below the reporting limit(RL), sample detections between the RL and the method detection limit (MDL) were changed to a non-detection at the RL. Sample detections at or above the RL and less than 5x RL were qualified as estimated with a high bias (J+) and sample detections greater than or equal to 5x RL were not qualified.

Example calculation for instrument blanks: (0.45 ug/L x 0.1 L/0.001 kg = 45 ug/kg = 0.045 mg/kg) - Discrete samples
Example calculation for instrument blanks: (0.45 ug/L x 0.1 L/0.010 kg = 4.5 ug/kg = 0.0045 mg/kg) - ISM samples

	Yes No N/A
Representativeness:	
Were sampling procedures and design criteria met?	**Yes**
Were holding times met?	**Yes**
Was preservation criteria met? (4° C ± 2° C)	**Yes**
Were Chain-of-Custody records complete and provided in data package?	**Yes**

Comments (note deviations): None, cooler temperature was 3.5 degrees Celsius

	Yes No N/A
Completeness (90%):	
Are all data in this SDG usable?	**Yes**

Comments (note deviations): None

	Yes No N/A
Sensitivity:	
Are MDLs present and reported?	**Yes**

Comments (note deviations): None

Data Validator:	Mary Lou Fox	Date:	10/15/2018
Data Reviewer:	Cherie Zakowski	Date:	10/23/2018

Vogelsang Former Waste Disposal Area
Yosemite National Park
Data Validation Report

Laboratory: APPL Labs, Inc.

Matrix: Soil

Sample Delivery Group (SDG) Number and Samples in SDG:

(Validated Samples are in Bold print.)

SDG	Samples
86766	**DU01-SS-01**
	DU01-SB-01
	DU02-SS-01
	DU03-SS-01
	DU04-SS-01

Collection date: August 29 and 30, 2018

Analysis/Methods: Polychlorinated Dibenzo-p-dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by SW-846 8290A

Validation of the data was performed in accordance with the methods, the Final SAP, and National Functional Guidelines for High Resolution Superfund Methods Dara Review (April 2016).

Precision:	**Yes No N/A**
Field Duplicates relative percent difference (RPD) criteria met ? (control limits RPD ≤ 25% or an absolute difference of the project quantitation limit if either detection is less than 5x the quantitation limit)	**N/A**
Matrix Spike Duplicates RPD ≤ 20% ?	**Yes**
Laboratory Control Spike Duplicate RPD within limits?	**N/A**

Comments (note deviations):

Accuracy:	**Yes No N/A**
Continuing Calibration Verifications (CCVs) analyzed and all criteria met?	**Yes**
Matrix Spike/Matrix Spike Duplicates recoveries met recovery limits of 40-135% for labeled standards and 70-130% for target analytes?	**Yes**
Spike Blank recoveries met recovery limits of 40-135% for labeled standards and 70-130% for target analytes?	**Yes**
Target analyte concentrations were all less than the lower method calibration limit in the laboratory blank?	**Yes**
Mass calibration and Resolution - A static resolving power of ≥ 10,000 was demonstrated for tuning compound PFK required masses at the beginning and end of each 12 hour calibration period. Standards Ion abundance ratios were within criteria.	**Yes**
Window defining mixture, containing the first and last isomers of each homologue CDD/CDF, was analyzed before the initial calibration and with each continuing calibration?	**Yes**
Initial Calibration was performed according to method requirement?	**Yes**
Relative retention times of native and labeled CDDs and CDFs are within limits?	
Calibration Verification meets all method requirement?	**Yes**
Relative ion abundance ratio in CS3 standard is within criteria?	**Yes**
Were the labeled internal standard recoveries within limits?	**Yes**
Compound Identification	
Relative retention times of native and labeled CDDs and CDFs are within limits?	**Yes**
Relative ion abundance are within specified criteria, or reported as an Estimated Maximum Possible Concentration and not included in the TEQ total?	**Yes**

Laboratory Blank

Compound	**Blank Detection**	**Qualifiers**
2,3,4,7,8-PeCDF	0.38 J	None

Comments (note deviations):

Representativeness:	**Yes No N/A**
Were sampling procedures and design criteria met?	**Yes**
Were holding times met?	**Yes**
Were preservation criteria met?	**Yes**
Were Chain-of-Custody records complete and provided in data package?	**Yes**

Comments (note deviations): None

Completeness (90%):	**Yes No N/A**
Are all data in this SDG useable?	**Yes**

Comments (note deviations):

Data evaluation	Mary Lou Fox	Date:	10/15/2018
Reviewer:	Cherie Zakowski	Date:	10/23/2018

Appendix D

ESI Boring Logs and ISM Sampling Forms

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Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

Date: 8/29/18	Start Time: 11:30	End Time: 1307	Weather: Sunny, 60°F's, P. Cloudy

Sampler(s): K YAUK

Decision Unit: DU 1 — Replicate #: 1

Description of Decision Unit: 5x6 grid — Size of Decision Unit: 8,362 SQ FT

Approximate Spacing between Incremental borings: 15 ft x 18 — Sampling Method: ISM

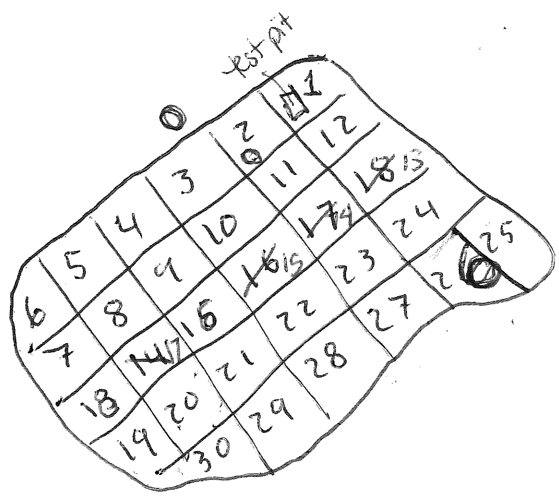
Sample ID/ Chain of Custody Number: DU01-SS-01

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (~~feet bgs~~) inches	Comments
1	1130	0	5	1x
2	1135		5	4x
3	1140		5	2x
4	1145		4	2x
5	1150		4	2x
6	1153		3.5	4x
7	1215		3.5	3x
8	1217		5	2x
9	1220		4	2x
10			3	2x
11	1225		5	1x
12			4	3x
13	1230		5	1x
14	1231		2	Rock Refusal
15	123		4	1x
16	1235		4	1x
17			3	1x
18			0	Refusal
19	1243		3	4x
20			5	2x
21	1246		5	2x in "Creek" drainage
22	1250		5	3x "
23	1251		5.5	~~to~~ ~~2x~~ 1x
24	1255		3	1x
25			5	1x
26			3	2x
27			3	
28	1303		0	Refusal - Rocks on Surface
29	1305		6	1x
30	1307	↓	5	2x

Type of Container:

Analysis:

General Comments: Step outs if recovery is 3 inches or less up to 3 tries
NE corner of cell



Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

Date: 8/29/18	Start Time: ~~1310~~ 1317	End Time: 1456	Weather: Sunny 70°F, Some Clouds
Sampler(s): K YAUK			
Decision Unit: DU 1		Replicate #: 2	
Description of Decision Unit:		Size of Decision Unit:	
Approximate Spacing between Incremental borings:		Sampling Method:	
Sample ID/ Chain of Custody Number: DU01-SS-02			

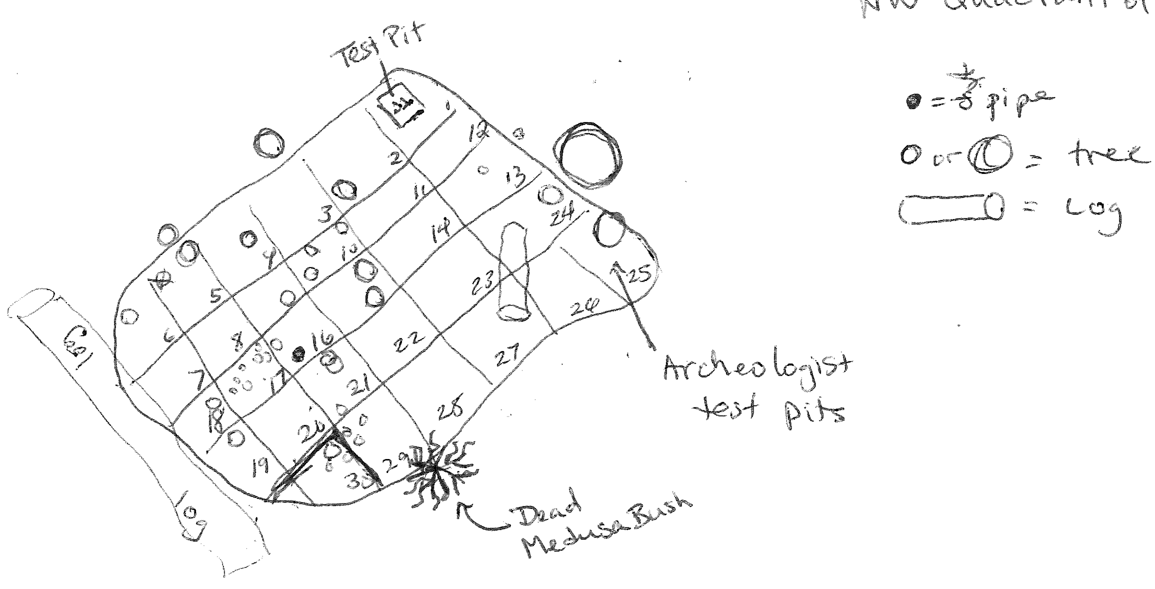
Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (~~feet~~ inch bgs)	Comments
1	1320	0	6"	2x
2	13		0	Refusal - Rocks
3	1325		3	2x
4	1330		3	1x
5	~~1336~~		4	1x Trees in NW Corner
6	1336		3	void with metal below
7	~~1340~~		4	near B10 boring
8	~~1342~~ 1340		3	stopped on metal
9	1342		5.5	1x
10	1345		3	mostly duff
11	1347		3	very fine 2x
12	50		4	v. fine
13	53		5	2x
14	1357		3	1x
15			6	2x
16	1400		4	3x V. Rocky
17	1404		5	1x v fine
18			5	1x v fine
19	1408		4	2x
20	1416		6	1x v. fine
21	1422		6	2x v fine
22	1425		4	1x
23	1427		6	1x
24	1431		6	1x thick duff
25	1437		5	1x v. fine
26	1440		0	Refusal - tree roots
27	1445		4	4x
28	1448		~~0~~ 2	3x V. Rocky Refusal
29	1454		3	4x V. Rocky
30	1456		6	v. fine

Type of Container:

Analysis:

General Comments:

NW Quadrant of cell



Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

Date: 8/29/18	Start Time: 1530	End Time: 1703	Weather:
Sampler(s): KYAUK			
Decision Unit: DU 1		Replicate #: 3	
Description of Decision Unit:		Size of Decision Unit:	
Approximate Spacing between Incremental borings:		Sampling Method: ISM - Step sampler	
Sample ID/ Chain of Custody Number: DU01 - SS - 03			

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (~~feet~~ inches bgs)	Comments
1	1535	0	~~2.5~~ 4	AVOIDED TEST PIT 2x
2			3	Rocky, 1X
3	1543		3	Rocky, 1X, hit a void
4	1546		4	
5	1548		3.5	Lots of void space
6	1554		3	" 2X
7	1558		4	v. fine 1X
8	1603		3	2x Rocky
9			3	2x, Rocks
10	1610		3	4x Tree Roots, Duff on top
11	1615		(0) 2	4x Refusal
12	1620		4	4x
13	1624		(0) 2	Refusal, 4x
24 ~~14~~	1626		3.5	1X in drainage
23 ~~15~~	1628		3.5	Adj to drainage
22 ~~16~~	1630		5	
21 ~~17~~	1635		4	2x hit a void
20 ~~18~~	1637		4.5	1x
19	1639		6	1X
18 ~~20~~	1646		4	1x
17 ~~21~~	1650		3	1X
16 ~~22~~	—		4	1X
15 ~~23~~	—		6	1x
14 ~~24~~	—		3	1x
25	—		6	1x
26	—		2	3x bedrock
27	1658		2	3x bedrock
28	—		2	3x bedrock
29	—		6	1x
30	1703	↓	4	~~4~~ 1x

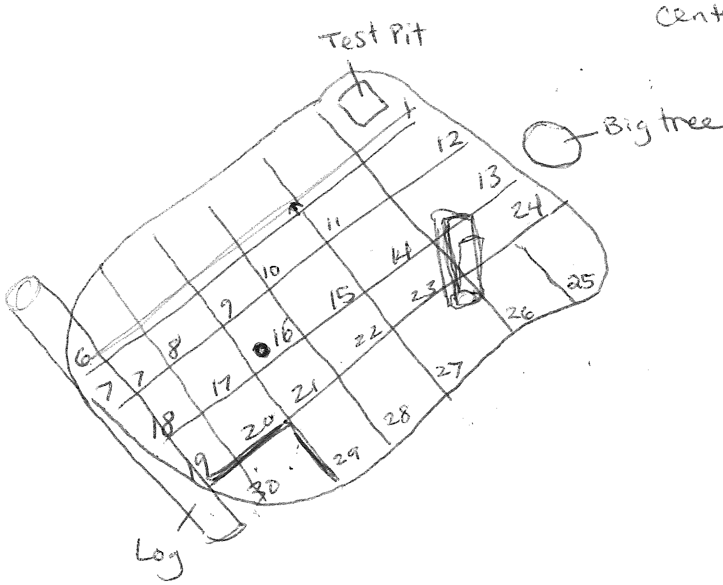
Type of Container:

Analysis:

General Comments:

Center - South center of cell

● = pipe



Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

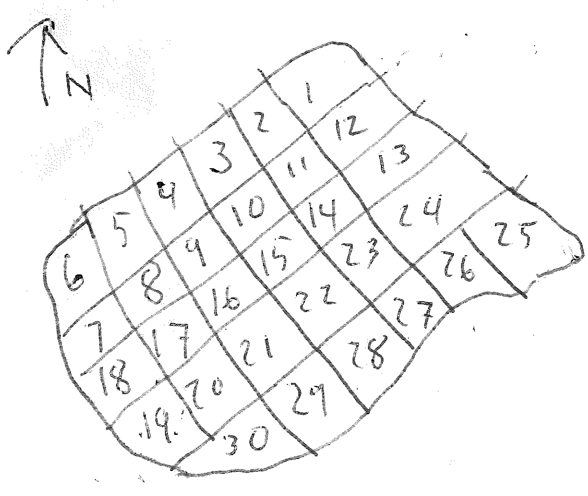
Date: 8-30-18	Start Time: ~~0845~~ 0915	End Time: 1215	Weather: Sunny 50°F
Sampler(s): R. Wood			
Decision Unit: DU07		Replicate #: SB01 → SE quadrant of cell	
Description of Decision Unit:		Size of Decision Unit:	
Approximate Spacing between Incremental borings:		Sampling Method:	
Sample ID/ Chain of Custody Number:			

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	0915	6"	24"	Bedrock
2	0922	↓	30"	Bedrock
3	0935		Refusal at 3 inches with 3x attempts bedrock	
4	0940		8"	Bedrock
5	0950		20"	Bedrock
6	0957		18	Bedrock
7	1004		18	Bedrock
8	1013		30"	Bedrock
9	1020		12"	tree root
10	1027		Refusal at 4" 3x attempts bedrock	
11	1031		Refusal at 6" 3x attempts bedrock	
12	1036		20"	Bedrock
13	1049		Refusal at 4"	3x attempts tree root
14	1054		Refusal at 3" 3x	attempts bedrock
15	1059		Refusal at 4" 3x	attempts tree root
16	1104		14"	bedrock 2x attempts
17	1110		14"	bedrock
18	1113		12"	bedrock
19	1119		10"	bedrock 2x attempts
20	1125		16"	bedrock
21	1130		8"	bedrock
22	1135		Refusal at 2"	3x attempts bedrock
23	1138		Refusal at 1"	3x attempts bedrock
24	1142		Refusal at 3"	3x attempts tree root
25	1151		8"	bedrock 3x attempts
26	1158		12" 3x attempts bedrock	
27	1202		Refusal at 2"	bedrock 3x attempts
28	1204		Refusal at 2"	bedrock 3x attempts
29	1209		12"	bedrock
30	1215	↓	Refusal at 5" on tree root 3x attempts	

Type of Container:

Analysis:

General Comments:



Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

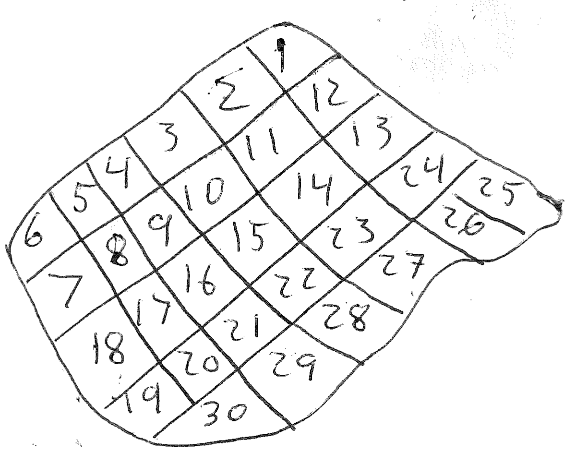
Date: 8-30-18	Start Time: 1310	End Time: 1537	Weather: Partly Cloudy 60°F
Sampler(s): R. Wood			
Decision Unit: DU01		Replicate #: SB02 → NE quadrant of cell	
Description of Decision Unit:		Size of Decision Unit:	
Approximate Spacing between Incremental borings:		Sampling Method:	
Sample ID/ Chain of Custody Number:			

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1310	0	12"	bedrock
2	1324		24"	bedrock
3	1328		Refusal at 4" on	boulder 3x attempts
4	1330		Refusal at 3" on	boulder 3x attempts
5	1334		12"	boulder
6	1338		24"	bedrock
7	1344		18"	bedrock
8	1400		36"	bedrock - volcanic pebble cave-in
9	1405		8"	boulder
10	1409		12"	boulder
11	1412		Refusal at	4" on boulder 3x attempts
12	1415		14"	bedrock
13	1420		10"	bedrock
14	1422		Refusal at 2"	on boulders 3x attempts
15	1425		Refusal at 3"	on bedrock 3x attempts
16	1429		8"	bedrock 3x attempts
17	1433		18"	bedrock
18	1439		16"	bedrock volcanic pebbles
19	1443		Refusal at 3" on	boulders 3x attempts
20	1449		18"	bedrock volcanic pebbles
21	1454		24"	bedrock
22	1502		Refusal at 3" on	boulders 3x attempts
23	1505		Refusal at 4" on	boulders 3x attempts
24	1508		Refusal at 4" on	Tree Root
25	1518		Refusal at 3" on	Tree Root
26	1525		8"	boulders 3x attempts
27	1527		Refusal at 1" on	boulders 3x attempts
28	1529		Refusal at 3" on	boulders 3x attempts
29	1532		Refusal at 2" on	boulders
30	1537	↓	12"	Bedrock

Type of Container:

Analysis:

General Comments:



Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

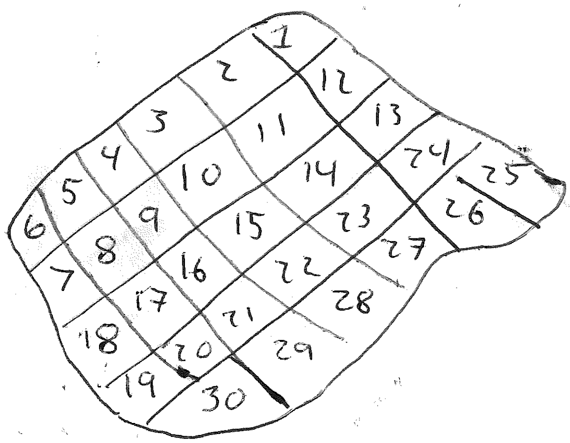
Date: 8/30/18	Start Time: 1550	End Time: 1755	Weather:
Sampler(s): R. WOOD			
Decision Unit: DU01		Replicate #: SB-03 → SW quadrant of cell	
Description of Decision Unit:		Size of Decision Unit:	
Approximate Spacing between Incremental borings:		Sampling Method:	
Sample ID/ Chain of Custody Number:			

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1550	0	24"	bedrock - In waste pile ~~Pit~~ B14
2	1557		Refusal at 3"	on boulders
3	1605		12"	bedrock 3rd attempt
4	1611		12"	Debris on bottom
5	1615		24"	Bedrock
6	1622		24"	Large Gravels
7	1626		Refusal at 3" on	boulders
8	1633		24"	Large Boulder - volcanic pebbles
9	1639		14"	Bedrock
10	1643		12"	Bedrock
11	1649		10"	Bedrock
12	1652		Refusal at 3" on	Boulders
13	1700		Refusal at ~~3~~ 6"	x 3 attempts - boulders
14	1704		Refusal at 6" x 3	attempts - boulders
15	1708		18"	Bedrock
16	1710		12"	Tree Root
17	1715	12"	18"	Refusal on bedrock, volcanic gravel from 6"-12
18	1718		24"	Bedrock
19	1721		14"	Bedrock
20	1727		8"	Boulder
21	1730		5" Refusal on boulder	x3
22	1736		Refusal at 3~~6~~" on	boulders ~~and roots~~ x 3
23	1744		Refusal at 6" on	boulders x 3
24	1748		Refusal at 3" on	rocks
25	1752		~~R~~ 10"	Bedrock
26	1750		Refusal at 4" on	Bedrock x 3
27	1746		Refusal at 3" on	Bedrock x 3
28	1739		10"	Bedrock
29	1735		Refusal at 6" on	boulder and roots x 3
30	1725		12"	~~Bedrock~~ Boulder

Type of Container:

Analysis:

General Comments:



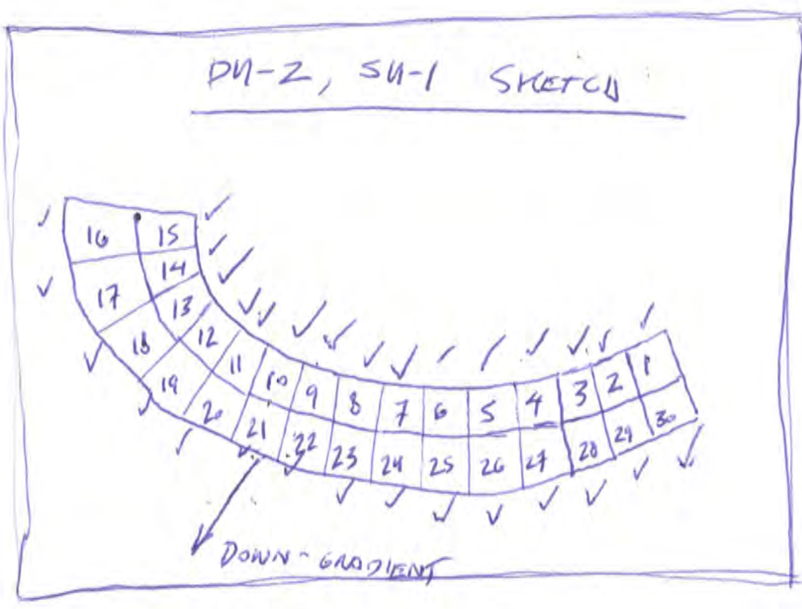
Incremental Sampling Methodology - Soil Sampling Log Vogelsang Former Waste Disposal Area				
Date: 8/29/18	Start Time: 1600	End Time: 1700		Weather:
Sampler(s): CA				
Decision Unit: DU-2			Replicate #: SU-01 (SS-01)	
Description of Decision Unit: DOWNGRADIENT ARC			Size of Decision Unit: ~1/12 ACRE	
Approximate Spacing between Incremental borings: 10'			Sampling Method: ELM SPLIT SPOON STEP SAMPLER	
Sample ID/ Chain of Custody Number:				

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1600	0"	3"	
2	1602		6"	
3	1604		4"	
4	1606		3"	
5	1608		3"	X 6, MOVE TO CENTER. ROCK REFUSAL
6	1610		3"	X 3, ROCK REFUSAL
7	1612		5"	
8	1614		3"	
9	1616		3"	
10	1618		6"	
11	1620		4"	X 5, LOOSE SOIL
12	1622		6"	X 3, " "
13	1624		6"	
14	1626		4"	
15	1628		6"	
16	1630		3"	
17	1633		6"	X 4, MOVED TOWARD CENTER, SHALLOW BEDROCK
18	1635		6"	X 1, REMOVED TOP 2" DUFF FROM CORE
19	1637		4"	X 2, ROOTS
20	1639		6"	REMOVED TOP 2" DUFF FROM CORE (A.)
21	1641		4"	" " " " " "
22	1643		4"	UP AGAINST TREE
23	1645		5"	(A.)
24	1647		6"	(A.)
25	1650		3"	X 3, REFUSAL ON ROCK
26	1652		6"	X 2, (A.)
27	1654		4"	X 2, (A.)
28	1656		3"	
29	1658		3"	
30	1700		3"	X 3, REFUSAL ROCK

Type of Container:

Analysis:

General Comments:



Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

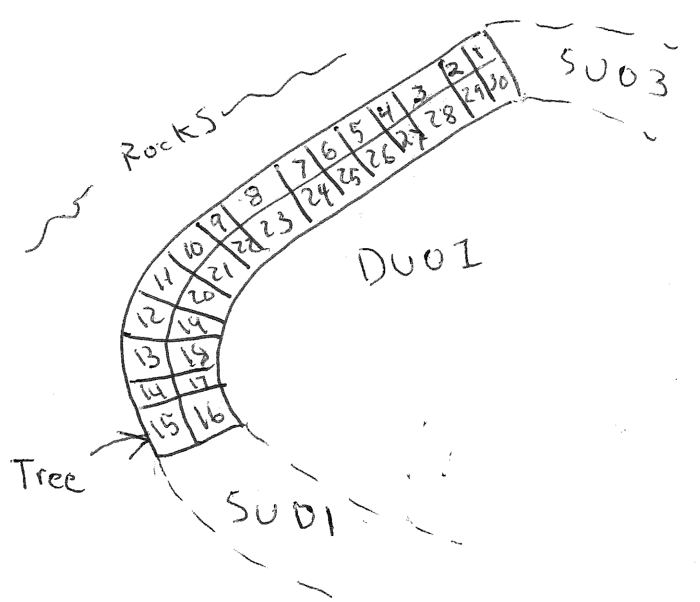
Date: 8-29-18	Start Time: 1715	End Time: 1756	Weather: Sunny 60° F
Sampler(s): R. WOOD			
Decision Unit: DU02		Replicate #: SU02 - SS02	
Description of Decision Unit:		Size of Decision Unit:	
Approximate Spacing between Incremental borings:		Sampling Method:	
Sample ID/ Chain of Custody Number:			

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1715	0	2	3x refusal
2	1720		6	1x
3	–		6	1x
4	–		4	1x
5	1726		2	3x refusal
6	–		1	3x refusal
7	–		3	1x
8	1731		3	1x
9	–		2	3x refusal
10	–		2	3x refusal
11	–		6	1x
12	–		6	1x
13	–		6	1x
14	1738		6	1x
15	–		6	1x
16	–		4	1x
17	–		6	1x
18	–		4	1x
19	1745		2	3x refusal
20			4	
21			1	3x refusal
22			1	3x refusal
23			3	3x refusal
24			3	3x refusal
25			4	1x
26			2	3x refusal
27			6	
28			3	3x refusal
29			3	3x refusal
30	1756		6	1x

Type of Container:

Analysis:

General Comments:



Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

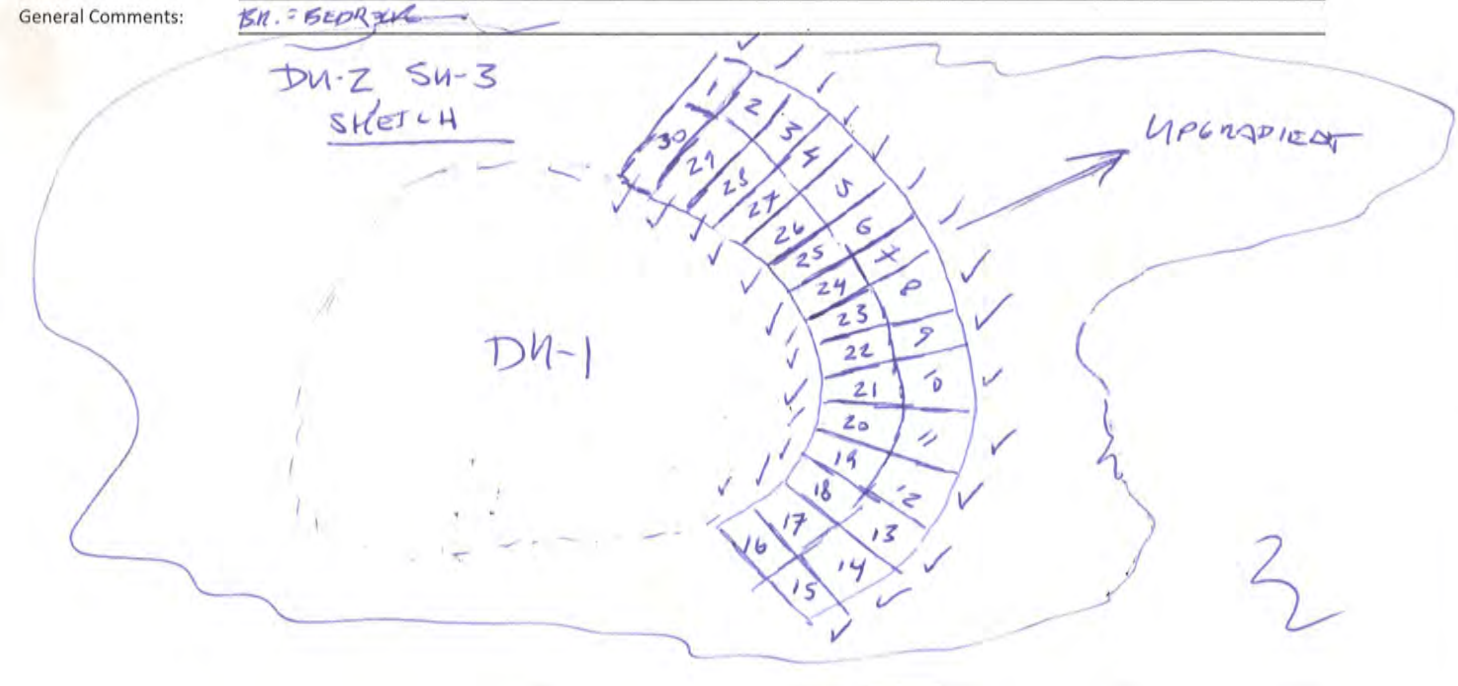
Date:	Start Time: 1710	End Time: 1808	Weather:
Sampler(s): CJ.			
Decision Unit: DU-2, SU-3		Replicate #: SS-03	
Description of Decision Unit: NE, UPGRADIENT / CROSS GRADIENT		Size of Decision Unit: ~ 1/12 - ACRE	
Approximate Spacing between Incremental borings: 10'		Sampling Method: ISM, ELM STEP SAMPLER	
Sample ID/ Chain of Custody Number:			

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1710	0"	3"	
2			5"	REMOVED TOP DUFF LAYER FROM CORE (A.)
3			4"	NEXT TO DEAD CONIFER
4			4"	
5			4"	
6			3"	ADJ. BEDROCK (B.)
7			5"	
8			3"	
9			3"	(B.) x 3
10			3"	(A.) x 2 ; MOVED OFF OF B.R.
11			3"	(B.), x 3, " " " "
12			3"	(B.) " " " "
13			3"	(A.) x 3
14			3"	x 2
15			3"	
16	1747		6"	
17			4"	x 3
18			4"	
19			3"	MOST OF CELL IS B.R., WENT W/IN CLEFT OF B.R.
20			3"	ROCKS & B.R. IN CELL
21			6"	BETWEEN CLEFT IN ROCKS
22			3"	
23			5"	
24			4"	
25			4"	
26			4"	(A.)
27			3"	W/IN TREES
28			4"	
29			4"	x 2
30	1808		5"	

Type of Container: ZIPLOC BAG

Analysis:

General Comments: B.R. = BEDROCK



DU03-SS-01

Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

Date: 8/30	Start Time: 1655	End Time: 1727	Weather:
Sampler(s): CJ			
Decision Unit: DU-3		Replicate #: ~~01~~ SU-01	
Description of Decision Unit: 1/12 ACRE (DOWNGRADIENT of DU-02)		Size of Decision Unit: 1/12 ACRE	
Approximate Spacing between Incremental borings:		Sampling Method: ISM STEP SAMPLER	
Sample ID/ Chain of Custody Number:			

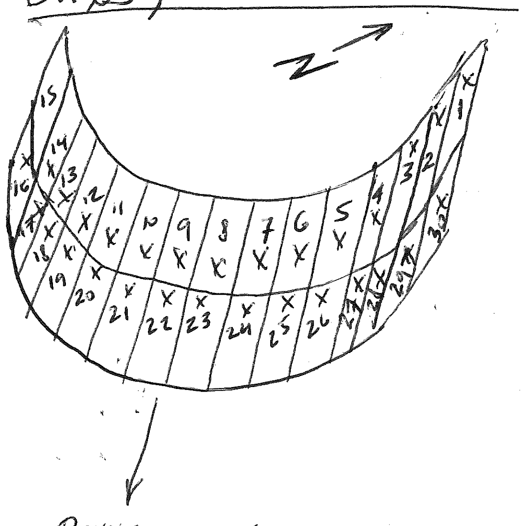
Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1655	0"	3"	
2		↓	3"	
3			4"	X 2 : moved to ctr BR
4			4"	X 2
5			4"	
6			6"	
7			6"	
8			3"	X 2 : moved to CTR BR
9			5"	X 2
10			3"	
11			4"	
12			5"	X 2
13			6"	X 2
14			6"	
15			5"	X 4
16			3"	X 2
17			6"	
18			4"	
19			5"	
20			6"	
21			3"	X 2
22			6"	
23			3"	X 2
24			6"	
25			6"	
26			3"	
27			4"	
28			3"	
29			3"	
30	1727	↓	5"	X 2

Type of Container:

Analysis:

General Comments: B.R. = BEDROCK

DU-~~3~~, SU-01 SKETCH



DU03-SS-02

Incremental Sampling Methodology - Soil Sampling Log Vogelsang Former Waste Disposal Area			
Date: 8/30	Start Time: 1737	End Time: 1801	Weather:
Sampler(s): CF			
Decision Unit: DU-3		Replicate #: SU-02	
Description of Decision Unit: 1/2 acre/downgradient of DU02		Size of Decision Unit: 1/12 acre	
Approximate Spacing between Incremental borings: 0		Sampling Method: ISM Step sampler	
Sample ID/ Chain of Custody Number:			

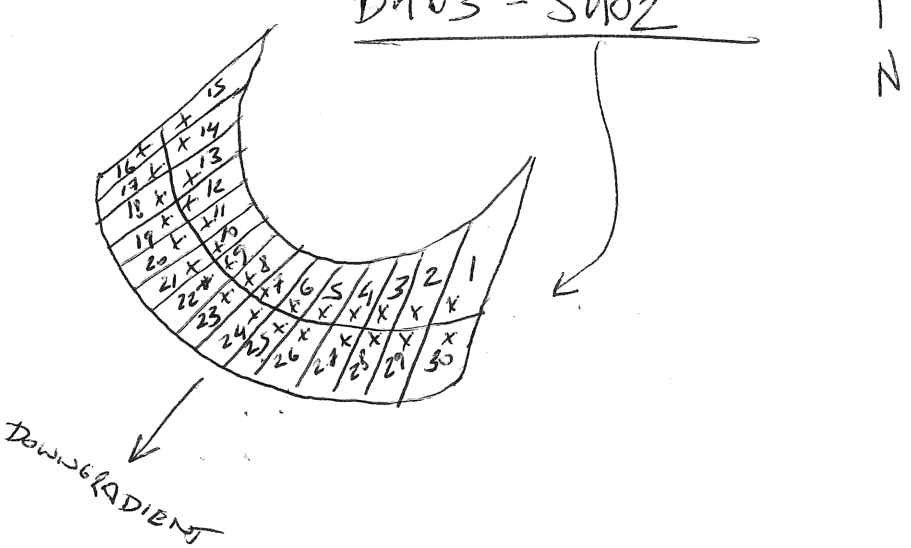
Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1737	0"	6"	
2			3"	BR
3			3"	
4			4"	
5			3"	BR
6			4"	
7			4"	
8			5"	
9			6"	
10			6"	
11			6"	
12			5"	
13			5"	
14			3"	
15			4"	
16			4"	adj S due to BR
17			4"	X5
18			5"	
19			6"	
20			3"	
21			3"	
22			6"	
23			6"	
24			4"	
25			6"	
26			6"	
27			6"	
28			6"	
29			6"	
30		0"	5"	

Type of Container:

Analysis:

General Comments: BR = Bedrock

DU03 - SU02



DU03-SS-03

Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

Date: 8/30	Start Time: 1812	End Time: 1835	Weather:

Sampler(s): CF

Decision Unit: DU-3 | Replicate #: SU-03

Description of Decision Unit: 1/2 acre / downgradient of DU02 | Size of Decision Unit: 1/2 acre

Approximate Spacing between Incremental borings: | Sampling Method: 15m step sampler

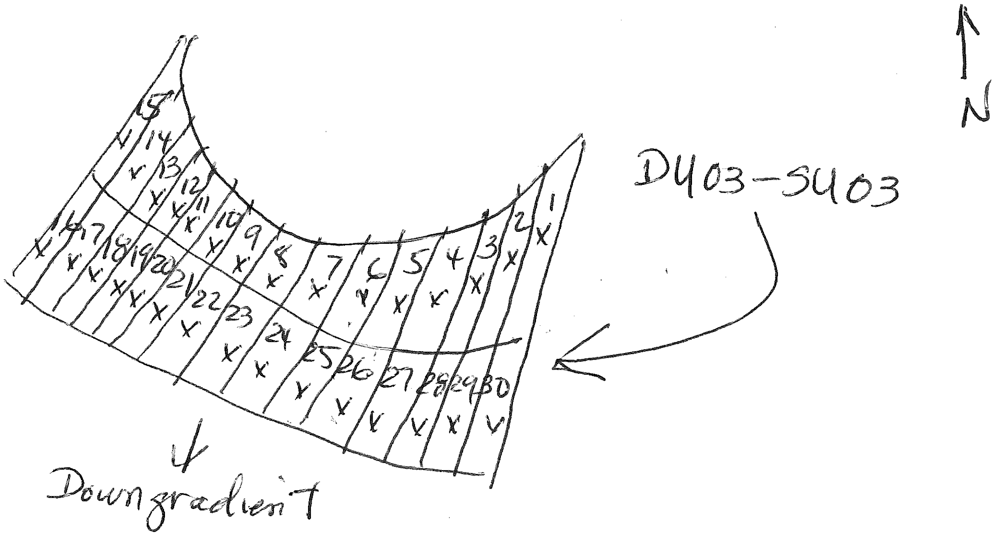
Sample ID/ Chain of Custody Number:

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1812	0"	6"	
2			6"	
3			6"	
4			4"	BR
5			6"	
6			5"	
7			6"	
8			6"	
9			6"	
10			5"	
11			6"	
12			6"	
13			4"	
14			4"	
15			3"	BR
16			6"	
17			4"	X2 BR
18			5"	
19			5"	
20			5"	
21			6"	
22			6"	
23			3"	
24			6"	
25			6"	
26			6"	
27			4"	
28			6"	
29			4"	
30	1835		6"	

Type of Container:

Analysis:

General Comments: BR= Bedrock



D4 04-SS-01

Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

Date: 8/30/18	Start Time: 1025	End Time: 1109	Weather: Partly Cloudy, 65°F

Sampler(s): CA.

Decision Unit: DU-4, Background | Replicate #: 01

Description of Decision Unit: Pristine. North of Site | Size of Decision Unit: 0.25 acre (133' x 81')

Approximate Spacing between Incremental borings: 13' + 27' | Sampling Method: ISM Step Sampler

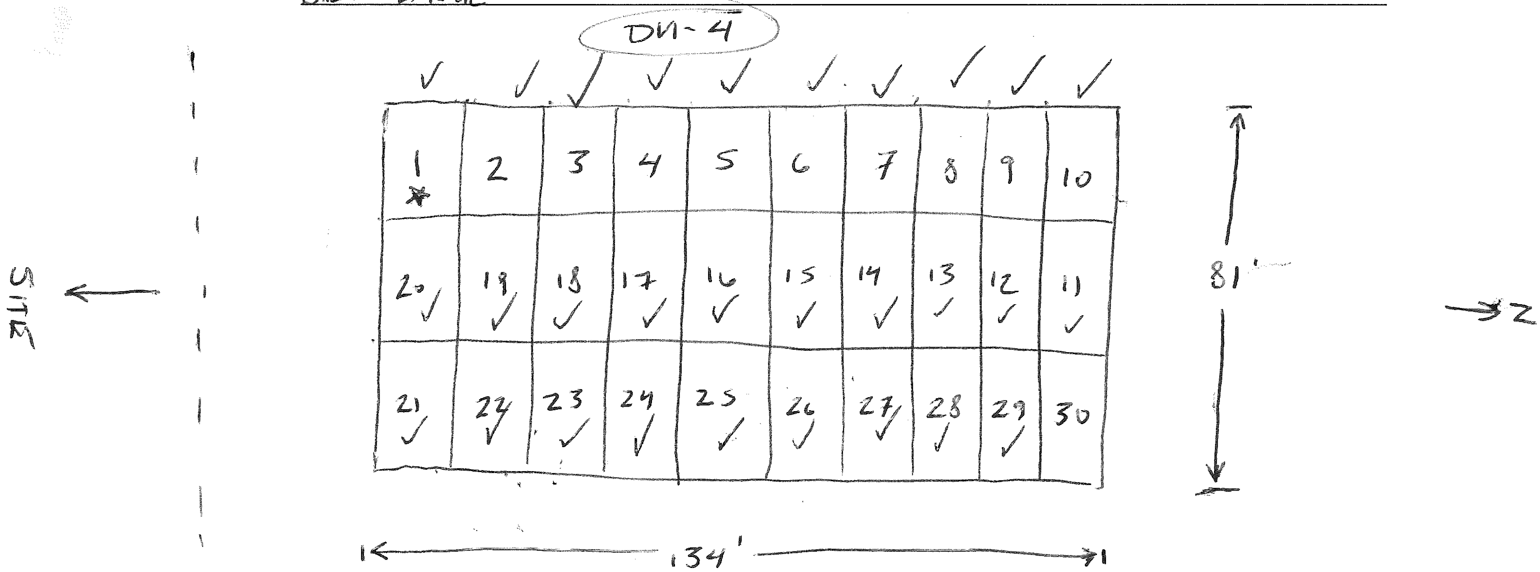
Sample ID/ Chain of Custody Number:

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1025	0"	3"	
2	1026		5"	
3	1027		6"	
4	1029		3"	
5	1030		3"	
6	1032		4"	
7	1034		3"	
8	1036		3"	
9	1037		3"	X3
10	1039		3"	
11	1040		6"	
12	1042		6"	
13	1044		5"	X3; B.R. Thrown; moved to center
14	1046		3"	X2, B.R.
15	1048		3"	X2
16	1050		4"	
17	1052		5"	
18	1054		4"	
19	1056		3"	
20	1057		3"	
21	1058		3"	
22	1059		3"	X3
23	1100		3"	
24	1101		3"	B.R.
25	1103		6"	
26	1104		6"	
27	1106		5"	
28	1107		3"	
29	1108		4"	
30	1109		6"	X2

Type of Container: 1-gal Ziploc Bag; Double-Bagged

Analysis:

General Comments: B.R. = Bedrock



* Random Sampling Location

Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

Date: 8/30/18	Start Time: 1025	End Time: 1140	Weather: Sunny, 60°s F
Sampler(s): KY			
Decision Unit: DU-4 (BACKGROUND)		Replicate #: 02	
Description of Decision Unit: PRISTINE. NORTH of SITE		Size of Decision Unit: 0.25 ACRE (133' x 81')	
Approximate Spacing between Incremental borings: 13' + 27'		Sampling Method: ISM STEP SAMPLER	
Sample ID/ Chain of Custody Number:			

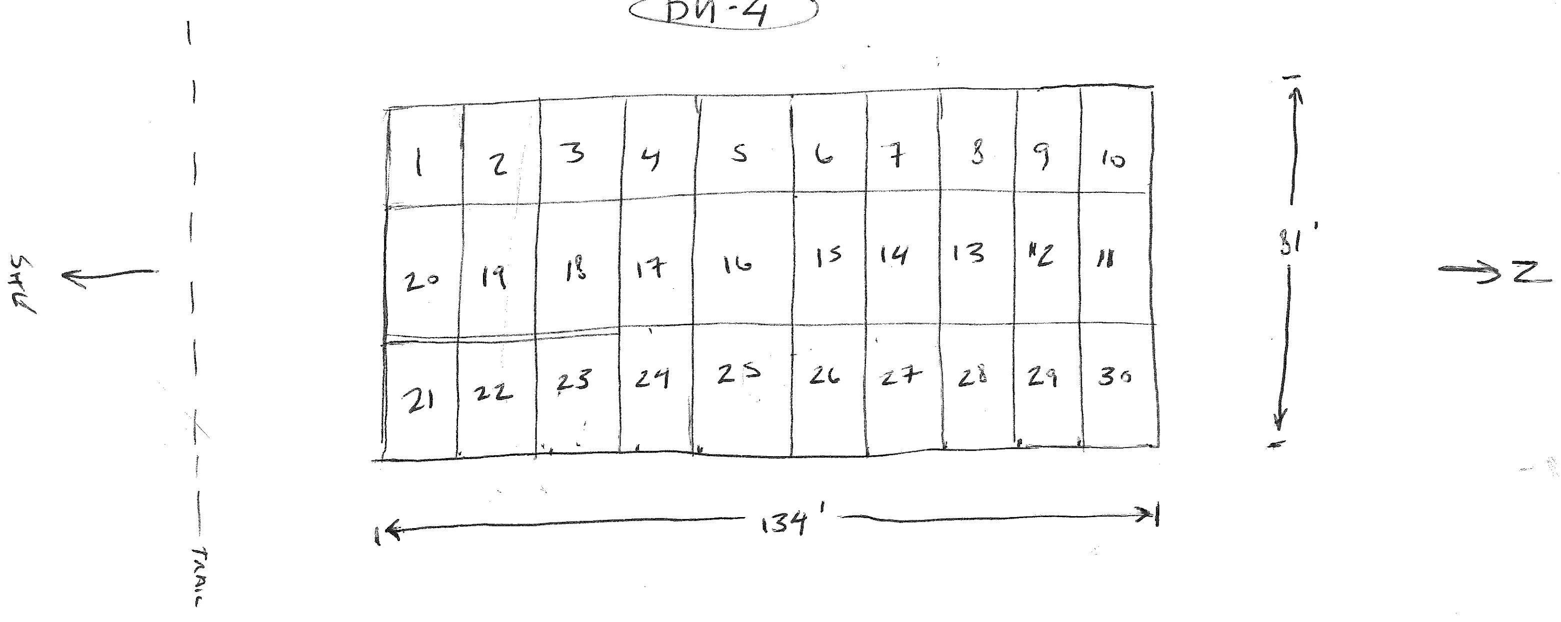
Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1030	0	3	1x Bedrock near Surface
2	34		3	"
3	104		3	2x "
4	1040		3	3x "
5	1043		3.5	1x v. fine
6	47		4	2x
7	~~51~~		3	1x
8	51		6	2x
9	55		3.5	1x
10	59		3	2x
11	1100		4	1x
12	04		6	2x
13	05		4	1x
14	06		2	1x
15	09		4	1x
16	1111		2	1x
17	1114		2	1x
18	1116		2	
19	18		5	1x
20	21		2	1x
21	23		5	1x
22	24		4	1x
23	26		4	1x
24	28		4	1x
25	30		2	1x
26	1131		2	1x
27	32		6	2x
28	1135		3	1x
29	1137		4	1x
30	1140		4	1x

Type of Container:

Analysis:

General Comments: Western central side of cell

DU-4



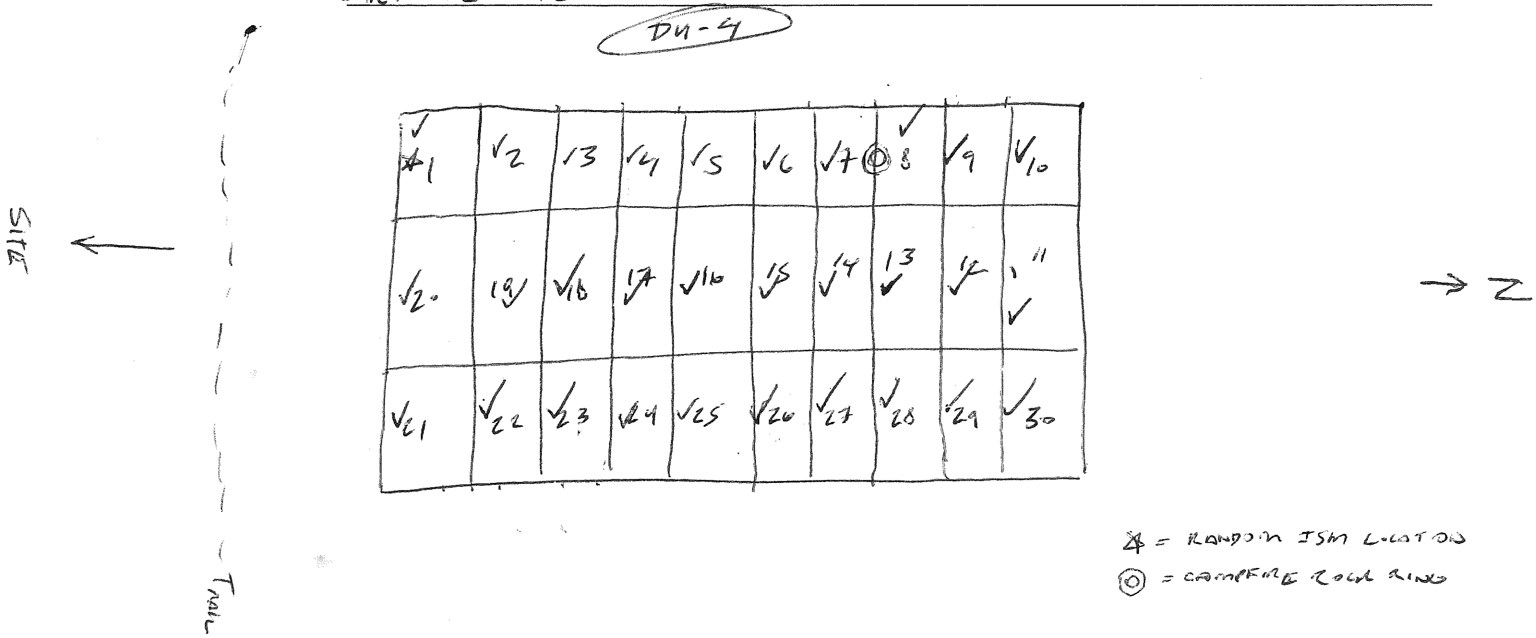
Incremental Sampling Methodology - Soil Sampling Log Vogelsang Former Waste Disposal Area				
Date: 8/30/15	Start Time: 1137	End Time: 1228		Weather: Sunny, 67°F
Sampler(s): CJ				
Decision Unit: DU-4 (Background)			Replicate #: 03	
Description of Decision Unit: Pristine. North of site			Size of Decision Unit: 0.25 acre (133' x 81')	
Approximate Spacing between Incremental borings: 13' + 27'			Sampling Method: ISM step sampler	
Sample ID/ Chain of Custody Number:				

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1	1137	0"	3"	x 2
2	1138		6"	
3	1140		3"	x 2
4	1141		5"	
5	1143		4"	
6	1145		3"	
7	1147		3"	B.R.; shifted to SW corner
8	1148		6"	shifted NW due to campfire ring
9	1150		3"	
10	1152		4"	
11	1153		3"	
12	1155		3"	
13	1157		4"	x 2
14	1158		5"	
15	1200		4"	
16	1202		3"	x 2
17	1204		6"	
18	1206		3"	x 2
19	1207		3"	x 2 Next to tree
20	1209		4"	x 3 B.R.
21	1211		3"	
22	1213		5"	
23	1215		4"	x 2
24	1217		4"	x 2
25	1219		3"	x 2
26	1221		3"	
27	1223		4"	x 2
28	1225		6"	
29	1226		4"	
30	1228		3"	x 3

Type of Container: 1-Gal Ziploc Bag, Double-Bagged

Analysis:

General Comments: B.R. = Bedrock



BORING ID: B01

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 1.5 feet
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

CDM Smith

GEOLOGIC DESCRIPTION

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0 1.0 1.5	X	B01-SB-01	1040	3.0		20	60	20		Silty sand w/ gravel	SM	DYB	D	L	N	W	F C	SA	W	F C	SA	3" of topsoil Fragments of metal glass, paper, bone, and some ash	
										Refusal at 1.5 feet on large gravels attempted 3 borings spaced 1 foot apart													
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B02

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. Wood
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 1.5 feet
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

0
1.5

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
																						3" of topsoil	
	☒			0.3		20	60	20		silty sand w/ gravel	SM	DYB	D	L	N	W	F C	SA	W	F C	SA	Debris Present: metal fragments, ceramic, glass	
										Refusal at 1.5 ft bgs on large gravels													
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B03

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION:
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 1.5 feet
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: grab

GEOLOGIC DESCRIPTION

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0 6"	X			13.2		20	20	60		sandy silt w/gravel	ML	pale Brown	D	M ST	N	P	F	SA	W	F C	SA	3" of topsoil No debris present	
1.5										Refusal at 1.5 feet bgs on large gravels													
Notes:						>1/4 inch	visible - 1/4 in.	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B04

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION:
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 0.75 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: grab

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0 / 6"	X			2.4		20	20	60		sandy silt w/gravel	ML	pale Brown	D	M ST	N	P	F	SA	W	F C	SA	6" of topsoil; No debris present	
9"										Refusal at 9" on large gravels													
Notes:						>1/4 inch	visible - 1/4 in.	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B05

CDM Smith

CLIENT:
JOB NUMBER:
LOCATION:
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 2.5 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD:

GEOLOGIC DESCRIPTION

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0 – 1.5' – 2	X	B05-SB-01	1245	2.8		20	20	60		~~silty~~ Sandy silt w/gravel	ML	pale brown	D	M ST	N	W	F C	SA	W	F C	SA	1" of topsoil Debris present metal, glass, ceramic Red Fe^{2+} stains	
2 – 2.5						30	10	60		Gravelly silt	ML	yellowish brown	D	M ST	N	W	F C	SA	W	F C	SA	No debris from 2 to 2.5' chunks of decomposed granite present.	
2.5										Refusal on large fragments of granite (3rd boring attempt) Likely close to interface between soil and bedrock (saprolite)													
										* First two borings were refusal at 12"													
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B06

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION:
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 2.5 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0																						4" of topsoil	
	12" ☒	B06-SB-01 MS/MSD	1310	0.3		20	20	60		sandy silt w/gravel	ML	DYB	D	M ST		P	F	SA	W	F C		Debris present, metal glass, plastic jelly packets	
2.0						20	20	60		sandy silt	ML	Pale Brown	D	M ST		P	F	SA	W	F C		No Debris below 2 ft	
2.5										Refusal at 2.5 ft on large gravels													
Notes:						>1/4 inch	visible - 1/4 in.	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

CDM Smith

BORING ID: B07

CLIENT: NPS
JOB NUMBER:
LOCATION:
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 2 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0–2	18"			0.1		20	60	20		silty sand w/ gravel	SM	Brown	D	L	N	P	F	SA	W	F C	SA	3" of topsoil. Debris present: metal, glass fragments of plastic jelly packets	
2										Refusal at 2.0 ft													
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few,15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B08

CLIENT:
JOB NUMBER:
LOCATION:
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 2 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

CDM Smith

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0																						8" of topsoil	
1	☒		1405	2.0		20	60	20		silty sand w/ gravel	SM	Pale Brown	D	L	N	P	F	SA	W	F C	SA	minimal debris layer ~12	
2						20	20	60		sandy silt w/ gravel	ML	yellowish Brown	D	M ST	N	P	F	SA	W	F	SA	140 Debris below 12"	
										Refusal	at	2 ft											
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: 309

CDM Smith

CLIENT:
JOB NUMBER:
LOCATION:
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 1.5 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0 – 1.5	0 ft ☒			0.1		20	60	20		silty sand w/gravel	SM	Brown	D	L	N	P	F	SA	W	F C	SA	2" of topsoil >50% debris throughout see photo log	
										Refusal on debris at 1.5 ft bgs													
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B10

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION:
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 9-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 2.0 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0	0.5 ft ☒			0.0		20	60	20		silty sand w/ gravel	SM	pale brown	D	L	N	P	F	SA				4" of topsoil No debris present in subsurface - some metal on surface	
2										Refusal on large gravels at 2.0 ft bgs													
Notes:						>1/4 inch	visible - 1/4 in.	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B11

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 3 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0	2.0 ft ☒			0.4		20	60	20		silty sand w/ gravel	SM	Brown	D	L	N	W	F C	SA	W	F C	SA	3" of topsoil Debris throughout glass, metal, ceramics	
2.5						20	20	60		sandy silt w/ gravel	ML	Yellowish Brown	D	M ST	N	P	F	SA	P	F	SA	weathered saprolite	
3																							
Notes:						>1/4 inch	visible - 1/4 in.	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B12

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. Wood
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 24"
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

GEOLOGIC DESCRIPTION

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
12"	☒			3.2		20	60	20		silty sand w/ gravel	SW	Brown	D	L	N	W	F C	SA	W	F C	SA	3" of topsoil >50% debris See photo log	
24"										Refusal at 24" on large granite boulder													
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B13

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 0.5 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

GEOLOGIC DESCRIPTION

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
	6" ☒			0.4		20	60	20		silty sand w/gravel	SW	pale brown	D	ST	N	P	F C	SA	W	F C		3" of topsoil No Debris	
0.5'										Refusal at 6" on granite slab. Attempted 3 times.													
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B14

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-28-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 24"
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

CDM Smith

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
	12" ☒			2.4		20	60	20		silty sand w/ gravel	SM	pale brown	D	L	N	W	F C	SA	W	F C	SA	4" of topsoil Debris present: metal, ceramic glass, burnt wood.	
18"						20	20	60		sandy silt w/ gravel	ML	yellowish brown	D	M ST	N	P	F	SA	W	F C	SA	saprolite	
24										Refusal at 24 on granite bedrock													
Notes:						>1/4 inch	visible - 1/4 in.	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B15

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. Wood
DATE DRILLED: 8-29-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 0.75 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

GEOLOGIC DESCRIPTION

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
0 6"	X		1545	0.4		20	60	20		Silty sand w/ gravel	SM	pale brown	D	L	N	P	F	SA	W	F	SA	3" of topsoil No debris present	
9"										Refusal at 9" bgs on granite													
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B16

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-29-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 0.25 ft
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
3"	3" ☒		1600	0.2		20	60	20		Silty sand w/ gravel	SM	pale brown	D	L	N	P	F	SA	W	E	SA	2" of topsoil No debris present	
										Refusal on 3 attempts at 3" bgs													
Notes:						>1/4 inch	visible - 1/4 in.	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few, 15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

BORING ID: B17

CDM Smith

CLIENT: NPS
JOB NUMBER:
LOCATION: Vogelsang
SURFACE ELEVATION:

GEOLOGIST: R. WOOD
DATE DRILLED: 8-29-18
DRILLING COMPANY:
NORTHING/EASTING:

TOTAL DEPTH: 15" (1.25 ft)
DRILLING METHOD/RIG: Hand Auger
SAMPLE METHOD: Grab

GEOLOGIC DESCRIPTION

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
	X		1645	0.2						silty sand w/ gravel	SW	pale brown	D	L	N	P	F	SA	W	F C	SA	4" of topsoil No Debris present	
12"										sandy silt w/ gravel	ML	yellowish brown	D	M ST	N	P	F	SA	W	F C	SA	Saprolite	
15"										Refusal at 15" on bedrock													
Notes:						>1/4 inch	visible - 1/4 in.	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few,15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

Appendix E

ESI Laboratory Reports

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908 North Temperance Ave. ∇ Clovis, CA 93611 ∇ Phone 559-275-2175 ∇ Fax 559-275-4422

Certification Number: CA1312
NELAP Certification number: CA00046
DoD-ELAP Certificate number: 74807

Data Validatable Report

September 21, 2018

CDM Smith
14432 SE Eastgate Way, Suite 100
Bellevue, Washington 98007

Attn: Scott Felton

Title: Report of Data: Case 86766

Project: Vogelsang Former Waste Disposal Area

Subcontract #: 2334-003-004-AL; Tracking #: 17469

Dear Mr. Felton:

Thirty-three soil and one water samples were received September 5, 2018. Written results for the requested analyses are provided on this September 21, 2018.

The EPA 8290 Dioxin and Furan report of data will be sent under separate cover. Results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

If you have any questions or require further information, please contact your APPL Project Manager, Libby Cheeseborough, libby@applinc.com, at your convenience. Thank you for choosing APPL, Inc.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. These test results meet all requirements of NELAC. Release of the hard copy has been authorized by the Laboratory Manager or her designee, as verified by the following signature.

for PM

Paula McCartney, Laboratory Director
APPL, Inc.

PM/rp
Enclosure
cc: File

Number of pages in this report: 1313

Data Validation Package

for

Vogelsang Former Waste Disposal Area

APPL SDG 86766

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LABORATORY NAME: *APPL, Inc.*

CASE NARRATIVE

Case Narrative

ARF: 86766

Project: Vogelsang Former Waste Disposal Area

Sample Receipt Information:

Thirty-three soil and one water samples were received September 5, 2018, at 3.5°C. The sample group was assigned Analytical Request Form (ARF) number 86766. The sample numbers and requested analyses were compared to the chains of custody. MS/MSDs were added as requested. Ten samples were placed on hold for dioxin and furan analysis. No other exception was encountered.

Sample Preparation and Analysis:

For the EPA 8015B analysis, the soil samples were sieved, manually ground, incrementally sampled, then extracted according to EPA method 3550B. The soil extracts were cleaned according to EPA method 3630C. The water sample was extracted according to EPA method 3510C.

For the EPA 8081A analysis, the soil samples were dried, sieved, manually ground, incrementally sampled, then extracted according to EPA method 3550B. The water sample was extracted according to EPA method 3510C.

For the EPA 8082A analysis, the soil samples were dried, sieved, manually ground, incrementally sampled, then extracted according to EPA method 3550B. The water sample was extracted according to EPA method 3510C.

For the EPA 8270C analyses, the soil samples were sieved, manually ground, incrementally sampled, then extracted according to EPA method 3550B. The water sample was extracted according to EPA method 3510C. **NOTE:** The EPA 8270C SIM surrogates were reported on the EPA 8270C report forms, since the extract was shared between the two instrument methods SIM and Full Scan.

For the EPA 6020A analysis, the designated soil samples were dried, sieved, manually ground, incrementally sampled, then digested according to EPA method 3050B. All other soil samples were digested according to EPA method 3050B. The water sample was digested according to EPA method 3010A.

For the EPA 7471A analysis, the designated soil samples were sieved, manually ground, incrementally sampled, then digested according to the method. All other soil samples were digested according to the method. The water sample was digested and analyzed according to EPA method 7470A.

Percent moisture was determined using ISM02.2, Exhibit D, section 10.0.

Only the portion of the injection log relative to these samples is included. A full sequence log is available upon request. Measurement uncertainty can be reported upon request.

Exceptions, Abnormalities and Deviations:

EPA 8015: In the MS/MSD performed on sample DU01-SB-03, diesel fuel recovered below the 64% lower control limit, and thee RPD exceeded the 35% limit. Corrective action: the client was notified.

The surrogate Octacosane recovered above the 140% upper control limit in 14 soil samples and MS/MSD. Corrective action: None, the high surrogate recovery may be attributed to the matrix.

Manual integrations were performed in accordance with APPL's SOP. Diesel was manually integrated in two continuing calibrations and two samples, and octacosane was manually integrated in one sample. Chromatograms of before and after manual integration are enclosed.

EPA 8081: Manual integrations were performed in accordance with APPL's SOP. The following were manually integrated in the calibration standards: 4,4'-DDD, 4,4'-DDT, endrin aldehyde, endrin ketone, methoxychlor, DECA (S), Chromatograms of before and after manual integrations are enclosed.

EPA 8270: In the MS/MSD performed on sample DU01-SB-02, seven compounds recovered outside their control limits and one RPD exceeded the 30% limit. Corrective action: the client was notified.

Manual integrations were performed in accordance with APPL's SOP. Benzoic acid was manually integrated in a continuing calibration standard. Chromatograms of before and after manual integrations are enclosed.

EPA 6020A: In the MS/MSD performed on sample DU01-SB-01, fifteen analytes recovered below their lower control limit. In the DT, one metal exceeded the 10% deviation limit. In the MS/MSD performed on sample B06-SB-01, four analytes recovered outside their control limits, and one RPD exceeded the 20% limit. Corrective action: the client was notified.

SDG	Received	Client ID	APPL ID	Collected DateTime	Matrix	Method	Method Description	Prep DateTime	Analysis DateTime
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/14/18 1:24:00 PM
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 12:43:03 PM
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 6:13:00 PM
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/10/18 10:42:00 PM
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 7:19:00 PM
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 2:07:00 PM
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 5:12:00 PM
86766	09/05/18	DU01-SS-01	AZ79146	08/29/18 1:00:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 12:13:00 PM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/14/18 1:28:00 PM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 12:44:45 PM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 6:42:00 PM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/10/18 11:02:00 PM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 7:39:00 PM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 2:26:00 PM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 5:29:00 PM
86766	09/05/18	DU01-SS-02	AZ79147	08/29/18 3:00:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 5:10:00 PM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/14/18 1:32:00 PM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 12:46:27 PM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 7:11:00 PM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/10/18 11:22:00 PM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 7:59:00 PM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 2:45:00 PM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 5:46:00 PM
86766	09/05/18	DU01-SS-03	AZ79148	08/29/18 5:03:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 5:38:00 PM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/14/18 1:36:00 PM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 12:48:09 PM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 7:40:00 PM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/10/18 11:42:00 PM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 8:19:00 PM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 3:04:00 PM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 6:03:00 PM
86766	09/05/18	DU01-SB-01	AZ79149	08/30/18 12:15:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 6:06:00 PM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/14/18 1:56:00 PM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 12:53:16 PM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 9:08:00 PM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 12:02:00 AM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 8:39:00 PM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 3:23:00 PM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 6:20:00 PM
86766	09/05/18	DU01-SB-02	AZ79150	08/30/18 3:45:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 7:30:00 PM
86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/14/18 2:00:00 PM
86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 12:54:58 PM
86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 9:37:00 PM
86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 12:22:00 AM

86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 8:59:00 PM
86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 3:42:00 PM
86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 6:37:00 PM
86766	09/05/18	DU01-SB-03	AZ79151	08/30/18 5:45:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 7:58:00 PM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:01:56 PM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 12:56:41 PM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 10:07:00 PM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 2:41:00 AM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 11:17:00 PM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 6:33:00 PM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 7:28:00 PM
86766	09/05/18	DU02-SS-01	AZ79152	08/29/18 5:00:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/12/18 11:01:00 AM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:05:51 PM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 12:58:23 PM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 10:36:00 PM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 3:01:00 AM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 11:37:00 PM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 6:52:00 PM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 8:19:00 PM
86766	09/05/18	DU02-SS-02	AZ79153	08/29/18 6:00:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 8:54:00 PM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:09:45 PM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 1:00:05 PM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 11:05:00 PM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 3:21:00 AM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/14/18 11:57:00 PM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 7:11:00 PM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 8:36:00 PM
86766	09/05/18	DU02-SS-03	AZ79154	08/29/18 6:30:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 9:22:00 PM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:13:40 PM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 1:07:35 PM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/17/18 11:34:00 PM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 2:40:00 PM	09/07/18 10:10:00 AM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 3:41:00 AM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/15/18 12:17:00 AM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 7:30:00 PM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 8:52:00 PM
86766	09/05/18	DU03-SS-01	AZ79155	08/30/18 5:30:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 9:50:00 PM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:17:35 PM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 1:09:17 PM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/19/18 11:31:00 AM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 4:01:00 AM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/15/18 12:37:00 AM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 7:49:00 PM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 9:10:00 PM
86766	09/05/18	DU03-SS-02	AZ79156	08/30/18 6:00:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 10:18:00 PM
86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:21:32 PM
86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 1:11:00 PM

86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/18/18 7:11:00 PM
86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 4:21:00 AM
86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/15/18 12:56:00 AM
86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 8:08:00 PM
86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 9:26:00 PM
86766	09/05/18	DU03-SS-03	AZ79157	08/30/18 6:35:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 10:46:00 PM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:25:27 PM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 1:12:43 PM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/18/18 7:40:00 PM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 4:41:00 AM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/15/18 1:16:00 AM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 8:27:00 PM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 9:43:00 PM
86766	09/05/18	DU04-SS-01	AZ79158	08/30/18 11:10:00 AM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/12/18 11:29:00 AM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:29:23 PM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 1:14:25 PM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/18/18 8:09:00 PM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 5:01:00 AM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/15/18 1:36:00 AM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 8:46:00 PM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 10:00:00 PM
86766	09/05/18	DU04-SS-02	AZ79159	08/30/18 11:40:00 AM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/11/18 11:42:00 PM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	6020A/3050B	EPA 6020A IS SOIL	09/13/18 7:36:00 AM	09/18/18 7:33:19 PM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A ISM	09/13/18 10:58:00 AM	09/14/18 1:16:08 PM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	8270C-LL	EPA 8270C SIM ISM SOIL	09/07/18 1:10:00 PM	09/18/18 8:39:00 PM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM SOIL	09/07/18 1:10:00 PM	09/11/18 5:21:00 AM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	EPA 8015B-e	EPA 8015B ISM W/SGC	09/07/18 1:10:00 PM	09/15/18 1:56:00 AM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	EPA 8081A	EPA 8081A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 9:05:00 PM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	EPA 8082A	EPA 8082A ISM SOIL	09/12/18 2:10:00 PM	09/14/18 10:17:00 PM
86766	09/05/18	DU04-SS-03	AZ79160	08/30/18 12:30:00 PM	SOIL	EPA 8270C	EPA 8270C ISM SOILS	09/07/18 1:10:00 PM	09/12/18 11:57:00 AM
86766	09/05/18	B01-SB-01	AZ79161	08/28/18 10:40:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 2:34:00 PM
86766	09/05/18	B01-SB-01	AZ79161	08/28/18 10:40:00 AM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 11:57:27 AM
86766	09/05/18	B01-SB-01	AZ79161	08/28/18 10:40:00 AM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	B02-SB-01	AZ79162	08/28/18 11:00:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 2:38:00 PM
86766	09/05/18	B02-SB-01	AZ79162	08/28/18 11:00:00 AM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 11:59:09 AM
86766	09/05/18	B02-SB-01	AZ79162	08/28/18 11:00:00 AM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	B03-SS-01	AZ79163	08/28/18 11:10:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 2:41:55 PM
86766	09/05/18	B03-SS-01	AZ79163	08/28/18 11:10:00 AM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:00:51 PM
86766	09/05/18	B03-SS-01	AZ79163	08/28/18 11:10:00 AM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	B04-SS-01	AZ79164	08/28/18 11:35:00 AM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 2:45:53 PM
86766	09/05/18	B04-SS-01	AZ79164	08/28/18 11:35:00 AM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:02:32 PM
86766	09/05/18	B04-SS-01	AZ79164	08/28/18 11:35:00 AM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	B05-SB-01	AZ79165	08/28/18 12:45:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 2:49:00 PM
86766	09/05/18	B05-SB-01	AZ79165	08/28/18 12:45:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:04:14 PM
86766	09/05/18	B05-SB-01	AZ79165	08/28/18 12:45:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:16:00 PM	09/07/18 10:25:00 AM
86766	09/05/18	B06-SB-01	AZ79166	08/28/18 1:10:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 2:53:00 PM
86766	09/05/18	B06-SB-01	AZ79166	08/28/18 1:10:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:05:55 PM

86766	09/05/18	B06-SB-01	AZ79166	08/28/18 1:10:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B07-SB-01	AZ79167	08/28/18 1:45:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:21:00 PM
86766	09/05/18	B07-SB-01	AZ79167	08/28/18 1:45:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:11:01 PM
86766	09/05/18	B07-SB-01	AZ79167	08/28/18 1:45:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B08-SB-01	AZ79168	08/28/18 2:05:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:25:00 PM
86766	09/05/18	B08-SB-01	AZ79168	08/28/18 2:05:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:12:42 PM
86766	09/05/18	B08-SB-01	AZ79168	08/28/18 2:05:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B09-SB-01	AZ79169	08/28/18 2:20:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:29:00 PM
86766	09/05/18	B09-SB-01	AZ79169	08/28/18 2:20:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:14:24 PM
86766	09/05/18	B09-SB-01	AZ79169	08/28/18 2:20:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B10-SS-01	AZ79170	08/28/18 2:30:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:33:38 PM
86766	09/05/18	B10-SS-01	AZ79170	08/28/18 2:30:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:16:05 PM
86766	09/05/18	B10-SS-01	AZ79170	08/28/18 2:30:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B10-SS-02	AZ79171	08/28/18 2:35:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:37:00 PM
86766	09/05/18	B10-SS-02	AZ79171	08/28/18 2:35:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:21:04 PM
86766	09/05/18	B10-SS-02	AZ79171	08/28/18 2:35:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B11-SB-01	AZ79172	08/28/18 2:40:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:41:00 PM
86766	09/05/18	B11-SB-01	AZ79172	08/28/18 2:40:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:22:46 PM
86766	09/05/18	B11-SB-01	AZ79172	08/28/18 2:40:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B12-SB-01	AZ79173	08/28/18 3:25:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:45:00 PM
86766	09/05/18	B12-SB-01	AZ79173	08/28/18 3:25:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:24:29 PM
86766	09/05/18	B12-SB-01	AZ79173	08/28/18 3:25:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B13-SS-01	AZ79174	08/28/18 3:35:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:49:20 PM
86766	09/05/18	B13-SS-01	AZ79174	08/28/18 3:35:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:26:10 PM
86766	09/05/18	B13-SS-01	AZ79174	08/28/18 3:35:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B14-SB-01	AZ79175	08/28/18 3:45:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:53:00 PM
86766	09/05/18	B14-SB-01	AZ79175	08/28/18 3:45:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:27:52 PM
86766	09/05/18	B14-SB-01	AZ79175	08/28/18 3:45:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:31:00 PM	09/07/18 10:33:00 AM
86766	09/05/18	B15-SS-01	AZ79176	08/29/18 3:45:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 4:57:11 PM
86766	09/05/18	B15-SS-01	AZ79176	08/29/18 3:45:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:29:34 PM
86766	09/05/18	B15-SS-01	AZ79176	08/29/18 3:45:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:39:00 PM	09/07/18 10:39:00 AM
86766	09/05/18	B16-SS-01	AZ79177	08/29/18 4:00:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 2:57:39 PM
86766	09/05/18	B16-SS-01	AZ79177	08/29/18 4:00:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:31:16 PM
86766	09/05/18	B16-SS-01	AZ79177	08/29/18 4:00:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:39:00 PM	09/07/18 10:39:00 AM
86766	09/05/18	B17-SS-01	AZ79178	08/29/18 4:15:00 PM	SOIL	6020A/3050B	EPA 6020A SOIL	09/11/18 9:26:00 AM	09/13/18 3:01:36 PM
86766	09/05/18	B17-SS-01	AZ79178	08/29/18 4:15:00 PM	SOIL	7471A/7471A	Mercury (Hg) EPA 7471A	09/11/18 11:18:00 AM	09/14/18 12:32:58 PM
86766	09/05/18	B17-SS-01	AZ79178	08/29/18 4:15:00 PM	SOIL	CLP MOIST	Moisture	09/06/18 3:39:00 PM	09/07/18 10:39:00 AM
86766	09/05/18	G-11-SS-04	AZ79179	09/01/18 2:00:00 PM	WATER	6020A/3015	EPA 6020A WATER	09/11/18 10:55:00 AM	09/14/18 1:08:00 PM
86766	09/05/18	G-11-SS-04	AZ79179	09/01/18 2:00:00 PM	WATER	7470A/7470A	MERCURY EPA 7470A	09/17/18 1:40:00 PM	09/19/18 2:49:24 PM
86766	09/05/18	G-11-SS-04	AZ79179	09/01/18 2:00:00 PM	WATER	8270C-LL	EPA 8270C SIM WATER	09/07/18 10:28:00 AM	09/17/18 4:16:00 PM
86766	09/05/18	G-11-SS-04	AZ79179	09/01/18 2:00:00 PM	WATER	EPA 8015B-e	EPA 8015B-E WATER	09/07/18 2:23:00 PM	09/11/18 8:00:00 AM
86766	09/05/18	G-11-SS-04	AZ79179	09/01/18 2:00:00 PM	WATER	EPA 8081A	EPA 8081A WATER	09/07/18 2:32:00 PM	09/12/18 1:02:00 PM
86766	09/05/18	G-11-SS-04	AZ79179	09/01/18 2:00:00 PM	WATER	EPA 8082A	EPA 8082A WATER	09/07/18 2:32:00 PM	09/11/18 5:05:00 PM
86766	09/05/18	G-11-SS-04	AZ79179	09/01/18 2:00:00 PM	WATER	EPA 8270C	EPA 8270C WATER	09/07/18 10:28:00 AM	09/10/18 1:10:00 PM

APPL Inc.
Abbreviations and Flags

FLAG	DESCRIPTION
#	Recovery or RPD outside control limits
*	Recovery or RPD outside control limits
B	Analyte detected in associated method blank
C1	Reason for correction: wrote incorrect response
C2	Reason for correction: calculated incorrectly
C3	Reason for correction: needs to be rechecked
C4	Reason for correction: data not usable
DO	Diluted out
E	Exceeds linear range
F	Estimated value
G1	Includes a wide range of hydrocarbons which does not match our gasoline standard
G10	Includes a match to hydrocarbon profiles within the range of mineral spirits
G11	Includes a match to hydrocarbon profiles within the range of JP-4
G12	Pattern does not match the gasoline standard; the carbon range for this sample is consistent with JP8
G13	Closely resembles the hydrocarbon profile of aviation gasoline
G14	Analyte concentration may be biased due to carry over
G2	Closely resembles the boiling point hydrocarbon profile consistent with weathered gasoline
G3	Includes higher boiling hydrocarbons
G4	Includes dominant peak(s) not indicative of petroleum hydrocarbons
G5	Is mainly dominant peak(s) not indicative of petroleum hydrocarbons
G6	Contains recognizable contaminant peak(s) which has been removed from quantitation
G7	Is mainly a match to hydrocarbons within the range of gasoline
G8	Closely resembles the boiling point hydrocarbon profile consistent with weathered gasoline
G9	Includes hydrocarbons within the range of kerosene
J	Estimated value
M	Matrix effect
MI1	Manual integration: integration does not follow baseline
MI2	Manual integration: non-target peak interference
MI3	Manual integration: to split a peak that was integrated as one peak by the computer.
MI4	Manual integration: to integrate a split peak
MI5	Manual integration: the whole peak or part of the peak was not integrated
MI6	Manual integration: computer integrated wrong peak
MI7	Manual integration: other – (See case narrative)
MDL	Method detection limit
ND	Not detected
NT	Non-target
Q	Acceptance criteria not met
T1 I	Includes wide range of hydrocarbons not indicative of diesel
T1 M	Is mainly wide range of hydrocarbons not necessarily indicative of diesel
T2 I	Includes lower boiling hydrocarbons, i.e. mineral spirits, kerosene, stoddard solvent, white gas
T2 M	Is mainly lower boiling hydrocarbons, i.e. mineral spirits, kerosene, stoddard solvent, white gas
T3 I	Includes higher boiling hydrocarbons, i.e. asphaltene, waster oil, motor oil, or weathered diesel fuel
T3 M	Is mainly higher boiling hydrocarbons, i.e. asphaltene, waster oil, motor oil, or weathered diesel fuel
T4 I	Includes dominant peak(s) not indicative of hydrocarbons
T4 M	Is mainly dominant peak(s) not indicative of hydrocarbons
T5	Contains recognizable contaminant peak(s) which has been removed from quantitation
T6	Is mainly a match to hydrocarbons within range of diesel fuel
T7	Closely resembles the boiling point hydrocarbon profile consistent with diesel fuel
T8	Includes a match to hydrocarbon profiles within range of diesel and kerosene fuel
T9 I	Includes non-diesel hydrocarbons within boiling point range of diesel fuel
T9 M	Is mainly non-diesel hydrocarbons within boiling point range of diesel fuel
U	Not detected
Y	Percent difference between primary and confirmation column > 40%

SAMPLE MANAGEMENT RECORDS

CHAIN OF CUSTODY,

ARF, CRF, AND

CLIENT COMMUNICATION

APPL - Analysis Request Form 86766

Client:	CDM Smith	Received by:	AAR
Address:	14432 SE Eastgate Way, Ste 100 Bellevue, WA 98007	Date Received:	09/05/18 Time: 10:05
		Delivered by:	FEDEX
Attn:	Scott Felton	Shuttle Custody Seals (Y/N):	N Time Zone: -8
Phone:	(425) 519-8300 Fax: (425) 746-0197	Chest Temp(s):	3.5°C
Job:	Vogelsang Former Waste Disposal Area	Color:	D-Yellow/Q-OrgYel
PO #:	SubK 2334-003-004-AL Tracking #17469	Samples Chilled until Placed in Refrig/Freezer:	Y
Chain of Custody (Y/N):	Y # 090418A-D	Project Manager:	Libby Cheesebor
RAD Screen (Y/N):	Y pH (Y/N): N	QC Report Type:	DVP4/EDD/CA
Turn Around Type:	2 WEEKS	Due Date:	09/19/18

Comments:

AN: Forms: Self Cal F1s with J to MDL; Blanks No analyte > PQL
MIS: perform WET ISM & moisture for Hg,TPH-D, PAHs, SVOCs; all others after dry
single extraction for SVOCs & PAHS (SVOC surrogates, separate LCS & MS/MSD)
8270-SIM soil: include PCP in PAH list; $87DODW: xxx 1,2-Diphenylhydrazine
8082: xxx 1016
FR: login and DVP in 2 weeks tofoxml@ & feltonds@cdmsmith.com
EDD: excel to foxml@cdmsmith.com & feltonds@cdmsmith.com

IN: attn Subcontracts Manager to CDMFED-Invoicing@cdmsmith.com MUST use subject

Sample Distribution:	Charges:	Invoice To:
GC: 15-$81ACAPMIS, 15-$82ADOD51SMI, 15-$87CCAPMIS, 15-$PCBS, 15-$SIMCAPMIS, 15-$TOXS, 15-$TPHCDMIS, 15-$TPHCDMISSGC, 1-$81ACAPW, 1-$82ADOD51W, 1-$87DODW, 1-$PCBW, 1-$SIMCAPW, 1-$TOXW, 1-$TPHCDMW		CDM FEDERAL PROGRAMS CORPORATI
Extractions: 15-_SON002LLMIS, 15-_SON004SGCMIS, 15-_SON004WETIS, 15-_SON009WETIS, 5-_SOX8290MIS, 1-_SEP004, 1-_SEP011, 1-_SEP025		see comments
Metals: 15-$62A14MIS(CAM17), 15-$HGMIS, 18-$62A14S(CAM17), 18-$HGS, 1-$62A14W(CAM17), 1-$HGDODW		
Wetlab: 33-MOIST		
Other: 5-$8290IS, 15-_M3050LLMIS, 15-_M7471MIS, 18-_M3050, 18-_M7471, 1-_M3010, 1-_M7470		

	Client ID	APPL ID	Sampled	Analyses Requested
1.	DU01-SS-01	AZ79146S	08/29/18 13:00	$62A14MIS(CAM17), $81ACAPMIS, $8290IS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
2.	DU01-SS-02	AZ79147S	08/29/18 15:00	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM

Note: All times, excluding sample collection times, are Pacific Time Zone unless noted otherwise. Collection times are in: -8 UTC

3. DU01-SS-03		AZ79148S	08/29/18	17:03	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
4. DU01-SB-01	MS/MSD: metals & 8290	AZ79149S	08/30/18	12:15	$62A14MIS(CAM17), $81ACAPMIS, $8290IS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
5. DU01-SB-02	MS/MSD: SIM,PCP & SVOCs	AZ79150S	08/30/18	15:45	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
6. DU01-SB-03	MS/MSD: TPH-e & 8081/82	AZ79151S	08/30/18	17:45	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
7. DU02-SS-01		AZ79152S	08/29/18	17:00	$62A14MIS(CAM17), $81ACAPMIS, $8290IS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
8. DU02-SS-02		AZ79153S	08/29/18	18:00	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
9. DU02-SS-03		AZ79154S	08/29/18	18:30	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
10. DU03-SS-01		AZ79155S	08/30/18	17:30	$62A14MIS(CAM17), $81ACAPMIS, $8290IS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
11. DU03-SS-02		AZ79156S	08/30/18	18:00	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM

Note: All times, excluding sample collection times, are Pacific Time Zone unless noted otherwise. Collection times are in: -8 UTC

12. DU03-SS-03		AZ79157S	08/30/18 18:35	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
13. DU04-SS-01		AZ79158S	08/30/18 11:10	$62A14MIS(CAM17), $81ACAPMIS, $8290IS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
14. DU04-SS-02		AZ79159S	08/30/18 11:40	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
15. DU04-SS-03		AZ79160S	08/30/18 12:30	$62A14MIS(CAM17), $81ACAPMIS, $82ADOD51SMI, $87CCAPMIS, $HGMIS, $PCBS, $SIMCAPMIS, $TOXS, $TPHCDMIS, $TPHCDMISSGC, MOIST -- WET IS Hg, SVOC/PAH, TPH; add PCP to SIM
16. B01-SB-01		AZ79161S	08/28/18 10:40	$62A14S(CAM17), $HGS, MOIST
17. B02-SB-01		AZ79162S	08/28/18 11:00	$62A14S(CAM17), $HGS, MOIST
18. B03-SS-01		AZ79163S	08/28/18 11:10	$62A14S(CAM17), $HGS, MOIST
19. B04-SS-01		AZ79164S	08/28/18 11:35	$62A14S(CAM17), $HGS, MOIST
20. B05-SB-01		AZ79165S	08/28/18 12:45	$62A14S(CAM17), $HGS, MOIST
21. B06-SB-01	MS/MSD	AZ79166S	08/28/18 13:10	$62A14S(CAM17), $HGS, MOIST
22. B07-SB-01		AZ79167S	08/28/18 13:45	$62A14S(CAM17), $HGS, MOIST
23. B08-SB-01		AZ79168S	08/28/18 14:05	$62A14S(CAM17), $HGS, MOIST
24. B09-SB-01		AZ79169S	08/28/18 14:20	$62A14S(CAM17), $HGS, MOIST
25. B10-SS-01		AZ79170S	08/28/18 14:30	$62A14S(CAM17), $HGS, MOIST
26. B10-SS-02		AZ79171S	08/28/18 14:35	$62A14S(CAM17), $HGS, MOIST
27. B11-SB-01		AZ79172S	08/28/18 14:40	$62A14S(CAM17), $HGS, MOIST
28. B12-SB-01		AZ79173S	08/28/18 15:25	$62A14S(CAM17), $HGS, MOIST
29. B13-SS-01		AZ79174S	08/28/18 15:35	$62A14S(CAM17), $HGS, MOIST
30. B14-SB-01		AZ79175S	08/28/18 15:45	$62A14S(CAM17), $HGS, MOIST

Note: All times, excluding sample collection times, are Pacific Time Zone unless noted otherwise. Collection times are in: -8 UTC

31. B15-SS-01	AZ79176S	08/29/18	15:45	$62A14S(CAM17), $HGS, MOIST
32. B16-SS-01	AZ79177S	08/29/18	16:00	$62A14S(CAM17), $HGS, MOIST
33. B17-SS-01	AZ79178S	08/29/18	16:15	$62A14S(CAM17), $HGS, MOIST
34. G-11-SS-04	AZ79179W	09/01/18	14:00	$62A14W(CAM17), $81ACAPW, $82ADOD51W, $87DODW, $HGDODW, $PCBW, $SIMCAPW, $TOXW, $TPHCDMW

APPL Sample Receipt Form

ARF# **86766**

Sample	Container Type	Count	p
AZ79146	35 Plastic Bag	1	NA
AZ79147	35 Plastic Bag	1	NA
AZ79148	35 Plastic Bag	1	NA
AZ79149	35 Plastic Bag	1	NA
AZ79150	35 Plastic Bag	1	NA
AZ79151	35 Plastic Bag	1	NA
AZ79152	35 Plastic Bag	1	NA
AZ79153	35 Plastic Bag	1	NA
AZ79154	35 Plastic Bag	1	NA
AZ79155	35 Plastic Bag	1	NA
AZ79156	35 Plastic Bag	1	NA
AZ79157	35 Plastic Bag	1	NA
AZ79158	35 Plastic Bag	1	NA
AZ79159	35 Plastic Bag	1	NA
AZ79160	35 Plastic Bag	1	NA
AZ79161	20 4oz Jar	1	NA
AZ79162	20 4oz Jar	1	NA
AZ79163	20 4oz Jar	1	NA
AZ79164	20 4oz Jar	1	NA
AZ79165	20 4oz Jar	1	NA
AZ79166	20 4oz Jar	2	NA
AZ79167	20 4oz Jar	1	NA
AZ79168	20 4oz Jar	1	NA
AZ79169	20 4oz Jar	1	NA
AZ79170	20 4oz Jar	1	NA
AZ79171	20 4oz Jar	1	NA
AZ79172	20 4oz Jar	1	NA
AZ79173	20 4oz Jar	1	NA
AZ79174	20 4oz Jar	1	NA
AZ79175	20 4oz Jar	1	NA
AZ79176	20 4oz Jar	1	NA
AZ79177	20 4oz Jar	1	NA
AZ79178	20 4oz Jar	1	NA
AZ79179	6 PL 500mL - HNO3	1	NA
	17 Amber Liter	5	NA
	40 500mL Amber, unprsrvd	3	NA

Sample	Container Type	Count	p

86766

APPL LABS

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611
www.applinc.com

CHAIN OF CUSTODY RECORD

Phone: (559) 275-2175
Fax: (559) 275-4422
coc@applinc.com
C.O.C. ____________

Report to: R Wood, K Yauk PLEASE PRINT, Scott Felton	Invoice to: PLEASE PRINT
Company Name: CDM Smith Inc. Phone: 925 933 2900	Company Name: ______ Phone: ______
Address: 2300 Clayton Rd Ste 950, Concord CA 94520 Fax: 925 933 4174	Address: (same) Fax: ______
Attn: Scott Felton yaukke@cdmsmith.com	Attn: ______
Email: feltonds@cdmsmith.com, woodr@cdmsmith.com	Email: ______

Project Name/Number	Sampler (Print)	Date Shipped:
		Carrier:
Purchase Order Number	Sampler (Signature)	Waybill No.:
		Comments:

Analysis Requested/Method Number

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Matrix: Aq	Matrix: Sed.	Matrix: Soil		sVOCs	PAHs	Dioxin/Furan	TPH D/Mo	TPH D/Mo + Silica	Metals	Mercury	Pesticides	PCBs				Comments
DU01-SS-01	Vogelsang	8/29/18	1300	PDT	1			X		X	X	X	X	X	X	X	X	X				
DU01-SS-02			1500		1			X		X	X	H	X	X	X	X	X	X				
DU01-SS-03			1703		1			X		X	X	H	X	X	X	X	X	X				
DU01-SB-01		8/30/18	1215		1			X		X	X	X	X	X	X	X	X	X				
DU01-SB-02			1545		1			X		X	X	H	X	X	X	X	X	X				
DU01-SB-03			1745		1			X		X	X	H	X	X	X	X	X	X				
DU02-SS-01		8/29/18	1700		1			X		X	X	X	X	X	X	X	X	X				
DU02-SS-02			1800		1			X		X	X	H	X	X	X	X	X	X				
DU02-SS-03			1830		1			X		X	X	H	X	X	X	X	X	X				
DU03-SS-01		8/30/18	1730		1			X		X	X	X	X	X	X	X	X	X				
DU03-SS-02			1800		1			X		X	X	H	X	X	X	X	X	X				

Shuttle Temperature: 3.5°

Turnaround Requested: Check one ☒ Standard 2-3 wk ☐ One week ☐ 3 days ☐ 24/48 Hrs. ☐ Other: ______

Sample Disposal: ☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
RW	9-4-18	1500	Fed Ex				
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					9/5/18	10:05	[signature] AA

See page 2 for Container Preservative and Sampling Information

APPL LABS

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611
www.applinc.com

Phone: (559) 275-2175
Fax: (559) 275-4422
coc@applinc.com

CHAIN OF CUSTODY RECORD

C.O.C. ____________

Report to: S Felton, R Wood, K Yauk PLEASE PRINT
Company Name: CDM Smith Phone: 925 933 2900
Address: 2300 Clayton Rd Ste 950
Concord CA 94520 Fax: 925 933 4174
Attn: Scott Felton
Email: feltonds@cdmsmith.com woodr@cdmsmith.com yaukke@cdmsmith.com

Invoice to: PLEASE PRINT
Company Name: (Same) Phone:
Address: Fax:
Attn:
Email:

Project Name/Number	Sampler (Print)	Date Shipped:
Purchase Order Number	Sampler (Signature)	Carrier:
		Waybill No.:
		Comments:

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Aq	Sed.	Soil		sVOCs	PAHs	Dioxin/Furan	TPH D/MO	TPH D/MO+silica	Metals	Mercury	Pesticides	PCBs				Comments
DU03-SS-03	Vogelsang	8/30/18	1835	PDT	1			X		X	X	H	X	X	X	X	X	X				
DU04-SS-01			1110		1			X		X	X	X	X	X	X	X	X	X				
DU04-SS-02			1140		1			X		X	X	H	X	X	X	X	X	X				
DU04-SS-03			1230		1			X		X	X	H	X	X	X	X	X	X				
B01-SB-01		8/28/18	1040		1			X							X	X						
B02-SB-01			1100		1			X							X	X						
B03-SS-01			1110		1			X							X	X						
B04-SS-01			1135		1			X							X	X						
B05-SB-01			1245		1			X							X	X						
B06-SB-01			1310		2			X							X	X						MS/MSD
B07-SB-01			1345		1			X							X	X						

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 3 days ☐ 24/48 Hrs. ☐ Other: ________

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
[signature]	9-4-18	1500	Fed Ex				
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					9/5/18	10:05	[signature]

See page 2 for Container Preservative and Sampling Information

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611
www.applinc.com

Phone: (559) 275-2175
Fax: (559) 275-4422
coc@applinc.com

CHAIN OF CUSTODY RECORD

C.O.C. ______

Report to: S Felton, R Wood, K Yauk PLEASE PRINT	Invoice to: PLEASE PRINT
Company Name: CDM Smith Phone:	Company Name: (Same) Phone:
Address: see page 1 Fax:	Address: Fax:
Attn:	Attn:
Email:	Email:

Project Name/Number	Sampler (Print)	Date Shipped:
Purchase Order Number	Sampler (Signature)	Carrier:
		Waybill No.:
		Comments:

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Aq	Sed.	Soil		sVOCs	PAHs	Dioxin/Furan	TPH D/Mo	TPH w/mo+silica	Metals	Mercury	Pesticides	PCBs				Comments
B08-SB-01	Vogelsang	8/28/18	1405	PDT	1			X							X	X						
B09-SB-01			1420		1			X							X	X						
B10-SS-01			1430		1			X							X	X						
B10-SS-02			1435		1			X							X	X						
B11-SB-01			1440		1			X							X	X						
B12-SB-01			1525		1			X							X	X						
B13-SS-01			1535		1			X							X	X						
B14-SB-01			1545		1			X							X	X						
B15-SS-01		8/29/18	1545		1			X							X	X						
B16-SS-01			1600		1			X							X	X						
B17-SS-01			1615		1			X							X	X						

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 3 days ☐ 24/48 Hrs. ☐ Other: ______

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
[signature]	9-4-18	1500	Fed Ex				
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date 9/5/18	Time 10:05	Received at lab by: [signature]

See page 2 for Container Preservative and Sampling Information

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611
www.applinc.com

CHAIN OF CUSTODY RECORD

Phone: (559) 275-2175
Fax: (559) 275-4422
coc@applinc.com
C.O.C. ____

Report to: PLEASE PRINT	Invoice to: PLEASE PRINT
Company Name: CDM Smith Phone:	Company Name: (Same) Phone:
Address: 2300 Clayton Rd Ste 950 Concord CA 94520 Fax:	Address: Fax:
Attn: Scott Felton	Attn:
Email:	Email:

Project Name/Number	Sampler (Print)	Date Shipped:
Purchase Order Number	Sampler (Signature)	Carrier:
		Waybill No.:
		Comments:

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Matrix: Aq	Matrix: Sed.	Matrix: Soil		sVOCs	PAHs	Dioxin/Furan	TPH D/Mo	TPH D/Mo + silica	Metals	Mercury	Pesticides	PCBs				Comments
G-11-SS-04	Vogelsang	9/1/18	1400	PDT	9	X				X	X	H	X		X	X	X	X				

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 3 days ☐ 24/48 Hrs. ☐ Other: ____

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
[signature]	9-4-18	1500	Fed EX				
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date 9/5/18	Time 10:05	Received at lab by: [signature]

See page 20 for Container Preservative and Sampling Information

Libby Cheeseborough

From: Fox, Mary <FoxML@cdmsmith.com>
Sent: Friday, September 07, 2018 2:16 PM
To: Libby Cheeseborough
Subject: RE: 86766 CDM SMITH

Hi Libby,

For the MS/MSD situation, we would like to prioritize matrix QC for the metals on sampled DU01-SB-01 and if you can get any additional matrix QC from that sample, then do so. After that sample, you can spread out matrix QC on the DU01-SB-02 sample, then DU01-SB-03, DU02-SB-01, DU-SB-02, etc – see the pattern ?:)

From: Libby Cheeseborough <libby@applinc.com>
Sent: Friday, September 07, 2018 1:43 PM
To: Fox, Mary <FoxML@cdmsmith.com>
Subject: RE: 86766 CDM SMITH

Hi Mary Lou,
For the dioxin/furan analysis, the hold time is 28 days, so it might make sense to leave it as it is (so you don't have to pay for the extraction). We'll do what you'd like, just a suggestion.
Also, after lying out the samples, there does not seem to be enough volume for MS/MSD for analysis.
Please advise.

Thank you,
Libby

Libby Cheeseborough
Project Manager

Agriculture & Priority Pollutants Laboratories, Inc.
WOSB. NELAP Accredited.
d. 559.862.2109 t. 559.275.2175 f. 559.275.4422
a. 908 N. Temperance Ave., Clovis, CA 93611

Website • Email

DoD accredited for ISM, Dioxins and PCB congeners.

COOLER RECEIPT FORM **ARF: 86766**

1) Project: El Capitan Landfill Site Date Received: 09/05/18

2) Coolers: Number of Coolers: 2

3) YES Were custody seals present and intact?
How many? 2 Name/Date on seal? see below

4) YES Was there a shipping slip? Carrier name: FEDEX

5) Type of packing in cooler: X bubble wrap __ popcorn __ foam X plastic bags __ other
X wet ice __ dry ice __ no ice __ gel ice

6) YES Were cooler temperatures acceptable?

7) Serial number of certified NIST thermometer use M65283

8) Cooler temp(s): In °C

1: 3.5°C	2:	3:	4:	5:	6:
7:	8:	9:	10:	11:	12:

Chain of custody:

9) YES Was a chain of custody received?

10) YES Were the custody papers complete/signed in the appropriate places?

Sample Labels:

11) YES Were all sample labels complete (sample ID, date/time of sampling, etc.)?

12) YES Did all container labels agree with custody papers?

Sample Containers:

13) YES Were all containers sealed in separate bags?

14) YES Did all containers arrive in good condition:(unbroken, no leakage, no cracked/broken li

15) YES Were correct containers and preservatives used for the tests indicated?

16) YES Was a sufficient amount of sample sent for tests indicated?

17) NA Were bubbles present in volatile samples?
If yes, the following were received with air bubbles:
Larger than a pea:
Smaller than a pea:

Preservation Hold time:

18) Yes Was a sufficient amount of holding time remaining to analyze the samples?

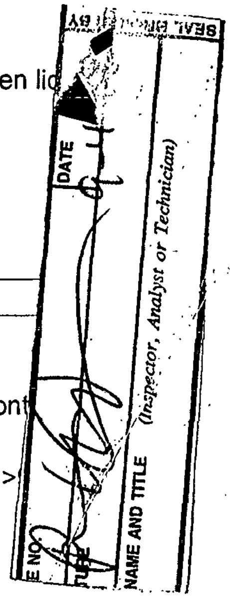
19) Yes Was the pH taken of all non-VOA preserved samples and written on the sample con

20) Yes Was the pH of acid preserved non-VOA samples < 2?

21) NA Was the pH of sodium hydroxide preserved samples for Cyanide > 12 and Sulfide >

22) NO Were unpreserved VOA Vials received?

23) NA Are unpreserved VOA vials noted in the ADD TEST FIELD on the ARF?
pH strip lot number: 90b2031
Lab notified if pH was not adequate:



Notes/Deficiencies:

Personnel receiving samples:	ZG	Second reviewer:	AA
Personnel labeling samples:	ZG		
Project manager notified:	AA	Date/Time of notification	09/05/18
Name of client notified:		Date/Time of notification	

Revision: 22, November 5, 2013

SAMPLE RESULTS

EPA 8015B ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-01

APPL ID: AZ79146

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.0 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	80 ++	5.2	0.52	mg/kg	09/07/18	09/10/18
EPA 8015B-e	MOTOR OIL (C24-C36)	160	52	3.6	mg/kg	09/07/18	09/10/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	219 #	47-140		%	09/07/18	09/10/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	87.8	51-128		%	09/07/18	09/10/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method: DROB0905.M
Run #: 910038
Instrument: Apollo
Sequence: 180910
Dilution Factor: 1
Initials: DPO

Printed: 09/11/18 2:20:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-01

APPL ID: AZ79146

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.0 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	4.3 ++J	5.2	0.52	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	7.0 J	52	3.6	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	105	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	95.0	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method:	DROB0905.M
Run #:	914033
Instrument:	Apollo
Sequence:	180914
Dilution Factor:	1
Initials:	DPO

Printed: 09/17/18 9:10:43 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

CDM Smith
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APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-02

APPL ID: AZ79147

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.9 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	250 ++	5.2	0.52	mg/kg	09/07/18	09/10/18
EPA 8015B-e	MOTOR OIL (C24-C36)	330	52	3.6	mg/kg	09/07/18	09/10/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	192 #	47-140		%	09/07/18	09/10/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	82.3	51-128		%	09/07/18	09/10/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB0905.M
Run #:	910039
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

Printed: 09/11/18 2:20:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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APPL Inc.
908 North Temperance Avenue
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-02

APPL ID: AZ79147

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.9 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	15 ++	5.2	0.52	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	12 J	52	3.6	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	123	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	78.8	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method: DROB0905.M
Run #: 914034
Instrument: Apollo
Sequence: 180914
Dilution Factor: 1
Initials: DPO

Printed: 09/17/18 9:10:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

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APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.1 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	91 ++	5.2	0.52	mg/kg	09/07/18	09/10/18
EPA 8015B-e	MOTOR OIL (C24-C36)	160	52	3.6	mg/kg	09/07/18	09/10/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	214 #	47-140		%	09/07/18	09/10/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	84.8	51-128		%	09/07/18	09/10/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method: DROB0905.M
Run #: 910040
Instrument: Apollo
Sequence: 180910
Dilution Factor: 1
Initials: DPO

Printed: 09/11/18 2:20:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

CDM Smith
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908 North Temperance Avenue
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.1 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	2.7 ++J	5.2	0.52	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	4.8 J	52	3.6	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	70.9	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	50.8	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method:	DROB0905.M
Run #:	914035
Instrument:	Apollo
Sequence:	180914
Dilution Factor:	1
Initials:	DPO

Printed: 09/17/18 9:10:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-01

APPL ID: AZ79149

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	33 ++	5.2	0.52	mg/kg	09/07/18	09/10/18
EPA 8015B-e	MOTOR OIL (C24-C36)	70	52	3.7	mg/kg	09/07/18	09/10/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	164 #	47-140		%	09/07/18	09/10/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	92.7	51-128		%	09/07/18	09/10/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method: DROB0905.M
Run #: 910041
Instrument: Apollo
Sequence: 180910
Dilution Factor: 1
Initials: DPO

Printed: 09/11/18 2:20:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

CDM Smith
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APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-01

APPL ID: AZ79149

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	3.4 ++J	5.2	0.52	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	7.5 J	52	3.7	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	112	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	91.8	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method: DROB0905.M
Run #: 914036
Instrument: Apollo
Sequence: 180914
Dilution Factor: 1
Initials: DPO

Printed: 09/17/18 9:10:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

CDM Smith
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Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-02

APPL ID: AZ79150

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	35 ++	5.3	0.53	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	75	53	3.7	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	202 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	108	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB0905.M
Run #:	910042
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

Printed: 09/11/18 2:20:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

CDM Smith
14432 SE Eastgate Way, Ste 100
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APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-02

APPL ID: AZ79150

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	3.5 ++J	5.3	0.53	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	9.7 J	53	3.7	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	128	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	113	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method: DROB0905.M
Run #: 914037
Instrument: Apollo
Sequence: 180914
Dilution Factor: 1
Initials: DPO

Printed: 09/17/18 9:10:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-03

APPL ID: AZ79151

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	38 ++	5.3	0.53	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	76	53	3.7	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	163 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	89.8	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method: DROB0905.M
Run #: 910043
Instrument: Apollo
Sequence: 180910
Dilution Factor: 1
Initials: DPO

Printed: 09/11/18 2:20:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-03

APPL ID: AZ79151

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	3.7 ++J	5.3	0.53	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	7.1 J	53	3.7	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	103	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	82.7	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method:	DROB0905.M
Run #:	914038
Instrument:	Apollo
Sequence:	180914
Dilution Factor:	1
Initials:	DPO

Printed: 09/17/18 9:10:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
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APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-01

APPL ID: AZ79152

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.3 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	91 ++	5.2	0.52	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	190	52	3.7	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	207 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	88.0	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB0905.M
Run #:	910050
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

Printed: 09/11/18 2:20:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-01

APPL ID: AZ79152

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.3 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	3.9 ++J	5.2	0.52	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	8.3 J	52	3.7	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	86.0	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	80.5	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method:	DROB0905.M
Run #:	914045
Instrument:	Apollo
Sequence:	180914
Dilution Factor:	1
Initials:	DPO

Printed: 09/17/18 9:10:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-02

APPL ID: AZ79153

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.6 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	190 ++	5.1	0.51	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	370	51	3.6	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	265 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	75.8	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method: DROB0905.M
Run #: 910051
Instrument: Apollo
Sequence: 180910
Dilution Factor: 1
Initials: DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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908 North Temperance Avenue
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-02

APPL ID: AZ79153

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.6 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	8.0 ++	5.1	0.51	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	9.8 J	51	3.6	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	107	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	68.2	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method: DROB0905.M
Run #: 914046
Instrument: Apollo
Sequence: 180914
Dilution Factor: 1
Initials: DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-03

APPL ID: AZ79154

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.2 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	110 ++	5.2	0.52	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	200	52	3.6	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	232 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	90.9	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method: DROB0905.M
Run #: 910052
Instrument: Apollo
Sequence: 180910
Dilution Factor: 1
Initials: DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-03

APPL ID: AZ79154

Sample Collection Date: 08/29/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.2 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	6.2 ++	5.2	0.52	mg/kg	09/07/18	09/14/18
EPA 8015B-e	MOTOR OIL	6.1 J	52	3.6	mg/kg	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	93.4	47-140		%	09/07/18	09/14/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	74.5	51-128		%	09/07/18	09/14/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method:	DROB0905.M
Run #:	914047
Instrument:	Apollo
Sequence:	180914
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-01

APPL ID: AZ79155

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	57 ++	5.2	0.52	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	140	52	3.7	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	189 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	95.4	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB0905.M
Run #:	910053
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-01

APPL ID: AZ79155

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	4.2 ++J	5.2	0.52	mg/kg	09/07/18	09/15/18
EPA 8015B-e	MOTOR OIL	12 J	52	3.7	mg/kg	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	103	47-140		%	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	94.4	51-128		%	09/07/18	09/15/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method:	DROB0905.M
Run #:	914048
Instrument:	Apollo
Sequence:	180914
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-02

APPL ID: AZ79156

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.4 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	71 ++	5.2	0.52	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	180	52	3.7	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	238 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	95.6	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB0905.M
Run #:	910054
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-02

APPL ID: AZ79156

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.4 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	4.8 ++J	5.2	0.52	mg/kg	09/07/18	09/15/18
EPA 8015B-e	MOTOR OIL	14 J	52	3.7	mg/kg	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	102	47-140		%	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	74.9	51-128		%	09/07/18	09/15/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method: DROB0905.M
Run #: 914049
Instrument: Apollo
Sequence: 180914
Dilution Factor: 1
Initials: DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-03

APPL ID: AZ79157

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 5.6 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	69 ++	5.3	0.53	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	170	53	3.7	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	225 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	87.0	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method: DROB0905.M
Run #: 910055
Instrument: Apollo
Sequence: 180910
Dilution Factor: 1
Initials: DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-03

APPL ID: AZ79157

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 5.6 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	5.4 ++	5.3	0.53	mg/kg	09/07/18	09/15/18
EPA 8015B-e	MOTOR OIL	13 J	53	3.7	mg/kg	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	89.1	47-140		%	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	78.4	51-128		%	09/07/18	09/15/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method:	DROB0905.M
Run #:	914050
Instrument:	Apollo
Sequence:	180914
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-01

APPL ID: AZ79158

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.2 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	81 ++	5.1	0.51	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	130	51	3.6	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	200 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	94.1	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB0905.M
Run #:	910056
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-01

APPL ID: AZ79158

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.2 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	3.6 ++J	5.1	0.51	mg/kg	09/07/18	09/15/18
EPA 8015B-e	MOTOR OIL	Not detected	51	3.6	mg/kg	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	79.2	47-140		%	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	62.0	51-128		%	09/07/18	09/15/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method: DROB0905.M
Run #: 914051
Instrument: Apollo
Sequence: 180914
Dilution Factor: 1
Initials: DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-02

APPL ID: AZ79159

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Moisture is < PQL (2%). No adjustments to solid Concentrations and Limits are necessary.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	140 ++	5.0	0.50	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	210	50	3.5	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	117	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	92.7	51-128		%	09/07/18	09/11/18

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB0905.M
Run #:	910057
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-02

APPL ID: AZ79159

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Moisture is < PQL (2%). No adjustments to solid Concentrations and Limits are necessary.)							
EPA 8015B-e	DIESEL FUEL	18 ++	5.0	0.50	mg/kg	09/07/18	09/15/18
EPA 8015B-e	MOTOR OIL	7.1 J	50	3.5	mg/kg	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	108	47-140		%	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	88.3	51-128		%	09/07/18	09/15/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method: DROB0905.M
Run #: 914052
Instrument: Apollo
Sequence: 180914
Dilution Factor: 1
Initials: DPO

Printed: 09/17/18 9:10:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-03

APPL ID: AZ79160

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A-233183

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.3 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL (C10-24)	48 ++	5.1	0.51	mg/kg	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	87	51	3.6	mg/kg	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	195 #	47-140		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	91.6	51-128		%	09/07/18	09/11/18

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons.

Quant Method:	DROB0905.M
Run #:	910058
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

Printed: 09/11/18 2:20:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B ISM SOIL W/SGC

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-03

APPL ID: AZ79160

Sample Collection Date: 08/30/18

QCG: #TPHCD-180907A2-233294

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.3 Percent Moisture.)							
EPA 8015B-e	DIESEL FUEL	4.8 ++J	5.1	0.51	mg/kg	09/07/18	09/15/18
EPA 8015B-e	MOTOR OIL	4.5 J	51	3.6	mg/kg	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	106	47-140		%	09/07/18	09/15/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	85.1	51-128		%	09/07/18	09/15/18

J = Estimated value.
++(T4M) The analyst has noted that the chromatogram of this sample does not contain a petroleum hydrocarbon pattern, however the presence of a dominant peak(s) were noted.

Quant Method: DROB0905.M
Run #: 914053
Instrument: Apollo
Sequence: 180914
Dilution Factor: 1
Initials: DPO

Printed: 09/17/18 9:10:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B-E WATER

CDM Smith
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: G-11-SS-04

APPL ID: AZ79179

Sample Collection Date: 09/01/18

QCG: #TPHCD-180907A1-233184

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-e	DIESEL FUEL (C10-C24)	Not detected	50	25.0	ug/L	09/07/18	09/11/18
EPA 8015B-e	MOTOR OIL (C24-C36)	Not detected	250	106.0	ug/L	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: OCTACOSANE (S)	81.6	28-142		%	09/07/18	09/11/18
EPA 8015B-e	SURROGATE: ORTHO-TERPHENYL (	70.7	49-128		%	09/07/18	09/11/18

Quant Method:	DROB0905.M
Run #:	910066
Instrument:	Apollo
Sequence:	180910
Dilution Factor:	1
Initials:	DPO

Printed: 09/11/18 2:20:59 PM

APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-01

APPL ID: AZ79146

Sample Collection Date: 08/29/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	91.1	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	99.3	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911159
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:04 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-02

APPL ID: AZ79147

Sample Collection Date: 08/29/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	91.7	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	103	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911160
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:04 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	90.1	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	105	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911161
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:04 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-01

APPL ID: AZ79149

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	94.9	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	103	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911162
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:04 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-02

APPL ID: AZ79150

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	96.9	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	103	70-125		%	09/12/18	09/14/18

Quant Method: OCL0911.M
Run #: 0911163
Instrument: Ethel
Sequence: 180911
Dilution Factor: 1
Initials: DPO

Printed: 09/21/18 11:48:04 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-03

APPL ID: AZ79151

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	93.6	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	108	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911164
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:04 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU02-SS-01
Sample Collection Date: 08/29/18

ARF: 86766
APPL ID: AZ79152
QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	86.8	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	100.0	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911173
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:04 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-02

APPL ID: AZ79153

Sample Collection Date: 08/29/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	90.3	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	109	70-125		%	09/12/18	09/14/18

Quant Method: OCL0911.M
Run #: 0911174
Instrument: Ethel
Sequence: 180911
Dilution Factor: 1
Initials: DPO

Printed: 09/21/18 11:48:05 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Bellevue, WA 98007

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Clovis, CA 93611

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-03

APPL ID: AZ79154

Sample Collection Date: 08/29/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	92.3	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	103	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911175
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:05 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-01

APPL ID: AZ79155

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	88.6	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	99.1	70-125		%	09/12/18	09/14/18

Quant Method: OCL0911.M
Run #: 0911176
Instrument: Ethel
Sequence: 180911
Dilution Factor: 1
Initials: DPO

Printed: 09/21/18 11:48:05 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-02

APPL ID: AZ79156

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	87.2	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	99.9	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911177
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:05 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-03

APPL ID: AZ79157

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	90.8	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	101	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911178
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:05 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-01

APPL ID: AZ79158

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	88.3	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	97.2	70-125		%	09/12/18	09/14/18

Quant Method: OCL0911.M
Run #: 0911179
Instrument: Ethel
Sequence: 180911
Dilution Factor: 1
Initials: DPO

Printed: 09/21/18 11:48:05 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-02

APPL ID: AZ79159

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	86.1	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	94.9	70-125		%	09/12/18	09/14/18

Quant Method: OCL0911.M
Run #: 0911180
Instrument: Ethel
Sequence: 180911
Dilution Factor: 1
Initials: DPO

Printed: 09/21/18 11:48:05 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
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Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-03

APPL ID: AZ79160

Sample Collection Date: 08/30/18

QCG: #81ACA-180912A-233334

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
EPA 8081A	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	96.5	55-130		%	09/12/18	09/14/18
EPA 8081A	SURROGATE: TCMX (S)	108	70-125		%	09/12/18	09/14/18

Quant Method:	OCL0911.M
Run #:	0911181
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:48:05 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8081A WATER

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Bellevue, WA 98007

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: G-11-SS-04

APPL ID: AZ79179

Sample Collection Date: 09/01/18

QCG: #81ACA-180907B-233248

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8081A	4,4'-DDD	Not detected	0.050	0.0030	ug/L	09/07/18	09/12/18
EPA 8081A	4,4'-DDE	Not detected	0.050	0.0040	ug/L	09/07/18	09/12/18
EPA 8081A	4,4'-DDT	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	ALDRIN	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	ALPHA-BHC	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	ALPHA-CHLORDANE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	BETA-BHC	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	DELTA-BHC	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	DIELDRIN	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	ENDOSULFAN I	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	ENDOSULFAN II	Not detected	0.050	0.0040	ug/L	09/07/18	09/12/18
EPA 8081A	ENDOSULFAN SULFATE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	ENDRIN	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	ENDRIN ALDEHYDE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	ENDRIN KETONE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	GAMMA-BHC (LINDANE)	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	GAMMA-CHLORDANE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	HEPTACHLOR	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	METHOXYCHLOR	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
EPA 8081A	TOXAPHENE	Not detected	1.0	0.20	ug/L	09/07/18	09/12/18
EPA 8081A	SURROGATE: DECACHLOROBIPHEN	80.5	30-135		%	09/07/18	09/12/18
EPA 8081A	SURROGATE: TETRACHLORO-M-XYL	40.3	25-140		%	09/07/18	09/12/18

Quant Method:	OCL0911.M
Run #:	0911038
Instrument:	Ethel
Sequence:	180911
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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908 North Temperance Avenue
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-01

APPL ID: AZ79146

Sample Collection Date: 08/29/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	82.1	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907154
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:49:53 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-02

APPL ID: AZ79147

Sample Collection Date: 08/29/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	88.1	60-125		%	09/12/18	09/14/18

Quant Method: PCB0907.M
Run #: 0907155
Instrument: Lucy
Sequence: 180907
Dilution Factor: 1
Initials: DPO

Printed: 09/21/18 11:49:53 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Bellevue, WA 98007

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	88.5	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907156
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:49:53 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-01

APPL ID: AZ79149

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	88.6	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907157
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:49:53 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-02

APPL ID: AZ79150

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	87.3	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907158
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-03

APPL ID: AZ79151

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	90.1	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907159
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:49:54 AM

APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-01

APPL ID: AZ79152

Sample Collection Date: 08/29/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	87.3	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907162
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:49:54 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-02

APPL ID: AZ79153

Sample Collection Date: 08/29/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	93.2	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907165
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

Printed: 09/21/18 11:49:54 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-03

APPL ID: AZ79154

Sample Collection Date: 08/29/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	85.5	60-125		%	09/12/18	09/14/18

Quant Method: PCB0907.M
Run #: 0907166
Instrument: Lucy
Sequence: 180907
Dilution Factor: 1
Initials: DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-01

APPL ID: AZ79155

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	89.4	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907167
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-02

APPL ID: AZ79156

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	90.1	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907168
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-03

APPL ID: AZ79157

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	92.3	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907169
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-01

APPL ID: AZ79158

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	92.7	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907170
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Bellevue, WA 98007

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Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-02

APPL ID: AZ79159

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	91.2	60-125		%	09/12/18	09/14/18

Quant Method:	PCB0907.M
Run #:	0907171
Instrument:	Lucy
Sequence:	180907
Dilution Factor:	1
Initials:	DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8082A ISM SOIL

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Bellevue, WA 98007

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Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-03

APPL ID: AZ79160

Sample Collection Date: 08/30/18

QCG: #82ADO-180912A-233308

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
EPA 8082A	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	86.4	60-125		%	09/12/18	09/14/18

Quant Method: PCB0907.M
Run #: 0907172
Instrument: Lucy
Sequence: 180907
Dilution Factor: 1
Initials: DPO

Printed: 09/21/18 11:49:54 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8082A WATER

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: G-11-SS-04

APPL ID: AZ79179

Sample Collection Date: 09/01/18

QCG: #82ADO-180907B-233197

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082A	AROCLOR 1221	Not detected	0.50	0.080	ug/L	09/07/18	09/11/18
EPA 8082A	AROCLOR 1232	Not detected	0.50	0.120	ug/L	09/07/18	09/11/18
EPA 8082A	AROCLOR 1242	Not detected	0.50	0.120	ug/L	09/07/18	09/11/18
EPA 8082A	AROCLOR 1248	Not detected	0.50	0.090	ug/L	09/07/18	09/11/18
EPA 8082A	AROCLOR 1254	Not detected	0.50	0.120	ug/L	09/07/18	09/11/18
EPA 8082A	AROCLOR 1260	Not detected	0.50	0.090	ug/L	09/07/18	09/11/18
EPA 8082A	AROCLOR 1262	Not detected	0.50	0.200	ug/L	09/07/18	09/11/18
EPA 8082A	AROCLOR 1268	Not detected	0.50	0.200	ug/L	09/07/18	09/11/18
EPA 8082A	TOTAL PCBS	Not detected	0.50	0.200	ug/L	09/07/18	09/11/18
EPA 8082A	SURROGATE: DECACHLOROBIPHEN	68.3	40-135		%	09/07/18	09/11/18

Quant Method: PCB0907.M
Run #: 0907055
Instrument: Lucy
Sequence: 180907
Dilution Factor: 1
Initials: DPO

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APPL-F1-SC-NoMC-REG MDLs

EPA 8270C ISM SOILS

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14432 SE Eastgate Way, Ste 100
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APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-01

APPL ID: AZ79146

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.0 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.90	0.940	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.90	0.960	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.90	0.350	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.90	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.90	0.630	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.90	0.980	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.90	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.90	1.400	mg/kg	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y199
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

Printed: 09/21/18 4:34:57 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-01

APPL ID: AZ79146

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.90	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.90	0.900	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	76.5	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	75.4	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	71.0	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	70.1	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	74.9	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	69.2	30-125		%	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y199
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-02

APPL ID: AZ79147

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.9 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.90	0.940	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.90	0.960	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.90	0.350	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.90	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.90	0.620	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.90	0.980	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.90	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.90	1.400	mg/kg	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y207
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-02

APPL ID: AZ79147

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.90	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.90	0.890	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	86.6	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	77.2	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	84.3	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	83.8	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	88.0	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	72.3	30-125		%	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y207
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

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908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.1 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.80	0.990	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.80	0.910	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.80	0.910	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.80	0.930	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.80	0.990	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3′-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.80	0.950	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.80	0.350	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.80	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.80	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.80	0.620	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.80	0.970	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.80	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.80	1.400	mg/kg	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y208
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.80	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.80	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.80	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.80	0.890	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	86.4	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	81.3	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	77.0	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	78.8	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	83.2	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	74.4	30-125		%	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y208
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-01

APPL ID: AZ79149

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.90	0.940	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.90	0.960	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.90	0.350	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.90	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.90	0.630	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.90	0.980	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.90	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.90	1.400	mg/kg	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y209
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-01

APPL ID: AZ79149

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.90	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.90	0.900	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	84.7	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	81.3	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	90.0	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	84.1	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	95.7	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	74.5	30-125		%	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y209
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-02

APPL ID: AZ79150

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.90	0.950	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3´-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.90	0.970	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.90	0.360	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.90	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.90	0.630	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.90	0.990	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.90	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.90	1.400	mg/kg	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y212
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-02

APPL ID: AZ79150

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.90	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.90	0.900	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	69.9	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	69.9	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	81.1	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	75.3	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	85.9	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	62.9	30-125		%	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y212
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-03

APPL ID: AZ79151

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.90	0.950	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.90	0.970	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.90	0.360	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.90	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.90	0.630	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.90	0.990	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.90	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.90	1.400	mg/kg	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y213
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-03

APPL ID: AZ79151

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.90	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.90	0.900	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	74.4	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	72.4	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	73.3	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	71.4	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	77.3	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	64.9	30-125		%	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y213
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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14432 SE Eastgate Way, Ste 100
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908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-01

APPL ID: AZ79152

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.3 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	14.00	2.000	mg/kg	09/07/18	09/12/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/12/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/12/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	14.00	2.000	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	14.00	2.500	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	14.00	2.000	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	14.00	2.100	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	14.00	1.800	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	28.00	2.300	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	28.00	2.700	mg/kg	09/07/18	09/12/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	28.00	2.500	mg/kg	09/07/18	09/12/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	14.00	2.200	mg/kg	09/07/18	09/12/18
EPA 8270C	2-CHLOROPHENOL	Not detected	14.00	1.800	mg/kg	09/07/18	09/12/18
EPA 8270C	2-METHYLPHENOL	Not detected	14.00	1.900	mg/kg	09/07/18	09/12/18
EPA 8270C	2-NITROANILINE	Not detected	28.00	2.600	mg/kg	09/07/18	09/12/18
EPA 8270C	2-NITROPHENOL	Not detected	14.00	2.000	mg/kg	09/07/18	09/12/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	28.00	2.300	mg/kg	09/07/18	09/12/18
EPA 8270C	3-NITROANILINE	Not detected	28.00	2.500	mg/kg	09/07/18	09/12/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	14.00	1.900	mg/kg	09/07/18	09/12/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	28.00	2.300	mg/kg	09/07/18	09/12/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	14.00	2.400	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	14.00	2.500	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLOROANILINE	Not detected	14.00	0.710	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	14.00	2.500	mg/kg	09/07/18	09/12/18
EPA 8270C	4-NITROANILINE	Not detected	14.00	3.100	mg/kg	09/07/18	09/12/18
EPA 8270C	4-NITROPHENOL	Not detected	28.00	2.500	mg/kg	09/07/18	09/12/18
EPA 8270C	BENZOIC ACID	Not detected	14.00	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	BENZYL ALCOHOL	Not detected	14.00	2.300	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	14.00	2.100	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	14.00	2.100	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	14.00	2.000	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	28.00	2.600	mg/kg	09/07/18	09/12/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	14.00	2.300	mg/kg	09/07/18	09/12/18
EPA 8270C	CARBAZOLE	Not detected	14.00	3.400	mg/kg	09/07/18	09/12/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	14.00	2.800	mg/kg	09/07/18	09/12/18

Quant Method: Y0829NC.M
Run #: 0829Y228
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 40
Initials: AAB

Printed: 09/21/18 4:34:57 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-01

APPL ID: AZ79152

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	14.00	2.400	mg/kg	09/07/18	09/12/18
EPA 8270C	DIBENZOFURAN	Not detected	28.00	2.400	mg/kg	09/07/18	09/12/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	14.00	2.600	mg/kg	09/07/18	09/12/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	14.00	2.600	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	28.00	2.500	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	14.00	2.200	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROETHANE	Not detected	14.00	2.100	mg/kg	09/07/18	09/12/18
EPA 8270C	ISOPHORONE	Not detected	14.00	2.400	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	14.00	2.300	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	14.00	3.600	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	14.00	2.100	mg/kg	09/07/18	09/12/18
EPA 8270C	NITROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/12/18
EPA 8270C	PHENOL	Not detected	14.00	1.800	mg/kg	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	67.6	35-125		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	64.4	45-105		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	66.2	35-105		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	64.6	35-100		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: PHENOL (S)	68.2	40-100		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	58.5	30-125		%	09/07/18	09/12/18

Quant Method:	Y0829NC.M
Run #:	0829Y228
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	40
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
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Bellevue, WA 98007

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908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-02

APPL ID: AZ79153

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.6 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	14.00	2.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	14.00	2.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	14.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	14.00	2.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	14.00	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	27.00	2.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	27.00	2.600	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	27.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	14.00	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	14.00	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	27.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	14.00	2.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3′-DICHLOROBENZIDINE	Not detected	27.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	27.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	14.00	1.900	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	27.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	14.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	14.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	14.00	0.700	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	14.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	14.00	3.000	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	27.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	14.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	14.00	1.900	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	27.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	14.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	14.00	3.400	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	14.00	2.700	mg/kg	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y215
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	40
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
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Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-02

APPL ID: AZ79153

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	14.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	27.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	14.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	14.00	2.600	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	27.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	14.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	14.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	14.00	3.600	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	14.00	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	65.5	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	64.7	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	59.2	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	56.9	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	63.5	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	58.0	30-125		%	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y215
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 40
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-03

APPL ID: AZ79154

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.2 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.80	0.990	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.80	0.910	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.80	0.910	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.80	0.930	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.80	0.990	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3´-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.80	0.950	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.80	0.350	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.80	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.80	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.80	0.620	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.80	0.970	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.80	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.80	1.400	mg/kg	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y216
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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14432 SE Eastgate Way, Ste 100
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-03

APPL ID: AZ79154

Sample Collection Date: 08/29/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.80	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.80	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.80	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.80	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.80	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.80	0.890	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	75.3	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	68.8	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	74.8	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	69.7	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	78.2	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	62.5	30-125		%	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y216
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-01

APPL ID: AZ79155

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.90	0.940	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.90	0.960	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.90	0.350	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.90	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.90	0.630	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.90	0.980	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.90	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.90	1.400	mg/kg	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y217
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
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APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-01

APPL ID: AZ79155

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.90	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.90	0.900	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	62.9	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	58.4	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	55.5	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	55.5	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	59.5	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	54.4	30-125		%	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y217
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-02

APPL ID: AZ79156

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.4 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.90	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.90	0.940	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3′-DICHLOROBENZIDINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.90	0.960	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.90	0.360	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.90	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.90	0.630	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.90	0.980	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.90	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.90	1.400	mg/kg	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y218
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-02

APPL ID: AZ79156

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.90	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.90	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.90	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.90	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.90	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.90	0.900	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	77.2	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	70.5	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	68.2	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	66.3	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	73.1	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	65.1	30-125		%	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y218
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

Printed: 09/21/18 4:34:58 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-03

APPL ID: AZ79157

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 5.6 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	14.00	2.200	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	14.00	2.200	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	14.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	14.00	2.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	14.00	2.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	14.00	1.900	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	28.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	28.00	2.700	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	28.00	2.600	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	14.00	2.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	14.00	1.900	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	14.00	1.900	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	28.00	2.600	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	14.00	2.000	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3′-DICHLOROBENZIDINE	Not detected	28.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	28.00	2.600	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	14.00	1.900	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	28.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	14.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	14.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	14.00	0.720	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	14.00	2.600	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	14.00	3.100	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	28.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	14.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	14.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	14.00	2.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	28.00	2.600	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	14.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	14.00	3.500	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	14.00	2.800	mg/kg	09/07/18	09/11/18

Quant Method:	Y0829NC.M
Run #:	0829Y219
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	40
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-03

APPL ID: AZ79157

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	14.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	28.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	14.00	2.600	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	14.00	2.700	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	28.00	2.500	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	14.00	2.200	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	14.00	2.400	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	14.00	2.300	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	14.00	3.700	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	14.00	2.200	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	14.00	2.100	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	14.00	1.800	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	73.8	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	74.0	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	65.5	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	72.9	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	65.1	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	64.9	30-125		%	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y219
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 40
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-01

APPL ID: AZ79158

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.2 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.70	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.70	0.980	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.70	0.900	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	13.00	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	13.00	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	13.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.70	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.70	0.900	mg/kg	09/07/18	09/12/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.70	0.920	mg/kg	09/07/18	09/12/18
EPA 8270C	2-NITROANILINE	Not detected	13.00	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	2-NITROPHENOL	Not detected	6.70	0.980	mg/kg	09/07/18	09/12/18
EPA 8270C	3,3′-DICHLOROBENZIDINE	Not detected	13.00	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	3-NITROANILINE	Not detected	13.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.70	0.940	mg/kg	09/07/18	09/12/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	13.00	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.70	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.70	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.70	0.350	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.70	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	4-NITROANILINE	Not detected	6.70	1.500	mg/kg	09/07/18	09/12/18
EPA 8270C	4-NITROPHENOL	Not detected	13.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	BENZOIC ACID	Not detected	6.70	0.610	mg/kg	09/07/18	09/12/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.70	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.70	0.960	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	13.00	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.70	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	CARBAZOLE	Not detected	6.70	1.700	mg/kg	09/07/18	09/12/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.70	1.300	mg/kg	09/07/18	09/12/18

Quant Method: Y0829NC.M
Run #: 0829Y229
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-01

APPL ID: AZ79158

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.70	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	DIBENZOFURAN	Not detected	13.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.70	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.70	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	13.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.70	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	ISOPHORONE	Not detected	6.70	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.70	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.70	1.800	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	NITROBENZENE	Not detected	6.70	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	PHENOL	Not detected	6.70	0.880	mg/kg	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	84.5	35-125		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	77.6	45-105		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	88.5	35-105		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	82.8	35-100		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: PHENOL (S)	93.0	40-100		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	70.6	30-125		%	09/07/18	09/12/18

Quant Method:	Y0829NC.M
Run #:	0829Y229
Instrument:	Yoda
Sequence:	Y180829
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

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908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-02

APPL ID: AZ79159

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Moisture is < PQL (2%). No adjustments to solid Concentrations and Limits are necessary.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.60	0.980	mg/kg	09/07/18	09/11/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.60	0.980	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.60	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.60	0.960	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.60	0.880	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	13.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	13.00	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	13.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.60	0.880	mg/kg	09/07/18	09/11/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.60	0.900	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROANILINE	Not detected	13.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	2-NITROPHENOL	Not detected	6.60	0.960	mg/kg	09/07/18	09/11/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	13.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	3-NITROANILINE	Not detected	13.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.60	0.920	mg/kg	09/07/18	09/11/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	13.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.60	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.60	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.60	0.340	mg/kg	09/07/18	09/11/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.60	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROANILINE	Not detected	6.60	1.500	mg/kg	09/07/18	09/11/18
EPA 8270C	4-NITROPHENOL	Not detected	13.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZOIC ACID	Not detected	6.60	0.600	mg/kg	09/07/18	09/11/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.60	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.60	0.940	mg/kg	09/07/18	09/11/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	13.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.60	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	CARBAZOLE	Not detected	6.60	1.600	mg/kg	09/07/18	09/11/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.60	1.300	mg/kg	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y221
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
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908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-02

APPL ID: AZ79159

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.60	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIBENZOFURAN	Not detected	13.00	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.60	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.60	1.300	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	13.00	1.200	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	ISOPHORONE	Not detected	6.60	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.60	1.100	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.60	1.700	mg/kg	09/07/18	09/11/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	NITROBENZENE	Not detected	6.60	1.000	mg/kg	09/07/18	09/11/18
EPA 8270C	PHENOL	Not detected	6.60	0.860	mg/kg	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	87.1	35-125		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	75.5	45-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	74.5	35-105		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	70.0	35-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: PHENOL (S)	79.4	40-100		%	09/07/18	09/11/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	71.3	30-125		%	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y221
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

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14432 SE Eastgate Way, Ste 100
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-03

APPL ID: AZ79160

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.3 Percent Moisture.)							
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	6.80	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	6.80	0.980	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	6.80	0.900	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	14.00	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	14.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	2-CHLOROPHENOL	Not detected	6.80	0.900	mg/kg	09/07/18	09/12/18
EPA 8270C	2-METHYLPHENOL	Not detected	6.80	0.920	mg/kg	09/07/18	09/12/18
EPA 8270C	2-NITROANILINE	Not detected	14.00	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	2-NITROPHENOL	Not detected	6.80	0.980	mg/kg	09/07/18	09/12/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	14.00	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	3-NITROANILINE	Not detected	14.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	6.80	0.940	mg/kg	09/07/18	09/12/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	14.00	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	6.80	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	6.80	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLOROANILINE	Not detected	6.80	0.350	mg/kg	09/07/18	09/12/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	6.80	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	4-NITROANILINE	Not detected	6.80	1.500	mg/kg	09/07/18	09/12/18
EPA 8270C	4-NITROPHENOL	Not detected	14.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	BENZOIC ACID	Not detected	6.80	0.610	mg/kg	09/07/18	09/12/18
EPA 8270C	BENZYL ALCOHOL	Not detected	6.80	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	6.80	0.960	mg/kg	09/07/18	09/12/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	14.00	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	6.80	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	CARBAZOLE	Not detected	6.80	1.700	mg/kg	09/07/18	09/12/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	6.80	1.400	mg/kg	09/07/18	09/12/18

Quant Method: Y0829NC.M
Run #: 0829Y230
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

Printed: 09/21/18 4:34:58 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C ISM SOILS

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-03

APPL ID: AZ79160

Sample Collection Date: 08/30/18

QCG: #87CCA-180907A-233202

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	6.80	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	DIBENZOFURAN	Not detected	14.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	6.80	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	DIMETHYL PHTHALATE	Not detected	6.80	1.300	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	14.00	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	6.80	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	HEXACHLOROETHANE	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	ISOPHORONE	Not detected	6.80	1.200	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	6.80	1.100	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	6.80	1.800	mg/kg	09/07/18	09/12/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	NITROBENZENE	Not detected	6.80	1.000	mg/kg	09/07/18	09/12/18
EPA 8270C	PHENOL	Not detected	6.80	0.880	mg/kg	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	65.9	35-125		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	62.6	45-105		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	83.1	35-105		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	73.4	35-100		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: PHENOL (S)	87.6	40-100		%	09/07/18	09/12/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	57.2	30-125		%	09/07/18	09/12/18

Quant Method: Y0829NC.M
Run #: 0829Y230
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 20
Initials: AAB

Printed: 09/21/18 4:34:58 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C WATER

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: G-11-SS-04

APPL ID: AZ79179

Sample Collection Date: 09/01/18

QCG: #87DOD-180907A-233145

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	1,2,4-TRICHLOROBENZENE	Not detected	10.0	1.30	ug/L	09/07/18	09/10/18
EPA 8270C	1,2-DICHLOROBENZENE	Not detected	10.0	1.10	ug/L	09/07/18	09/10/18
EPA 8270C	1,3-DICHLOROBENZENE	Not detected	10.0	1.00	ug/L	09/07/18	09/10/18
EPA 8270C	1,4-DICHLOROBENZENE	Not detected	10.0	1.00	ug/L	09/07/18	09/10/18
EPA 8270C	2,4,5-TRICHLOROPHENOL	Not detected	10.0	2.30	ug/L	09/07/18	09/10/18
EPA 8270C	2,4,6-TRICHLOROPHENOL	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	2,4-DICHLOROPHENOL	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	2,4-DIMETHYLPHENOL	Not detected	10.0	2.40	ug/L	09/07/18	09/10/18
EPA 8270C	2,4-DINITROPHENOL	Not detected	20.0	1.80	ug/L	09/07/18	09/10/18
EPA 8270C	2,4-DINITROTOLUENE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	2,6-DINITROTOLUENE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	2-CHLORONAPHTHALENE	Not detected	10.0	2.00	ug/L	09/07/18	09/10/18
EPA 8270C	2-CHLOROPHENOL	Not detected	10.0	2.00	ug/L	09/07/18	09/10/18
EPA 8270C	2-METHYLNAPHTHALENE	Not detected	10.0	1.80	ug/L	09/07/18	09/10/18
EPA 8270C	2-METHYLPHENOL	Not detected	10.0	1.90	ug/L	09/07/18	09/10/18
EPA 8270C	2-NITROANILINE	Not detected	20.0	2.40	ug/L	09/07/18	09/10/18
EPA 8270C	2-NITROPHENOL	Not detected	10.0	2.10	ug/L	09/07/18	09/10/18
EPA 8270C	3,3'-DICHLOROBENZIDINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	3-NITROANILINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	3/4-METHYLPHENOL	Not detected	10.0	1.70	ug/L	09/07/18	09/10/18
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	Not detected	20.0	2.20	ug/L	09/07/18	09/10/18
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	4-CHLORO-3-METHYLPHENOL	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	4-CHLOROANILINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	4-NITROANILINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	4-NITROPHENOL	Not detected	20.0	0.80	ug/L	09/07/18	09/10/18
EPA 8270C	ACENAPHTHENE	Not detected	10.0	2.30	ug/L	09/07/18	09/10/18
EPA 8270C	ACENAPHTHYLENE	Not detected	10.0	2.30	ug/L	09/07/18	09/10/18
EPA 8270C	ANTHRACENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	BENZ (A) ANTHRACENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	BENZO (A) PYRENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	BENZO (B) FLUORANTHENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	BENZO (G,H,I) PERYLENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	BENZO (K) FLUORANTHENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18

J = Estimated value.

Quant Method: Y0829NC.M
Run #: 0829Y181
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 1
Initials: AAB

Printed: 09/21/18 10:56:38 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8270C WATER

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: G-11-SS-04

APPL ID: AZ79179

Sample Collection Date: 09/01/18

QCG: #87DOD-180907A-233145

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8270C	BENZOIC ACID	Not detected	10.0	1.00	ug/L	09/07/18	09/10/18
EPA 8270C	BENZYL ALCOHOL	7.9 J	10.0	2.00	ug/L	09/07/18	09/10/18
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	Not detected	10.0	2.40	ug/L	09/07/18	09/10/18
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	Not detected	10.0	2.20	ug/L	09/07/18	09/10/18
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	10.0	2.00	ug/L	09/07/18	09/10/18
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	BUTYL BENZYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	CARBAZOLE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	CHRYSENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	DI-N-BUTYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	DI-N-OCTYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	DIBENZ (A,H) ANTHRACENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	DIBENZOFURAN	Not detected	20.0	2.40	ug/L	09/07/18	09/10/18
EPA 8270C	DIETHYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	DIMETHYL PHTHALATE	2.5 J	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	FLUORANTHENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	FLUORENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	HEXACHLOROBENZENE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	HEXACHLOROBUTADIENE	Not detected	10.0	0.90	ug/L	09/07/18	09/10/18
EPA 8270C	HEXACHLOROETHANE	Not detected	10.0	0.80	ug/L	09/07/18	09/10/18
EPA 8270C	INDENO (1,2,3-CD) PYRENE	Not detected	10.0	2.40	ug/L	09/07/18	09/10/18
EPA 8270C	ISOPHORONE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	Not detected	10.0	2.20	ug/L	09/07/18	09/10/18
EPA 8270C	N-NITROSODIMETHYLAMINE	Not detected	10.0	1.70	ug/L	09/07/18	09/10/18
EPA 8270C	N-NITROSODIPHENYLAMINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	NAPHTHALENE	Not detected	10.0	1.80	ug/L	09/07/18	09/10/18
EPA 8270C	NITROBENZENE	Not detected	10.0	2.10	ug/L	09/07/18	09/10/18
EPA 8270C	PENTACHLOROPHENOL	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	PHENANTHRENE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	PHENOL	Not detected	10.0	1.00	ug/L	09/07/18	09/10/18
EPA 8270C	PYRENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
EPA 8270C	SURROGATE: 2,4,6-TRIBROMOPHEN	74.9	40-125		%	09/07/18	09/10/18
EPA 8270C	SURROGATE: 2-FLUORBIPHENYL (S)	57.8	50-110		%	09/07/18	09/10/18
EPA 8270C	SURROGATE: 2-FLUOROPHENOL (S)	52.4	20-110		%	09/07/18	09/10/18
EPA 8270C	SURROGATE: NITROBENZENE-D5 (S	71.1	40-110		%	09/07/18	09/10/18
EPA 8270C	SURROGATE: PHENOL (S)	37.1	10-115		%	09/07/18	09/10/18
EPA 8270C	SURROGATE: TERPHENYL-D14 (S)	60.6	50-135		%	09/07/18	09/10/18

J = Estimated value.

Quant Method: Y0829NC.M
Run #: 0829Y181
Instrument: Yoda
Sequence: Y180829
Dilution Factor: 1
Initials: AAB

Printed: 09/21/18 10:56:39 AM
APPL-F1-SC-NoMC-REG MDLs

EPA 8270C SIM ISM SOIL

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Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-01

APPL ID: AZ79146

Sample Collection Date: 08/29/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.0 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0270	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.210	0.1700	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L019
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	20
Initials:	AAB

Printed: 09/21/18 4:46:25 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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14432 SE Eastgate Way, Ste 100
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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-02

APPL ID: AZ79147

Sample Collection Date: 08/29/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.9 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0270	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.210	0.1700	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L020
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

QCG: #SIMCA-180907A1-233394

(Solid Concentrations and Limits have been adjusted to reflect 3.1 Percent Moisture.)

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0270	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.210	0.1700	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L021
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-01

APPL ID: AZ79149

Sample Collection Date: 08/30/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0270	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.210	0.1700	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L022
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU01-SB-02
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79150
QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.110	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.110	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.110	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.110	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.110	0.0270	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.110	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.110	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.110	0.0250	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.110	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.210	0.1700	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.110	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.110	0.0250	mg/kg	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L025
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-03

APPL ID: AZ79151

Sample Collection Date: 08/30/18

QCG: #SIMCA-180907A1-233394

(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.110	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.110	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.110	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.110	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.110	0.0270	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.110	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.110	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.110	0.0250	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.110	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.110	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.210	0.1700	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.110	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.110	0.0250	mg/kg	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L026
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-01

APPL ID: AZ79152

Sample Collection Date: 08/29/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.3 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.210	0.0420	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.210	0.0420	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.210	0.0330	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.210	0.0460	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.210	0.0540	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.210	0.0420	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.210	0.0330	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.210	0.0500	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.210	0.0420	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.420	0.3300	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.210	0.0460	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.210	0.0500	mg/kg	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L027
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	40
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-02

APPL ID: AZ79153

Sample Collection Date: 08/29/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.6 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.210	0.0410	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.210	0.0370	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.210	0.0410	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.210	0.0370	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.210	0.0330	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.210	0.0370	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.210	0.0370	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.210	0.0450	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.210	0.0530	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.210	0.0410	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.210	0.0330	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.210	0.0370	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.210	0.0490	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.210	0.0410	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.210	0.0370	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.210	0.0370	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.410	0.3300	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.210	0.0450	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.210	0.0490	mg/kg	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L028
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	40
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-03

APPL ID: AZ79154

Sample Collection Date: 08/29/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.2 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	0.023 J	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0270	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	0.54	0.210	0.1700	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18

J = Estimated value.

Quant Method:	L0917PCP.M
Run #:	0917L029
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-01

APPL ID: AZ79155

Sample Collection Date: 08/30/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0270	mg/kg	09/07/18	09/17/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/17/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/17/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.210	0.1700	mg/kg	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/17/18

Quant Method: L0917PCP.M
Run #: 0917L030
Instrument: Linus
Sequence: L180917P
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-02

APPL ID: AZ79156

Sample Collection Date: 08/30/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.4 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/19/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/19/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/19/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/19/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0170	mg/kg	09/07/18	09/19/18
8270C-LL	BENZO(A)ANTHRACENE	0.072 J	0.100	0.0190	mg/kg	09/07/18	09/19/18
8270C-LL	BENZO(A)PYRENE	0.059 J	0.100	0.0190	mg/kg	09/07/18	09/19/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/19/18
8270C-LL	BENZO(GHI)PERYLENE	0.040 J	0.100	0.0270	mg/kg	09/07/18	09/19/18
8270C-LL	BENZO(K)FLUORANTHENE	0.036 J	0.100	0.0210	mg/kg	09/07/18	09/19/18
8270C-LL	CHRYSENE	0.086 J	0.100	0.0170	mg/kg	09/07/18	09/19/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/19/18
8270C-LL	FLUORANTHENE	0.095 J	0.100	0.0250	mg/kg	09/07/18	09/19/18
8270C-LL	FLUORENE	Not detected	0.100	0.0210	mg/kg	09/07/18	09/19/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	0.19	0.100	0.0190	mg/kg	09/07/18	09/19/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0190	mg/kg	09/07/18	09/19/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.210	0.1700	mg/kg	09/07/18	09/19/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/19/18
8270C-LL	PYRENE	0.085 J	0.100	0.0250	mg/kg	09/07/18	09/19/18

J = Estimated value.

Quant Method:	L0918PCP.M
Run #:	0918L030
Instrument:	Linus
Sequence:	L180918P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-03

APPL ID: AZ79157

Sample Collection Date: 08/30/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 5.6 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.210	0.0420	mg/kg	09/07/18	09/18/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/18/18
8270C-LL	ACENAPHTHENE	Not detected	0.210	0.0420	mg/kg	09/07/18	09/18/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/18/18
8270C-LL	ANTHRACENE	Not detected	0.210	0.0340	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.210	0.0470	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.210	0.0550	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.210	0.0420	mg/kg	09/07/18	09/18/18
8270C-LL	CHRYSENE	Not detected	0.210	0.0340	mg/kg	09/07/18	09/18/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/18/18
8270C-LL	FLUORANTHENE	Not detected	0.210	0.0510	mg/kg	09/07/18	09/18/18
8270C-LL	FLUORENE	Not detected	0.210	0.0420	mg/kg	09/07/18	09/18/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/18/18
8270C-LL	NAPHTHALENE	Not detected	0.210	0.0380	mg/kg	09/07/18	09/18/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.420	0.3400	mg/kg	09/07/18	09/18/18
8270C-LL	PHENANTHRENE	Not detected	0.210	0.0470	mg/kg	09/07/18	09/18/18
8270C-LL	PYRENE	Not detected	0.210	0.0510	mg/kg	09/07/18	09/18/18

Quant Method:	L0918PCP.M
Run #:	0918L019
Instrument:	Linus
Sequence:	L180918P
Dilution Factor:	40
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-01

APPL ID: AZ79158

Sample Collection Date: 08/30/18

QCG: #SIMCA-180907A1-233394

(Solid Concentrations and Limits have been adjusted to reflect 2.2 Percent Moisture.)

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0160	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0220	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0270	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0160	mg/kg	09/07/18	09/18/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/18/18
8270C-LL	FLUORENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.200	0.1600	mg/kg	09/07/18	09/18/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0220	mg/kg	09/07/18	09/18/18
8270C-LL	PYRENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/18/18

Quant Method:	L0918PCP.M
Run #:	0918L020
Instrument:	Linus
Sequence:	L180918P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-02

APPL ID: AZ79159

Sample Collection Date: 08/30/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Moisture is < PQL (2%). No adjustments to solid Concentrations and Limits are necessary.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0160	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0220	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0260	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0160	mg/kg	09/07/18	09/18/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0240	mg/kg	09/07/18	09/18/18
8270C-LL	FLUORENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.200	0.1600	mg/kg	09/07/18	09/18/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0220	mg/kg	09/07/18	09/18/18
8270C-LL	PYRENE	Not detected	0.100	0.0240	mg/kg	09/07/18	09/18/18

Quant Method: L0918PCP.M
Run #: 0918L021
Instrument: Linus
Sequence: L180918P
Dilution Factor: 20
Initials: AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM ISM SOIL

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-03

APPL ID: AZ79160

Sample Collection Date: 08/30/18

QCG: #SIMCA-180907A1-233394

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.3 Percent Moisture.)							
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	2-METHYLNAPHTHALENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	ACENAPHTHENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	ANTHRACENE	Not detected	0.100	0.0160	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(A)ANTHRACENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(A)PYRENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(B)FLUORANTHENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(GHI)PERYLENE	Not detected	0.100	0.0270	mg/kg	09/07/18	09/18/18
8270C-LL	BENZO(K)FLUORANTHENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	CHRYSENE	Not detected	0.100	0.0160	mg/kg	09/07/18	09/18/18
8270C-LL	DIBENZ(A,H)ANTHRACENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	FLUORANTHENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/18/18
8270C-LL	FLUORENE	Not detected	0.100	0.0200	mg/kg	09/07/18	09/18/18
8270C-LL	INDENO(1,2,3-CD)PYRENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	NAPHTHALENE	Not detected	0.100	0.0180	mg/kg	09/07/18	09/18/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.200	0.1600	mg/kg	09/07/18	09/18/18
8270C-LL	PHENANTHRENE	Not detected	0.100	0.0230	mg/kg	09/07/18	09/18/18
8270C-LL	PYRENE	Not detected	0.100	0.0250	mg/kg	09/07/18	09/18/18

Quant Method:	L0918PCP.M
Run #:	0918L022
Instrument:	Linus
Sequence:	L180918P
Dilution Factor:	20
Initials:	AAB

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8270C SIM WATER

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: G-11-SS-04

APPL ID: AZ79179

Sample Collection Date: 09/01/18

QCG: #SIMCA-180907A-233357

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8270C-LL	1-METHYLNAPHTHALENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	2-METHYLNAPHTHALENE	1.4	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	ACENAPHTHENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
8270C-LL	ACENAPHTHYLENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
8270C-LL	ANTHRACENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
8270C-LL	BENZ (A) ANTHRACENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	BENZO (A) PYRENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	BENZO (B) FLUORANTHENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
8270C-LL	BENZO (G,H,I) PERYLENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	BENZO (K) FLUORANTHENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
8270C-LL	CHRYSENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
8270C-LL	DIBENZ (A,H) ANTHRACENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
8270C-LL	FLUORANTHENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	FLUORENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	INDENO (1,2,3-CD) PYRENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
8270C-LL	NAPHTHALENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	PENTACHLOROPHENOL	Not detected	0.2	0.10	ug/L	09/07/18	09/17/18
8270C-LL	PHENANTHRENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
8270C-LL	PYRENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18

Quant Method:	L0917PCP.M
Run #:	0917L015
Instrument:	Linus
Sequence:	L180917P
Dilution Factor:	1
Initials:	AAB

Printed: 09/21/18 9:44:43 AM

APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

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Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-01

APPL ID: AZ79146

Sample Collection Date: 08/29/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.50	0.2	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ARSENIC (AS)	1.3	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BARIUM (BA)	20.2	0.25	0.070	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.20 J	1.0	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CADMIUM (CD)	0.10	0.1	0.03	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CHROMIUM (CR)	2.5	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COBALT (CO)	1.8	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COPPER (CU)	14.5	2.5	0.04	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	LEAD (PB)	8.7	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	9.2	0.2	0.01	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	NICKEL (NI)	10.0	0.35	0.102	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SELENIUM (SE)	0.079 J	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SILVER (AG)	0.053 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	THALLIUM (TL)	0.040 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	VANADIUM (V)	15.8	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ZINC (ZN)	31.4	2.5	0.75	mg/Kg	1	09/13/18	09/14/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU01-SS-01
Sample Collection Date: 08/29/18

ARF: 86766
APPL ID: AZ79146

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.0 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU01-SS-02
Sample Collection Date: 08/29/18

ARF: 86766
APPL ID: AZ79147

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.57	0.2	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ARSENIC (AS)	1.4	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BARIUM (BA)	20.8	0.25	0.070	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.21 J	1.0	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CADMIUM (CD)	0.088 J	0.1	0.03	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CHROMIUM (CR)	3.1	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COBALT (CO)	1.7	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COPPER (CU)	17.4	2.5	0.04	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	LEAD (PB)	11.5	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	10.8	0.2	0.01	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	NICKEL (NI)	23.3	0.35	0.102	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SELENIUM (SE)	0.078 J	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SILVER (AG)	0.093 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	THALLIUM (TL)	0.047 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	VANADIUM (V)	17.8	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ZINC (ZN)	31.8	2.5	0.75	mg/Kg	1	09/13/18	09/14/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU01-SS-02
Sample Collection Date: 08/29/18

ARF: 86766
APPL ID: AZ79147

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.9 Percent Moisture.)								
7471A/7471A	MERCURY	0.021 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	1.6	0.2	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ARSENIC (AS)	1.4	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BARIUM (BA)	24.3	0.25	0.070	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.21 J	1.0	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CADMIUM (CD)	0.18	0.1	0.03	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CHROMIUM (CR)	3.7	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COBALT (CO)	1.8	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COPPER (CU)	33.3	2.5	0.04	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	LEAD (PB)	19.1	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	10.5	0.2	0.01	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	NICKEL (NI)	11.2	0.35	0.102	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SELENIUM (SE)	0.079 J	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SILVER (AG)	0.11	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	THALLIUM (TL)	0.043 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	VANADIUM (V)	17.8	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ZINC (ZN)	50.2	2.5	0.75	mg/Kg	1	09/13/18	09/14/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SS-03

APPL ID: AZ79148

Sample Collection Date: 08/29/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.1 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU01-SB-01
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79149

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.46	0.2	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ARSENIC (AS)	2.1	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BARIUM (BA)	18.5	0.25	0.070	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.20 J	1.0	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CADMIUM (CD)	0.12	0.1	0.03	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CHROMIUM (CR)	4.3	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COBALT (CO)	2.0	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COPPER (CU)	24.8	2.5	0.04	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	LEAD (PB)	16.5	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	12.4	0.2	0.01	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	NICKEL (NI)	3.4	0.35	0.102	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SELENIUM (SE)	0.089 J	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SILVER (AG)	0.076 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	THALLIUM (TL)	0.042 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	VANADIUM (V)	19.7	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ZINC (ZN)	39.1	2.5	0.75	mg/Kg	1	09/13/18	09/14/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-01

APPL ID: AZ79149

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-02

APPL ID: AZ79150

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	1.0	0.2	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ARSENIC (AS)	1.8	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BARIUM (BA)	17.3	0.25	0.070	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.22 J	1.0	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CADMIUM (CD)	0.15	0.1	0.03	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CHROMIUM (CR)	4.3	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COBALT (CO)	2.0	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COPPER (CU)	23.0	2.5	0.04	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	LEAD (PB)	17.7	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	13.3	0.2	0.01	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	NICKEL (NI)	3.0	0.35	0.102	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SELENIUM (SE)	0.12 J	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SILVER (AG)	0.11	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	THALLIUM (TL)	0.069 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	VANADIUM (V)	20.9	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ZINC (ZN)	41.6	2.5	0.75	mg/Kg	1	09/13/18	09/14/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-02

APPL ID: AZ79150

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU01-SB-03
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79151

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	1.8	0.2	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ARSENIC (AS)	1.9	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BARIUM (BA)	21.1	0.25	0.070	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.20 J	1.0	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CADMIUM (CD)	0.17	0.1	0.03	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	CHROMIUM (CR)	4.7	0.5	0.07	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COBALT (CO)	2.0	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	COPPER (CU)	56.8	2.5	0.04	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	LEAD (PB)	29.4	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	13.9	0.2	0.01	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	NICKEL (NI)	4.1	0.35	0.102	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SELENIUM (SE)	0.11 J	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	SILVER (AG)	0.10	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	THALLIUM (TL)	0.057 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	VANADIUM (V)	20.0	0.5	0.05	mg/Kg	1	09/13/18	09/14/18
6020A/3050B	ZINC (ZN)	56.2	2.5	0.75	mg/Kg	1	09/13/18	09/14/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU01-SB-03

APPL ID: AZ79151

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU02-SS-01
Sample Collection Date: 08/29/18

ARF: 86766
APPL ID: AZ79152

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	1.0	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.3	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	26.1	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.24 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.15	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	3.5	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	2.0	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	32.2	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	23.0	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	15.9	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	14.2	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	0.061 J	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.12	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.065 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	19.0	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	58.3	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-01

APPL ID: AZ79152

Sample Collection Date: 08/29/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.3 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU02-SS-02
Sample Collection Date: 08/29/18

ARF: 86766
APPL ID: AZ79153

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.29	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.00	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	18.1	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.13 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.12	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	2.3	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	1.8	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	10.8	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	18.0	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	4.7	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	7.3	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	Not detected	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.075 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.060 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	13.4	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	29.2	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-02

APPL ID: AZ79153

Sample Collection Date: 08/29/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.6 Percent Moisture.)								
7471A/7471A	MERCURY	0.021 J	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

J = Estimated value.

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU02-SS-03
Sample Collection Date: 08/29/18

ARF: 86766
APPL ID: AZ79154

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.19 J	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.3	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	24.1	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.26 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.073 J	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	2.9	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	2.5	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	8.7	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	5.2	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	8.3	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	9.5	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	0.074 J	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.041 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.082 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	18.7	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	24.0	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU02-SS-03

APPL ID: AZ79154

Sample Collection Date: 08/29/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.2 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU03-SS-01
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79155

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.34	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.3	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	17.7	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.26 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.064 J	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	2.6	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	1.7	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	18.1	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	5.4	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	25.4	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	9.1	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	0.072 J	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.070 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.059 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	20.9	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	27.7	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-01

APPL ID: AZ79155

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.2 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU03-SS-02
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79156

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.20	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.2	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	18.9	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.26 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.056 J	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	2.7	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	1.7	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	14.1	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	4.9	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	20.9	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	10.5	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	0.097 J	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.077 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.067 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	18.8	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	24.0	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU03-SS-02

APPL ID: AZ79156

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.4 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU03-SS-03
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79157

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.18 J	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.2	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	18.0	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.27 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.041 J	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	2.7	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	1.7	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	11.5	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	4.7	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	15.8	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	7.9	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	0.10 J	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.053 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.064 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	17.4	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	20.3	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU03-SS-03
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79157

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 5.6 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU04-SS-01
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79158

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.086 J	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.6	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	15.8	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.15 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.037 J	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	2.8	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	1.8	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	7.6	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	4.7	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	1.0	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	8.0	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	0.068 J	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.033 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.072 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	16.8	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	19.7	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-01

APPL ID: AZ79158

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.2 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU04-SS-02
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79159

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	0.098 J	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.6	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	18.0	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.18 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.038 J	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	3.4	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	1.7	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	8.6	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	5.3	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	1.4	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	12.3	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	0.074 J	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.039 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.083 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	19.0	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	21.3	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-02

APPL ID: AZ79159

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Moisture is < PQL (2%). No adjustments to solid Concentrations and Limits are necessary.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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ʔL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: DU04-SS-03
Sample Collection Date: 08/30/18

ARF: 86766
APPL ID: AZ79160

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3050B	ANTIMONY (SB)	Not detected	0.2	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ARSENIC (AS)	1.4	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BARIUM (BA)	14.3	0.25	0.070	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	BERYLLIUM (BE)	0.14 J	1.0	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CADMIUM (CD)	0.033 J	0.1	0.03	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	CHROMIUM (CR)	2.5	0.5	0.07	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COBALT (CO)	1.6	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	COPPER (CU)	7.4	2.5	0.04	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	LEAD (PB)	4.3	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	MOLYBDENUM (MO)	1.2	0.2	0.01	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	NICKEL (NI)	9.5	0.35	0.102	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SELENIUM (SE)	0.076 J	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	SILVER (AG)	0.033 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	THALLIUM (TL)	0.064 J	0.1	0.02	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	VANADIUM (V)	15.9	0.5	0.05	mg/Kg	1	09/13/18	09/18/18
6020A/3050B	ZINC (ZN)	17.8	2.5	0.75	mg/Kg	1	09/13/18	09/18/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: DU04-SS-03

APPL ID: AZ79160

Sample Collection Date: 08/30/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.3 Percent Moisture.)								
7471A/7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	1	09/13/18	09/14/18

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B01-SB-01

APPL ID: AZ79161

Sample Collection Date: 08/28/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 9.0 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	2.9	0.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	20.3	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	23.2	0.27	0.077	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.23 J	1.1	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.44	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	53.3	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	20.0	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	142	14.0	0.22	mg/Kg	5	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	416	0.6	0.11	mg/Kg	5	09/11/18	09/14/18
7471A/7471A	MERCURY	0.11 J	0.6	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	15.4	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	54.4	0.38	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.25 J	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.11	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.14	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	20.1	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	167	14.0	4.10	mg/Kg	5	09/11/18	09/14/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B02-SB-01
Sample Collection Date: 08/28/18

ARF: 86766
APPL ID: AZ79162

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 7.6 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	3.0	0.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	23.6	0.5	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	17.4	0.27	0.076	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.27 J	1.1	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.25	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	68.7	0.5	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	11.3	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	127	27.0	0.43	mg/Kg	10	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	815	1.1	0.22	mg/Kg	10	09/11/18	09/14/18
7471A/7471A	MERCURY	0.13 J	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	23.4	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	58.2	0.38	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.17 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.27	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.12	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	20.0	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	74.2	2.7	0.81	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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ᑭL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B03-SS-01

APPL ID: AZ79163

Sample Collection Date: 08/28/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.6 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	0.15 J	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.6	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	18.5	0.26	0.073	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.30 J	1.0	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.039 J	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	6.0	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	2.4	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	10.2	2.6	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	LEAD (PB)	4.3	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	0.11 J	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	10.1	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	3.9	0.36	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.12 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.057 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.1000	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	23.4	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	29.4	2.6	0.78	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B04-SS-01

APPL ID: AZ79164

Sample Collection Date: 08/28/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.4 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	0.27	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	2.2	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	23.2	0.26	0.072	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.40 J	1.0	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.069 J	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	7.2	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	2.8	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	14.0	2.6	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	LEAD (PB)	5.8	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	0.12 J	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	13.4	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	5.0	0.36	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.16 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.063 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.092 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	29.8	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	35.2	2.6	0.78	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B05-SB-01

APPL ID: AZ79165

Sample Collection Date: 08/28/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 12.8 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	4.2	0.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	2.2	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	25.6	0.29	0.080	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.31 J	1.1	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.39	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	4.8	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	6.0	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	1170	57.0	0.92	mg/Kg	20	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	82.6	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	0.21 J	0.6	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	20.8	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	10.9	0.40	0.120	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.17 J	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.14	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.081 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	25.5	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	165	14.0	4.30	mg/Kg	5	09/11/18	09/14/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B06-SB-01
Sample Collection Date: 08/28/18

ARF: 86766
APPL ID: AZ79166

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 6.7 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	1.2	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.6	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	64.4	0.27	0.075	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.26 J	1.1	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.41	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	9.2	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	1.8	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	486	27.0	0.43	mg/Kg	10	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	29.4	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	0.027 J	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	24.4	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	5.6	0.38	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.18 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.092 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.062 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	23.3	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	54.4	2.7	0.80	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B07-SB-01
Sample Collection Date: 08/28/18

ARF: 86766
APPL ID: AZ79167

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 15.2 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	32.4	0.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.3	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	108	0.6	0.17	mg/Kg	2	09/11/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.22 J	1.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.59	0.1	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	11.0	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	2.5	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	191	5.9	0.09	mg/Kg	2	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	195	0.2	0.05	mg/Kg	2	09/11/18	09/14/18
7471A/7471A	MERCURY	0.042 J	0.6	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	8.5	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	5.5	0.41	0.120	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.17 J	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.75	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.098 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	17.9	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	115	2.9	0.88	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B08-SB-01

APPL ID: AZ79168

Sample Collection Date: 08/28/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 12.0 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	103	0.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.9	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	152	2.8	0.80	mg/Kg	10	09/11/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.22 J	1.1	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.91	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	36.7	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	4.9	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	519	28.0	0.45	mg/Kg	10	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	372	1.1	0.23	mg/Kg	10	09/11/18	09/14/18
7471A/7471A	MERCURY	0.057 J	0.6	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	13.1	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	78.8	0.40	0.120	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.17 J	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	8.0	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.13	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	24.0	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	301	28	9.1	mg/Kg	10	09/11/18	09/14/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B09-SB-01
Sample Collection Date: 08/28/18

ARF: 86766
APPL ID: AZ79169

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 8.3 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	1.9	0.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	8.4	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	21.7	0.27	0.076	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.20 J	1.1	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.25	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	10.7	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	5.7	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	36.1	2.7	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	LEAD (PB)	298	0.6	0.11	mg/Kg	5	09/11/18	09/14/18
7471A/7471A	MERCURY	0.027 J	0.6	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	19.8	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	14.3	0.38	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.12 J	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.19	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.080 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	24.3	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	131	14.0	4.10	mg/Kg	5	09/11/18	09/14/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B10-SS-01

APPL ID: AZ79170

Sample Collection Date: 08/28/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.8 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	0.96	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.9	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	20.9	0.26	0.074	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.22 J	1.1	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.14	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	5.1	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	2.1	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	86.9	2.6	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	LEAD (PB)	28.7	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	0.025 J	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	13.4	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	3.2	0.37	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.15 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.19	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.070 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	26.8	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	62.2	2.6	0.79	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B10-SS-02

APPL ID: AZ79171

Sample Collection Date: 08/28/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 4.1 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	0.95	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.9	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	24.5	0.26	0.073	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.25 J	1.0	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.23	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	6.8	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	2.2	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	111	13.0	0.21	mg/Kg	5	09/11/18	09/18/18
6020A/3050B	LEAD (PB)	40.3	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	0.026 J	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	12.8	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	3.0	0.36	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.18 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.39	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.068 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	25.4	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	89.1	2.6	0.78	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B11-SB-01
Sample Collection Date: 08/28/18

ARF: 86766
APPL ID: AZ79172

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 19.4 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	320	2.5	0.87	mg/Kg	10	09/11/18	09/14/18
6020A/3050B	ARSENIC (AS)	35.1	0.6	0.09	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	190	3.1	0.87	mg/Kg	10	09/11/18	09/14/18
6020A/3050B	BERYLLIUM (BE)	0.19 J	1.2	0.09	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.56	0.1	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	26.4	0.6	0.09	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	12.0	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	1990	155.0	2.50	mg/Kg	50	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	581	1.2	0.25	mg/Kg	10	09/11/18	09/14/18
7471A/7471A	MERCURY	0.10 J	0.6	0.03	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	19.1	0.3	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	29.8	0.43	0.130	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.17 J	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.57	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.074 J	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	28.9	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	294	31	9.9	mg/Kg	10	09/11/18	09/14/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B12-SB-01
Sample Collection Date: 08/28/18

ARF: 86766
APPL ID: AZ79173

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 19.0 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	28.3	0.3	0.09	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	7.7	0.6	0.09	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	108	0.31	0.086	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.17 J	1.2	0.09	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	1.2	0.1	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	60.2	0.6	0.09	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	29.8	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	240	15.0	0.25	mg/Kg	5	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	469	0.6	0.12	mg/Kg	5	09/11/18	09/14/18
7471A/7471A	MERCURY	0.33 J	0.6	0.03	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	22.2	0.3	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	77.9	0.43	0.130	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.31 J	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	1.4	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.080 J	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	17.5	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	341	15.0	4.60	mg/Kg	5	09/11/18	09/14/18

J = Estimated value.

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B13-SS-01
Sample Collection Date: 08/28/18

ARF: 86766
APPL ID: AZ79174

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 2.0 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	2.2	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.7	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	26.2	0.26	0.071	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.24 J	1.0	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.22	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	13.3	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	2.4	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	14.2	2.6	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	LEAD (PB)	10.3	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	Not detected	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	7.6	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	7.0	0.36	0.100	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.11 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.069 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.072 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	22.8	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	52.6	2.6	0.77	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B14-SB-01
Sample Collection Date: 08/28/18

ARF: 86766
APPL ID: AZ79175

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 13.2 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	1.8	0.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	4.7	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	44.0	0.29	0.081	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.16 J	1.2	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.74	0.1	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	24.9	0.6	0.08	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	12.4	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	113	14.0	0.23	mg/Kg	5	09/11/18	09/14/18
6020A/3050B	LEAD (PB)	249	0.6	0.12	mg/Kg	5	09/11/18	09/14/18
7471A/7471A	MERCURY	Not detected	0.6	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	10.4	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	26.0	0.40	0.120	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.17 J	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.71	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.062 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	20.5	0.6	0.06	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	293	14.0	4.30	mg/Kg	5	09/11/18	09/14/18

J = Estimated value.

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ᴾL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B15-SS-01

APPL ID: AZ79176

Sample Collection Date: 08/29/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 5.2 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	0.18 J	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	2.3	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	16.7	0.26	0.074	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.41 J	1.1	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.035 J	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	9.8	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	2.7	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	16.0	2.6	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	LEAD (PB)	5.2	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	Not detected	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	14.0	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	5.8	0.37	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.13 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.059 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.088 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	32.4	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	36.6	2.6	0.79	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton
Project: Vogelsang Former Waste Disposal Area
Sample ID: B16-SS-01
Sample Collection Date: 08/29/18

ARF: 86766
APPL ID: AZ79177

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 3.9 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	0.51	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.5	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	23.7	0.26	0.073	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.23 J	1.0	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.11	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	4.8	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	2.4	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	6.6	2.6	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	LEAD (PB)	5.5	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	0.026 J	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	11.4	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	3.1	0.36	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.080 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.052 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.075 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	23.3	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	29.0	2.6	0.78	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: B17-SS-01

APPL ID: AZ79178

Sample Collection Date: 08/29/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
(Solid Concentrations and Limits have been adjusted to reflect 5.7 Percent Moisture.)								
6020A/3050B	ANTIMONY (SB)	1.4	0.2	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ARSENIC (AS)	1.7	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BARIUM (BA)	22.9	0.27	0.074	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	BERYLLIUM (BE)	0.23 J	1.1	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CADMIUM (CD)	0.10	0.1	0.03	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	CHROMIUM (CR)	3.4	0.5	0.07	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COBALT (CO)	1.7	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	COPPER (CU)	13.4	2.7	0.04	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	LEAD (PB)	12.8	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
7471A/7471A	MERCURY	Not detected	0.5	0.02	mg/Kg	1	09/11/18	09/14/18
6020A/3050B	MOLYBDENUM (MO)	22.2	0.2	0.01	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	NICKEL (NI)	2.3	0.37	0.110	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SELENIUM (SE)	0.11 J	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	SILVER (AG)	0.1000	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	THALLIUM (TL)	0.065 J	0.1	0.02	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	VANADIUM (V)	23.8	0.5	0.05	mg/Kg	1	09/11/18	09/13/18
6020A/3050B	ZINC (ZN)	30.5	2.7	0.80	mg/Kg	1	09/11/18	09/13/18

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

ARF: 86766

Sample ID: G-11-SS-04

APPL ID: AZ79179

Sample Collection Date: 09/01/18

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6020A/3015^	ANTIMONY (SB)	0.57 J	6.0	0.35	ug/L	1	09/11/18	09/14/18
6020A/3015^	ARSENIC (AS)	Not detected	5.0	0.31	ug/L	1	09/11/18	09/14/18
6020A/3015^	BARIUM (BA)	0.45 J	3.0	0.25	ug/L	1	09/11/18	09/14/18
6020A/3015^	BERYLLIUM (BE)	Not detected	1.0	0.08	ug/L	1	09/11/18	09/14/18
6020A/3015^	CADMIUM (CD)	Not detected	1.0	0.10	ug/L	1	09/11/18	09/14/18
6020A/3015^	CHROMIUM (CR)	Not detected	10.0	0.45	ug/L	1	09/11/18	09/14/18
6020A/3015^	COBALT (CO)	Not detected	1.0	0.13	ug/L	1	09/11/18	09/14/18
6020A/3015^	COPPER (CU)	30.6	2.0	0.55	ug/L	1	09/11/18	09/14/18
6020A/3015^	LEAD (PB)	2.7 J	3.0	0.19	ug/L	1	09/11/18	09/14/18
7470A/7470A	MERCURY (HG)	Not detected	0.2	0.06	ug/L	1	09/17/18	09/19/18
6020A/3015^	MOLYBDENUM (MO)	Not detected	2.0	0.12	ug/L	1	09/11/18	09/14/18
6020A/3015^	NICKEL (NI)	Not detected	3.0	0.30	ug/L	1	09/11/18	09/14/18
6020A/3015^	SELENIUM (SE)	Not detected	5.0	0.50	ug/L	1	09/11/18	09/14/18
6020A/3015^	SILVER (AG)	Not detected	5.0	0.03	ug/L	1	09/11/18	09/14/18
6020A/3015^	THALLIUM (TL)	Not detected	1.0	0.10	ug/L	1	09/11/18	09/14/18
6020A/3015^	VANADIUM (V)	Not detected	6.0	0.45	ug/L	1	09/11/18	09/14/18
6020A/3015^	ZINC (ZN)	73.1	20.0	12.70	ug/L	1	09/11/18	09/14/18

J = Estimated value.

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APPL-F1-SC-NoMC-REG MDLs

Wetlab Results

ARF: 86766

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

Attn: Scott Felton

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
APPL ID: AZ79146 -Client Sample ID: DU01-SS-01		-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	4.0	2.0		%	09/06/18	09/07/18
APPL ID: AZ79147 -Client Sample ID: DU01-SS-02		-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	3.9	2.0		%	09/06/18	09/07/18
APPL ID: AZ79148 -Client Sample ID: DU01-SS-03		-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	3.1	2.0		%	09/06/18	09/07/18
APPL ID: AZ79149 -Client Sample ID: DU01-SB-01		-Sample Collection Date: 08/30/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	4.2	2.0		%	09/06/18	09/07/18
APPL ID: AZ79150 -Client Sample ID: DU01-SB-02		-Sample Collection Date: 08/30/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	4.8	2.0		%	09/06/18	09/07/18
APPL ID: AZ79151 -Client Sample ID: DU01-SB-03		-Sample Collection Date: 08/30/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	4.8	2.0		%	09/06/18	09/07/18
APPL ID: AZ79152 -Client Sample ID: DU02-SS-01		-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	4.3	2.0		%	09/06/18	09/07/18
APPL ID: AZ79153 -Client Sample ID: DU02-SS-02		-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	2.6	2.0		%	09/06/18	09/07/18
APPL ID: AZ79154 -Client Sample ID: DU02-SS-03		-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	3.2	2.0		%	09/06/18	09/07/18
APPL ID: AZ79155 -Client Sample ID: DU03-SS-01		-Sample Collection Date: 08/30/18			Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	4.2	2.0		%	09/06/18	09/07/18

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Wetlab Results

ARF: 86766

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

Attn: Scott Felton

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
APPL ID: AZ79156	-Client Sample ID: DU03-SS-02		-Sample Collection Date: 08/30/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	4.4	2.0		%	09/06/18	09/07/18
APPL ID: AZ79157	-Client Sample ID: DU03-SS-03		-Sample Collection Date: 08/30/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	5.6	2.0		%	09/06/18	09/07/18
APPL ID: AZ79158	-Client Sample ID: DU04-SS-01		-Sample Collection Date: 08/30/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	2.2	2.0		%	09/06/18	09/07/18
APPL ID: AZ79159	-Client Sample ID: DU04-SS-02		-Sample Collection Date: 08/30/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	Not Detected	2.0		%	09/06/18	09/07/18
APPL ID: AZ79160	-Client Sample ID: DU04-SS-03		-Sample Collection Date: 08/30/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	2.3	2.0		%	09/06/18	09/07/18
APPL ID: AZ79161	-Client Sample ID: B01-SB-01		-Sample Collection Date: 08/28/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	9.0	2.0		%	09/06/18	09/07/18
APPL ID: AZ79162	-Client Sample ID: B02-SB-01		-Sample Collection Date: 08/28/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	7.6	2.0		%	09/06/18	09/07/18
APPL ID: AZ79163	-Client Sample ID: B03-SS-01		-Sample Collection Date: 08/28/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	3.6	2.0		%	09/06/18	09/07/18
APPL ID: AZ79164	-Client Sample ID: B04-SS-01		-Sample Collection Date: 08/28/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	3.4	2.0		%	09/06/18	09/07/18
APPL ID: AZ79165	-Client Sample ID: B05-SB-01		-Sample Collection Date: 08/28/18		Project: Vogelsang Former Wast		
CLP MOIST	MOISTURE	12.8	2.0		%	09/06/18	09/07/18

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Wetlab Results

ARF: 86766

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

Attn: Scott Felton

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
APPL ID: AZ79166	-Client Sample ID: B06-SB-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	6.7	2.0		%	09/06/18	09/07/18
APPL ID: AZ79167	-Client Sample ID: B07-SB-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	15.2	2.0		%	09/06/18	09/07/18
APPL ID: AZ79168	-Client Sample ID: B08-SB-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	12.0	2.0		%	09/06/18	09/07/18
APPL ID: AZ79169	-Client Sample ID: B09-SB-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	8.3	2.0		%	09/06/18	09/07/18
APPL ID: AZ79170	-Client Sample ID: B10-SS-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	4.8	2.0		%	09/06/18	09/07/18
APPL ID: AZ79171	-Client Sample ID: B10-SS-02		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	4.1	2.0		%	09/06/18	09/07/18
APPL ID: AZ79172	-Client Sample ID: B11-SB-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	19.4	2.0		%	09/06/18	09/07/18
APPL ID: AZ79173	-Client Sample ID: B12-SB-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	19.0	2.0		%	09/06/18	09/07/18
APPL ID: AZ79174	-Client Sample ID: B13-SS-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	2.0	2.0		%	09/06/18	09/07/18
APPL ID: AZ79175	-Client Sample ID: B14-SB-01		-Sample Collection Date: 08/28/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	13.2	2.0		%	09/06/18	09/07/18

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Wetlab Results

ARF: 86766

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

Attn: Scott Felton

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
APPL ID: AZ79176 -Client Sample ID: B15-SS-01			-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	5.2	2.0		%	09/06/18	09/07/18
APPL ID: AZ79177 -Client Sample ID: B16-SS-01			-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	3.9	2.0		%	09/06/18	09/07/18
APPL ID: AZ79178 -Client Sample ID: B17-SS-01			-Sample Collection Date: 08/29/18			Project: Vogelsang Former Wast	
CLP MOIST	MOISTURE	5.7	2.0		%	09/06/18	09/07/18

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QC FORMS

EPA 8015B-e

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/10/18
Matrix: SOIL Instrument: Apollo

APPL ID.	Client Sample No.	SURROGATE: OCTACOSANE (S)			SURROGATE: ORTHO-TERPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
180907A-BLK	Blank	47-140	128		51-128	95.3	
180907A-LCS	Lab Control Spike	47-140	116		51-128	85.7	
AZ79146	DU01-SS-01	47-140	219	#	51-128	87.8	
AZ79147	DU01-SS-02	47-140	192	#	51-128	82.3	
AZ79148	DU01-SS-03	47-140	214	#	51-128	84.8	
AZ79149	DU01-SB-01	47-140	164	#	51-128	92.7	
AZ79150	DU01-SB-02	47-140	202	#	51-128	108	
AZ79151	DU01-SB-03	47-140	163	#	51-128	89.8	
AZ79151-MS	Matrix Spike	47-140	143	*	51-128	102	
AZ79151-MSD	Matrix SpikeD	47-140	154	*	51-128	105	
AZ79152	DU02-SS-01	47-140	207	#	51-128	88.0	
AZ79153	DU02-SS-02	47-140	265	#	51-128	75.8	
AZ79154	DU02-SS-03	47-140	232	#	51-128	90.9	
AZ79155	DU03-SS-01	47-140	189	#	51-128	95.4	
AZ79156	DU03-SS-02	47-140	238	#	51-128	95.6	
AZ79157	DU03-SS-03	47-140	225	#	51-128	87.0	
AZ79158	DU04-SS-01	47-140	200	#	51-128	94.1	
AZ79159	DU04-SS-02	47-140	117		51-128	92.7	
AZ79160	DU04-SS-03	47-140	195	#	51-128	91.6	

Comments: Batch: #TPHCD-180907A
* = Recovery outside of Control Limits on QC Sample.
# = Recovery outside of Control Limits on Sample.

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Form 2 & 8, Surrogate Recovery Summary

EPA 8015B-e

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 86766

Case No: 86766 Date Analyzed: 09/14/18

Matrix: SOIL Instrument: Apollo

APPL ID.	Client Sample No.	SURROGATE: OCTACOSANE (S)			SURROGATE: ORTHO-TERPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
180907A2-BLK	Blank	47-140	81.2		51-128	66.9	
180907A2-LCS	Lab Control Spike	47-140	102		51-128	86.3	
AZ79146	DU01-SS-01	47-140	105		51-128	95.0	
AZ79147	DU01-SS-02	47-140	123		51-128	78.8	
AZ79148	DU01-SS-03	47-140	70.9		51-128	50.8	
AZ79149	DU01-SB-01	47-140	112		51-128	91.8	
AZ79150	DU01-SB-02	47-140	128		51-128	113	
AZ79151	DU01-SB-03	47-140	103		51-128	82.7	
AZ79151-MS	Matrix Spike	47-140	107		51-128	80.5	
AZ79151-MSD	Matrix SpikeD	47-140	93.7		51-128	83.5	
AZ79152	DU02-SS-01	47-140	86.0		51-128	80.5	
AZ79153	DU02-SS-02	47-140	107		51-128	68.2	
AZ79154	DU02-SS-03	47-140	93.4		51-128	74.5	
AZ79155	DU03-SS-01	47-140	103		51-128	94.4	
AZ79156	DU03-SS-02	47-140	102		51-128	74.9	
AZ79157	DU03-SS-03	47-140	89.1		51-128	78.4	
AZ79158	DU04-SS-01	47-140	79.2		51-128	62.0	
AZ79159	DU04-SS-02	47-140	108		51-128	88.3	
AZ79160	DU04-SS-03	47-140	106		51-128	85.1	

Comments: Batch: #TPHCD-180907A2

Printed: 09/17/18 9:11:11 AM

Form 2 & 8, Surrogate Recovery Summary

EPA 8015B-e

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc.
Case No: 86766
Matrix: WATER

SDG No: 86766
Date Analyzed: 09/11/18
Instrument: Apollo

APPL ID.	Client Sample No.	SURROGATE: OCTACOSANE (S)			SURROGATE: ORTHO-TERPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
180907A1-BLK	Blank	28-142	97.6		49-128	85.4	
AZ79179	G-11-SS-04	28-142	81.6		49-128	70.7	
180907A1-LCS	Lab Control Spike	28-142	88.7		49-128	111	

Comments: Batch: #TPHCD-180907A1

Printed: 09/13/18 8:47:36 AM
Form 2 & 8, Surrogate Recovery Summary

EPA 8015B-e

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/10/18
Matrix:	SOIL	Instrument:	Apollo
Blank ID:	180907A-BLK	Time Analyzed:	2102

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A-BLK	Blank	910033	09/10/18 2102
180907A-LCS	Lab Control Spike	910034	09/10/18 2122
AZ79146	DU01-SS-01	910038	09/10/18 2242
AZ79147	DU01-SS-02	910039	09/10/18 2302
AZ79148	DU01-SS-03	910040	09/10/18 2322
AZ79149	DU01-SB-01	910041	09/10/18 2342
AZ79150	DU01-SB-02	910042	09/11/18 0002
AZ79151	DU01-SB-03	910043	09/11/18 0022
180907A-MS	Matrix Spike	910044	09/11/18 0041
180907A-MSD	Matrix SpikeD	910045	09/11/18 0101
AZ79152	DU02-SS-01	910050	09/11/18 0241
AZ79153	DU02-SS-02	910051	09/11/18 0301
AZ79154	DU02-SS-03	910052	09/11/18 0321
AZ79155	DU03-SS-01	910053	09/11/18 0341
AZ79156	DU03-SS-02	910054	09/11/18 0401
AZ79157	DU03-SS-03	910055	09/11/18 0421
AZ79158	DU04-SS-01	910056	09/11/18 0441
AZ79159	DU04-SS-02	910057	09/11/18 0501
AZ79160	DU04-SS-03	910058	09/11/18 0521

Comments: Batch: #TPHCD-180907A

Printed: 09/11/18 2:20:35 PM
Form 4, Blank Summary

Method Blank
EPA 8015B ISM SOIL

Blank Name/QCG: **180907S-79151 - 233183**
Batch ID: #TPHCD-180907A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	DIESEL FUEL (C10-24)	Not detected	5.0	0.50	mg/kg	09/07/18	09/10/18
BLANK	MOTOR OIL (C24-C36)	Not detected	50	3.5	mg/kg	09/07/18	09/10/18
BLANK	SURROGATE: OCTACOSANE (S)	128	47-140		%	09/07/18	09/10/18
BLANK	SURROGATE: ORTHO-TERPHENYL (	95.3	51-128		%	09/07/18	09/10/18

Quant Method: DROB0905.M
Run #: 910033
Instrument: Apollo
Sequence: 180910
Initials: DPO

GC SC-Blank-REG MDLs
Printed: 09/11/18 2:20:44 PM

EPA 8015B-e

Form 4

Blank Summary

Lab Name: APPL, Inc.
SDG No: 86766
Case No: 86766
Date Analyzed: 09/14/18
Matrix: SOIL
Instrument: Apollo
Blank ID: 180907A2-BLK
Time Analyzed: 1737

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A2-BLK	Blank	914028	09/14/18 1737
180907A2-LCS	Lab Control Spike	914031	09/14/18 1838
AZ79146	DU01-SS-01	914033	09/14/18 1919
AZ79147	DU01-SS-02	914034	09/14/18 1939
AZ79148	DU01-SS-03	914035	09/14/18 1959
AZ79149	DU01-SB-01	914036	09/14/18 2019
AZ79150	DU01-SB-02	914037	09/14/18 2039
AZ79151	DU01-SB-03	914038	09/14/18 2059
180907A2-MS	Matrix Spike	914039	09/14/18 2119
180907A2-MSD	Matrix SpikeD	914041	09/14/18 2157
AZ79152	DU02-SS-01	914045	09/14/18 2317
AZ79153	DU02-SS-02	914046	09/14/18 2337
AZ79154	DU02-SS-03	914047	09/14/18 2357
AZ79155	DU03-SS-01	914048	09/15/18 0017
AZ79156	DU03-SS-02	914049	09/15/18 0037
AZ79157	DU03-SS-03	914050	09/15/18 0056
AZ79158	DU04-SS-01	914051	09/15/18 0116
AZ79159	DU04-SS-02	914052	09/15/18 0136
AZ79160	DU04-SS-03	914053	09/15/18 0156

Comments: Batch: #TPHCD-180907A2

Printed: 09/17/18 9:11:01 AM
Form 4, Blank Summary

Method Blank
EPA 8015B ISM SOIL W/SGC

Blank Name/QCG: **180907S-79151 - 233294**
Batch ID: #TPHCD-180907A2

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	DIESEL FUEL	Not detected	5.0	0.50	mg/kg	09/07/18	09/14/18
BLANK	MOTOR OIL	Not detected	50	3.5	mg/kg	09/07/18	09/14/18
BLANK	SURROGATE: OCTACOSANE (S)	81.2	47-140		%	09/07/18	09/14/18
BLANK	SURROGATE: ORTHO-TERPHENYL (	66.9	51-128		%	09/07/18	09/14/18

Quant Method: DROB0905.M
Run #: 914028
Instrument: Apollo
Sequence: 180914
Initials: DPO

GC SC-Blank-REG MDLs
Printed: 09/17/18 9:11:13 AM

EPA 8015B-e

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/11/18
Matrix:	WATER	Instrument:	Apollo
Blank ID:	180907A1-BLK	Time Analyzed:	0621

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A1-BLK	Blank	910061	09/11/18 0621
AZ79179	G-11-SS-04	910066	09/11/18 0800
180907A1-LCS	Lab Control Spike	912004	09/12/18 1656

Comments: Batch: #TPHCD-180907A1

Printed: 09/13/18 8:47:32 AM
Form 4, Blank Summary

Method Blank

EPA 8015B-E WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **180907W-79179 - 233184**
Batch ID: #TPHCD-180907A1

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	DIESEL FUEL (C10-C24)	Not detected	50	25.0	ug/L	09/07/18	09/11/18
BLANK	MOTOR OIL (C24-C36)	Not detected	250	106.0	ug/L	09/07/18	09/11/18
BLANK	SURROGATE: OCTACOSANE (S)	97.6	28-142		%	09/07/18	09/11/18
BLANK	SURROGATE: ORTHO-TERPHENYL (	85.4	49-128		%	09/07/18	09/11/18

Quant Method: DROB0905.M
Run #: 910061
Instrument: Apollo
Sequence: 180910
Initials: DPO

GC SC-Blank-REG MDLs
Printed: 09/11/18 2:21:08 PM

EPA 8015B-e

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/10/18
Matrix:	SOIL	Instrument:	Apollo
LCS ID:	180907A-LCS	Time Analyzed:	2122

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A-BLK	Blank	910033	09/10/18 2102
180907A-LCS	Lab Control Spike	910034	09/10/18 2122
AZ79146	DU01-SS-01	910038	09/10/18 2242
AZ79147	DU01-SS-02	910039	09/10/18 2302
AZ79148	DU01-SS-03	910040	09/10/18 2322
AZ79149	DU01-SB-01	910041	09/10/18 2342
AZ79150	DU01-SB-02	910042	09/11/18 0002
AZ79151	DU01-SB-03	910043	09/11/18 0022
180907A-MS	Matrix Spike	910044	09/11/18 0041
180907A-MSD	Matrix SpikeD	910045	09/11/18 0101
AZ79152	DU02-SS-01	910050	09/11/18 0241
AZ79153	DU02-SS-02	910051	09/11/18 0301
AZ79154	DU02-SS-03	910052	09/11/18 0321
AZ79155	DU03-SS-01	910053	09/11/18 0341
AZ79156	DU03-SS-02	910054	09/11/18 0401
AZ79157	DU03-SS-03	910055	09/11/18 0421
AZ79158	DU04-SS-01	910056	09/11/18 0441
AZ79159	DU04-SS-02	910057	09/11/18 0501
AZ79160	DU04-SS-03	910058	09/11/18 0521

Comments: Batch: #TPHCD-180907A

Printed: 09/11/18 2:20:33 PM
Form 4, LCS Summary

Laboratory Control Spike Recovery
EPA 8015B ISM SOIL

APPL ID: **180907S-79151 LCS - 233183**
Batch ID: #TPHCD-180907A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level mg/kg	SPK Result mg/kg	SPK % Recovery	Recovery Limits
DIESEL FUEL (C10-24)	40.0	37.6	94.0	64-122
MOTOR OIL (C24-C36)	40.0	39.3	98.3	50-150
SURROGATE: OCTACOSANE (S)	3.00	3.49	116	47-140
SURROGATE: ORTHO-TERPHENYL (S)	3.00	2.57	85.7	51-128

Comments: ______________________

Primary	SPK
Quant Method :	DROB0905.M
Extraction Date :	09/07/18
Analysis Date :	09/10/18
Instrument :	Apollo
Run :	910034
Initials :	DPO

Printed: 09/11/18 2:20:40 PM
APPL Standard LCS

EPA 8015B-e

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Apollo
LCS ID:	180907A2-LCS	Time Analyzed:	1838

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A2-BLK	Blank	914028	09/14/18 1737
180907A2-LCS	Lab Control Spike	914031	09/14/18 1838
AZ79146	DU01-SS-01	914033	09/14/18 1919
AZ79147	DU01-SS-02	914034	09/14/18 1939
AZ79148	DU01-SS-03	914035	09/14/18 1959
AZ79149	DU01-SB-01	914036	09/14/18 2019
AZ79150	DU01-SB-02	914037	09/14/18 2039
AZ79151	DU01-SB-03	914038	09/14/18 2059
180907A2-MS	Matrix Spike	914039	09/14/18 2119
180907A2-MSD	Matrix SpikeD	914041	09/14/18 2157
AZ79152	DU02-SS-01	914045	09/14/18 2317
AZ79153	DU02-SS-02	914046	09/14/18 2337
AZ79154	DU02-SS-03	914047	09/14/18 2357
AZ79155	DU03-SS-01	914048	09/15/18 0017
AZ79156	DU03-SS-02	914049	09/15/18 0037
AZ79157	DU03-SS-03	914050	09/15/18 0056
AZ79158	DU04-SS-01	914051	09/15/18 0116
AZ79159	DU04-SS-02	914052	09/15/18 0136
AZ79160	DU04-SS-03	914053	09/15/18 0156

Comments: Batch: #TPHCD-180907A2

Laboratory Control Spike Recovery

EPA 8015B ISM SOIL W/SGC

APPL ID: **180907S-79151 LCS - 233294**
Batch ID: #TPHCD-180907A2

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level mg/kg	SPK Result mg/kg	SPK % Recovery	Recovery Limits
DIESEL FUEL	40.0	31.7	79.3	64-122
MOTOR OIL	40.0	37.4	93.5	50-150
SURROGATE: OCTACOSANE (S)	3.00	3.07	102	47-140
SURROGATE: ORTHO-TERPHENYL (S)	3.00	2.59	86.3	51-128

Comments: ______________________________

Primary	SPK
Quant Method :	DROB0905.M
Extraction Date :	09/07/18
Analysis Date :	09/14/18
Instrument :	Apollo
Run :	914031
Initials :	DPO

Printed: 09/17/18 9:11:08 AM
APPL Standard LCS

EPA 8015B-e

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/12/18
Matrix:	WATER	Instrument:	Apollo
LCS ID:	180907A1-LCS	Time Analyzed:	1656

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A1-BLK	Blank	910061	09/11/18 0621
AZ79179	G-11-SS-04	910066	09/11/18 0800
180907A1-LCS	Lab Control Spike	912004	09/12/18 1656

Comments: Batch: #TPHCD-180907A1

Laboratory Control Spike Recovery
EPA 8015B-E WATER

APPL ID: **180907W-79179 LCS - 233184**
Batch ID: #TPHCD-180907A1

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
DIESEL FUEL (C10-C24)	2000	1560	78.0	61-143
MOTOR OIL (C24-C36)	2000	1710	85.5	61-143
SURROGATE: OCTACOSANE (S)	150	133	88.7	28-142
SURROGATE: ORTHO-TERPHENYL (S)	150	167	111	49-128

Comments: ______________________

Primary	SPK
Quant Method :	DROB0905.M
Extraction Date :	09/07/18
Analysis Date :	09/12/18
Instrument :	Apollo
Run :	912004
Initials :	DPO

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APPL Standard LCS

Matrix Spike Recoveries
EPA 8015B ISM SOIL

APPL ID: **180907S-79151 MS - 233183**
Batch ID: #TPHCD-180907A
Sample ID: AZ79151
Client ID: DU01-SB-03

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl mg/kg	Matrix Result mg/kg	SPK Result mg/kg	DUP Result mg/kg	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
DIESEL FUEL (C10-24)	80.0	36	101	65.8	81.3	37.3 #	64-122	42.2 #	35
MOTOR OIL (C24-C36)	80.0	72	132	130	75.0	72.5	50-150	1.5	35
SURROGATE: OCTACOSANE (S)	6.00	NA	8.58	9.26	143 #	154 #	47-140		
SURROGATE: ORTHO-TERPHENYL (S)	6.00	NA	6.13	6.27	102	105	51-128		

= Recovery is outside QC limits.

Comments: ______________________________

Primary	SPK	DUP
Quant Method :	DROB0905.M	DROB0905.M
Extraction Date :	09/07/18	09/07/18
Analysis Date :	09/11/18	09/11/18
Instrument :	Apollo	Apollo
Run :	910044	910045
Initials :	DPO	

Printed: 09/11/18 2:32:52 PM
APPL MSD SCII

Matrix Spike Recoveries

EPA 8015B ISM SOIL W/SGC

APPL ID: **180907S-79151 MS - 233294**
Batch ID: #TPHCD-180907A2
Sample ID: AZ79151
Client ID: DU01-SB-03

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl mg/kg	Matrix Result mg/kg	SPK Result mg/kg	DUP Result mg/kg	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
DIESEL FUEL	80.0	3.6	61.9	60.9	72.9	71.6	64-122	1.6	35
MOTOR OIL	80.0	6.8	70.8	71.6	80.0	81.0	50-150	1.1	35
SURROGATE: OCTACOSANE (S)	6.00	NA	6.43	5.62	107	93.7	47-140		
SURROGATE: ORTHO-TERPHENYL (S)	6.00	NA	4.83	5.01	80.5	83.5	51-128		

Comments: ______________________________

Primary	SPK	DUP
Quant Method :	DROB0905.M	DROB0905.M
Extraction Date :	09/07/18	09/07/18
Analysis Date :	09/14/18	09/14/18
Instrument :	Apollo	Apollo
Run :	914039	914041
Initials :	DPO	

Printed: 09/17/18 9:11:04 AM
APPL MSD SCII

EPA 8081A

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/14/18
Matrix: SOIL Instrument: Ethel

APPL ID.	Client Sample No.	SURROGATE: DECACHLOROBIPHENYL (S)			SURROGATE: TCMX (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
180912A-BLK	Blank	55-130	96.8		70-125	90.1	
180912A-LCS	Lab Control Spike	55-130	93.4		70-125	93.4	
AZ79146	DU01-SS-01	55-130	91.1		70-125	99.3	
AZ79147	DU01-SS-02	55-130	91.7		70-125	103	
AZ79148	DU01-SS-03	55-130	90.1		70-125	105	
AZ79149	DU01-SB-01	55-130	94.9		70-125	103	
AZ79150	DU01-SB-02	55-130	96.9		70-125	103	
AZ79151	DU01-SB-03	55-130	93.6		70-125	108	
AZ79151-MS	Matrix Spike	55-130	96.5		70-125	109	
AZ79151-MSD	Matrix SpikeD	55-130	92.5		70-125	101	
AZ79152	DU02-SS-01	55-130	86.8		70-125	100.0	
AZ79153	DU02-SS-02	55-130	90.3		70-125	109	
AZ79154	DU02-SS-03	55-130	92.3		70-125	103	
AZ79155	DU03-SS-01	55-130	88.6		70-125	99.1	
AZ79156	DU03-SS-02	55-130	87.2		70-125	99.9	
AZ79157	DU03-SS-03	55-130	90.8		70-125	101	
AZ79158	DU04-SS-01	55-130	88.3		70-125	97.2	
AZ79159	DU04-SS-02	55-130	86.1		70-125	94.9	
AZ79160	DU04-SS-03	55-130	96.5		70-125	108	

Comments: Batch: #81ACA-180912A

EPA 8081A

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc.
Case No: 86766
Matrix: WATER

SDG No: 86766
Date Analyzed: 09/12/18
Instrument: Ethel

APPL ID.	Client Sample No.	SURROGATE: DECACHLOROBIPHENYL (S)			SURROGATE: TETRACHLORO-M-XYLENE (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
180907B-BLK	Blank	30-135	83.8		25-140	24.5	
AZ79179	G-11-SS-04	30-135	80.5		25-140	40.3	
180907B-LCS	Lab Control Spike	30-135	90.7		25-140	34.3	

Comments: Batch: #81ACA-180907B

Printed: 09/14/18 1:34:50 PM
Form 2 & 8, Surrogate Recovery Summary

EPA 8081A

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Ethel
Blank ID:	180912A-BLK	Time Analyzed:	1213

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180912A-BLK	Blank	0911153	09/14/18 1213
180912A-LCS	Lab Control Spike	0911154	09/14/18 1232
AZ79146	DU01-SS-01	0911159	09/14/18 1407
AZ79147	DU01-SS-02	0911160	09/14/18 1426
AZ79148	DU01-SS-03	0911161	09/14/18 1445
AZ79149	DU01-SB-01	0911162	09/14/18 1504
AZ79150	DU01-SB-02	0911163	09/14/18 1523
AZ79151	DU01-SB-03	0911164	09/14/18 1542
180912A-MS	Matrix Spike	0911165	09/14/18 1601
180912A-MSD	Matrix SpikeD	0911166	09/14/18 1620
AZ79152	DU02-SS-01	0911173	09/14/18 1833
AZ79153	DU02-SS-02	0911174	09/14/18 1852
AZ79154	DU02-SS-03	0911175	09/14/18 1911
AZ79155	DU03-SS-01	0911176	09/14/18 1930
AZ79156	DU03-SS-02	0911177	09/14/18 1949
AZ79157	DU03-SS-03	0911178	09/14/18 2008
AZ79158	DU04-SS-01	0911179	09/14/18 2027
AZ79159	DU04-SS-02	0911180	09/14/18 2046
AZ79160	DU04-SS-03	0911181	09/14/18 2105

Comments: Batch: #81ACA-180912A

Method Blank
EPA 8081A ISM SOIL

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **180912S-79151 - 233334**
Batch ID: #81ACA-180912A

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	4,4'-DDD	Not detected	0.050	0.0018	mg/kg	09/12/18	09/14/18
BLANK	4,4'-DDE	Not detected	0.050	0.0016	mg/kg	09/12/18	09/14/18
BLANK	4,4'-DDT	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	ALDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	ALPHA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	ALPHA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	BETA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	DELTA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	DIELDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	ENDOSULFAN I	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	ENDOSULFAN II	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	ENDOSULFAN SULFATE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	ENDRIN	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	ENDRIN ALDEHYDE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
BLANK	ENDRIN KETONE	Not detected	0.050	0.0020	mg/kg	09/12/18	09/14/18
BLANK	GAMMA-BHC	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	GAMMA-CHLORDANE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	HEPTACHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	METHOXYCHLOR	Not detected	0.050	0.0008	mg/kg	09/12/18	09/14/18
BLANK	TOXAPHENE	Not detected	1.00	0.015	mg/kg	09/12/18	09/14/18
BLANK	SURROGATE: DECACHLOROBIPHEN	96.8	55-130		%	09/12/18	09/14/18
BLANK	SURROGATE: TCMX (S)	90.1	70-125		%	09/12/18	09/14/18

Quant Method: OCL0911.M
Run #: 0911153
Instrument: Ethel
Sequence: 180911
Initials: DPO

GC SC-Blank-REG MDLs
Printed: 09/17/18 3:18:49 PM

EPA 8081A

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/12/18
Matrix:	WATER	Instrument:	Ethel
Blank ID:	180907B-BLK	Time Analyzed:	1127

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907B-BLK	Blank	0911033	09/12/18 1127
AZ79179	G-11-SS-04	0911038	09/12/18 1302
180907B-LCS	Lab Control Spike	0911129	09/13/18 1830

Comments: Batch: #81ACA-180907B

Printed: 09/14/18 1:34:44 PM
Form 4, Blank Summary

Method Blank
EPA 8081A WATER

Blank Name/QCG: **180907W-79179 - 233248**
Batch ID: #81ACA-180907B

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	4,4'-DDD	Not detected	0.050	0.0030	ug/L	09/07/18	09/12/18
BLANK	4,4'-DDE	Not detected	0.050	0.0040	ug/L	09/07/18	09/12/18
BLANK	4,4'-DDT	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	ALDRIN	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	ALPHA-BHC	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	ALPHA-CHLORDANE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	BETA-BHC	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	DELTA-BHC	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	DIELDRIN	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	ENDOSULFAN I	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	ENDOSULFAN II	Not detected	0.050	0.0040	ug/L	09/07/18	09/12/18
BLANK	ENDOSULFAN SULFATE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	ENDRIN	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	ENDRIN ALDEHYDE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	ENDRIN KETONE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	GAMMA-BHC (LINDANE)	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	GAMMA-CHLORDANE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	HEPTACHLOR	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	HEPTACHLOR EPOXIDE	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	METHOXYCHLOR	Not detected	0.050	0.0050	ug/L	09/07/18	09/12/18
BLANK	TOXAPHENE	Not detected	1.0	0.20	ug/L	09/07/18	09/12/18
BLANK	SURROGATE: DECACHLOROBIPHEN	83.8	30-135		%	09/07/18	09/12/18
BLANK	SURROGATE: TETRACHLORO-M-XYL	24.5	25-140		%	09/07/18	09/12/18

Quant Method: OCL0911.M
Run #: 0911033
Instrument: Ethel
Sequence: 180911
Initials: DPO

GC SC-Blank-REG MDLs
Printed: 09/13/18 3:25:53 PM

EPA 8081A

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Ethel
LCS ID:	180912A-LCS	Time Analyzed:	1232

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180912A-BLK	Blank	0911153	09/14/18 1213
180912A-LCS	Lab Control Spike	0911154	09/14/18 1232
AZ79146	DU01-SS-01	0911159	09/14/18 1407
AZ79147	DU01-SS-02	0911160	09/14/18 1426
AZ79148	DU01-SS-03	0911161	09/14/18 1445
AZ79149	DU01-SB-01	0911162	09/14/18 1504
AZ79150	DU01-SB-02	0911163	09/14/18 1523
AZ79151	DU01-SB-03	0911164	09/14/18 1542
180912A-MS	Matrix Spike	0911165	09/14/18 1601
180912A-MSD	Matrix SpikeD	0911166	09/14/18 1620
AZ79152	DU02-SS-01	0911173	09/14/18 1833
AZ79153	DU02-SS-02	0911174	09/14/18 1852
AZ79154	DU02-SS-03	0911175	09/14/18 1911
AZ79155	DU03-SS-01	0911176	09/14/18 1930
AZ79156	DU03-SS-02	0911177	09/14/18 1949
AZ79157	DU03-SS-03	0911178	09/14/18 2008
AZ79158	DU04-SS-01	0911179	09/14/18 2027
AZ79159	DU04-SS-02	0911180	09/14/18 2046
AZ79160	DU04-SS-03	0911181	09/14/18 2105

Comments: Batch: #81ACA-180912A

Printed: 09/17/18 3:18:31 PM
Form 4, LCS Summary

Laboratory Control Spike Recovery
EPA 8081A ISM SOIL

APPL ID: **180912S-79151 LCS - 233334**
Batch ID: #81ACA-180912A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level mg/kg	SPK Result mg/kg	SPK % Recovery	Recovery Limits
4,4'-DDD	0.167	0.181	108	30-135
4,4'-DDE	0.167	0.181	108	70-125
4,4'-DDT	0.167	0.168	101	45-140
ALDRIN	0.167	0.188	113	45-140
ALPHA-BHC	0.167	0.195	117	60-125
ALPHA-CHLORDANE	0.167	0.163	97.6	65-120
BETA-BHC	0.167	0.182	109	60-125
DELTA-BHC	0.167	0.116	69.5	55-130
DIELDRIN	0.167	0.178	107	65-125
ENDOSULFAN I	0.167	0.171	102	15-135
ENDOSULFAN II	0.167	0.173	104	35-140
ENDOSULFAN SULFATE	0.167	0.157	94.0	60-135
ENDRIN	0.167	0.166	99.4	60-135
ENDRIN ALDEHYDE	0.167	0.166	99.4	35-145
ENDRIN KETONE	0.167	0.191	114	65-135
GAMMA-BHC	0.167	0.186	111	60-125
GAMMA-CHLORDANE	0.167	0.177	106	65-125
HEPTACHLOR	0.167	0.182	109	50-140
HEPTACHLOR EPOXIDE	0.167	0.183	110	65-130
METHOXYCHLOR	0.167	0.185	111	55-145
TOXAPHENE	1.67	1.74	104	50-150
SURROGATE: DECACHLOROBIPHENYL	0.333	0.311	93.4	55-130
SURROGATE: TCMX (S)	0.333	0.311	93.4	70-125

Comments: ______________________________

Primary	SPK
Quant Method :	OCL0911.M
Extraction Date :	09/12/18
Analysis Date :	09/14/18
Instrument :	Ethel
Run :	0911154
Initials :	DPO

Printed: 09/17/18 3:18:39 PM
APPL Standard LCS

EPA 8081A

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/13/18
Matrix:	WATER	Instrument:	Ethel
LCS ID:	180907B-LCS	Time Analyzed:	1830

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907B-BLK	Blank	0911033	09/12/18 1127
AZ79179	G-11-SS-04	0911038	09/12/18 1302
180907B-LCS	Lab Control Spike	0911129	09/13/18 1830

Comments: Batch: #81ACA-180907B

Laboratory Control Spike Recovery
EPA 8081A WATER

APPL ID: **180907W-79179 LCS - 233248**
Batch ID: #81ACA-180907B

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
4,4'-DDD	0.300	0.266	88.7	25-150
4,4'-DDE	0.300	0.210	70.0	35-140
4,4'-DDT	0.300	0.252	84.0	45-140
ALDRIN	0.300	0.123	41.0	25-140
ALPHA-BHC	0.300	0.268	89.3	60-130
ALPHA-CHLORDANE	0.300	0.210	70.0	65-125
BETA-BHC	0.300	0.299	99.7	65-125
DELTA-BHC	0.300	0.176	58.7	45-135
DIELDRIN	0.300	0.256	85.3	60-130
ENDOSULFAN I	0.300	0.254	84.7	50-110
ENDOSULFAN II	0.300	0.275	91.7	30-130
ENDOSULFAN SULFATE	0.300	0.250	83.3	55-135
ENDRIN	0.300	0.248	82.7	55-135
ENDRIN ALDEHYDE	0.300	0.253	84.3	55-135
ENDRIN KETONE	0.300	0.313	104	75-125
GAMMA-BHC (LINDANE)	0.300	0.271	90.3	25-135
GAMMA-CHLORDANE	0.300	0.192	64.0	60-125
HEPTACHLOR	0.300	0.138	46.0	40-130
HEPTACHLOR EPOXIDE	0.300	0.264	88.0	60-130
METHOXYCHLOR	0.300	0.306	102	55-150
TOXAPHENE	2.00	1.72	86.0	58-116
SURROGATE: DECACHLOROBIPHENYL	0.300	0.272	90.7	30-135
SURROGATE: TETRACHLORO-M-XYLE	0.300	0.103	34.3	25-140

Comments: ______________________

Primary	SPK
Quant Method :	OCL0911.M
Extraction Date :	09/07/18
Analysis Date :	09/13/18
Instrument :	Ethel
Run :	0911129
Initials :	DPO

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APPL Standard LCS

Matrix Spike Recoveries

EPA 8081A ISM SOIL

APPL ID: **180912S-79151 MS - 233334**
Batch ID: #81ACA-180912A
Sample ID: AZ79151
Client ID: DU01-SB-03

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl mg/kg	Matrix Result mg/kg	SPK Result mg/kg	DUP Result mg/kg	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
4,4'-DDD	0.200	ND	0.223	0.202	112	101	30-135	9.9	30
4,4'-DDE	0.200	ND	0.223	0.208	112	104	70-125	7.0	30
4,4'-DDT	0.200	ND	0.206	0.196	103	98.0	45-140	5.0	30
ALDRIN	0.200	ND	0.248	0.229	124	115	45-140	8.0	30
ALPHA-BHC	0.200	ND	0.230	0.240	115	120	60-125	4.3	30
ALPHA-CHLORDANE	0.200	ND	0.212	0.203	106	102	65-120	4.3	30
BETA-BHC	0.200	ND	0.228	0.239	114	119	60-125	4.7	30
DELTA-BHC	0.200	ND	0.153	0.141	76.5	70.5	55-130	8.2	30
DIELDRIN	0.200	ND	0.223	0.215	112	107	65-125	3.7	30
ENDOSULFAN I	0.200	ND	0.224	0.205	112	102	15-135	8.9	30
ENDOSULFAN II	0.200	ND	0.224	0.215	112	107	35-140	4.1	30
ENDOSULFAN SULFATE	0.200	ND	0.197	0.184	98.5	92.0	60-135	6.8	30
ENDRIN	0.200	ND	0.215	0.204	107	102	60-135	5.3	30
ENDRIN ALDEHYDE	0.200	ND	0.208	0.198	104	99.0	35-145	4.9	30
ENDRIN KETONE	0.200	ND	0.238	0.219	119	110	65-135	8.3	30
GAMMA-BHC	0.200	ND	0.250	0.235	125	117	60-125	6.2	30
GAMMA-CHLORDANE	0.200	ND	0.226	0.211	113	105	65-125	6.9	30
HEPTACHLOR	0.200	ND	0.239	0.222	119	111	50-140	7.4	30
HEPTACHLOR EPOXIDE	0.200	ND	0.242	0.225	121	113	65-130	7.3	30
METHOXYCHLOR	0.200	ND	0.225	0.207	113	103	55-145	8.3	30
TOXAPHENE	2.00	ND	2.18	2.45	109	123	50-150	11.7	30
SURROGATE: DECACHLOROBIPHENYL	0.400	NA	0.386	0.370	96.5	92.5	55-130		
SURROGATE: TCMX (S)	0.400	NA	0.434	0.403	109	101	70-125		

Comments: ______________________

Primary	SPK	DUP
Quant Method :	OCL0911.M	OCL0911.M
Extraction Date :	09/12/18	09/12/18
Analysis Date :	09/14/18	09/14/18
Instrument :	Ethel	Ethel
Run :	0911165	0911166
Initials :	DPO	

Printed: 09/21/18 11:48:14 AM
APPL MSD SCII

EPA 8082A

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/14/18
Matrix: SOIL Instrument: Lucy

APPL ID.	Client Sample No.	SURROGATE: DECACHLOROBIPHENYL (S)					
		Limits	Result	Qualifier	Limits	Result	Qualifier
180912A-BLK	Blank	60-125	85.2				
180912A-LCS	Lab Control Spike	60-125	77.8				
AZ79146	DU01-SS-01	60-125	82.1				
AZ79147	DU01-SS-02	60-125	88.1				
AZ79148	DU01-SS-03	60-125	88.5				
AZ79149	DU01-SB-01	60-125	88.6				
AZ79150	DU01-SB-02	60-125	87.3				
AZ79151	DU01-SB-03	60-125	90.1				
AZ79151-MS	Matrix Spike	60-125	89.5				
AZ79151-MSD	Matrix SpikeD	60-125	90.7				
AZ79152	DU02-SS-01	60-125	87.3				
AZ79153	DU02-SS-02	60-125	93.2				
AZ79154	DU02-SS-03	60-125	85.5				
AZ79155	DU03-SS-01	60-125	89.4				
AZ79156	DU03-SS-02	60-125	90.1				
AZ79157	DU03-SS-03	60-125	92.3				
AZ79158	DU04-SS-01	60-125	92.7				
AZ79159	DU04-SS-02	60-125	91.2				
AZ79160	DU04-SS-03	60-125	86.4				

Comments: Batch: #82ADO-180912A

Printed: 09/17/18 11:15:36 AM
Form 2 & 8, Surrogate Recovery Summary

EPA 8082A

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc.
SDG No: 86766
Case No: 86766
Date Analyzed: 09/11/18
Matrix: WATER
Instrument: Lucy

APPL ID.	Client Sample No.	SURROGATE: DECACHLOROBIPHENYL (S)					
		Limits	Result	Qualifier	Limits	Result	Qualifier
180907B-BLK	Blank	40-135	69.0				
180907B-LCS	Lab Control Spike	40-135	66.7				
AZ79179	G-11-SS-04	40-135	68.3				

Comments: Batch: #82ADO-180907B

EPA 8082A

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Lucy
Blank ID:	180912A-BLK	Time Analyzed:	1604

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180912A-BLK	Blank	0907150	09/14/18 1604
180912A-LCS	Lab Control Spike	0907151	09/14/18 1621
AZ79146	DU01-SS-01	0907154	09/14/18 1712
AZ79147	DU01-SS-02	0907155	09/14/18 1729
AZ79148	DU01-SS-03	0907156	09/14/18 1746
AZ79149	DU01-SB-01	0907157	09/14/18 1803
AZ79150	DU01-SB-02	0907158	09/14/18 1820
AZ79151	DU01-SB-03	0907159	09/14/18 1837
180912A-MS	Matrix Spike	0907160	09/14/18 1854
180912A-MSD	Matrix SpikeD	0907161	09/14/18 1911
AZ79152	DU02-SS-01	0907162	09/14/18 1928
AZ79153	DU02-SS-02	0907165	09/14/18 2019
AZ79154	DU02-SS-03	0907166	09/14/18 2036
AZ79155	DU03-SS-01	0907167	09/14/18 2052
AZ79156	DU03-SS-02	0907168	09/14/18 2110
AZ79157	DU03-SS-03	0907169	09/14/18 2126
AZ79158	DU04-SS-01	0907170	09/14/18 2143
AZ79159	DU04-SS-02	0907171	09/14/18 2200
AZ79160	DU04-SS-03	0907172	09/14/18 2217

Comments: Batch: #82ADO-180912A

Printed: 09/17/18 11:15:28 AM
Form 4, Blank Summary

Method Blank
EPA 8082A ISM SOIL

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **180912S-79151 - 233308**
Batch ID: #82ADO-180912A

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	AROCLOR 1221	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
BLANK	AROCLOR 1232	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
BLANK	AROCLOR 1242	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
BLANK	AROCLOR 1248	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
BLANK	AROCLOR 1254	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
BLANK	AROCLOR 1260	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
BLANK	AROCLOR 1262	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
BLANK	AROCLOR 1268	Not detected	0.05	0.006	mg/kg	09/12/18	09/14/18
BLANK	TOTAL PCBS	Not detected	0.05	0.004	mg/kg	09/12/18	09/14/18
BLANK	SURROGATE: DECACHLOROBIPHEN	85.2	60-125		%	09/12/18	09/14/18

Quant Method: PCB0907.M
Run #: 0907150
Instrument: Lucy
Sequence: 180907
Initials: DPO

GC SC-Blank-REG MDLs
Printed: 09/17/18 11:15:39 AM

EPA 8082A

Form 4

Blank Summary

Lab Name: APPL, Inc.   SDG No: 86766
Case No: 86766   Date Analyzed: 09/11/18
Matrix: WATER   Instrument: Lucy
Blank ID: 180907B-BLK   Time Analyzed: 1615

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907B-BLK	Blank	0907052	09/11/18 1615
180907B-LCS	Lab Control Spike	0907053	09/11/18 1632
AZ79179	G-11-SS-04	0907055	09/11/18 1705

Comments: Batch: #82ADO-180907B

Method Blank
EPA 8082A WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **180907W-79179 - 233197**
Batch ID: #82ADO-180907B

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	AROCLOR 1221	Not detected	0.50	0.080	ug/L	09/07/18	09/11/18
BLANK	AROCLOR 1232	Not detected	0.50	0.120	ug/L	09/07/18	09/11/18
BLANK	AROCLOR 1242	Not detected	0.50	0.120	ug/L	09/07/18	09/11/18
BLANK	AROCLOR 1248	Not detected	0.50	0.090	ug/L	09/07/18	09/11/18
BLANK	AROCLOR 1254	Not detected	0.50	0.120	ug/L	09/07/18	09/11/18
BLANK	AROCLOR 1260	Not detected	0.50	0.090	ug/L	09/07/18	09/11/18
BLANK	AROCLOR 1262	Not detected	0.50	0.200	ug/L	09/07/18	09/11/18
BLANK	AROCLOR 1268	Not detected	0.50	0.200	ug/L	09/07/18	09/11/18
BLANK	TOTAL PCBS	Not detected	0.50	0.200	ug/L	09/07/18	09/11/18
BLANK	SURROGATE: DECACHLOROBIPHEN	69.0	40-135		%	09/07/18	09/11/18

Quant Method: PCB0907.M
Run #: 0907052
Instrument: Lucy
Sequence: 180907
Initials: DPO

GC SC-Blank-REG MDLs
Printed: 09/17/18 11:16:44 AM

EPA 8082A

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Lucy
LCS ID:	180912A-LCS	Time Analyzed:	1621

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180912A-BLK	Blank	0907150	09/14/18 1604
180912A-LCS	Lab Control Spike	0907151	09/14/18 1621
AZ79146	DU01-SS-01	0907154	09/14/18 1712
AZ79147	DU01-SS-02	0907155	09/14/18 1729
AZ79148	DU01-SS-03	0907156	09/14/18 1746
AZ79149	DU01-SB-01	0907157	09/14/18 1803
AZ79150	DU01-SB-02	0907158	09/14/18 1820
AZ79151	DU01-SB-03	0907159	09/14/18 1837
180912A-MS	Matrix Spike	0907160	09/14/18 1854
180912A-MSD	Matrix SpikeD	0907161	09/14/18 1911
AZ79152	DU02-SS-01	0907162	09/14/18 1928
AZ79153	DU02-SS-02	0907165	09/14/18 2019
AZ79154	DU02-SS-03	0907166	09/14/18 2036
AZ79155	DU03-SS-01	0907167	09/14/18 2052
AZ79156	DU03-SS-02	0907168	09/14/18 2110
AZ79157	DU03-SS-03	0907169	09/14/18 2126
AZ79158	DU04-SS-01	0907170	09/14/18 2143
AZ79159	DU04-SS-02	0907171	09/14/18 2200
AZ79160	DU04-SS-03	0907172	09/14/18 2217

Comments: Batch: #82ADO-180912A

Laboratory Control Spike Recovery
EPA 8082A ISM SOIL

APPL ID: **180912S-79151 LCS - 233308**
Batch ID: #82ADO-180912A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level mg/kg	SPK Result mg/kg	SPK % Recovery	Recovery Limits
AROCLOR 1260	0.417	0.363	87.1	53-140
SURROGATE: DECACHLOROBIPHENYL	0.333	0.259	77.8	60-125

Comments: ______________________________

Primary	SPK
Quant Method :	PCB0907.M
Extraction Date :	09/12/18
Analysis Date :	09/14/18
Instrument :	Lucy
Run :	0907151
Initials :	DPO

Printed: 09/17/18 11:15:33 AM
APPL Standard LCS

EPA 8082A

Form 4

LCS Summary

Lab Name: APPL, Inc.
SDG No: 86766
Case No: 86766
Date Analyzed: 09/11/18
Matrix: WATER
Instrument: Lucy
LCS ID: 180907B-LCS
Time Analyzed: 1632

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907B-BLK	Blank	0907052	09/11/18 1615
180907B-LCS	Lab Control Spike	0907053	09/11/18 1632
AZ79179	G-11-SS-04	0907055	09/11/18 1705

Comments: Batch: #82ADO-180907B

Printed: 09/17/18 11:16:36 AM
Form 4, LCS Summary

Laboratory Control Spike Recovery
EPA 8082A WATER

APPL ID: **180907W-79179 LCS - 233197**
Batch ID: #82ADO-180907B

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
AROCLOR 1260	1.0	0.694	69.4	45-134
SURROGATE: DECACHLOROBIPHENYL	0.300	0.200	66.7	40-135

Comments: ____________________

Primary	SPK
Quant Method :	PCB0907.M
Extraction Date :	09/07/18
Analysis Date :	09/11/18
Instrument :	Lucy
Run :	0907053
Initials :	DPO

Printed: 09/17/18 11:16:39 AM
APPL Standard LCS

Matrix Spike Recoveries
EPA 8082A ISM SOIL

APPL ID: **180912S-79151 MS - 233308**
Batch ID: #82ADO-180912A
Sample ID: AZ79151
Client ID: DU01-SB-03

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl mg/kg	Matrix Result mg/kg	SPK Result mg/kg	DUP Result mg/kg	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
AROCLOR 1260	0.500	ND	0.531	0.513	106	103	53-140	3.4	30
SURROGATE: DECACHLOROBIPHENYL	0.400	NA	0.358	0.363	89.5	90.7	60-125		

Comments: ______________________

Primary	SPK	DUP
Quant Method :	PCB0907.M	PCB0907.M
Extraction Date :	09/12/18	09/12/18
Analysis Date :	09/14/18	09/14/18
Instrument :	Lucy	Lucy
Run :	0907160	0907161
Initials :	DPO	

Printed: 09/21/18 11:49:58 AM
APPL MSD SCII

EPA 8270C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/11/18
Matrix: SOIL Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: 2,4,6-TRIBROMOPHENOL (S)			SURROGATE: 2-FLUORBIPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
AZ79146	DU01-SS-01	35-125	76.5		45-105	75.4	
180907A-BLK	Blank	35-125	77.4		45-105	70.7	
180907A-LCS	Lab Control Spike	35-125	68.4		45-105	62.2	
AZ79147	DU01-SS-02	35-125	86.6		45-105	77.2	
AZ79148	DU01-SS-03	35-125	86.4		45-105	81.3	
AZ79149	DU01-SB-01	35-125	84.7		45-105	81.3	
AZ79150	DU01-SB-02	35-125	69.9		45-105	69.9	
AZ79151	DU01-SB-03	35-125	74.4		45-105	72.4	
AZ79153	DU02-SS-02	35-125	65.5		45-105	64.7	
AZ79154	DU02-SS-03	35-125	75.3		45-105	68.8	
AZ79155	DU03-SS-01	35-125	62.9		45-105	58.4	
AZ79156	DU03-SS-02	35-125	77.2		45-105	70.5	
AZ79157	DU03-SS-03	35-125	73.8		45-105	74.0	
AZ79159	DU04-SS-02	35-125	87.1		45-105	75.5	
AZ79150-MSD	Matrix SpikeD	35-125	87.5		45-105	79.1	
AZ79152	DU02-SS-01	35-125	67.6		45-105	64.4	
AZ79158	DU04-SS-01	35-125	84.5		45-105	77.6	
AZ79160	DU04-SS-03	35-125	65.9		45-105	62.6	
AZ79150-MS	Matrix Spike	35-125	76.9		45-105	70.0	

Comments: Batch: #87CCA-180907A

Printed: 09/12/18 3:10:15 PM
Form 2 & 8, Surrogate Recovery Summary

EPA 8270C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. | SDG No: 86766
Case No: 86766 | Date Analyzed: 09/11/18
Matrix: SOIL | Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: 2-FLUOROPHENOL (S)			SURROGATE: NITROBENZENE-D5 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
AZ79146	DU01-SS-01	35-105	71.0		35-100	70.1	
180907A-BLK	Blank	35-105	95.4		35-100	91.3	
180907A-LCS	Lab Control Spike	35-105	75.0		35-100	71.8	
AZ79147	DU01-SS-02	35-105	84.3		35-100	83.8	
AZ79148	DU01-SS-03	35-105	77.0		35-100	78.8	
AZ79149	DU01-SB-01	35-105	90.0		35-100	84.1	
AZ79150	DU01-SB-02	35-105	81.1		35-100	75.3	
AZ79151	DU01-SB-03	35-105	73.3		35-100	71.4	
AZ79153	DU02-SS-02	35-105	59.2		35-100	56.9	
AZ79154	DU02-SS-03	35-105	74.8		35-100	69.7	
AZ79155	DU03-SS-01	35-105	55.5		35-100	55.5	
AZ79156	DU03-SS-02	35-105	68.2		35-100	66.3	
AZ79157	DU03-SS-03	35-105	65.5		35-100	72.9	
AZ79159	DU04-SS-02	35-105	74.5		35-100	70.0	
AZ79150-MSD	Matrix SpikeD	35-105	85.3		35-100	76.3	
AZ79152	DU02-SS-01	35-105	66.2		35-100	64.6	
AZ79158	DU04-SS-01	35-105	88.5		35-100	82.8	
AZ79160	DU04-SS-03	35-105	83.1		35-100	73.4	
AZ79150-MS	Matrix Spike	35-105	72.6		35-100	66.1	

Comments: Batch: #87CCA-180907A

Printed: 09/12/18 3:10:16 PM
Form 2 & 8, Surrogate Recovery Summary

EPA 8270C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 86766

Case No: 86766 Date Analyzed: 09/11/18

Matrix: SOIL Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: PHENOL (S)			SURROGATE: TERPHENYL-D14 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
AZ79146	DU01-SS-01	40-100	74.9		30-125	69.2	
180907A-BLK	Blank	40-100	96.1		30-125	62.9	
180907A-LCS	Lab Control Spike	40-100	73.6		30-125	58.9	
AZ79147	DU01-SS-02	40-100	88.0		30-125	72.3	
AZ79148	DU01-SS-03	40-100	83.2		30-125	74.4	
AZ79149	DU01-SB-01	40-100	95.7		30-125	74.5	
AZ79150	DU01-SB-02	40-100	85.9		30-125	62.9	
AZ79151	DU01-SB-03	40-100	77.3		30-125	64.9	
AZ79153	DU02-SS-02	40-100	63.5		30-125	58.0	
AZ79154	DU02-SS-03	40-100	78.2		30-125	62.5	
AZ79155	DU03-SS-01	40-100	59.5		30-125	54.4	
AZ79156	DU03-SS-02	40-100	73.1		30-125	65.1	
AZ79157	DU03-SS-03	40-100	65.1		30-125	64.9	
AZ79159	DU04-SS-02	40-100	79.4		30-125	71.3	
AZ79150-MSD	Matrix SpikeD	40-100	91.8		30-125	70.6	
AZ79152	DU02-SS-01	40-100	68.2		30-125	58.5	
AZ79158	DU04-SS-01	40-100	93.0		30-125	70.6	
AZ79160	DU04-SS-03	40-100	87.6		30-125	57.2	
AZ79150-MS	Matrix Spike	40-100	77.5		30-125	62.8	

Comments: Batch: #87CCA-180907A

Printed: 09/12/18 3:10:16 PM

Form 2 & 8, Surrogate Recovery Summary

EPA 8270C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/10/18
Matrix: WATER Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: 2,4,6-TRIBROMOPHENOL (S)			SURROGATE: 2-FLUORBIPHENYL (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
180907A-BLK	Blank	40-125	97.5		50-110	68.9	
AZ79179	G-11-SS-04	40-125	74.9		50-110	57.8	
180907A-LCS	Lab Control Spike	40-125	68.5		50-110	54.8	

Comments: Batch: #87DOD-180907A

EPA 8270C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/10/18
Matrix: WATER Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: 2-FLUOROPHENOL (S)			SURROGATE: NITROBENZENE-D5 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
180907A-BLK	Blank	20-110	69.1		40-110	91.2	
AZ79179	G-11-SS-04	20-110	52.4		40-110	71.1	
180907A-LCS	Lab Control Spike	20-110	59.0		40-110	72.4	

Comments: Batch: #87DOD-180907A

EPA 8270C

Form 2 & 8

Surrogate Recovery

Lab Name: APPL, Inc.
Case No: 86766
Matrix: WATER

SDG No: 86766
Date Analyzed: 09/10/18
Instrument: Yoda

APPL ID.	Client Sample No.	SURROGATE: PHENOL (S)			SURROGATE: TERPHENYL-D14 (S)		
		Limits	Result	Qualifier	Limits	Result	Qualifier
180907A-BLK	Blank	10-115	47.4		50-135	82.1	
AZ79179	G-11-SS-04	10-115	37.1		50-135	60.6	
180907A-LCS	Lab Control Spike	10-115	40.8		50-135	62.0	

Comments: Batch: #87DOD-180907A

Printed: 09/11/18 3:05:37 PM
Form 2 & 8, Surrogate Recovery Summary

EPA 8270C

Form 4

Blank Summary

Lab Name: APPL, Inc.
SDG No: 86766
Case No: 86766
Date Analyzed: 09/11/18
Matrix: SOIL
Instrument: Yoda
Blank ID: 180907A-BLK
Time Analyzed: 1545

APPL ID.	Client Sample No.	File ID.	Date Analyzed
AZ79146	DU01-SS-01	0829Y199	09/11/18 1213
180907A-BLK	Blank	0829Y204	09/11/18 1545
180907A-LCS	Lab Control Spike	0829Y205	09/11/18 1614
AZ79147	DU01-SS-02	0829Y207	09/11/18 1710
AZ79148	DU01-SS-03	0829Y208	09/11/18 1738
AZ79149	DU01-SB-01	0829Y209	09/11/18 1806
AZ79150	DU01-SB-02	0829Y212	09/11/18 1930
AZ79151	DU01-SB-03	0829Y213	09/11/18 1958
AZ79153	DU02-SS-02	0829Y215	09/11/18 2054
AZ79154	DU02-SS-03	0829Y216	09/11/18 2122
AZ79155	DU03-SS-01	0829Y217	09/11/18 2150
AZ79156	DU03-SS-02	0829Y218	09/11/18 2218
AZ79157	DU03-SS-03	0829Y219	09/11/18 2246
AZ79159	DU04-SS-02	0829Y221	09/11/18 2342
180907A-MSD	Matrix SpikeD	0829Y227	09/12/18 1033
AZ79152	DU02-SS-01	0829Y228	09/12/18 1101
AZ79158	DU04-SS-01	0829Y229	09/12/18 1129
AZ79160	DU04-SS-03	0829Y230	09/12/18 1157
180907A-MS	Matrix Spike	0829Y231	09/12/18 1225

Comments: Batch: #87CCA-180907A

Method Blank
EPA 8270C ISM SOILS

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **180907S-79150 - 233202**
Batch ID: #87CCA-180907A

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	1,2,4-TRICHLOROBENZENE	Not detected	0.33	0.049	mg/kg	09/07/18	09/11/18
BLANK	1,2-DICHLOROBENZENE	Not detected	0.33	0.051	mg/kg	09/07/18	09/11/18
BLANK	1,3-DICHLOROBENZENE	Not detected	0.33	0.051	mg/kg	09/07/18	09/11/18
BLANK	1,4-DICHLOROBENZENE	Not detected	0.33	0.049	mg/kg	09/07/18	09/11/18
BLANK	2,4,5-TRICHLOROPHENOL	Not detected	0.33	0.060	mg/kg	09/07/18	09/11/18
BLANK	2,4,6-TRICHLOROPHENOL	Not detected	0.33	0.048	mg/kg	09/07/18	09/11/18
BLANK	2,4-DICHLOROPHENOL	Not detected	0.33	0.051	mg/kg	09/07/18	09/11/18
BLANK	2,4-DIMETHYLPHENOL	Not detected	0.33	0.044	mg/kg	09/07/18	09/11/18
BLANK	2,4-DINITROPHENOL	Not detected	0.66	0.054	mg/kg	09/07/18	09/11/18
BLANK	2,4-DINITROTOLUENE	Not detected	0.66	0.064	mg/kg	09/07/18	09/11/18
BLANK	2,6-DINITROTOLUENE	Not detected	0.66	0.061	mg/kg	09/07/18	09/11/18
BLANK	2-CHLORONAPHTHALENE	Not detected	0.33	0.052	mg/kg	09/07/18	09/11/18
BLANK	2-CHLOROPHENOL	Not detected	0.33	0.044	mg/kg	09/07/18	09/11/18
BLANK	2-METHYLPHENOL	Not detected	0.33	0.045	mg/kg	09/07/18	09/11/18
BLANK	2-NITROANILINE	Not detected	0.66	0.062	mg/kg	09/07/18	09/11/18
BLANK	2-NITROPHENOL	Not detected	0.33	0.048	mg/kg	09/07/18	09/11/18
BLANK	3,3'-DICHLOROBENZIDINE	Not detected	0.66	0.056	mg/kg	09/07/18	09/11/18
BLANK	3-NITROANILINE	Not detected	0.66	0.061	mg/kg	09/07/18	09/11/18
BLANK	3/4-METHYLPHENOL	Not detected	0.33	0.046	mg/kg	09/07/18	09/11/18
BLANK	4,6-DINITRO-2-METHYLPHENOL	Not detected	0.66	0.056	mg/kg	09/07/18	09/11/18
BLANK	4-BROMOPHENYL PHENYL ETHER	Not detected	0.33	0.057	mg/kg	09/07/18	09/11/18
BLANK	4-CHLORO-3-METHYLPHENOL	Not detected	0.33	0.059	mg/kg	09/07/18	09/11/18
BLANK	4-CHLOROANILINE	Not detected	0.33	0.017	mg/kg	09/07/18	09/11/18
BLANK	4-CHLOROPHENYL PHENYL ETHER	Not detected	0.33	0.061	mg/kg	09/07/18	09/11/18
BLANK	4-NITROANILINE	Not detected	0.33	0.073	mg/kg	09/07/18	09/11/18
BLANK	4-NITROPHENOL	Not detected	0.66	0.060	mg/kg	09/07/18	09/11/18
BLANK	BENZOIC ACID	Not detected	0.33	0.030	mg/kg	09/07/18	09/11/18
BLANK	BENZYL ALCOHOL	Not detected	0.33	0.056	mg/kg	09/07/18	09/11/18
BLANK	BIS (2-CHLORETHOXY) METHANE	Not detected	0.33	0.050	mg/kg	09/07/18	09/11/18
BLANK	BIS (2-CHLOROETHYL) ETHER	Not detected	0.33	0.050	mg/kg	09/07/18	09/11/18
BLANK	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	0.33	0.047	mg/kg	09/07/18	09/11/18
BLANK	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	0.66	0.062	mg/kg	09/07/18	09/11/18
BLANK	BUTYL BENZYL PHTHALATE	Not detected	0.33	0.056	mg/kg	09/07/18	09/11/18
BLANK	CARBAZOLE	Not detected	0.33	0.082	mg/kg	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y204
Instrument: Yoda
Sequence: Y180829
Initials: AAB

GC SC-Blank-REG MDLs
Printed: 09/12/18 3:14:48 PM

Method Blank

EPA 8270C ISM SOILS

Blank Name/QCG: **180907S-79150 - 233202**
Batch ID: #87CCA-180907A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	DI-N-BUTYL PHTHALATE	Not detected	0.33	0.066	mg/kg	09/07/18	09/11/18
BLANK	DI-N-OCTYL PHTHALATE	Not detected	0.33	0.058	mg/kg	09/07/18	09/11/18
BLANK	DIBENZOFURAN	Not detected	0.66	0.057	mg/kg	09/07/18	09/11/18
BLANK	DIETHYL PHTHALATE	Not detected	0.33	0.062	mg/kg	09/07/18	09/11/18
BLANK	DIMETHYL PHTHALATE	Not detected	0.33	0.063	mg/kg	09/07/18	09/11/18
BLANK	HEXACHLOROBENZENE	Not detected	0.66	0.060	mg/kg	09/07/18	09/11/18
BLANK	HEXACHLOROBUTADIENE	Not detected	0.33	0.052	mg/kg	09/07/18	09/11/18
BLANK	HEXACHLOROETHANE	Not detected	0.33	0.050	mg/kg	09/07/18	09/11/18
BLANK	ISOPHORONE	Not detected	0.33	0.057	mg/kg	09/07/18	09/11/18
BLANK	N-NITROSODI-N-PROPYLAMINE	Not detected	0.33	0.055	mg/kg	09/07/18	09/11/18
BLANK	N-NITROSODIMETHYLAMINE	Not detected	0.33	0.087	mg/kg	09/07/18	09/11/18
BLANK	N-NITROSODIPHENYLAMINE	Not detected	0.33	0.051	mg/kg	09/07/18	09/11/18
BLANK	NITROBENZENE	Not detected	0.33	0.050	mg/kg	09/07/18	09/11/18
BLANK	PHENOL	Not detected	0.33	0.043	mg/kg	09/07/18	09/11/18
BLANK	SURROGATE: 2,4,6-TRIBROMOPHEN	77.4	35-125		%	09/07/18	09/11/18
BLANK	SURROGATE: 2-FLUORBIPHENYL (S)	70.7	45-105		%	09/07/18	09/11/18
BLANK	SURROGATE: 2-FLUOROPHENOL (S)	95.4	35-105		%	09/07/18	09/11/18
BLANK	SURROGATE: NITROBENZENE-D5 (S	91.3	35-100		%	09/07/18	09/11/18
BLANK	SURROGATE: PHENOL (S)	96.1	40-100		%	09/07/18	09/11/18
BLANK	SURROGATE: TERPHENYL-D14 (S)	62.9	30-125		%	09/07/18	09/11/18

Quant Method: Y0829NC.M
Run #: 0829Y204
Instrument: Yoda
Sequence: Y180829
Initials: AAB

GC SC-Blank-REG MDLs
Printed: 09/12/18 3:14:48 PM

EPA 8270C

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/10/18
Matrix:	WATER	Instrument:	Yoda
Blank ID:	180907A-BLK	Time Analyzed:	1147

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A-BLK	Blank	0829Y178	09/10/18 1147
AZ79179	G-11-SS-04	0829Y181	09/10/18 1310
180907A-LCS	Lab Control Spike	0829Y201	09/11/18 1333

Comments: Batch: #87DOD-180907A

Printed: 09/11/18 3:05:31 PM
Form 4, Blank Summary

Method Blank
EPA 8270C WATER

Blank Name/QCG: **180907W-79179 - 233145**
Batch ID: #87DOD-180907A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	1,2,4-TRICHLOROBENZENE	Not detected	10.0	1.30	ug/L	09/07/18	09/10/18
BLANK	1,2-DICHLOROBENZENE	Not detected	10.0	1.10	ug/L	09/07/18	09/10/18
BLANK	1,3-DICHLOROBENZENE	Not detected	10.0	1.00	ug/L	09/07/18	09/10/18
BLANK	1,4-DICHLOROBENZENE	Not detected	10.0	1.00	ug/L	09/07/18	09/10/18
BLANK	2,4,5-TRICHLOROPHENOL	Not detected	10.0	2.30	ug/L	09/07/18	09/10/18
BLANK	2,4,6-TRICHLOROPHENOL	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	2,4-DICHLOROPHENOL	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	2,4-DIMETHYLPHENOL	Not detected	10.0	2.40	ug/L	09/07/18	09/10/18
BLANK	2,4-DINITROPHENOL	Not detected	20.0	1.80	ug/L	09/07/18	09/10/18
BLANK	2,4-DINITROTOLUENE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
BLANK	2,6-DINITROTOLUENE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
BLANK	2-CHLORONAPHTHALENE	Not detected	10.0	2.00	ug/L	09/07/18	09/10/18
BLANK	2-CHLOROPHENOL	Not detected	10.0	2.00	ug/L	09/07/18	09/10/18
BLANK	2-METHYLNAPHTHALENE	Not detected	10.0	1.80	ug/L	09/07/18	09/10/18
BLANK	2-METHYLPHENOL	Not detected	10.0	1.90	ug/L	09/07/18	09/10/18
BLANK	2-NITROANILINE	Not detected	20.0	2.40	ug/L	09/07/18	09/10/18
BLANK	2-NITROPHENOL	Not detected	10.0	2.10	ug/L	09/07/18	09/10/18
BLANK	3,3'-DICHLOROBENZIDINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	3-NITROANILINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	3/4-METHYLPHENOL	Not detected	10.0	1.70	ug/L	09/07/18	09/10/18
BLANK	4,6-DINITRO-2-METHYLPHENOL	Not detected	20.0	2.20	ug/L	09/07/18	09/10/18
BLANK	4-BROMOPHENYL PHENYL ETHER	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	4-CHLORO-3-METHYLPHENOL	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	4-CHLOROANILINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	4-CHLOROPHENYL PHENYL ETHER	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	4-NITROANILINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	4-NITROPHENOL	Not detected	20.0	0.80	ug/L	09/07/18	09/10/18
BLANK	ACENAPHTHENE	Not detected	10.0	2.30	ug/L	09/07/18	09/10/18
BLANK	ACENAPHTHYLENE	Not detected	10.0	2.30	ug/L	09/07/18	09/10/18
BLANK	ANTHRACENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	BENZ (A) ANTHRACENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	BENZO (A) PYRENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	BENZO (B) FLUORANTHENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	BENZO (G,H,I) PERYLENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18

Quant Method: Y0829NC.M
Run #: 0829Y178
Instrument: Yoda
Sequence: Y180829
Initials: AAB

GC SC-Blank-REG MDLs
Printed: 09/21/18 10:56:42 AM

Method Blank
EPA 8270C WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **180907W-79179 - 233145**
Batch ID: #87DOD-180907A

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	BENZO (K) FLUORANTHENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	BENZOIC ACID	Not detected	10.0	1.00	ug/L	09/07/18	09/10/18
BLANK	BENZYL ALCOHOL	Not detected	10.0	2.00	ug/L	09/07/18	09/10/18
BLANK	BIS (2-CHLORETHOXY) METHANE	Not detected	10.0	2.40	ug/L	09/07/18	09/10/18
BLANK	BIS (2-CHLOROETHYL) ETHER	Not detected	10.0	2.20	ug/L	09/07/18	09/10/18
BLANK	BIS (2-CHLOROISOPROPYL) ETHER	Not detected	10.0	2.00	ug/L	09/07/18	09/10/18
BLANK	BIS (2-ETHYLHEXYL) PHTHALATE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
BLANK	BUTYL BENZYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	CARBAZOLE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	CHRYSENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	DI-N-BUTYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	DI-N-OCTYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	DIBENZ (A,H) ANTHRACENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	DIBENZOFURAN	Not detected	20.0	2.40	ug/L	09/07/18	09/10/18
BLANK	DIETHYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	DIMETHYL PHTHALATE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	FLUORANTHENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	FLUORENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	HEXACHLOROBENZENE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
BLANK	HEXACHLOROBUTADIENE	Not detected	10.0	0.90	ug/L	09/07/18	09/10/18
BLANK	HEXACHLOROETHANE	Not detected	10.0	0.80	ug/L	09/07/18	09/10/18
BLANK	INDENO (1,2,3-CD) PYRENE	Not detected	10.0	2.40	ug/L	09/07/18	09/10/18
BLANK	ISOPHORONE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	N-NITROSODI-N-PROPYLAMINE	Not detected	10.0	2.20	ug/L	09/07/18	09/10/18
BLANK	N-NITROSODIMETHYLAMINE	Not detected	10.0	1.70	ug/L	09/07/18	09/10/18
BLANK	N-NITROSODIPHENYLAMINE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	NAPHTHALENE	Not detected	10.0	1.80	ug/L	09/07/18	09/10/18
BLANK	NITROBENZENE	Not detected	10.0	2.10	ug/L	09/07/18	09/10/18
BLANK	PENTACHLOROPHENOL	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
BLANK	PHENANTHRENE	Not detected	20.0	2.50	ug/L	09/07/18	09/10/18
BLANK	PHENOL	Not detected	10.0	1.00	ug/L	09/07/18	09/10/18
BLANK	PYRENE	Not detected	10.0	2.50	ug/L	09/07/18	09/10/18
BLANK	SURROGATE: 2,4,6-TRIBROMOPHEN	97.5	40-125		%	09/07/18	09/10/18
BLANK	SURROGATE: 2-FLUORBIPHENYL (S)	68.9	50-110		%	09/07/18	09/10/18

Quant Method: Y0829NC.M
Run #: 0829Y178
Instrument: Yoda
Sequence: Y180829
Initials: AAB

GC SC-Blank-REG MDLs
Printed: 09/21/18 10:56:42 AM

Method Blank
EPA 8270C WATER

Blank Name/QCG: **180907W-79179 - 233145**
Batch ID: #87DOD-180907A

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	SURROGATE: 2-FLUOROPHENOL (S)	69.1	20-110		%	09/07/18	09/10/18
BLANK	SURROGATE: NITROBENZENE-D5 (S	91.2	40-110		%	09/07/18	09/10/18
BLANK	SURROGATE: PHENOL (S)	47.4	10-115		%	09/07/18	09/10/18
BLANK	SURROGATE: TERPHENYL-D14 (S)	82.1	50-135		%	09/07/18	09/10/18

Quant Method: Y0829NC.M
Run #: 0829Y178
Instrument: Yoda
Sequence: Y180829
Initials: AAB

GC SC-Blank-REG MDLs
Printed: 09/21/18 10:56:42 AM

EPA 8270C

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/11/18
Matrix:	SOIL	Instrument:	Yoda
LCS ID:	180907A-LCS	Time Analyzed:	1614

APPL ID.	Client Sample No.	File ID.	Date Analyzed
AZ79146	DU01-SS-01	0829Y199	09/11/18 1213
180907A-BLK	Blank	0829Y204	09/11/18 1545
180907A-LCS	Lab Control Spike	0829Y205	09/11/18 1614
AZ79147	DU01-SS-02	0829Y207	09/11/18 1710
AZ79148	DU01-SS-03	0829Y208	09/11/18 1738
AZ79149	DU01-SB-01	0829Y209	09/11/18 1806
AZ79150	DU01-SB-02	0829Y212	09/11/18 1930
AZ79151	DU01-SB-03	0829Y213	09/11/18 1958
AZ79153	DU02-SS-02	0829Y215	09/11/18 2054
AZ79154	DU02-SS-03	0829Y216	09/11/18 2122
AZ79155	DU03-SS-01	0829Y217	09/11/18 2150
AZ79156	DU03-SS-02	0829Y218	09/11/18 2218
AZ79157	DU03-SS-03	0829Y219	09/11/18 2246
AZ79159	DU04-SS-02	0829Y221	09/11/18 2342
180907A-MSD	Matrix SpikeD	0829Y227	09/12/18 1033
AZ79152	DU02-SS-01	0829Y228	09/12/18 1101
AZ79158	DU04-SS-01	0829Y229	09/12/18 1129
AZ79160	DU04-SS-03	0829Y230	09/12/18 1157
180907A-MS	Matrix Spike	0829Y231	09/12/18 1225

Comments: Batch: #87CCA-180907A

Laboratory Control Spike Recovery
EPA 8270C ISM SOILS

APPL ID: **180907S-79150 LCS - 233202**
Batch ID: #87CCA-180907A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level mg/kg	SPK Result mg/kg	SPK % Recovery	Recovery Limits
1,2,4-TRICHLOROBENZENE	1.67	1.13	67.8	45-110
1,2-DICHLOROBENZENE	1.67	1.21	72.6	45-95
1,3-DICHLOROBENZENE	1.67	1.19	71.4	40-100
1,4-DICHLOROBENZENE	1.67	1.19	71.4	35-105
2,4,5-TRICHLOROPHENOL	1.67	1.19	71.4	50-110
2,4,6-TRICHLOROPHENOL	1.67	1.15	69.0	45-110
2,4-DICHLOROPHENOL	1.67	1.16	69.6	45-110
2,4-DIMETHYLPHENOL	1.67	1.11	66.6	30-105
2,4-DINITROPHENOL	1.67	1.27	76.2	15-130
2,4-DINITROTOLUENE	1.67	1.21	72.6	50-115
2,6-DINITROTOLUENE	1.67	1.22	73.2	50-110
2-CHLORONAPHTHALENE	1.67	1.15	69.0	45-105
2-CHLOROPHENOL	1.67	1.19	71.4	45-105
2-METHYLPHENOL	1.67	1.22	73.2	40-105
2-NITROANILINE	1.67	1.20	72.0	45-120
2-NITROPHENOL	1.67	1.19	71.4	40-110
3,3´-DICHLOROBENZIDINE	1.67	0.946	56.7	10-130
3-NITROANILINE	1.67	1.07	64.2	25-110
3/4-METHYLPHENOL	3.33	2.49	74.8	40-105
4,6-DINITRO-2-METHYLPHENOL	1.67	1.25	75.0	30-135
4-BROMOPHENYL PHENYL ETHER	1.67	1.19	71.4	45-115
4-CHLORO-3-METHYLPHENOL	1.67	1.18	70.8	45-115
4-CHLOROANILINE	1.67	0.794	47.6	10-95
4-CHLOROPHENYL PHENYL ETHER	1.67	1.20	72.0	45-110
4-NITROANILINE	1.67	1.11	66.6	35-115
4-NITROPHENOL	1.67	1.21	72.6	15-140
BENZOIC ACID	1.67	1.34	80.4	10-110
BENZYL ALCOHOL	1.67	1.21	72.6	20-125
BIS (2-CHLORETHOXY) METHANE	1.67	1.23	73.8	45-110
BIS (2-CHLOROETHYL) ETHER	1.67	1.25	75.0	40-105
BIS (2-CHLOROISOPROPYL) ETHER	1.67	1.22	73.2	20-115

Primary	SPK
Quant Method :	Y0829NC.M
Extraction Date :	09/07/18
Analysis Date :	09/11/18
Instrument :	Yoda
Run :	0829Y205
Initials :	AAB

Comments: ______

Printed: 09/12/18 3:10:31 PM
APPL Standard LCS

Laboratory Control Spike Recovery
EPA 8270C ISM SOILS

APPL ID: **180907S-79150 LCS - 233202**
Batch ID: #87CCA-180907A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level mg/kg	SPK Result mg/kg	SPK % Recovery	Recovery Limits
BIS (2-ETHYLHEXYL) PHTHALATE	1.67	1.16	69.6	45-125
BUTYL BENZYL PHTHALATE	1.67	1.14	68.4	50-125
CARBAZOLE	1.67	1.16	69.6	45-115
DI-N-BUTYL PHTHALATE	1.67	1.22	73.2	55-110
DI-N-OCTYL PHTHALATE	1.67	1.18	70.8	40-130
DIBENZOFURAN	1.67	1.15	69.0	50-105
DIETHYL PHTHALATE	1.67	1.14	68.4	50-115
DIMETHYL PHTHALATE	1.67	1.14	68.4	50-110
HEXACHLOROBENZENE	1.67	1.15	69.0	45-120
HEXACHLOROBUTADIENE	1.67	1.20	72.0	40-115
HEXACHLOROETHANE	1.67	1.25	75.0	35-110
ISOPHORONE	1.67	1.17	70.2	45-110
N-NITROSODI-N-PROPYLAMINE	1.67	1.14	68.4	40-115
N-NITROSODIMETHYLAMINE	1.67	1.25	75.0	20-115
N-NITROSODIPHENYLAMINE	3.33	2.27	68.2	50-115
NITROBENZENE	1.67	1.16	69.6	40-115
PHENOL	1.67	1.17	70.2	40-100
SURROGATE: 2,4,6-TRIBROMOPHENOL	6.66	4.55	68.4	35-125
SURROGATE: 2-FLUORBIPHENYL (S)	3.33	2.07	62.2	45-105
SURROGATE: 2-FLUOROPHENOL (S)	6.66	4.99	75.0	35-105
SURROGATE: NITROBENZENE-D5 (S)	3.33	2.39	71.8	35-100
SURROGATE: PHENOL (S)	6.66	4.90	73.6	40-100
SURROGATE: TERPHENYL-D14 (S)	3.33	1.96	58.9	30-125

Comments: ______________________

Primary	SPK
Quant Method :	Y0829NC.M
Extraction Date :	09/07/18
Analysis Date :	09/11/18
Instrument :	Yoda
Run :	0829Y205
Initials :	AAB

Printed: 09/12/18 3:10:31 PM
APPL Standard LCS

EPA 8270C

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/11/18
Matrix:	WATER	Instrument:	Yoda
LCS ID:	180907A-LCS	Time Analyzed:	1333

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A-BLK	Blank	0829Y178	09/10/18 1147
AZ79179	G-11-SS-04	0829Y181	09/10/18 1310
180907A-LCS	Lab Control Spike	0829Y201	09/11/18 1333

Comments: Batch: #87DOD-180907A

Printed: 09/11/18 3:05:26 PM
Form 4, LCS Summary

Laboratory Control Spike Recovery
EPA 8270C WATER

APPL ID: **180907W-79179 LCS - 233145**
Batch ID: #87DOD-180907A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
1,2,4-TRICHLOROBENZENE	50.0	18.5	37.0	35-105
1,2-DICHLOROBENZENE	50.0	20.4	40.8	35-100
1,3-DICHLOROBENZENE	50.0	17.9	35.8	30-100
1,4-DICHLOROBENZENE	50.0	18.7	37.4	30-100
2,4,5-TRICHLOROPHENOL	50.0	36.4	72.8	50-110
2,4,6-TRICHLOROPHENOL	50.0	36.1	72.2	50-115
2,4-DICHLOROPHENOL	50.0	37.0	74.0	50-105
2,4-DIMETHYLPHENOL	50.0	36.1	72.2	30-110
2,4-DINITROPHENOL	50.0	40.4	80.8	15-140
2,4-DINITROTOLUENE	50.0	37.5	75.0	50-120
2,6-DINITROTOLUENE	50.0	38.3	76.6	50-115
2-CHLORONAPHTHALENE	50.0	24.9	49.8	50-105
2-CHLOROPHENOL	50.0	38.1	76.2	35-105
2-METHYLNAPHTHALENE	50.0	23.7	47.4	45-105
2-METHYLPHENOL	50.0	37.1	74.2	40-110
2-NITROANILINE	50.0	37.6	75.2	50-115
2-NITROPHENOL	50.0	37.6	75.2	40-115
3,3'-DICHLOROBENZIDINE	50.0	31.2	62.4	20-110
3-NITROANILINE	50.0	40.0	80.0	20-125
3/4-METHYLPHENOL	100	66.5	66.5	30-110
4,6-DINITRO-2-METHYLPHENOL	50.0	40.4	80.8	40-130
4-BROMOPHENYL PHENYL ETHER	50.0	32.2	64.4	50-115
4-CHLORO-3-METHYLPHENOL	50.0	37.9	75.8	45-110
4-CHLOROANILINE	50.0	33.8	67.6	15-110
4-CHLOROPHENYL PHENYL ETHER	50.0	28.9	57.8	50-110
4-NITROANILINE	50.0	37.9	75.8	35-120
4-NITROPHENOL	50.0	19.8	39.6	10-125
ACENAPHTHENE	50.0	29.3	58.6	45-110
ACENAPHTHYLENE	50.0	29.7	59.4	50-105
ANTHRACENE	50.0	33.9	67.8	55-110
BENZ (A) ANTHRACENE	50.0	32.5	65.0	55-110

Comments: ______

Primary	SPK
Quant Method :	Y0829NC.M
Extraction Date :	09/07/18
Analysis Date :	09/11/18
Instrument :	Yoda
Run :	0829Y201
Initials :	AAB

Printed: 09/11/18 3:18:46 PM
APPL Standard LCS

Laboratory Control Spike Recovery
EPA 8270C WATER

APPL ID: **180907W-79179 LCS - 233145**
Batch ID: #87DOD-180907A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
BENZO (A) PYRENE	50.0	34.3	68.6	55-110
BENZO (B) FLUORANTHENE	50.0	33.6	67.2	45-120
BENZO (G,H,I) PERYLENE	50.0	35.7	71.4	40-125
BENZO (K) FLUORANTHENE	50.0	36.5	73.0	45-125
BENZOIC ACID	50.0	20.0	40.0	10-125
BENZYL ALCOHOL	50.0	38.6	77.2	30-110
BIS (2-CHLORETHOXY) METHANE	50.0	38.6	77.2	45-105
BIS (2-CHLOROETHYL) ETHER	50.0	39.6	79.2	35-110
BIS (2-CHLOROISOPROPYL) ETHER	50.0	36.9	73.8	25-130
BIS (2-ETHYLHEXYL) PHTHALATE	50.0	35.0	70.0	40-125
BUTYL BENZYL PHTHALATE	50.0	36.3	72.6	45-115
CARBAZOLE	50.0	36.1	72.2	50-115
CHRYSENE	50.0	34.0	68.0	55-110
DI-N-BUTYL PHTHALATE	50.0	36.5	73.0	55-115
DI-N-OCTYL PHTHALATE	50.0	37.7	75.4	35-135
DIBENZ (A,H) ANTHRACENE	50.0	35.0	70.0	40-125
DIBENZOFURAN	50.0	29.9	59.8	55-105
DIETHYL PHTHALATE	50.0	35.8	71.6	40-120
DIMETHYL PHTHALATE	50.0	37.8	75.6	25-125
FLUORANTHENE	50.0	34.8	69.6	55-115
FLUORENE	50.0	32.0	64.0	50-110
HEXACHLOROBENZENE	50.0	33.1	66.2	50-110
HEXACHLOROBUTADIENE	50.0	15.2	30.4	25-105
HEXACHLOROETHANE	50.0	15.9	31.8	30-95
INDENO (1,2,3-CD) PYRENE	50.0	35.9	71.8	45-125
ISOPHORONE	50.0	37.3	74.6	50-110
N-NITROSODI-N-PROPYLAMINE	50.0	36.6	73.2	35-130
N-NITROSODIMETHYLAMINE	50.0	31.1	62.2	25-110
N-NITROSODIPHENYLAMINE	100	66.5	66.5	50-110
NAPHTHALENE	50.0	25.1	50.2	40-100
NITROBENZENE	50.0	35.6	71.2	45-110

Comments:

Primary	SPK
Quant Method :	Y0829NC.M
Extraction Date :	09/07/18
Analysis Date :	09/11/18
Instrument :	Yoda
Run :	0829Y201
Initials :	AAB

Printed: 09/11/18 3:18:47 PM
APPL Standard LCS

Laboratory Control Spike Recovery
EPA 8270C WATER

APPL ID: **180907W-79179 LCS - 233145**
Batch ID: #87DOD-180907A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
PENTACHLOROPHENOL	50.0	37.8	75.6	40-115
PHENANTHRENE	50.0	32.4	64.8	50-115
PHENOL	50.0	22.4	44.8	10-115
PYRENE	50.0	33.9	67.8	50-130
SURROGATE: 2,4,6-TRIBROMOPHENOL	200	137	68.5	40-125
SURROGATE: 2-FLUORBIPHENYL (S)	100	54.8	54.8	50-110
SURROGATE: 2-FLUOROPHENOL (S)	200	118	59.0	20-110
SURROGATE: NITROBENZENE-D5 (S)	100	72.4	72.4	40-110
SURROGATE: PHENOL (S)	200	81.5	40.8	10-115
SURROGATE: TERPHENYL-D14 (S)	100	62.0	62.0	50-135

Comments: ______________________________

Primary	SPK
Quant Method :	Y0829NC.M
Extraction Date :	09/07/18
Analysis Date :	09/11/18
Instrument :	Yoda
Run :	0829Y201
Initials :	AAB

Printed: 09/11/18 3:18:47 PM
APPL Standard LCS

Matrix Spike Recoveries
EPA 8270C ISM SOILS

APPL ID: **180907S-79150 MS - 233202**
Batch ID: #87CCA-180907A
Sample ID: AZ79150
Client ID: DU01-SB-02

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl mg/kg	Matrix Result mg/kg	SPK Result mg/kg	DUP Result mg/kg	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
1,2,4-TRICHLOROBENZENE	1.67	ND	1.17	1.35	70.2	81.0	45-110	14.3	30
1,2-DICHLOROBENZENE	1.67	ND	1.14	1.28	68.4	76.8	45-95	11.6	30
1,3-DICHLOROBENZENE	1.67	ND	1.14	1.32	68.4	79.2	40-100	14.6	30
1,4-DICHLOROBENZENE	1.67	ND	1.12	1.28	67.2	76.8	35-105	13.3	30
2,4,5-TRICHLOROPHENOL	1.67	ND	0.990	1.28	59.4	76.8	50-110	25.6	30
2,4,6-TRICHLOROPHENOL	1.67	ND	0.981	1.07	58.8	64.2	45-110	8.7	30
2,4-DICHLOROPHENOL	1.67	ND	0.942	1.17	56.5	70.2	45-110	21.6	30
2,4-DIMETHYLPHENOL	1.67	ND	0.857	1.10	51.4	66.0	30-105	24.8	30
2,4-DINITROPHENOL	1.67	ND	5.60	5.65	336 #	339 #	15-130	0.89	30
2,4-DINITROTOLUENE	1.67	ND	0.784	0.956	47.0 #	57.3	50-115	19.8	30
2,6-DINITROTOLUENE	1.67	ND	0.759	0.963	45.5 #	57.8	50-110	23.7	30
2-CHLORONAPHTHALENE	1.67	ND	1.10	1.25	66.0	75.0	45-105	12.8	30
2-CHLOROPHENOL	1.67	ND	1.08	1.19	64.8	71.4	45-105	9.7	30
2-METHYLPHENOL	1.67	ND	1.03	1.29	61.8	77.4	40-105	22.4	30
2-NITROANILINE	1.67	ND	0.865	1.07	51.9	64.2	45-120	21.2	30
2-NITROPHENOL	1.67	ND	0.894	1.11	53.6	66.6	40-110	21.6	30
3,3'-DICHLOROBENZIDINE	1.67	ND	0.689	0.778	41.3	46.7	10-130	12.1	30
3-NITROANILINE	1.67	ND	0.698	0.817	41.9	49.0	25-110	15.7	30
3/4-METHYLPHENOL	3.33	ND	0.00	0	0.0 #	0.0 #	40-105	0.00	30
4,6-DINITRO-2-METHYLPHENOL	1.67	ND	0.345	0.403	20.7 #	24.2 #	30-135	15.5	30
4-BROMOPHENYL PHENYL ETHER	1.67	ND	1.08	1.16	64.8	69.6	45-115	7.1	30
4-CHLORO-3-METHYLPHENOL	1.67	ND	0.964	1.22	57.8	73.2	45-115	23.4	30
4-CHLOROANILINE	1.67	ND	0.545	0.640	32.7	38.4	10-95	16.0	30
4-CHLOROPHENYL PHENYL ETHER	1.67	ND	0.00	0	0.0 #	0.0 #	45-110	0.00	30
4-NITROANILINE	1.67	ND	0.850	0.930	51.0	55.8	35-115	9.0	30
4-NITROPHENOL	1.67	ND	0.550	0.651	33.0	39.1	15-140	16.8	30
BENZOIC ACID	1.67	ND	0.0151	0.0722	0.9 #	4.3 #	10-110	130.8 #	30
BENZYL ALCOHOL	1.67	ND	1.02	1.26	61.2	75.6	20-125	21.1	30
BIS (2-CHLORETHOXY) METHANE	1.67	ND	1.19	1.45	71.4	87.0	45-110	19.7	30
BIS (2-CHLOROETHYL) ETHER	1.67	ND	1.16	1.32	69.6	79.2	40-105	12.9	30

= Recovery is outside QC limits.

Comments:

Primary	SPK	DUP
Quant Method :	Y0829NC.M	Y0829NC.M
Extraction Date :	09/07/18	09/07/18
Analysis Date :	09/12/18	09/12/18
Instrument :	Yoda	Yoda
Run :	0829Y231	0829Y227
Initials :	AAB	

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APPL MSD SCII

Matrix Spike Recoveries

EPA 8270C ISM SOILS

APPL ID: **180907S-79150 MS - 233202**
Batch ID: #87CCA-180907A
Sample ID: AZ79150
Client ID: DU01-SB-02

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl mg/kg	Matrix Result mg/kg	SPK Result mg/kg	DUP Result mg/kg	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
BIS (2-CHLOROISOPROPYL) ETHER	1.67	ND	1.09	1.23	65.4	73.8	20-115	12.1	30
BIS (2-ETHYLHEXYL) PHTHALATE	1.67	ND	1.20	1.58	72.0	94.8	45-125	27.3	30
BUTYL BENZYL PHTHALATE	1.67	ND	0.957	1.12	57.4	67.2	50-125	15.7	30
CARBAZOLE	1.67	ND	1.01	1.12	60.6	67.2	45-115	10.3	30
DI-N-BUTYL PHTHALATE	1.67	ND	1.07	1.17	64.2	70.2	55-110	8.9	30
DI-N-OCTYL PHTHALATE	1.67	ND	0.911	1.07	54.6	64.2	40-130	16.1	30
DIBENZOFURAN	1.67	ND	1.12	1.31	67.2	78.6	50-105	15.6	30
DIETHYL PHTHALATE	1.67	ND	1.06	1.20	63.6	72.0	50-115	12.4	30
DIMETHYL PHTHALATE	1.67	ND	1.04	1.21	62.4	72.6	50-110	15.1	30
HEXACHLOROBENZENE	1.67	ND	1.12	1.23	67.2	73.8	45-120	9.4	30
HEXACHLOROBUTADIENE	1.67	ND	1.07	1.29	64.2	77.4	40-115	18.6	30
HEXACHLOROETHANE	1.67	ND	1.02	1.27	61.2	76.2	35-110	21.8	30
ISOPHORONE	1.67	ND	1.04	1.27	62.4	76.2	45-110	19.9	30
N-NITROSODI-N-PROPYLAMINE	1.67	ND	1.13	1.40	67.8	84.0	40-115	21.3	30
N-NITROSODIMETHYLAMINE	1.67	ND	1.14	1.13	68.4	67.8	20-115	0.88	30
N-NITROSODIPHENYLAMINE	3.33	ND	2.32	2.56	69.7	76.9	50-115	9.8	30
NITROBENZENE	1.67	ND	1.07	1.29	64.2	77.4	40-115	18.6	30
PHENOL	1.67	ND	1.15	1.36	69.0	81.6	40-100	16.7	30
SURROGATE: 2,4,6-TRIBROMOPHENOL	6.66	NA	5.12	5.82	76.9	87.5	35-125		
SURROGATE: 2-FLUORBIPHENYL (S)	3.33	NA	2.33	2.63	70.0	79.1	45-105		
SURROGATE: 2-FLUOROPHENOL (S)	6.66	NA	4.83	5.68	72.6	85.3	35-105		
SURROGATE: NITROBENZENE-D5 (S)	3.33	NA	2.20	2.54	66.1	76.3	35-100		
SURROGATE: PHENOL (S)	6.66	NA	5.16	6.11	77.5	91.8	40-100		
SURROGATE: TERPHENYL-D14 (S)	3.33	NA	2.09	2.35	62.8	70.6	30-125		

\# = Recovery is outside QC limits.

Comments:

Primary	SPK	DUP
Quant Method :	Y0829NC.M	Y0829NC.M
Extraction Date :	09/07/18	09/07/18
Analysis Date :	09/12/18	09/12/18
Instrument :	Yoda	Yoda
Run :	0829Y231	0829Y227
Initials :	AAB	

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APPL MSD SCII

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No:
Matrix: Soil
ID: 0829Y002.D

SDG No:
Date Analyzed: 08/29/18
Instrument: Yoda
Time Analyzed: 5:57

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		4ug/ml 8270 08/16/18	0829Y003.D	08/29/18 6:24
2		5ug/ml 8270 08/16/18	0829Y004.D	08/29/18 6:52
3		10ug/ml 8270 08/16/1	0829Y005.D	08/29/18 7:20
4		20ug/ml 8270 08/16/1	0829Y006.D	08/29/18 7:47
5		40ug/ml 8270 08/16/1	0829Y007.D	08/29/18 8:15
6		50ug/ml 8270 08/16/1	0829Y008.D	08/29/18 8:43
7		60ug/ml 8270 08/16/1	0829Y009.D	08/29/18 9:11
8		80ug/ml 8270 08/16/1	0829Y010.D	08/29/18 9:39
9		100ug/ml 8270 08/16/	0829Y011.D	08/29/18 10:07
10		SSug/ml 8270 08/16/1	0829Y012.D	08/29/18 10:35
11				
12				
13				
14				
15				
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17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	50.0
68	0 - 2% of mass 69	0.0
70	0 - 2% of mass 69	0.0
127	10 - 80% of mass 198	57.8
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 197.95	100.0
199	5 - 9% of mass 198	7.0
275	10 - 60% of mass 198	26.5
365	1 - 100% of mass 198	3.3
441	0.01 - 24% of mass 442	17.0
442	50 - 150% of mass 197.95	96.0
443	15 - 24% of mass 442	19.9

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Water
ID: 0829Y174.D

SDG No: 86766
Date Analyzed: 09/10/18
Instrument: Yoda
Time Analyzed: 9:52

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50ug/ml 8270 08/16/1	0829Y175.D	09/10/18 10:07
2	Blank	180907A Blk 1/1000	0829Y178.D	09/10/18 11:47
3	G-11-SS-04	AZ79179W03 1/910	0829Y181.D	09/10/18 13:10
4		50ug/ml 8270 08/16/1	0829Y191.D	09/10/18 20:06
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11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	48.7
68	0 - 2% of mass 69	0.0
70	0 - 2% of mass 69	0.2
127	10 - 80% of mass 198	55.4
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 197.95	100.0
199	5 - 9% of mass 198	6.8
275	10 - 60% of mass 198	26.7
365	1 - 100% of mass 198	3.5
441	0.01 - 24% of mass 442	17.2
442	50 - 150% of mass 197.95	96.1
443	15 - 24% of mass 442	19.7

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Soil
ID: 0829Y195.D

SDG No: 86766
Date Analyzed: 09/11/18
Instrument: Yoda
Time Analyzed: 9:32

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50ug/ml 8270 08/16/1	0829Y196.D	09/11/18 9:47
2	DU01-SS-01	AZ79146SO1 1/30.36G	0829Y199.D	09/11/18 12:13
3				
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11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	49.0
68	0 - 2% of mass 69	0.0
70	0 - 2% of mass 69	0.7
127	10 - 80% of mass 198	56.7
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.9
275	10 - 60% of mass 198	26.7
365	1 - 100% of mass 198	3.9
441	0.01 - 24% of mass 442	17.8
442	50 - 150% of mass 198	100.7
443	15 - 24% of mass 442	18.8

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Water
ID: 0829Y195.D

SDG No: 86766
Date Analyzed: 09/11/18
Instrument: Yoda
Time Analyzed: 9:32

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50ug/ml 8270 08/16/1	0829Y196.D	09/11/18 9:47
2	Lab Control Spike	180907A LCS-1 1/100	0829Y201.D	09/11/18 13:33
3		50ug/ml 8270 08/16/1	0829Y225.D	09/12/18 9:01
4				
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11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	49.0
68	0 - 2% of mass 69	0.0
70	0 - 2% of mass 69	0.7
127	10 - 80% of mass 198	56.7
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.9
275	10 - 60% of mass 198	26.7
365	1 - 100% of mass 198	3.9
441	0.01 - 24% of mass 442	17.8
442	50 - 150% of mass 198	100.7
443	15 - 24% of mass 442	18.8

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Soil
ID: 0829Y202.D

SDG No: 86766
Date Analyzed: 09/11/18
Instrument: Yoda
Time Analyzed: 15:02

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50ug/ml 8270 08/16/1	0829Y203.D	09/11/18 15:17
2	Blank	180907A BLK 1/30.54G	0829Y204.D	09/11/18 15:45
3	Lab Control Spike	180907A LCS-1 1/30.3	0829Y205.D	09/11/18 16:14
4	DU01-SS-02	AZ79147S01 1/30.19G	0829Y207.D	09/11/18 17:10
5	DU01-SS-03	AZ79148S01 1/30.31G	0829Y208.D	09/11/18 17:38
6	DU01-SB-01	AZ79149S01 1/30.35G	0829Y209.D	09/11/18 18:06
7	DU01-SB-02	AZ79150S01 1/30.70G	0829Y212.D	09/11/18 19:30
8	DU01-SB-03	AZ79151S01 1/30.51G	0829Y213.D	09/11/18 19:58
9	DU02-SS-02	AZ79153S01 1/30.31G	0829Y215.D	09/11/18 20:54
10	DU02-SS-03	AZ79154S01 1/30.75G	0829Y216.D	09/11/18 21:22
11	DU03-SS-01	AZ79155S01 1/30.41G	0829Y217.D	09/11/18 21:50
12	DU03-SS-02	AZ79156S01 1/30.55G	0829Y218.D	09/11/18 22:18
13	DU03-SS-03	AZ79157S01 1/30.36G	0829Y219.D	09/11/18 22:46
14	DU04-SS-02	AZ79159S01 1/30.37G	0829Y221.D	09/11/18 23:42
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	48.2
68	0 - 2% of mass 69	0.0
70	0 - 2% of mass 69	0.5
127	10 - 80% of mass 198	53.8
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.5
275	10 - 60% of mass 198	27.8
365	1 - 100% of mass 198	4.0
441	0.01 - 24% of mass 442	17.0
442	50 - 150% of mass 198	113.7
443	15 - 24% of mass 442	19.7

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Soil
ID: 0829Y224.D

SDG No: 86766
Date Analyzed: 09/12/18
Instrument: Yoda
Time Analyzed: 8:46

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		50ug/ml 8270 08/16/1	0829Y225.D	09/12/18 9:01
2		AZ79150S01 MSD-1 1/3	0829Y227.D	09/12/18 10:33
3	DU02-SS-01	AZ79152S01 1/30.59G	0829Y228.D	09/12/18 11:01
4	DU04-SS-01	AZ79158S01 1/30.14G	0829Y229.D	09/12/18 11:29
5	DU04-SS-03	AZ79160S01 1/30.70G	0829Y230.D	09/12/18 11:57
6		AZ79150S01 MS-1 1/30	0829Y231.D	09/12/18 12:25
7		50ug/ml 8270 08/16/1	0829Y240.D	09/12/18 17:10
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80.04% of mass 198	50.9
68	0 - 2% of mass 69	0.0
70	0 - 2% of mass 69	0.7
127	10 - 80% of mass 198	57.8
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	7.1
275	10 - 60% of mass 198	25.5
365	1 - 100% of mass 198	3.7
441	0.01 - 24% of mass 442	16.5
442	50 - 150% of mass 198	95.2
443	15 - 24% of mass 442	19.3

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review

Lab Code: ________ SDG No.: 86766

Lab File ID (Standard): 0829Y008.D Date Analyzed: 08/29/18

Instrument ID: Yoda Time Analyzed: 8:43

GC Column: ________ ID: Heated Purge: (Y/N) ________

		1,4-dichlorobenzene-D4(IS)		Napthalene-D8(IS)		Acenaphthene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	319743	5.61	1314190	7.05	679317	9.06
	UPPER LIMIT	639486	5.78	2628380	7.22	1358634	9.23
	LOWER LIMIT	159872	5.44	657095	6.88	339659	8.89
	SAMPLE NO.						
01	SSug/ml 8270 08/16/18	325956	5.61	1354700	7.04	690477	9.07
02	50ug/ml 8270 08/16/18 (	517481	5.60	2203140	7.04	1160360	9.06
03	180907A Blk 1/1000	251204	5.60	1039160	7.03	534685	9.05
04	AZ79179W03 1/910	327778	5.60	1347690	7.04	703633	9.06
05	50ug/ml 8270 08/16/18 (	387669	5.60	1634560	7.04	854156	9.06
06	50ug/ml 8270 08/16/18 (	321685	5.61	1352000	7.04	703504	9.06
07	AZ79146SO1 1/30.36G	381529	5.60	1519990	7.03	783331	9.06
08	180907A LCS-1 1/1000	478675	5.61	2180110	7.04	1168020	9.06
09	50ug/ml 8270 08/16/18 (	328412	5.60	1375260	7.04	703328	9.06
10	180907A BLK 1/30.54G	321043	5.61	1423500	7.04	841050	9.06
11	180907A LCS-1 1/30.31	404795	5.61	1782180	7.04	935995	9.06
12	AZ79147S01 1/30.19G c	321024	5.60	1304600	7.04	766303	9.05
13	AZ79148S01 1/30.31G c	350468	5.61	1435470	7.03	747126	9.06
14	AZ79149S01 1/30.35G c	302453	5.60	1248710	7.03	712502	9.05
15	AZ79150S01 1/30.70G c	342952	5.61	1443880	7.03	854914	9.06
16	AZ79151S01 1/30.51G c	383810	5.61	1577420	7.04	866957	9.06
17	AZ79153S01 1/30.31G c	431104	5.61	1757290	7.04	894382	9.06
18	AZ79154S01 1/30.75G c	415230	5.61	1696140	7.04	954448	9.06
19	AZ79155S01 1/30.41G c	517544	5.61	2074880	7.04	1069050	9.06
20	AZ79156S01 1/30.55G c	450928	5.61	1844600	7.03	961492	9.06
21	AZ79157S01 1/30.36G c	410891	5.61	1695440	7.04	940893	9.06
22	AZ79159S01 1/30.37G c	437026	5.61	1760300	7.04	895790	9.06

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review

Lab Code: ______ SDG No.: 86766

Lab File ID (Standard): 0829Y008.D Date Analyzed: 08/29/18

Instrument ID: Yoda Time Analyzed: 8:43

GC Column: ______ ID: Heated Purge: (Y/N) ______

		1,4-dichlorobenzene-D4(IS)		Napthalene-D8(IS)		Acenaphthene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	319743	5.6091	1314190	7.0481	679317	9.0626
	UPPER LIMIT	639486	5.7791	2628380	7.2181	1358634	9.2326
	LOWER LIMIT	159871.5	5.4391	657095	6.8781	339658.5	8.8926
	SAMPLE NO.						
23	50ug/ml 8270 08/16/18 (	345948	5.60	1440880	7.04	752322	9.06
24	AZ79150S01 MSD-1 1/3	348170	5.60	1443150	7.03	808790	9.05
25	AZ79152S01 1/30.59G [	394650	5.61	1619460	7.03	903725	9.06
26	AZ79158S01 1/30.14G [	380901	5.60	1575430	7.04	933357	9.06
27	AZ79160S01 1/30.70G [	325184	5.61	1428800	7.04	904644	9.06
28	AZ79150S01 MS-1 1/30	322973	5.60	1375950	7.04	723397	9.05
29	50ug/ml 8270 08/16/18 (	338844	5.61	1420260	7.04	728218	9.06
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.~~50~~ minutes of internal standard RT
RT LOWER LIMIT = -0.~~50~~ minutes of internal standard RT
17 ΥΡ 9-21-18
Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review
Lab Code: ______ SDG No.: 86766
Lab File ID (Standard): 0829Y008.D Date Analyzed: 08/29/18
Instrument ID: Yoda Time Analyzed: 8:43
GC Column: ______ ID: Heated Purge: (Y/N) ______

		Phenanthrene-D10(IS)		Chrysene-D12(IS)		Perylene-D12(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	1213680	10.81	1119670	13.90	1280650	15.85
	UPPER LIMIT	2427360	10.98	2239340	14.07	2561300	16.02
	LOWER LIMIT	606840	10.64	559835	13.73	640325	15.68
	SAMPLE NO.						
01	SSug/ml 8270 08/16/18	1269880	10.80	1153310	13.90	1330720	15.85
02	50ug/ml 8270 08/16/18 (	2141370	10.80	1925750	13.91	2294360	15.85
03	180907A Blk 1/1000	1015820	10.79	1001540	13.89	1045360	15.83
04	AZ79179W03 1/910	1348760	10.79	1348720	13.89	1386720	15.83
05	50ug/ml 8270 08/16/18 (	1586030	10.80	1492040	13.90	1689010	15.85
06	50ug/ml 8270 08/16/18 (	1289650	10.80	1241550	13.90	1351150	15.84
07	AZ79146SO1 1/30.36G	1462020	10.79	1481080	13.89	1473520	15.84
08	180907A LCS-1 1/1000	2149870	10.80	1993420	13.90	2289450	15.85
09	50ug/ml 8270 08/16/18 (	1305310	10.80	1237000	13.90	1333100	15.84
10	180907A BLK 1/30.54G	1594020	10.80	1564120	13.89	1591920	15.84
11	180907A LCS-1 1/30.31	1711500	10.80	1623840	13.90	1795180	15.84
12	AZ79147S01 1/30.19G c	1486960	10.80	1451270	13.89	1477950	15.83
13	AZ79148S01 1/30.31G c	1437920	10.79	1408980	13.89	1415590	15.84
14	AZ79149S01 1/30.35G c	1401660	10.79	1366780	13.89	1400180	15.83
15	AZ79150S01 1/30.70G c	1639210	10.79	1597900	13.89	1656340	15.84
16	AZ79151S01 1/30.51G c	1655700	10.79	1623820	13.89	1659710	15.84
17	AZ79153S01 1/30.31G c	1677520	10.80	1640920	13.89	1694240	15.84
18	AZ79154S01 1/30.75G c	1835560	10.80	1787230	13.89	1864930	15.84
19	AZ79155S01 1/30.41G c	1994390	10.80	1924020	13.89	2017010	15.84
20	AZ79156S01 1/30.55G c	1818420	10.79	1762740	13.89	1809620	15.84
21	AZ79157S01 1/30.36G c	1783710	10.79	1743250	13.89	1796430	15.84
22	AZ79159S01 1/30.37G c	1672330	10.80	1618840	13.89	1687490	15.84

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. | Contract: Review

Lab Code: ________ | SDG No.: 86766

Lab File ID (Standard): 0829Y008.D | Date Analyzed: 08/29/18

Instrument ID: Yoda | Time Analyzed: 8:43

GC Column: ________ ID: | Heated Purge: (Y/N) ________

		Phenanthrene-D10(IS)		Chrysene-D12(IS)		Perylene-D12(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	1213680	10.808	1119670	13.899	1280650	15.849
	UPPER LIMIT	2427360	10.978	2239340	14.069	2561300	16.019
	LOWER LIMIT	606840	10.638	559835	13.729	640325	15.679
	SAMPLE NO.						
23	50ug/ml 8270 08/16/18 (	1372600	10.80	1276400	13.90	1390240	15.84
24	AZ79150S01 MSD-1 1/3	1562870	10.79	1532210	13.89	1595790	15.83
25	AZ79152S01 1/30.59G [	1726390	10.79	1722610	13.89	1793420	15.84
26	AZ79158S01 1/30.14G [	1766180	10.80	1744620	13.89	1818020	15.84
27	AZ79160S01 1/30.70G [	1713970	10.79	1699210	13.89	1762980	15.84
28	AZ79150S01 MS-1 1/30	1350660	10.79	1325920	13.89	1375380	15.83
29	50ug/ml 8270 08/16/18 (	1344940	10.80	1253440	13.90	1365720	15.84
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.~~50~~ minutes of internal standard RT
RT LOWER LIMIT = -0.~~50~~ minutes of internal standard RT
.17 MP 9-21-17
Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A

INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review

Lab Code: ______ SDG No.: 86766

Lab File ID (Standard): 0829Y008.D Date Analyzed: 08/29/18

Instrument ID: Yoda Time Analyzed: 8:43

GC Column: ______ ID: Heated Purge: (Y/N) ______

		1,4-dichlorobenzene-D4(IS)		Napthalene-D8(IS)		Acenaphthene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	319743	5.61	1314190	7.05	679317	9.06
	UPPER LIMIT	639486	6.11	2628380	7.55	1358634	9.56
	LOWER LIMIT	159872	5.11	657095	6.55	339659	8.56
	SAMPLE NO.						
01	SSug/ml 8270 08/16/18	325956	5.61	1354700	7.04	690477	9.07
02	50ug/ml 8270 08/16/18 (	517481	5.60	2203140	7.04	1160360	9.06
03	180907A Blk 1/1000	251204	5.60	1039160	7.03	534685	9.05
04	AZ79179W03 1/910	327778	5.60	1347690	7.04	703633	9.06
05	50ug/ml 8270 08/16/18 (	387669	5.60	1634560	7.04	854156	9.06
06	50ug/ml 8270 08/16/18 (	321685	5.61	1352000	7.04	703504	9.06
07	180907A LCS-1 1/1000	478675	5.61	2180110	7.04	1168020	9.06
08	50ug/ml 8270 08/16/18 (	345948	5.60	1440880	7.04	752322	9.06
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.~~50~~ minutes of internal standard RT
RT LOWER LIMIT = -0.~~50~~ minutes of internal standard RT
.17 rp 9-21-18

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A

INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review

Lab Code: SDG No.: 86766

Lab File ID (Standard): 0829Y008.D Date Analyzed: 08/29/18

Instrument ID: Yoda Time Analyzed: 8:43

GC Column: ID: Heated Purge: (Y/N)

		Phenanthrene-D10(IS)		Chrysene-D12(IS)		Perylene-D12(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	1213680	10.81	1119670	13.90	1280650	15.85
	UPPER LIMIT	2427360	11.31	2239340	14.40	2561300	16.35
	LOWER LIMIT	606840	10.31	559835	13.40	640325	15.35
	SAMPLE NO.						
01	SSug/ml 8270 08/16/18	1269880	10.80	1153310	13.90	1330720	15.85
02	50ug/ml 8270 08/16/18 (	2141370	10.80	1925750	13.91	2294360	15.85
03	180907A Blk 1/1000	1015820	10.79	1001540	13.89	1045360	15.83
04	AZ79179W03 1/910	1348760	10.79	1348720	13.89	1386720	15.83
05	50ug/ml 8270 08/16/18 (	1586030	10.80	1492040	13.90	1689010	15.85
06	50ug/ml 8270 08/16/18 (	1289650	10.80	1241550	13.90	1351150	15.84
07	180907A LCS-1 1/1000	2149870	10.80	1993420	13.90	2289450	15.85
08	50ug/ml 8270 08/16/18 (	1372600	10.80	1276400	13.90	1390240	15.84
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.~~50~~ minutes of internal standard RT
RT LOWER LIMIT = -0.~~50~~ minutes of internal standard RT
.17 rp 9-21-18
Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8270C-LL

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/17/18
Matrix:	SOIL	Instrument:	Linus
Blank ID:	180907A1-BLK	Time Analyzed:	1645

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A1-BLK	Blank	0917L016	09/17/18 1645
AZ79146	DU01-SS-01	0917L019	09/17/18 1813
AZ79147	DU01-SS-02	0917L020	09/17/18 1842
AZ79148	DU01-SS-03	0917L021	09/17/18 1911
AZ79149	DU01-SB-01	0917L022	09/17/18 1940
AZ79150	DU01-SB-02	0917L025	09/17/18 2108
AZ79151	DU01-SB-03	0917L026	09/17/18 2137
AZ79152	DU02-SS-01	0917L027	09/17/18 2207
AZ79153	DU02-SS-02	0917L028	09/17/18 2236
AZ79154	DU02-SS-03	0917L029	09/17/18 2305
AZ79155	DU03-SS-01	0917L030	09/17/18 2334
180907A1-LCS	Lab Control Spike	0918L014	09/18/18 1645
AZ79157	DU03-SS-03	0918L019	09/18/18 1911
AZ79158	DU04-SS-01	0918L020	09/18/18 1940
AZ79159	DU04-SS-02	0918L021	09/18/18 2009
AZ79160	DU04-SS-03	0918L022	09/18/18 2039
180907A1-MS	Matrix Spike	0918L023	09/18/18 2108
180907A1-MSD	Matrix SpikeD	0918L024	09/18/18 2137
AZ79156	DU03-SS-02	0918L030	09/19/18 1131

Comments: Batch: #SIMCA-180907A1

Printed: 09/19/18 3:23:32 PM
Form 4, Blank Summary

Method Blank

EPA 8270C SIM ISM SOIL

Blank Name/QCG: **180907S-79150 - 233394**
Batch ID: #SIMCA-180907A1

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	1-METHYLNAPHTHALENE	Not detected	0.005	0.0010	mg/kg	09/07/18	09/17/18
BLANK	2-METHYLNAPHTHALENE	Not detected	0.005	0.0009	mg/kg	09/07/18	09/17/18
BLANK	ACENAPHTHENE	Not detected	0.005	0.0010	mg/kg	09/07/18	09/17/18
BLANK	ACENAPHTHYLENE	Not detected	0.005	0.0009	mg/kg	09/07/18	09/17/18
BLANK	ANTHRACENE	Not detected	0.005	0.0008	mg/kg	09/07/18	09/17/18
BLANK	BENZO(A)ANTHRACENE	Not detected	0.005	0.0009	mg/kg	09/07/18	09/17/18
BLANK	BENZO(A)PYRENE	Not detected	0.005	0.0009	mg/kg	09/07/18	09/17/18
BLANK	BENZO(B)FLUORANTHENE	Not detected	0.005	0.0011	mg/kg	09/07/18	09/17/18
BLANK	BENZO(GHI)PERYLENE	Not detected	0.005	0.0013	mg/kg	09/07/18	09/17/18
BLANK	BENZO(K)FLUORANTHENE	Not detected	0.005	0.0010	mg/kg	09/07/18	09/17/18
BLANK	CHRYSENE	Not detected	0.005	0.0008	mg/kg	09/07/18	09/17/18
BLANK	DIBENZ(A,H)ANTHRACENE	Not detected	0.005	0.0009	mg/kg	09/07/18	09/17/18
BLANK	FLUORANTHENE	Not detected	0.005	0.0012	mg/kg	09/07/18	09/17/18
BLANK	FLUORENE	Not detected	0.005	0.0010	mg/kg	09/07/18	09/17/18
BLANK	INDENO(1,2,3-CD)PYRENE	Not detected	0.005	0.0009	mg/kg	09/07/18	09/17/18
BLANK	NAPHTHALENE	Not detected	0.005	0.0009	mg/kg	09/07/18	09/17/18
BLANK	PENTACHLOROPHENOL	Not detected	0.010	0.0080	mg/kg	09/07/18	09/17/18
BLANK	PHENANTHRENE	Not detected	0.005	0.0011	mg/kg	09/07/18	09/17/18
BLANK	PYRENE	Not detected	0.005	0.0012	mg/kg	09/07/18	09/17/18

Quant Method: L0917PCP.M
Run #: 0917L016
Instrument: Linus
Sequence: L180917P
Initials: AAB

GC SC-Blank-REG MDLs
Printed: 09/19/18 3:17:30 PM

8270C-LL

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/17/18
Matrix:	WATER	Instrument:	Linus
Blank ID:	180907A-BLK	Time Analyzed:	1448

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A-BLK	Blank	0917L012	09/17/18 1448
AZ79179	G-11-SS-04	0917L015	09/17/18 1616
180907A-LCS	Lab Control Spike	0918L012	09/18/18 1546

Comments: Batch: #SIMCA-180907A

Printed: 09/19/18 8:30:53 AM
Form 4, Blank Summary

Method Blank
EPA 8270C SIM WATER

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

Blank Name/QCG: **180907W-79179 - 233357**
Batch ID: #SIMCA-180907A

Sample Type	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
BLANK	1-METHYLNAPHTHALENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	2-METHYLNAPHTHALENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	ACENAPHTHENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
BLANK	ACENAPHTHYLENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
BLANK	ANTHRACENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
BLANK	BENZ (A) ANTHRACENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	BENZO (A) PYRENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	BENZO (B) FLUORANTHENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
BLANK	BENZO (G,H,I) PERYLENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	BENZO (K) FLUORANTHENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
BLANK	CHRYSENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
BLANK	DIBENZ (A,H) ANTHRACENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
BLANK	FLUORANTHENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	FLUORENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	INDENO (1,2,3-CD) PYRENE	Not detected	0.2	0.05	ug/L	09/07/18	09/17/18
BLANK	NAPHTHALENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	PENTACHLOROPHENOL	Not detected	0.2	0.10	ug/L	09/07/18	09/17/18
BLANK	PHENANTHRENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18
BLANK	PYRENE	Not detected	0.2	0.04	ug/L	09/07/18	09/17/18

Quant Method: L0917PCP.M
Run #: 0917L012
Instrument: Linus
Sequence: L180917P
Initials: AAB

GC SC-Blank-REG MDLs
Printed: 09/21/18 9:45:36 AM

8270C-LL

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/18/18
Matrix:	SOIL	Instrument:	Linus
LCS ID:	180907A1-LCS	Time Analyzed:	1645

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A1-BLK	Blank	0917L016	09/17/18 1645
AZ79146	DU01-SS-01	0917L019	09/17/18 1813
AZ79147	DU01-SS-02	0917L020	09/17/18 1842
AZ79148	DU01-SS-03	0917L021	09/17/18 1911
AZ79149	DU01-SB-01	0917L022	09/17/18 1940
AZ79150	DU01-SB-02	0917L025	09/17/18 2108
AZ79151	DU01-SB-03	0917L026	09/17/18 2137
AZ79152	DU02-SS-01	0917L027	09/17/18 2207
AZ79153	DU02-SS-02	0917L028	09/17/18 2236
AZ79154	DU02-SS-03	0917L029	09/17/18 2305
AZ79155	DU03-SS-01	0917L030	09/17/18 2334
180907A1-LCS	Lab Control Spike	0918L014	09/18/18 1645
AZ79157	DU03-SS-03	0918L019	09/18/18 1911
AZ79158	DU04-SS-01	0918L020	09/18/18 1940
AZ79159	DU04-SS-02	0918L021	09/18/18 2009
AZ79160	DU04-SS-03	0918L022	09/18/18 2039
180907A1-MS	Matrix Spike	0918L023	09/18/18 2108
180907A1-MSD	Matrix SpikeD	0918L024	09/18/18 2137
AZ79156	DU03-SS-02	0918L030	09/19/18 1131

Comments: Batch: #SIMCA-180907A1

Printed: 09/19/18 3:23:33 PM
Form 4, LCS Summary

Laboratory Control Spike Recovery
EPA 8270C SIM ISM SOIL

APPL ID: **180907S-79150 LCS - 233394**
Batch ID: #SIMCA-180907A1

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level mg/kg	SPK Result mg/kg	SPK % Recovery	Recovery Limits
1-METHYLNAPHTHALENE	0.167	0.166	99.4	45-105
2-METHYLNAPHTHALENE	0.167	0.168	101	45-105
ACENAPHTHENE	0.167	0.155	92.8	45-110
ACENAPHTHYLENE	0.167	0.160	95.8	45-105
ANTHRACENE	0.167	0.160	95.8	55-105
BENZO(A)ANTHRACENE	0.167	0.155	92.8	50-110
BENZO(A)PYRENE	0.167	0.159	95.2	50-110
BENZO(B)FLUORANTHENE	0.167	0.163	97.6	45-115
BENZO(GHI)PERYLENE	0.167	0.154	92.2	40-125
BENZO(K)FLUORANTHENE	0.167	0.162	97.0	45-125
CHRYSENE	0.167	0.152	91.0	55-110
DIBENZ(A,H)ANTHRACENE	0.167	0.154	92.2	40-125
FLUORANTHENE	0.167	0.163	97.6	55-115
FLUORENE	0.167	0.162	97.0	50-110
INDENO(1,2,3-CD)PYRENE	0.167	0.136	81.4	40-120
NAPHTHALENE	0.167	0.160	95.8	40-105
PENTACHLOROPHENOL	0.167	0.143	85.6	25-120
PHENANTHRENE	0.167	0.156	93.4	50-110
PYRENE	0.167	0.156	93.4	45-125

Comments: ______________________

Primary	SPK
Quant Method :	L0918PCP.M
Extraction Date :	09/07/18
Analysis Date :	09/18/18
Instrument :	Linus
Run :	0918L014
Initials :	AAB

Printed: 09/19/18 3:17:33 PM
APPL Standard LCS

8270C-LL

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/18/18
Matrix:	WATER	Instrument:	Linus
LCS ID:	180907A-LCS	Time Analyzed:	1546

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180907A-BLK	Blank	0917L012	09/17/18 1448
AZ79179	G-11-SS-04	0917L015	09/17/18 1616
180907A-LCS	Lab Control Spike	0918L012	09/18/18 1546

Comments: Batch: #SIMCA-180907A

Laboratory Control Spike Recovery
EPA 8270C SIM WATER

APPL ID: **180907W-79179 LCS - 233357**
Batch ID: #SIMCA-180907A

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits
1-METHYLNAPHTHALENE	5.00	2.41	48.2	45-105
2-METHYLNAPHTHALENE	5.00	2.27	45.4	45-105
ACENAPHTHENE	5.00	2.74	54.8	45-110
ACENAPHTHYLENE	5.00	2.96	59.2	50-105
ANTHRACENE	5.00	3.13	62.6	55-110
BENZ (A) ANTHRACENE	5.00	3.21	64.2	55-110
BENZO (A) PYRENE	5.00	3.27	65.4	55-110
BENZO (B) FLUORANTHENE	5.00	3.24	64.8	45-120
BENZO (G,H,I) PERYLENE	5.00	3.26	65.2	40-125
BENZO (K) FLUORANTHENE	5.00	3.47	69.4	45-125
CHRYSENE	5.00	3.27	65.4	55-110
DIBENZ (A,H) ANTHRACENE	5.00	3.21	64.2	40-125
FLUORANTHENE	5.00	3.32	66.4	55-115
FLUORENE	5.00	3.13	62.6	50-110
INDENO (1,2,3-CD) PYRENE	5.00	2.80	56.0	45-125
NAPHTHALENE	5.00	2.41	48.2	40-100
PENTACHLOROPHENOL	5.00	3.37	67.4	35-138
PHENANTHRENE	5.00	3.14	62.8	50-115
PYRENE	5.00	3.21	64.2	50-130

Comments: ______________________________

Primary	SPK
Quant Method :	L0918PCP.M
Extraction Date :	09/07/18
Analysis Date :	09/18/18
Instrument :	Linus
Run :	0918L012
Initials :	AAB

Printed: 09/21/18 9:47:00 AM
APPL Standard LCS

Matrix Spike Recoveries
EPA 8270C SIM ISM SOIL

APPL ID: **180907S-79150 MS - 233394**
Batch ID: #SIMCA-180907A1
Sample ID: AZ79150
Client ID: DU01-SB-02

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Compound Name	Spike Lvl mg/kg	Matrix Result mg/kg	SPK Result mg/kg	DUP Result mg/kg	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
1-METHYLNAPHTHALENE	0.167	ND	0.140	0.161	83.8	96.4	45-105	14.0	20
2-METHYLNAPHTHALENE	0.167	ND	0.145	0.165	86.8	98.8	45-105	12.9	20
ACENAPHTHENE	0.167	ND	0.133	0.149	79.6	89.2	45-110	11.3	20
ACENAPHTHYLENE	0.167	ND	0.139	0.158	83.2	94.6	45-105	12.8	20
ANTHRACENE	0.167	ND	0.132	0.151	79.0	90.4	55-105	13.4	20
BENZO(A)ANTHRACENE	0.167	ND	0.136	0.151	81.4	90.4	50-110	10.5	20
BENZO(A)PYRENE	0.167	ND	0.136	0.152	81.4	91.0	50-110	11.1	20
BENZO(B)FLUORANTHENE	0.167	ND	0.136	0.151	81.4	90.4	45-115	10.5	20
BENZO(GHI)PERYLENE	0.167	ND	0.121	0.133	72.5	79.6	40-125	9.4	20
BENZO(K)FLUORANTHENE	0.167	ND	0.122	0.140	73.1	83.8	45-125	13.7	20
CHRYSENE	0.167	ND	0.132	0.146	79.0	87.4	55-110	10.1	20
DIBENZ(A,H)ANTHRACENE	0.167	ND	0.123	0.137	73.7	82.0	40-125	10.8	20
FLUORANTHENE	0.167	ND	0.139	0.156	83.2	93.4	55-115	11.5	20
FLUORENE	0.167	ND	0.139	0.160	83.2	95.8	50-110	14.0	20
INDENO(1,2,3-CD)PYRENE	0.167	ND	0.126	0.136	75.4	81.4	40-120	7.6	20
NAPHTHALENE	0.167	ND	0.139	0.160	83.2	95.8	40-105	14.0	20
PENTACHLOROPHENOL	0.167	ND	0.138	0.152	82.6	91.0	25-120	9.7	20
PHENANTHRENE	0.167	ND	0.131	0.149	78.4	89.2	50-110	12.9	20
PYRENE	0.167	ND	0.135	0.150	80.8	89.8	45-125	10.5	20

Comments: ______________________

Primary	SPK	DUP
Quant Method :	L0918PCP.M	L0918PCP.M
Extraction Date :	09/07/18	09/07/18
Analysis Date :	09/18/18	09/18/18
Instrument :	Linus	Linus
Run :	0918L023	0918L024
Initials :	AAB	

Printed: 09/19/18 3:17:35 PM
APPL MSD SCII

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Soil
ID: 0917L002.D

SDG No: 86766
Date Analyzed: 09/17/18
Instrument: Linus
Time Analyzed: 9:30

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		0.1ug/mL SIM PCP 09/	0917L003.D	09/17/18 9:48
2		0.2 SIM PCP 09/09/18	0917L004.D	09/17/18 10:17
3		0.5 SIM PCP 09/09/18	0917L005.D	09/17/18 10:46
4		2.5 SIM PCP 09/09/18	0917L006.D	09/17/18 11:15
5		5.0 SIM PCP 09/09/18	0917L007.D	09/17/18 11:45
6		25 SIM PCP 09/09/18	0917L008.D	09/17/18 12:14
7		50 SIM PCP 09/09/18	0917L009.D	09/17/18 12:43
8		SS SIM PCP 09/09/18	0917L010.D	09/17/18 13:43
9				
10				
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12				
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14				
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19				
20				
21				
22				

m/e		
51	9.95 - 80% of mass 198	24.4
68	0 - 2.05% of mass 69	0.0
70	0 - 2% of mass 69	0.7
127	10 - 80% of mass 198	45.3
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.4
275	10 - 60% of mass 198	29.9
365	1 - 100% of mass 198	3.9
441	0.01 - 24% of mass 442	15.6
442	50 - 150% of mass 198	141.8
443	15 - 24% of mass 442	19.4

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Soil
ID: 0917L011.D

SDG No: 86766
Date Analyzed: 09/17/18
Instrument: Linus
Time Analyzed: 14:27

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1	Blank	180907A BLK 1/30.54G	0917L016.D	09/17/18 16:45
2	DU01-SS-01	AZ79146S01 1/30.36G	0917L019.D	09/17/18 18:13
3	DU01-SS-02	AZ79147S01 1/30.19G	0917L020.D	09/17/18 18:42
4	DU01-SS-03	AZ79148S01 1/30.31G	0917L021.D	09/17/18 19:11
5	DU01-SB-01	AZ79149S01 1/30.35G	0917L022.D	09/17/18 19:40
6	DU01-SB-02	AZ79150S01 1/30.70G	0917L025.D	09/17/18 21:08
7	DU01-SB-03	AZ79151S01 1/30.51G	0917L026.D	09/17/18 21:37
8	DU02-SS-01	AZ79152S01 1/30.59G	0917L027.D	09/17/18 22:07
9	DU02-SS-02	AZ79153S01 1/30.31G	0917L028.D	09/17/18 22:36
10	DU02-SS-03	AZ79154S01 1/30.75G	0917L029.D	09/17/18 23:05
11	DU03-SS-01	AZ79155S01 1/30.41G	0917L030.D	09/17/18 23:34
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80% of mass 198	25.7
68	0 - 2.05% of mass 69	0.0
70	0 - 2% of mass 69	0.6
127	10 - 80% of mass 198	47.6
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.9
275	10 - 60% of mass 198	28.9
365	1 - 100% of mass 198	3.7
441	0.01 - 24% of mass 442	15.3
442	50 - 150% of mass 198	130.5
443	15 - 24% of mass 442	19.7

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Water
ID: 0917L011.D

SDG No: 86766
Date Analyzed: 09/17/18
Instrument: Linus
Time Analyzed: 14:27

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1	Blank	180907A BLK 1/1000	0917L012.D	09/17/18 14:48
2	G-11-SS-04	AZ79179W03 1/910	0917L015.D	09/17/18 16:16
3				
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7				
8				
9				
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11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80% of mass 198	25.7
68	0 - 2.05% of mass 69	0.0
70	0 - 2% of mass 69	0.6
127	10 - 80% of mass 198	47.6
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.9
275	10 - 60% of mass 198	28.9
365	1 - 100% of mass 198	3.7
441	0.01 - 24% of mass 442	15.3
442	50 - 150% of mass 198	130.5
443	15 - 24% of mass 442	19.7

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Soil
ID: 0918L002.D

SDG No: 86766
Date Analyzed: 09/18/18
Instrument: Linus
Time Analyzed: 10:14

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		0.1ug/mL SIM PCP 09/	0918L003.D	09/18/18 11:12
2		0.2 SIM PCP 09/09/18	0918L004.D	09/18/18 11:41
3		0.5 SIM PCP 09/09/18	0918L005.D	09/18/18 12:10
4		2.5 SIM PCP 09/09/18	0918L006.D	09/18/18 12:39
5		5.0 SIM PCP 09/09/18	0918L007.D	09/18/18 13:09
6		25 SIM PCP 09/09/18	0918L008.D	09/18/18 13:38
7		50 SIM PCP 09/09/18	0918L009.D	09/18/18 14:07
8		SS SIM PCP 09/09/18	0918L010.D	09/18/18 14:36
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80% of mass 198	23.9
68	0 - 2.05% of mass 69	0.0
70	0 - 2% of mass 69	0.7
127	10 - 80% of mass 198	45.7
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.5
275	10 - 60% of mass 198	28.8
365	1 - 100% of mass 198	3.9
441	0.01 - 24% of mass 442	15.8
442	50 - 150% of mass 198	136.7
443	15 - 24% of mass 442	19.9

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Water
ID: 0918L002.D

SDG No: 86766
Date Analyzed: 09/18/18
Instrument: Linus
Time Analyzed: 10:14

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		0.1ug/mL SIM PCP 09/	0918L003.D	09/18/18 11:12
2		0.2 SIM PCP 09/09/18	0918L004.D	09/18/18 11:41
3		0.5 SIM PCP 09/09/18	0918L005.D	09/18/18 12:10
4		2.5 SIM PCP 09/09/18	0918L006.D	09/18/18 12:39
5		5.0 SIM PCP 09/09/18	0918L007.D	09/18/18 13:09
6		25 SIM PCP 09/09/18	0918L008.D	09/18/18 13:38
7		50 SIM PCP 09/09/18	0918L009.D	09/18/18 14:07
8		SS SIM PCP 09/09/18	0918L010.D	09/18/18 14:36
9	Lab Control Spike	180907A LCS-2 1/1000	0918L012.D	09/18/18 15:46
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80% of mass 198	23.9
68	0 - 2.05% of mass 69	0.0
70	0 - 2% of mass 69	0.7
127	10 - 80% of mass 198	45.7
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.5
275	10 - 60% of mass 198	28.8
365	1 - 100% of mass 198	3.9
441	0.01 - 24% of mass 442	15.8
442	50 - 150% of mass 198	136.7
443	15 - 24% of mass 442	19.9

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Soil
ID: 0918L011.D

SDG No: 86766
Date Analyzed: 09/18/18
Instrument: Linus
Time Analyzed: 15:27

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1	Lab Control Spike	180907A LCS-2 1/30.2	0918L014.D	09/18/18 16:45
2	DU03-SS-03	AZ79157S01 1/30.36G	0918L019.D	09/18/18 19:11
3	DU04-SS-01	AZ79158S01 1/30.14G	0918L020.D	09/18/18 19:40
4	DU04-SS-02	AZ79159S01 1/30.37G	0918L021.D	09/18/18 20:09
5	DU04-SS-03	AZ79160S01 1/30.70G	0918L022.D	09/18/18 20:39
6		AZ79150S01 MS-2 1/30	0918L023.D	09/18/18 21:08
7		AZ79150S01 MSD-2 1/3	0918L024.D	09/18/18 21:37
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80% of mass 198	25.1
68	0 - 2.05% of mass 69	0.0
70	0 - 2% of mass 69	0.5
127	10 - 80% of mass 198	46.8
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.7
275	10 - 60% of mass 198	29.1
365	1 - 100% of mass 198	3.8
441	0.01 - 24% of mass 442	15.5
442	50 - 150% of mass 198	137.0
443	15 - 24% of mass 442	19.7

Form 5
Tune Summary

Lab Name: APPL Inc.
Case No: 86766
Matrix: Soil
ID: 0918L028.D

SDG No: 86766
Date Analyzed: 09/19/18
Instrument: Linus
Time Analyzed: 10:38

	Client Sample No.	APPL ID.	File ID.	Date Analyzed
1		5.0 SIM PCP 09/09/18	0918L029.D	09/19/18 10:54
2	DU03-SS-02	AZ79156S01 1/30.55G	0918L030.D	09/19/18 11:31
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

m/e		
51	9.95 - 80% of mass 198	26.7
68	0 - 2.05% of mass 69	0.0
70	0 - 2% of mass 69	0.2
127	10 - 80% of mass 198	47.2
197	0 - 2% of mass 198	0.0
198	100 - 100% of mass 198	100.0
199	5 - 9% of mass 198	6.7
275	10 - 60% of mass 198	28.3
365	1 - 100% of mass 198	3.8
441	0.01 - 24% of mass 442	16.0
442	50 - 150% of mass 198	118.6
443	15 - 24% of mass 442	19.9

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review

Lab Code: ____________ SDG No.: 86766

Lab File ID (Standard): 0917L007.D Date Analyzed: 09/17/18

Instrument ID: Linus Time Analyzed: 11:45

GC Column: ____________ ID: Heated Purge: (Y/N) ____________

		Napthalene-D8(IS)		Acenaphthene-D10(IS)		Phenanthrene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	19112	4.19	8336	6.22	16064	7.97
	UPPER LIMIT	38224	4.69	16672	6.72	32128	8.47
	LOWER LIMIT	9556	3.69	4168	5.72	8032	7.47
	SAMPLE NO.						
01	SS SIM PCP 09/09/18	17489	4.19	7705	6.22	15192	7.97
02	180907A BLK 1/30.54G	25036	4.19	11673	6.22	25372	7.97
03	AZ79146S01 1/30.36G c	29188	4.20	13433	6.22	27442	7.97
04	AZ79147S01 1/30.19G c	27658	4.20	12572	6.22	25362	7.97
05	AZ79148S01 1/30.31G c	15474	4.20	7191	6.22	16745	7.97
06	AZ79149S01 1/30.35G c	30678	4.20	14083	6.22	27852	7.97
07	AZ79150S01 1/30.70G c	29113	4.20	13409	6.22	26575	7.97
08	AZ79151S01 1/30.51G c	28370	4.20	13175	6.22	26010	7.97
09	AZ79152S01 1/30.59G c	26025	4.20	12451	6.22	25360	7.97
10	AZ79153S01 1/30.31G c	26749	4.20	12751	6.22	25083	7.97
11	AZ79154S01 1/30.75G c	23606	4.20	11077	6.22	21895	7.97
12	AZ79155S01 1/30.41G c	27787	4.20	13052	6.22	25758	7.97
13							
14							
15							
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17							
18							
19							
20							
21							
22							

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.~~50~~ minutes of internal standard RT
RT LOWER LIMIT = -0.~~50~~ minutes of internal standard RT
.17 rp 9-21-18
Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review

Lab Code: SDG No.: 86766

Lab File ID (Standard): 0917L007.D Date Analyzed: 09/17/18

Instrument ID: Linus Time Analyzed: 11:45

GC Column: ID: Heated Purge: (Y/N)

		Chrysene-D12(IS)		Perylene-D12(IS)			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	20792	14.39	20089	18.17		
	UPPER LIMIT	41584	14.89	40178	18.67		
	LOWER LIMIT	10396	13.89	10045	17.67		
	SAMPLE NO.						
01	SS SIM PCP 09/09/18	19627	14.40	18725	18.18		
02	180907A BLK 1/30.54G	33360	14.40	32093	18.18		
03	AZ79146S01 1/30.36G c	35601	14.40	35544	18.18		
04	AZ79147S01 1/30.19G c	31295	14.40	31302	18.18		
05	AZ79148S01 1/30.31G c	22268	14.40	22138	18.18		
06	AZ79149S01 1/30.35G c	35338	14.40	34764	18.18		
07	AZ79150S01 1/30.70G c	34459	14.40	34739	18.18		
08	AZ79151S01 1/30.51G c	32745	14.40	32696	18.18		
09	AZ79152S01 1/30.59G c	32378	14.40	32079	18.18		
10	AZ79153S01 1/30.31G c	31700	14.40	31298	18.18		
11	AZ79154S01 1/30.75G c	27572	14.40	27444	18.18		
12	AZ79155S01 1/30.41G c	32699	14.40	32722	18.18		
13							
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.~~50~~ minutes of internal standard RT
RT LOWER LIMIT = -0.~~50~~ minutes of internal standard RT
.17 rp 9-21-18
Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review
Lab Code: SDG No.: 86766
Lab File ID (Standard): 0918L007.D Date Analyzed: 09/18/18
Instrument ID: Linus Time Analyzed: 13:09
GC Column: ID: Heated Purge: (Y/N)

		Napthalene-D8(IS)				Acenaphthene-D10(IS)				Phenanthrene-D10(IS)			
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	12 HOUR STD	19194		4.19		8369		6.22		16285		7.97	
	UPPER LIMIT	38388		4.36		16738		6.39		32570		8.14	
	LOWER LIMIT	9597		4.02		4185		6.05		8143		7.80	
	SAMPLE NO.												
01	SS SIM PCP 09/09/18	17891		4.19		7912		6.22		15761		7.97	
02	180907A LCS-2 1/30.25	16562		4.19		7606		6.22		14870		7.97	
03	AZ79157S01 1/30.36G [	26402		4.19		12038		6.22		23829		7.97	
04	AZ79158S01 1/30.14G [	25511		4.19		12130		6.22		24901		7.97	
05	AZ79159S01 1/30.37G	28137		4.19		13347		6.22		26142		7.97	
06	AZ79160S01 1/30.70G [	21225		4.19		10201		6.22		22862		7.97	
07	AZ79150S01 MS-2 1/30	18524		4.19		8341		6.22		16669		7.97	
08	AZ79150S01 MSD-2 1/3	16990		4.19		7763		6.22		15610		7.97	
09	5.0 SIM PCP 09/09/18	20259		4.18		8817		6.22		17581		7.97	
10	AZ79156S01 1/30.55G [	20586		4.18		9294		6.22		18183		7.97	
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A

INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc.　　　Contract: Review

Lab Code: ______　　　SDG No.: 86766

Lab File ID (Standard): 0918L007.D　　　Date Analyzed: 09/18/18

Instrument ID: Linus　　　Time Analyzed: 13:09

GC Column: ______　　ID:　　Heated Purge: (Y/N) ______

		Chrysene-D12(IS)		Perylene-D12(IS)			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	20975	14.40	20323	18.18		
	UPPER LIMIT	41950	14.57	40646	18.35		
	LOWER LIMIT	10488	14.23	10162	18.01		
	SAMPLE NO.						
01	SS SIM PCP 09/09/18	20529	14.40	19456	18.18		
02	180907A LCS-2 1/30.25	19844	14.40	19034	18.18		
03	AZ79157S01 1/30.36G [	30097	14.40	29675	18.18		
04	AZ79158S01 1/30.14G [	31814	14.40	31888	18.18		
05	AZ79159S01 1/30.37G	34188	14.40	34127	18.18		
06	AZ79160S01 1/30.70G [	30225	14.40	30218	18.18		
07	AZ79150S01 MS-2 1/30	21669	14.41	22406	18.20		
08	AZ79150S01 MSD-2 1/3	20574	14.41	20940	18.20		
09	5.0 SIM PCP 09/09/18	22785	14.40	23381	18.18		
10	AZ79156S01 1/30.55G [	22870	14.41	23613	18.20		
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review

Lab Code: ______ SDG No.: 86766

Lab File ID (Standard): 0917L007.D Date Analyzed: 09/17/18

Instrument ID: Linus Time Analyzed: 11:45

GC Column: ______ ID: Heated Purge: (Y/N) ______

		Napthalene-D8(IS)		Acenaphthene-D10(IS)		Phenanthrene-D10(IS)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	19112	4.19	8336	6.22	16064	7.97
	UPPER LIMIT	38224	4.69	16672	6.72	32128	8.47
	LOWER LIMIT	9556	3.69	4168	5.72	8032	7.47
	SAMPLE NO.						
01	SS SIM PCP 09/09/18	17489	4.19	7705	6.22	15192	7.97
02	180907A BLK 1/1000	22452	4.19	10074	6.22	19625	7.97
03	AZ79179W03 1/910			12068	6.22	23276	7.97
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.~~50~~ minutes of internal standard RT
RT LOWER LIMIT = -0.~~50~~ minutes of internal standard RT
17 rp 9-21-18
Column used to flag values outside QC limits with an asterisk.
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8A
INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: Review

Lab Code: ____________ SDG No.: 86766

Lab File ID (Standard): 0917L007.D Date Analyzed: 09/17/18

Instrument ID: Linus Time Analyzed: 11:45

GC Column: ____________ ID: Heated Purge: (Y/N) ____________

		Chrysene-D12(IS)				Perylene-D12(IS)							
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	12 HOUR STD	20792		14.39		20089		18.17					
	UPPER LIMIT	41584		14.89		40178		18.67					
	LOWER LIMIT	10396		13.89		10045		17.67					
	SAMPLE NO.												
01	SS SIM PCP 09/09/18	19627		14.40		18725		18.18					
02	180907A BLK 1/1000	23942		14.40		23292		18.18					
03	AZ79179W03 1/910	29416		14.40		28415		18.17					
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.~~50~~ minutes of internal standard RT
RT LOWER LIMIT = -0.~~50~~ minutes of internal standard RT
.17 rp 9-21-18
Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A

INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc.   Contract: ______

Lab Code: ______   SDG No.: ______

Lab File ID (Standard): 0918L007.D   Date Analyzed: 09/18/18

Instrument ID: Linus   Time Analyzed: 13:09

GC Column: ______   ID: Heated Purge: (Y/N) ______

		Napthalene-D8(IS)			Acenaphthene-D10(IS)			Phenanthrene-D10(IS)						
		AREA	#	RT	#	AREA	#	RT	#	AREA	#	RT	#
	12 HOUR STD	19194		4.19		8369		6.22		16285		7.97	
	UPPER LIMIT	38388		4.36		16738		6.39		32570		8.14	
	LOWER LIMIT	9597		4.02		4185		6.05		8143		7.80	
	SAMPLE NO.												
01	SS SIM PCP 09/09/18	17891		4.19		7912		6.22		15761		7.97	
02	180907A LCS-2 1/1000	18088		4.19		8160		6.22		16822		7.97	
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RT UPPER LIMIT = +0.17 minutes of internal standard RT
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* Values outside of QC limits.

INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: APPL Inc. Contract: ____

Lab Code: ____ SDG No.: ____

Lab File ID (Standard): 0918L007.D Date Analyzed: 09/18/18

Instrument ID: Linus Time Analyzed: 13:09

GC Column: ____ ID: Heated Purge: (Y/N) ____

		Chrysene-D12(IS)		Perylene-D12(IS)			
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	12 HOUR STD	20975	14.40	20323	18.18		
	UPPER LIMIT	41950	14.57	40646	18.35		
	LOWER LIMIT	10488	14.23	10162	18.01		
	SAMPLE NO.						
01	SS SIM PCP 09/09/18	20529	14.40	19456	18.18		
02	180907A LCS-2 1/1000	21843	14.40	21169	18.18		
03							
04							
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AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = -50% of internal standard area.
RT UPPER LIMIT = +0.17 minutes of internal standard RT
RT LOWER LIMIT = -0.17 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

6020A/3050B

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Megatron
Blank ID:	180913A-BLK	Time Analyzed:	1241

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180913A-MS	Matrix Spike	180914A	09/14/18 1341
180913A-LCS	Lab Control Spike	180914A	09/14/18 1249
180913A-BLK	Blank	180914A	09/14/18 1241
AZ79147	DU01-SS-02	180914A	09/14/18 1328
AZ79148	DU01-SS-03	180914A	09/14/18 1332
AZ79149	DU01-SB-01	180914A	09/14/18 1336
AZ79150	DU01-SB-02	180914A	09/14/18 1356
180913A-MSD	Matrix SpikeD	180914A	09/14/18 1345
AZ79151	DU01-SB-03	180914A	09/14/18 1400
AZ79146	DU01-SS-01	180914A	09/14/18 1324
AZ79156	DU03-SS-02	180918A	09/18/18 1917
AZ79152	DU02-SS-01	180918A	09/18/18 1901
AZ79153	DU02-SS-02	180918A	09/18/18 1905
AZ79155	DU03-SS-01	180918A	09/18/18 1913
AZ79157	DU03-SS-03	180918A	09/18/18 1921
AZ79158	DU04-SS-01	180918A	09/18/18 1925
AZ79159	DU04-SS-02	180918A	09/18/18 1929
AZ79160	DU04-SS-03	180918A	09/18/18 1933
AZ79154	DU02-SS-03	180918A	09/18/18 1909

Comments: Batch: #62A14-180913A

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date	QC Group
6020A	ANTIMONY (SB)	Not detected	0.2	0.07	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	ARSENIC (AS)	Not detected	0.5	0.07	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	BARIUM (BA)	Not detected	0.25	0.070	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	BERYLLIUM (BE)	Not detected	1.0	0.07	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	CADMIUM (CD)	Not detected	0.1	0.03	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	CHROMIUM (CR)	Not detected	0.5	0.07	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	COBALT (CO)	Not detected	0.1	0.02	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	COPPER (CU)	Not detected	2.5	0.04	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	LEAD (PB)	Not detected	0.1	0.02	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	MOLYBDENUM (MO)	Not detected	0.2	0.01	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	NICKEL (NI)	Not detected	0.35	0.102	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	SELENIUM (SE)	Not detected	0.5	0.05	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	SILVER (AG)	Not detected	0.1	0.02	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	THALLIUM (TL)	Not detected	0.1	0.02	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	VANADIUM (V)	Not detected	0.5	0.05	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149
6020A	ZINC (ZN)	Not detected	2.5	0.75	mg/Kg	09/13/18	09/14/18	#62A14-180913A-AZ79149

Metals SC-Blank-REG MDLs
Printed: 09/20/18 12:01:50 PM

7471A/7471A

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Freddie
Blank ID:	180913A-BLK	Time Analyzed:	1237

APPL ID.	Client Sample No.	File ID.	Date Analyzed
AZ79155	DU03-SS-01	180914S	09/14/18 1307
AZ79146	DU01-SS-01	180914S	09/14/18 1243
AZ79147	DU01-SS-02	180914S	09/14/18 1244
AZ79148	DU01-SS-03	180914S	09/14/18 1246
AZ79149	DU01-SB-01	180914S	09/14/18 1248
AZ79150	DU01-SB-02	180914S	09/14/18 1253
AZ79151	DU01-SB-03	180914S	09/14/18 1254
AZ79152	DU02-SS-01	180914S	09/14/18 1256
180913A-BLK	Blank	180914S	09/14/18 1237
AZ79154	DU02-SS-03	180914S	09/14/18 1300
180913A-MSD	Matrix SpikeD	180914S	09/14/18 1251
AZ79156	DU03-SS-02	180914S	09/14/18 1309
AZ79157	DU03-SS-03	180914S	09/14/18 1311
AZ79158	DU04-SS-01	180914S	09/14/18 1312
AZ79159	DU04-SS-02	180914S	09/14/18 1314
AZ79160	DU04-SS-03	180914S	09/14/18 1316
180913A-LCS	Lab Control Spike	180914S	09/14/18 1239
180913A-MS	Matrix Spike	180914S	09/14/18 1249
AZ79153	DU02-SS-02	180914S	09/14/18 1258

Comments: Batch: #HGMIS-180913A

Printed: 09/20/18 12:01:33 PM
Form 4, Blank Summary

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date	QC Group
7471A	MERCURY	Not detected	0.1	0.02	mg/Kg	09/13/18	09/14/18	#HGMIS-180913A-AZ79149

Metals SC-Blank-REG MDLs
Printed: 09/20/18 12:01:30 PM

6020A/3050B

Form 4

Blank Summary

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/13/18
Matrix: SOIL Instrument: Megatron
Blank ID: 180911A1-BLK Time Analyzed: 1426

APPL ID.	Client Sample No.	File ID.	Date Analyzed
AZ79172	B11-SB-01	180914A	09/13/18 1641
AZ79172	B11-SB-01	180914A	09/14/18 1801
AZ79169	B09-SB-01	180914A	09/14/18 1757
AZ79168	B08-SB-01	180914A	09/14/18 1753
AZ79167	B07-SB-01	180914A	09/14/18 1749
AZ79166	B06-SB-01	180914A	09/14/18 1729
AZ79165	B05-SB-01	180914A	09/14/18 1721
AZ79162	B02-SB-01	180914A	09/14/18 1717
AZ79161	B01-SB-01	180914A	09/14/18 1713
180911A1-BLK	Blank	180914A	09/13/18 1426
AZ79176	B15-SS-01	180914A	09/13/18 1657
AZ79175	B14-SB-01	180914A	09/13/18 1653
AZ79161	B01-SB-01	180914A	09/13/18 1434
AZ79173	B12-SB-01	180914A	09/13/18 1645
AZ79175	B14-SB-01	180914A	09/14/18 1813
AZ79171	B10-SS-02	180914A	09/13/18 1637
AZ79170	B10-SS-01	180914A	09/13/18 1633
AZ79169	B09-SB-01	180914A	09/13/18 1629
AZ79168	B08-SB-01	180914A	09/13/18 1625
AZ79167	B07-SB-01	180914A	09/13/18 1621
AZ79178	B17-SS-01	180914A	09/13/18 1501
AZ79177	B16-SS-01	180914A	09/13/18 1457
AZ79166	B06-SB-01	180914A	09/13/18 1453
AZ79165	B05-SB-01	180914A	09/13/18 1449
AZ79164	B04-SS-01	180914A	09/13/18 1445
AZ79163	B03-SS-01	180914A	09/13/18 1441
AZ79162	B02-SB-01	180914A	09/13/18 1438
AZ79174	B13-SS-01	180914A	09/13/18 1649
AZ79165	B05-SB-01	180914A	09/14/18 1725
AZ79172	B11-SB-01	180914A	09/14/18 1805
180911A1-LCS	Lab Control Spike	180914A	09/13/18 1430
180911A1-MS	Matrix Spike	180914A	09/13/18 1505
180911A1-MSD	Matrix SpikeD	180914A	09/13/18 1509
AZ79173	B12-SB-01	180914A	09/14/18 1809
AZ79171	B10-SS-02	180918A	09/18/18 1000

Comments: Batch: #62A14-180911A1

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date	QC Group
6020A	ANTIMONY (SB)	Not detected	0.2	0.07	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	ARSENIC (AS)	Not detected	0.5	0.07	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	BARIUM (BA)	Not detected	0.25	0.070	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	BERYLLIUM (BE)	Not detected	1.0	0.07	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	CADMIUM (CD)	Not detected	0.1	0.03	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	CHROMIUM (CR)	Not detected	0.5	0.07	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	COBALT (CO)	Not detected	0.1	0.02	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	COPPER (CU)	Not detected	2.5	0.04	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	LEAD (PB)	Not detected	0.1	0.02	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	MOLYBDENUM (MO)	Not detected	0.2	0.01	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	NICKEL (NI)	Not detected	0.35	0.102	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	SELENIUM (SE)	Not detected	0.5	0.05	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	SILVER (AG)	Not detected	0.1	0.02	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	THALLIUM (TL)	Not detected	0.1	0.02	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	VANADIUM (V)	Not detected	0.5	0.05	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166
6020A	ZINC (ZN)	Not detected	2.5	0.75	mg/Kg	09/11/18	09/13/18	#62A14-180911A1-AZ79166

Metals SC-Blank-REG MDLs
Printed: 09/20/18 12:22:31 PM

7471A/7471A

Form 4

Blank Summary

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/14/18
Matrix: SOIL Instrument: Freddie
Blank ID: 180911A-BLK Time Analyzed: 1154

APPL ID.	Client Sample No.	File ID.	Date Analyzed
AZ79178	B17-SS-01	180914S	09/14/18 1232
AZ79172	B11-SB-01	180914S	09/14/18 1222
AZ79173	B12-SB-01	180914S	09/14/18 1224
AZ79174	B13-SS-01	180914S	09/14/18 1226
AZ79175	B14-SB-01	180914S	09/14/18 1227
AZ79171	B10-SS-02	180914S	09/14/18 1221
AZ79177	B16-SS-01	180914S	09/14/18 1231
AZ79166	B06-SB-01	180914S	09/14/18 1205
180911A-LCS	Lab Control Spike	180914S	09/14/18 1155
180911A-MS	Matrix Spike	180914S	09/14/18 1207
AZ79176	B15-SS-01	180914S	09/14/18 1229
AZ79170	B10-SS-01	180914S	09/14/18 1216
AZ79169	B09-SB-01	180914S	09/14/18 1214
AZ79167	B07-SB-01	180914S	09/14/18 1211
AZ79165	B05-SB-01	180914S	09/14/18 1204
AZ79164	B04-SS-01	180914S	09/14/18 1202
AZ79163	B03-SS-01	180914S	09/14/18 1200
AZ79162	B02-SB-01	180914S	09/14/18 1159
AZ79161	B01-SB-01	180914S	09/14/18 1157
180911A-BLK	Blank	180914S	09/14/18 1154
180911A-MSD	Matrix SpikeD	180914S	09/14/18 1209
AZ79168	B08-SB-01	180914S	09/14/18 1212

Comments: Batch: #HGS-180911A

Printed: 09/20/18 12:01:18 PM
Form 4, Blank Summary

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date	QC Group
7471A	MERCURY	Not detected	0.5	0.02	mg/Kg	09/11/18	09/14/18	#HGS-180911A-AZ79166

Metals SC-Blank-REG MDLs
Printed: 09/20/18 12:22:32 PM

6020A/3015

Form 4

Blank Summary

Lab Name: APPL, Inc. SDG No: 86766
Case No: 86766 Date Analyzed: 09/14/18
Matrix: WATER Instrument: Megatron
Blank ID: 180911A-BLK Time Analyzed: 1114

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180911A-LCS	Lab Control Spike	180914A	09/14/18 1118
180911A-BLK	Blank	180914A	09/14/18 1114
AZ79179	G-11-SS-04	180914A	09/14/18 1308

Comments: Batch: #62A14-180911A

Printed: 09/20/18 12:00:55 PM
Form 4, Blank Summary

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date	QC Group
6020A	ANTIMONY (SB)	Not detected	6.0	0.35	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	ARSENIC (AS)	Not detected	5.0	0.31	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	BARIUM (BA)	Not detected	3.0	0.25	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	BERYLLIUM (BE)	Not detected	1.0	0.08	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	CADMIUM (CD)	Not detected	1.0	0.10	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	CHROMIUM (CR)	Not detected	10.0	0.45	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	COBALT (CO)	Not detected	1.0	0.13	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	COPPER (CU)	1.2 J	2.0	0.55	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	LEAD (PB)	Not detected	3.0	0.19	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	MOLYBDENUM (MO)	0.20 J	2.0	0.12	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	NICKEL (NI)	Not detected	3.0	0.30	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	SELENIUM (SE)	Not detected	5.0	0.50	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	SILVER (AG)	Not detected	5.0	0.03	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	THALLIUM (TL)	Not detected	1.0	0.10	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	VANADIUM (V)	Not detected	6.0	0.45	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179
6020A	ZINC (ZN)	Not detected	20.0	12.70	ug/L	09/11/18	09/14/18	#62A14-180911A-AZ79179

J = Estimated value.

7470A/7470A

Form 4

Blank Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/19/18
Matrix:	WATER	Instrument:	Freddie
Blank ID:	180917B1-BLK	Time Analyzed:	1427

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180917B1-LCSD	Lab Control SpikeD	180919W	09/19/18 1430
180917B1-LCS	Lab Control Spike	180919W	09/19/18 1429
AZ79179	G-11-SS-04	180919W	09/19/18 1449
180917B1-BLK	Blank	180919W	09/19/18 1427

Comments: Batch: #HGDOD-180917B

Printed: 09/20/18 12:00:55 PM
Form 4, Blank Summary

METALS BLANK

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date	QC Group
7470A	MERCURY (HG)	Not detected	0.2	0.06	ug/L	09/17/18	09/19/18	HGDOD-180917B1-AZ79179

Metals SC-Blank-REG MDLs
Printed: 09/20/18 12:00:52 PM

6020A/3050B

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Megatron
LCS ID:	180913A-LCS	Time Analyzed:	1249

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180913A-MS	Matrix Spike	180914A	09/14/18 1341
180913A-LCS	Lab Control Spike	180914A	09/14/18 1249
180913A-BLK	Blank	180914A	09/14/18 1241
AZ79147	DU01-SS-02	180914A	09/14/18 1328
AZ79148	DU01-SS-03	180914A	09/14/18 1332
AZ79149	DU01-SB-01	180914A	09/14/18 1336
AZ79150	DU01-SB-02	180914A	09/14/18 1356
180913A-MSD	Matrix SpikeD	180914A	09/14/18 1345
AZ79151	DU01-SB-03	180914A	09/14/18 1400
AZ79146	DU01-SS-01	180914A	09/14/18 1324
AZ79156	DU03-SS-02	180918A	09/18/18 1917
AZ79152	DU02-SS-01	180918A	09/18/18 1901
AZ79153	DU02-SS-02	180918A	09/18/18 1905
AZ79155	DU03-SS-01	180918A	09/18/18 1913
AZ79157	DU03-SS-03	180918A	09/18/18 1921
AZ79158	DU04-SS-01	180918A	09/18/18 1925
AZ79159	DU04-SS-02	180918A	09/18/18 1929
AZ79160	DU04-SS-03	180918A	09/18/18 1933
AZ79154	DU02-SS-03	180918A	09/18/18 1909

Comments: Batch: #62A14-180913A

Laboratory Control Spike Recovery
METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level mg/Kg	SPK Result mg/Kg	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 6020A	ANTIMONY (SB)	2.50	2.4	96.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	ARSENIC (AS)	2.50	2.1	84.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	BARIUM (BA)	2.50	2.4	96.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	BERYLLIUM (BE)	0.50	0.46	92.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	CADMIUM (CD)	0.50	0.45	90.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	CHROMIUM (CR)	2.50	2.2	88.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	COBALT (CO)	2.50	2.3	92.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	COPPER (CU)	2.50	2.3	92.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	LEAD (PB)	2.50	2.3	92.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	MOLYBDENUM (MO)	2.50	2.3	92.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	NICKEL (NI)	2.50	2.2	88.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	SELENIUM (SE)	2.50	2.0	80.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	SILVER (AG)	1.0	0.92	92.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	THALLIUM (TL)	2.50	2.4	96.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	VANADIUM (V)	2.50	2.3	92.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149
EPA 6020A	ZINC (ZN)	5.00	4.1	82.0	80-120	09/13/18	09/14/18	#62A14-180913A-AZ79149

Comments:

7471A/7471A

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Freddie
LCS ID:	180913A-LCS	Time Analyzed:	1239

APPL ID.	Client Sample No.	File ID.	Date Analyzed
AZ79155	DU03-SS-01	180914S	09/14/18 1307
AZ79146	DU01-SS-01	180914S	09/14/18 1243
AZ79147	DU01-SS-02	180914S	09/14/18 1244
AZ79148	DU01-SS-03	180914S	09/14/18 1246
AZ79149	DU01-SB-01	180914S	09/14/18 1248
AZ79150	DU01-SB-02	180914S	09/14/18 1253
AZ79151	DU01-SB-03	180914S	09/14/18 1254
AZ79152	DU02-SS-01	180914S	09/14/18 1256
180913A-BLK	Blank	180914S	09/14/18 1237
AZ79154	DU02-SS-03	180914S	09/14/18 1300
180913A-MSD	Matrix SpikeD	180914S	09/14/18 1251
AZ79156	DU03-SS-02	180914S	09/14/18 1309
AZ79157	DU03-SS-03	180914S	09/14/18 1311
AZ79158	DU04-SS-01	180914S	09/14/18 1312
AZ79159	DU04-SS-02	180914S	09/14/18 1314
AZ79160	DU04-SS-03	180914S	09/14/18 1316
180913A-LCS	Lab Control Spike	180914S	09/14/18 1239
180913A-MS	Matrix Spike	180914S	09/14/18 1249
AZ79153	DU02-SS-02	180914S	09/14/18 1258

Comments: Batch: #HGMIS-180913A

Printed: 09/20/18 12:01:33 PM
Form 4, LCS Summary

Laboratory Control Spike Recovery
METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level mg/Kg	SPK Result mg/Kg	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 7471A	MERCURY	0.16	0.17	106	80-120	09/13/18	09/14/18	#HGMIS-180913A-AZ79149

Comments: ______________________________

6020A/3050B

Form 4

LCS Summary

Lab Name: APPL, Inc.
SDG No: 86766
Case No: 86766
Date Analyzed: 09/13/18
Matrix: SOIL
Instrument: Megatron
LCS ID: 180911A1-LCS
Time Analyzed: 1430

APPL ID.	Client Sample No.	File ID.	Date Analyzed
AZ79172	B11-SB-01	180914A	09/13/18 1641
AZ79172	B11-SB-01	180914A	09/14/18 1801
AZ79169	B09-SB-01	180914A	09/14/18 1757
AZ79168	B08-SB-01	180914A	09/14/18 1753
AZ79167	B07-SB-01	180914A	09/14/18 1749
AZ79166	B06-SB-01	180914A	09/14/18 1729
AZ79165	B05-SB-01	180914A	09/14/18 1721
AZ79162	B02-SB-01	180914A	09/14/18 1717
AZ79161	B01-SB-01	180914A	09/14/18 1713
180911A1-BLK	Blank	180914A	09/13/18 1426
AZ79176	B15-SS-01	180914A	09/13/18 1657
AZ79175	B14-SB-01	180914A	09/13/18 1653
AZ79161	B01-SB-01	180914A	09/13/18 1434
AZ79173	B12-SB-01	180914A	09/13/18 1645
AZ79175	B14-SB-01	180914A	09/14/18 1813
AZ79171	B10-SS-02	180914A	09/13/18 1637
AZ79170	B10-SS-01	180914A	09/13/18 1633
AZ79169	B09-SB-01	180914A	09/13/18 1629
AZ79168	B08-SB-01	180914A	09/13/18 1625
AZ79167	B07-SB-01	180914A	09/13/18 1621
AZ79178	B17-SS-01	180914A	09/13/18 1501
AZ79177	B16-SS-01	180914A	09/13/18 1457
AZ79166	B06-SB-01	180914A	09/13/18 1453
AZ79165	B05-SB-01	180914A	09/13/18 1449
AZ79164	B04-SS-01	180914A	09/13/18 1445
AZ79163	B03-SS-01	180914A	09/13/18 1441
AZ79162	B02-SB-01	180914A	09/13/18 1438
AZ79174	B13-SS-01	180914A	09/13/18 1649
AZ79165	B05-SB-01	180914A	09/14/18 1725
AZ79172	B11-SB-01	180914A	09/14/18 1805
180911A1-LCS	Lab Control Spike	180914A	09/13/18 1430
180911A1-MS	Matrix Spike	180914A	09/13/18 1505
180911A1-MSD	Matrix SpikeD	180914A	09/13/18 1509
AZ79173	B12-SB-01	180914A	09/14/18 1809
AZ79171	B10-SS-02	180918A	09/18/18 1000

Comments: Batch: #62A14-180911A1

Laboratory Control Spike Recovery
METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level mg/Kg	SPK Result mg/Kg	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 6020A	ANTIMONY (SB)	25.0	24.4	97.6	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	ARSENIC (AS)	25.0	23.2	92.8	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	BARIUM (BA)	25.0	24.2	96.8	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	BERYLLIUM (BE)	5.00	4.9	98.0	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	CADMIUM (CD)	5.00	4.7	94.0	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	CHROMIUM (CR)	25.0	23.7	94.8	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	COBALT (CO)	25.0	23.8	95.2	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	COPPER (CU)	25.0	23.2	92.8	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	LEAD (PB)	25.0	23.8	95.2	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	MOLYBDENUM (MO)	25.0	23.4	93.6	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	NICKEL (NI)	25.0	22.8	91.2	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	SELENIUM (SE)	25.0	22.9	91.6	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	SILVER (AG)	10.00	9.1	91.0	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	THALLIUM (TL)	25.0	23.6	94.4	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	VANADIUM (V)	25.0	23.8	95.2	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166
EPA 6020A	ZINC (ZN)	50.0	44.9	89.8	80-120	09/11/18	09/13/18	#62A14-180911A1-AZ79166

Comments: ______

7471A/7471A

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	SOIL	Instrument:	Freddie
LCS ID:	180911A-LCS	Time Analyzed:	1155

APPL ID.	Client Sample No.	File ID.	Date Analyzed
AZ79178	B17-SS-01	180914S	09/14/18 1232
AZ79172	B11-SB-01	180914S	09/14/18 1222
AZ79173	B12-SB-01	180914S	09/14/18 1224
AZ79174	B13-SS-01	180914S	09/14/18 1226
AZ79175	B14-SB-01	180914S	09/14/18 1227
AZ79171	B10-SS-02	180914S	09/14/18 1221
AZ79177	B16-SS-01	180914S	09/14/18 1231
AZ79166	B06-SB-01	180914S	09/14/18 1205
180911A-LCS	Lab Control Spike	180914S	09/14/18 1155
180911A-MS	Matrix Spike	180914S	09/14/18 1207
AZ79176	B15-SS-01	180914S	09/14/18 1229
AZ79170	B10-SS-01	180914S	09/14/18 1216
AZ79169	B09-SB-01	180914S	09/14/18 1214
AZ79167	B07-SB-01	180914S	09/14/18 1211
AZ79165	B05-SB-01	180914S	09/14/18 1204
AZ79164	B04-SS-01	180914S	09/14/18 1202
AZ79163	B03-SS-01	180914S	09/14/18 1200
AZ79162	B02-SB-01	180914S	09/14/18 1159
AZ79161	B01-SB-01	180914S	09/14/18 1157
180911A-BLK	Blank	180914S	09/14/18 1154
180911A-MSD	Matrix SpikeD	180914S	09/14/18 1209
AZ79168	B08-SB-01	180914S	09/14/18 1212

Comments: Batch: #HGS-180911A

Laboratory Control Spike Recovery
METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level mg/Kg	SPK Result mg/Kg	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 7471A	MERCURY	0.67	0.74	110	80-120	09/11/18	09/14/18	#HGS-180911A-AZ79166

Comments: ______________________________

6020A/3015

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/14/18
Matrix:	WATER	Instrument:	Megatron
LCS ID:	180911A-LCS	Time Analyzed:	1118

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180911A-LCS	Lab Control Spike	180914A	09/14/18 1118
180911A-BLK	Blank	180914A	09/14/18 1114
AZ79179	G-11-SS-04	180914A	09/14/18 1308

Comments: Batch: #62A14-180911A

Printed: 09/20/18 12:00:55 PM
Form 4, LCS Summary

Laboratory Control Spike Recovery

METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Level ug/L	SPK Result ug/L	SPK % Recovery	Recovery Limits	Extract Date	Analysis Date	QC Group
EPA 6020A	ANTIMONY (SB)	250	246	98.4	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	ARSENIC (AS)	250	239	95.6	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	BARIUM (BA)	250	237	94.8	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	BERYLLIUM (BE)	50.0	41.0	82.0	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	CADMIUM (CD)	50.0	47.5	95.0	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	CHROMIUM (CR)	250	238	95.2	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	COBALT (CO)	250	239	95.6	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	COPPER (CU)	250	252	101	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	LEAD (PB)	250	226	90.4	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	MOLYBDENUM (MO)	250	233	93.2	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	NICKEL (NI)	250	232	92.8	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	SELENIUM (SE)	250	214	85.6	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	SILVER (AG)	100.0	91.9	91.9	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	THALLIUM (TL)	250	227	90.8	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	VANADIUM (V)	250	240	96.0	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179
EPA 6020A	ZINC (ZN)	500	481	96.2	80-120	09/11/18	09/14/18	#62A14-180911A-AZ79179

Comments:

7470A/7470A

Form 4

LCS Summary

Lab Name:	APPL, Inc.	SDG No:	86766
Case No:	86766	Date Analyzed:	09/19/18
Matrix:	WATER	Instrument:	Freddie
LCS ID:	180917B1-LCS	Time Analyzed:	1429

APPL ID.	Client Sample No.	File ID.	Date Analyzed
180917B1-LCSD	Lab Control SpikeD	180919W	09/19/18 1430
180917B1-LCS	Lab Control Spike	180919W	09/19/18 1429
AZ79179	G-11-SS-04	180919W	09/19/18 1449
180917B1-BLK	Blank	180919W	09/19/18 1427

Comments: Batch: #HGDOD-180917B

Laboratory Control Spike Recoveries

METALS

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Lvl ug/L	SPK Res ug/L	DUP Res ug/L	SPK % Recov	DUP % Recov	RPD	RPD Max	QC Limits	Extract Date-Spk	Analysis Date-Spk	Extract Date-Dup	Analysis Date-Dup	QC Group
EPA 7470A	MERCURY (HG)	4.00	3.9	4.1	97.5	102	5.0	20	80-120	09/17/18	09/19/18	09/17/18	09/19/18	#HGDOD-180917B1-AZ79

Comments: __________

Matrix Spike Recoveries

METALS

APPL ID: **180913S-79149 MS - 233319**

Sample ID: AZ79149
Client ID: DU01-SB-01

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Lvl mg/Kg	Matrix Res mg/Kg	SPK Res mg/Kg	DUP Res mg/Kg	SPK % Recovery	DUP % Recovery	RPD	RPD Max	Recovery Limits	Extract Date-Spk	Analysis Date-Spk	Extract Date-Dup	Analysis Date-Dup	QC Group	QC Sample
EPA 6020A	ANTIMONY (SB)	80.0	0.46	38.0	38.5	46.9 #	47.5 #	1.3	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	ARSENIC (AS)	80.0	2.1	64.8	62.6	78.4 #	75.6 #	3.5	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	BARIUM (BA)	80.0	18.5	29.9	29.8	14.2 #	14.1 #	0.3	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	BERYLLIUM (BE)	80.0	0.20	57.8	57.1	72.0 #	71.1 #	1.2	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	CADMIUM (CD)	80.0	0.12	64.4	62.2	80.4	77.6 #	3.5	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	CHROMIUM (CR)	80.0	4.3	66.5	66.4	77.8 #	77.6 #	0.1	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	COBALT (CO)	80.0	2.0	65.6	65.1	79.5 #	78.9 #	0.8	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	COPPER (CU)	80.0	24.8	87.5	87.7	78.4 #	78.6 #	0.2	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	LEAD (PB)	80.0	16.5	81.5	82.6	81.3	82.6	1.3	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	MOLYBDENUM (MO)	80.0	12.4	73.7	73.3	76.6 #	76.1 #	0.5	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	NICKEL (NI)	80.0	3.4	66.3	66.2	78.6 #	78.5 #	0.1	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	SELENIUM (SE)	80.0	0.089	57.5	59.9	71.8 #	74.8 #	4.1	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	SILVER (AG)	40.0	0.076	31.3	31.9	78.1 #	79.6 #	1.9	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	THALLIUM (TL)	80.0	0.042	62.5	63.1	78.1 #	78.8 #	1.0	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	VANADIUM (V)	80.0	19.7	81.8	82.0	77.6 #	77.9 #	0.2	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149
EPA 6020A	ZINC (ZN)	80.0	39.1	96.8	95.7	72.1 #	70.8 #	1.1	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233319	AZ79149

= Recovery is outside QC limits.

Comments: ______________________________

Printed: 09/20/18 12:01:52 PM
APPL MSD SCII

Matrix Spike Recoveries

METALS

APPL ID: **180913S-79149 MS - 233410**

Sample ID: AZ79149

Client ID: DU01-SB-01

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Lvl mg/Kg	Matrix Res mg/Kg	SPK Res mg/Kg	DUP Res mg/Kg	SPK % Recovery	DUP % Recovery	RPD	RPD Max	Recovery Limits	Extract Date-Spk	Analysis Date-Spk	Extract Date-Dup	Analysis Date-Dup	QC Group	QC Sample
EPA 7471A	MERCURY	0.16	0.018	0.17	0.17	95.0	95.0	0.0	20	80-120	09/13/18	09/14/18	09/13/18	09/14/18	233410	AZ79149

Comments: ______________________________

Matrix Spike Recoveries

METALS

APPL ID: **180911S-79166 MS - 233340**

Sample ID: AZ79166
Client ID: B06-SB-01

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Method	Compound Name	Spike Lvl mg/Kg	Matrix Res mg/Kg	SPK Res mg/Kg	DUP Res mg/Kg	SPK % Recovery	DUP % Recovery	RPD	RPD Max	Recovery Limits	Extract Date-Spk	Analysis Date-Spk	Extract Date-Dup	Analysis Date-Dup	QC Group	QC Sample
EPA 6020A	ANTIMONY (SB)	50	1.1	40.2	39.9	78.2 #	77.6 #	0.8	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	ARSENIC (AS)	50	1.5	47.8	47.3	92.6	91.6	1.1	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	BARIUM (BA)	50	60.1	92.7	91.0	65.2 #	61.8 #	1.9	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	BERYLLIUM (BE)	10	0.24	10.1	9.9	98.6	96.6	2.0	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	CADMIUM (CD)	10	0.38	9.6	9.5	92.2	91.2	1.0	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	CHROMIUM (CR)	50	8.6	56.4	54.6	95.6	92.0	3.2	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	COBALT (CO)	50	1.7	48.3	48.5	93.2	93.6	0.4	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	COPPER (CU)	50	453	866	528	826 #	150 #	48.5 #	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	LEAD (PB)	50	27.4	77.1	72.2	99.4	89.6	6.6	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	MOLYBDENUM (MO)	50	22.8	70.0	64.5	94.4	83.4	8.2	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	NICKEL (NI)	50	5.2	50.9	49.8	91.4	89.2	2.2	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	SELENIUM (SE)	50	0.17	48.8	45.8	97.3	91.3	6.3	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	SILVER (AG)	20	0.086	18.2	18.0	90.6	89.6	1.1	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	THALLIUM (TL)	50	0.058	46.8	46.5	93.5	92.9	0.6	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	VANADIUM (V)	50	21.7	70.9	68.7	98.4	94.0	3.2	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 6020A	ZINC (ZN)	100	50.8	125	124	74.2 #	73.2 #	0.8	20	80-120	09/11/18	09/13/18	09/11/18	09/13/18	233340	AZ79166
EPA 7471A	MERCURY	0.618	0.025	0.59	0.62	91.4	96.3	5.0	20	80-120	09/11/18	09/14/18	09/11/18	09/14/18	233337	AZ79166

= Recovery is outside QC limits.

Comments: ______________________________

Printed: 09/20/18 12:01:18 PM
APPL MSD SCII

WETLAB

Sample/Sample Duplicate Results

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

Sample ID: AZ79155
Client ID: DU03-SS-01

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

ARF: 86766

Method	Analyte	Sample ID	Sample Result	Sample Dup Result	RPD	RPD Max	MDL	PQL	Units	Sample Extract Date	Sample Analysis Date	Sample Dup Extract Date	Sample Dup Analysis Date
CLP MOIST	MOISTURE	AZ79155	4.2	4.1	2.4	20		2.0	%	09/06/18	09/07/18	09/06/18	09/07/18

Printed: 09/18/18 12:22:55 PM

Dup-SCII (NoMC)

WETLAB

Sample/Sample Duplicate Results

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

Sample ID: AZ79165
Client ID: B05-SB-01

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

ARF: 86766

Method	Analyte	Sample ID	Sample Result	Sample Dup Result	RPD	RPD Max	MDL	PQL	Units	Sample Extract Date	Sample Analysis Date	Sample Dup Extract Date	Sample Dup Analysis Date
CLP MOIST	MOISTURE	AZ79165	12.8	14.3	11	20		2.0	%	09/06/18	09/07/18	09/06/18	09/07/18

Printed: 09/18/18 12:22:55 PM

Dup-SCII (NoMC)

WETLAB

Sample/Sample Duplicate Results

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

Sample ID: AZ79166
Client ID: B06-SB-01

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

ARF: 86766

Method	Analyte	Sample ID	Sample Result	Sample Dup Result	RPD	RPD Max	MDL	PQL	Units	Sample Extract Date	Sample Analysis Date	Sample Dup Extract Date	Sample Dup Analysis Date
CLP MOIST	MOISTURE	AZ79166	6.7	6.5	3.0	20		2.0	%	09/06/18	09/07/18	09/06/18	09/07/18

Printed: 09/18/18 12:22:55 PM

Dup-SCII (NoMC)

WETLAB

Sample/Sample Duplicate Results

CDM Smith
14432 SE Eastgate Way, Ste 100
Bellevue, WA 98007

Attn: Scott Felton

Project: Vogelsang Former Waste Disposal Area

Sample ID: AZ79178
Client ID: B17-SS-01

APPL Inc.
908 North Temperance Avenu
Clovis, CA 93611

ARF: 86766

Method	Analyte	Sample ID	Sample Result	Sample Dup Result	RPD	RPD Max	MDL	PQL	Units	Sample Extract Date	Sample Analysis Date	Sample Dup Extract Date	Sample Dup Analysis Date
CLP MOIST	MOISTURE	AZ79178	5.7	5.1	11	20		2.0	%	09/06/18	09/07/18	09/06/18	09/07/18

Printed: 09/18/18 12:22:55 PM

Dup-SCII (NoMC)

ORGANICS
Calibration Data

APPL, INC.

TPH Extractables
DROB0905

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 09/05/18
Matrix: Instrument: Apollo Initials:

Diesel:	905003.D	905004.D	905005.D	905006.D	905007.D	905008.D
Motor Oil	905010.D	905011.D	905012.D	905013.D	905014.D	905015.D

		Compound	1	2	3	4	5	6					Avg	%RSD	Type	r^2	Q
1	HATM	Diesel (C10-C24)	1988224	1595370	1560240	1616332	1572433	1571442					1650673	10	HATM		
2	HBTM	Motor Oil (C24-C36)	1446969	1297949	1134843	1165499	1129589	1149237					1220681	10	HBTM		
3	SA	Ortho-Terphenyl(S)	2367841	1987512	1916740	1891892	1734307	1719637					1936322	12	SA		
4	SA	Octacosane(S)	1652614	1674318	1605080	1646548	1560961	1550101					1614937	3.2	SA		
5																	
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1.025526

Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180905\905003.D Vial: 3
Acq On : 9-5-18 13:32:12 Operator: DP
Sample : Diesel - 1 9/5/18 Inst : Apollo
Misc : Mix(A) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 10 10:54 2018 Quant Results File: AK0905.RES

Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

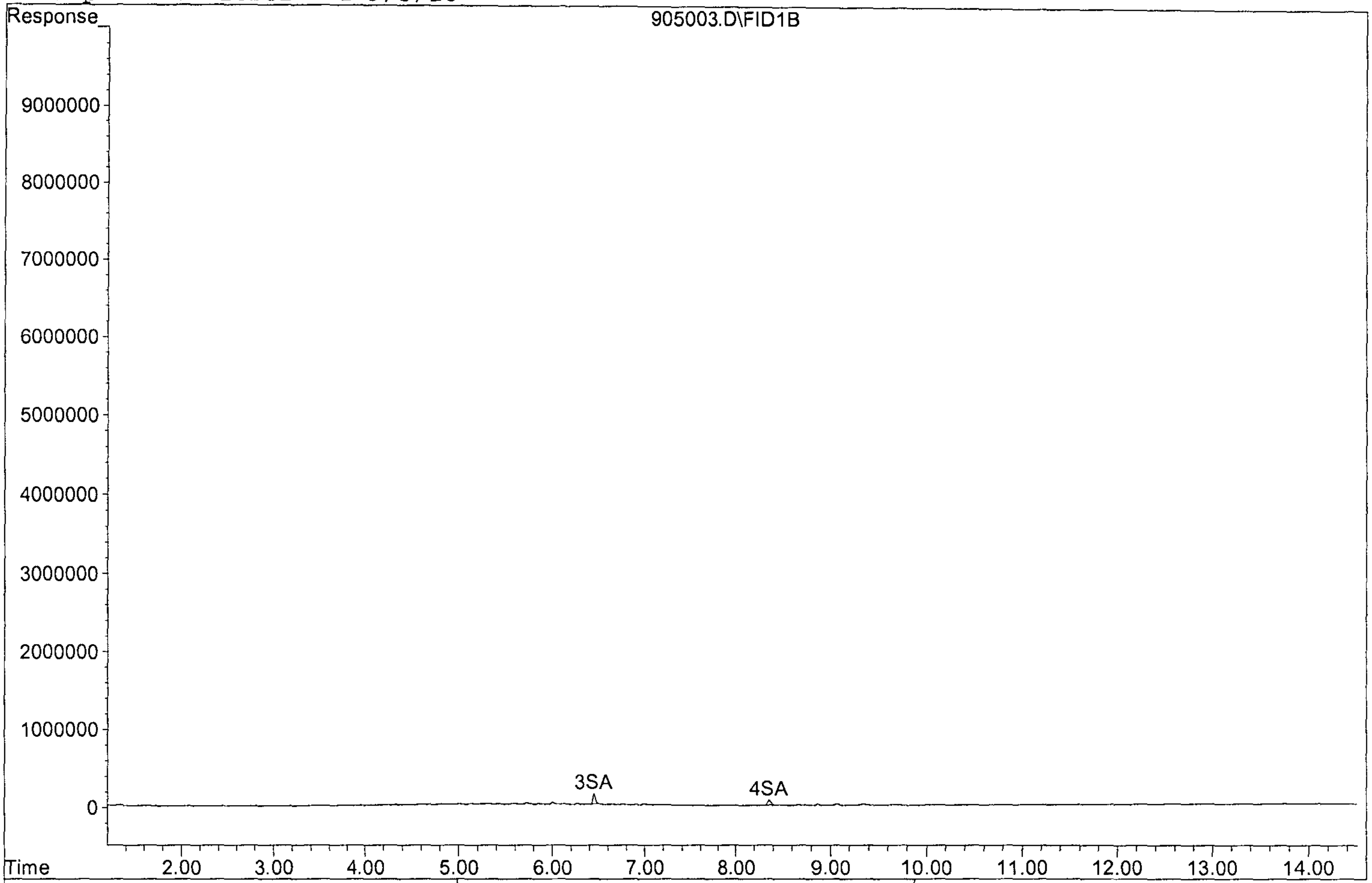
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

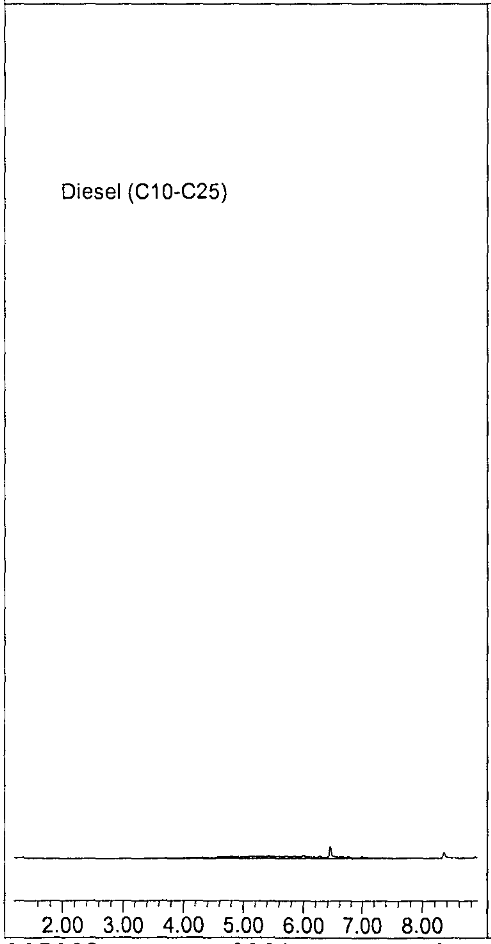
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	2367841	0.611 ppb
Surrogate Spike 30.000	Recovery	=	2.04%
4) SA Octacosane(S)	8.35	1652614	0.512 ppb
Surrogate Spike 30.000	Recovery	=	1.71%
Target Compounds			
1) HATM Diesel (C10-C25)	4.95	40344655	12.118 ppb

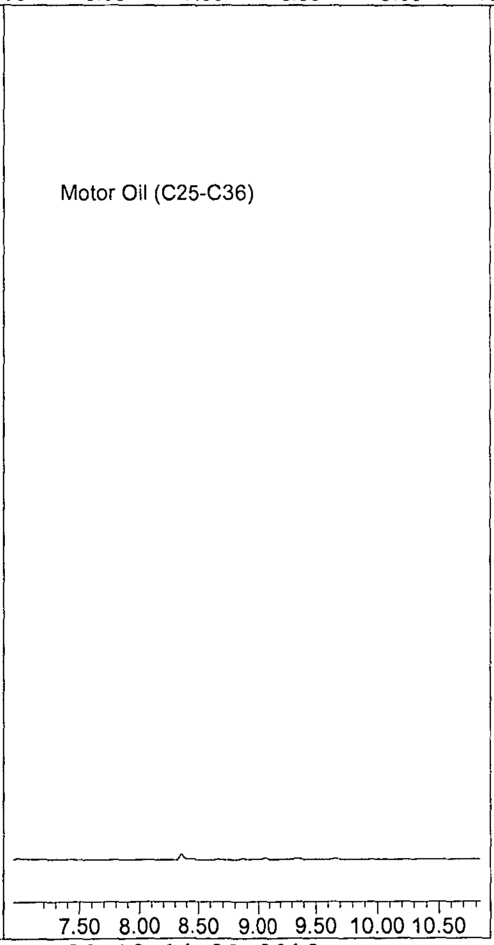
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180905\905003.D
Sample : Diesel - 1 9/5/18







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180905\905004.D   Vial: 4
Acq On : 9-5-18 13:51:56   Operator: DP
Sample : Diesel - 2 9/5/18   Inst : Apollo
Misc : Mix(A)   Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 10 10:54 2018 Quant Results File: AK0905.RES

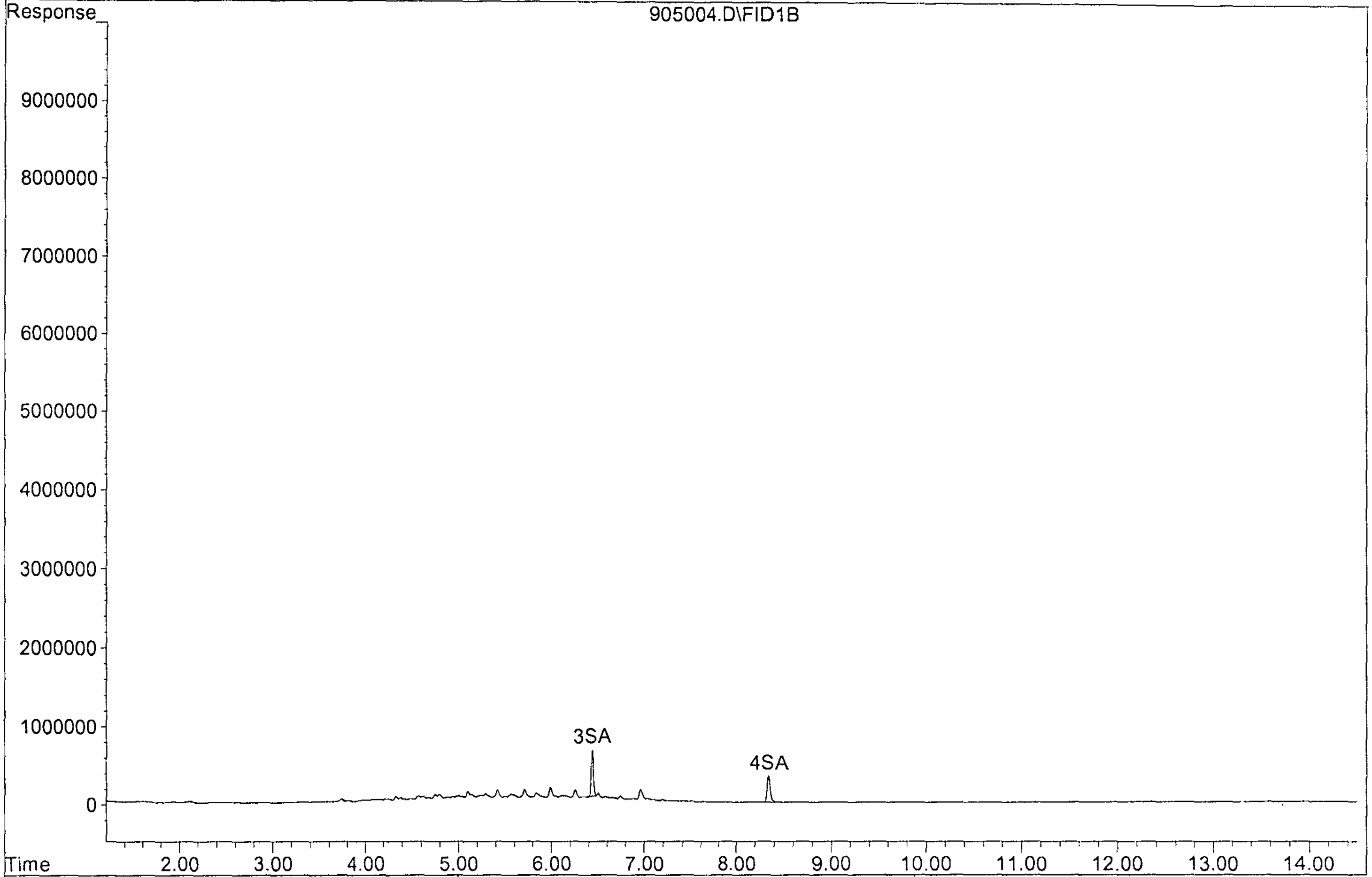
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

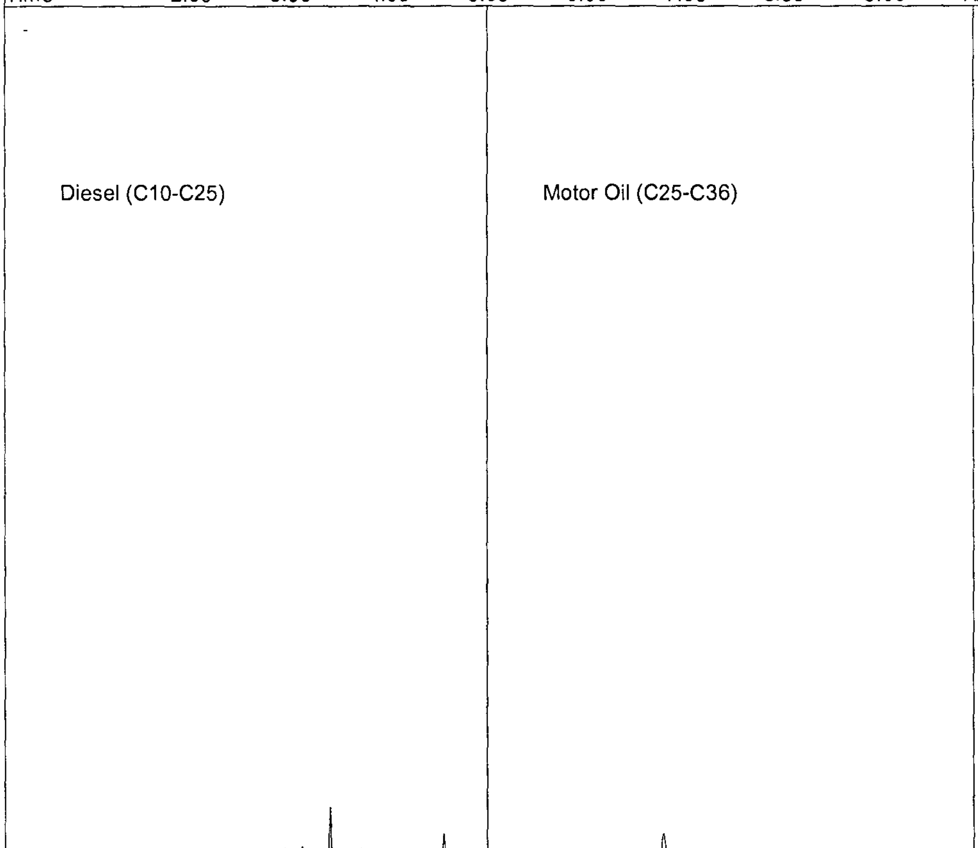
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	9937558	2.566 ppb
Surrogate Spike 30.000		Recovery =	8.55%
4) SA Octacosane(S)	8.35	8371591	2.592 ppb
Surrogate Spike 30.000		Recovery =	8.64%
Target Compounds			
1) HATM Diesel (C10-C25)	4.95	160325827	48.155 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180905\905004.D
Sample : Diesel - 2 9/5/18

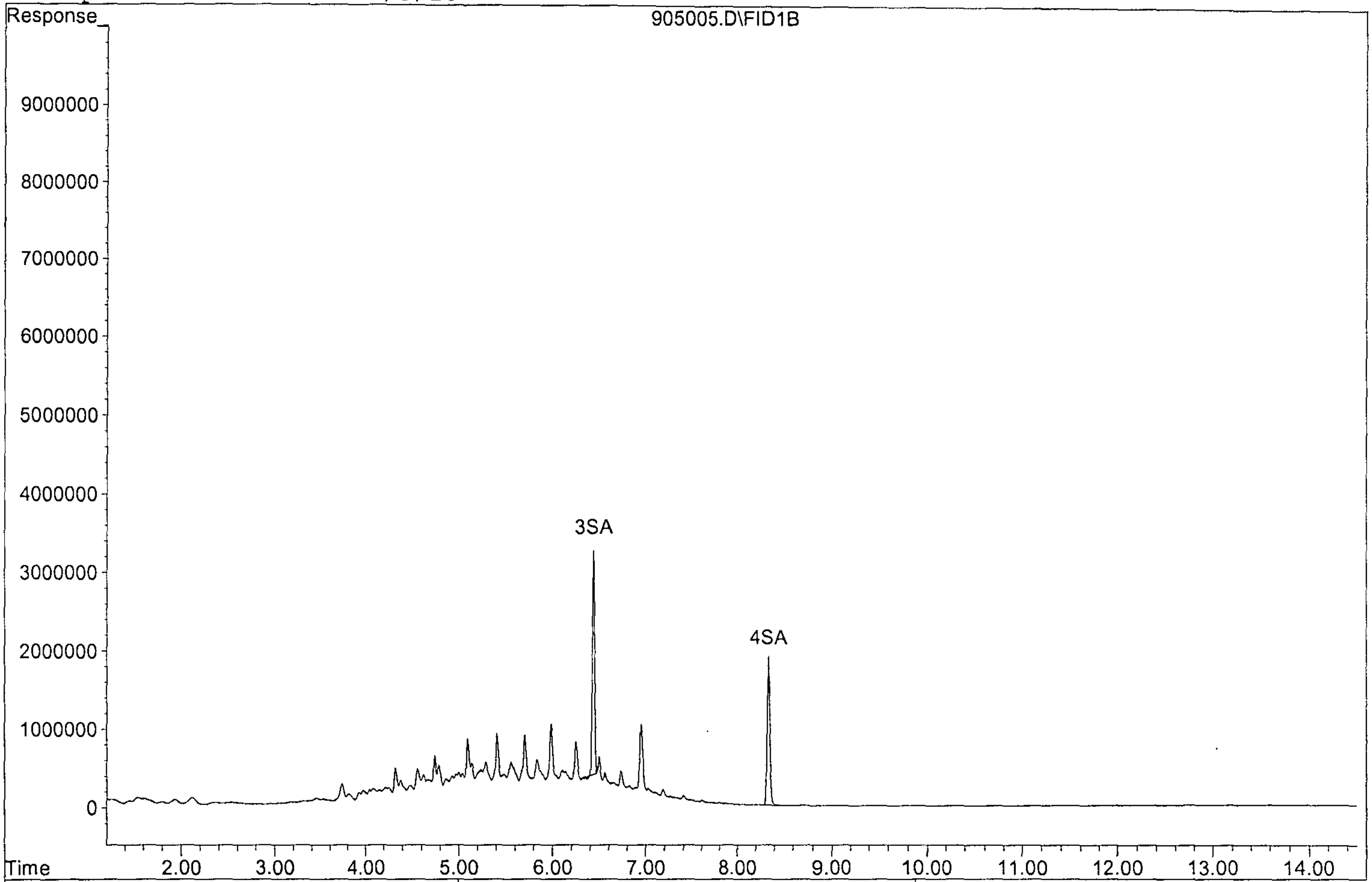


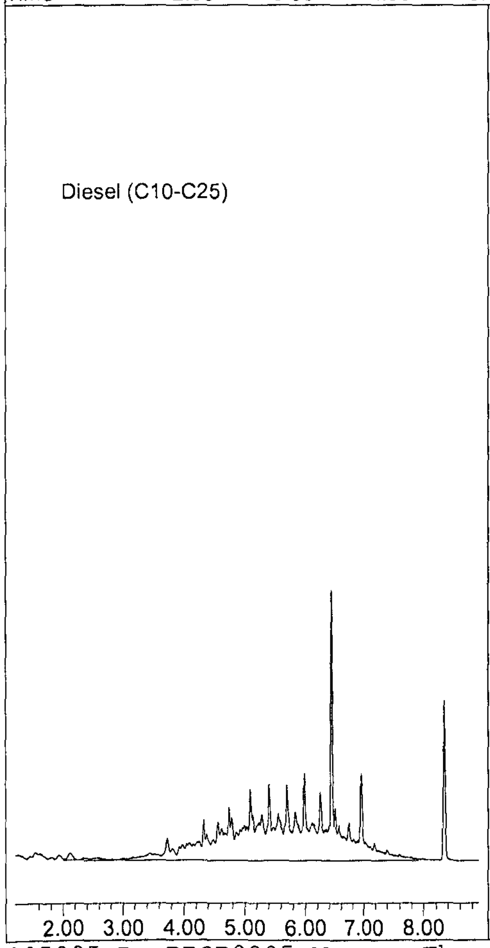


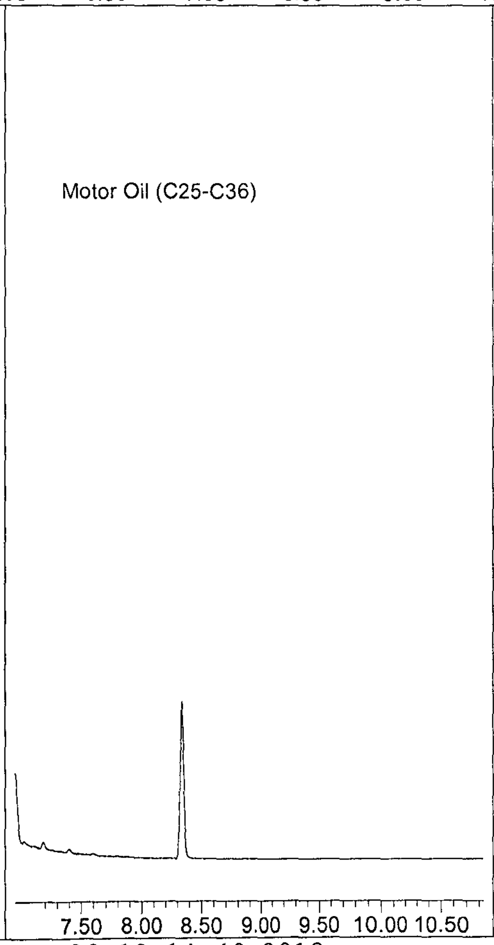
Quantitation Report (Not Reviewed)

```
Data File : G:\APOLLO\DATA\180905\905005.D                Vial: 5
Acq On    : 9-5-18 14:11:55                           Operator: DP
Sample    : Diesel - 3 9/5/18                         Inst    : Apollo
Misc      : Mix(A)                                    Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 10 10:54 2018  Quant Results File: AK0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A

    Compound                          R.T.      Response   Conc Units
  --------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)            6.44      47918495   12.374 ppb
Surrogate Spike 30.000                   Recovery      =   41.25%
 4) SA  Octacosane(S)                 8.34      40127010   12.424 ppb
Surrogate Spike 30.000                   Recovery      =   41.41%

  Target Compounds
 1) HATM Diesel (C10-C25)              4.95      786057856  236.098 ppb
```

Data File: G:\APOLLO\DATA\180905\905005.D
Sample : Diesel - 3 9/5/18





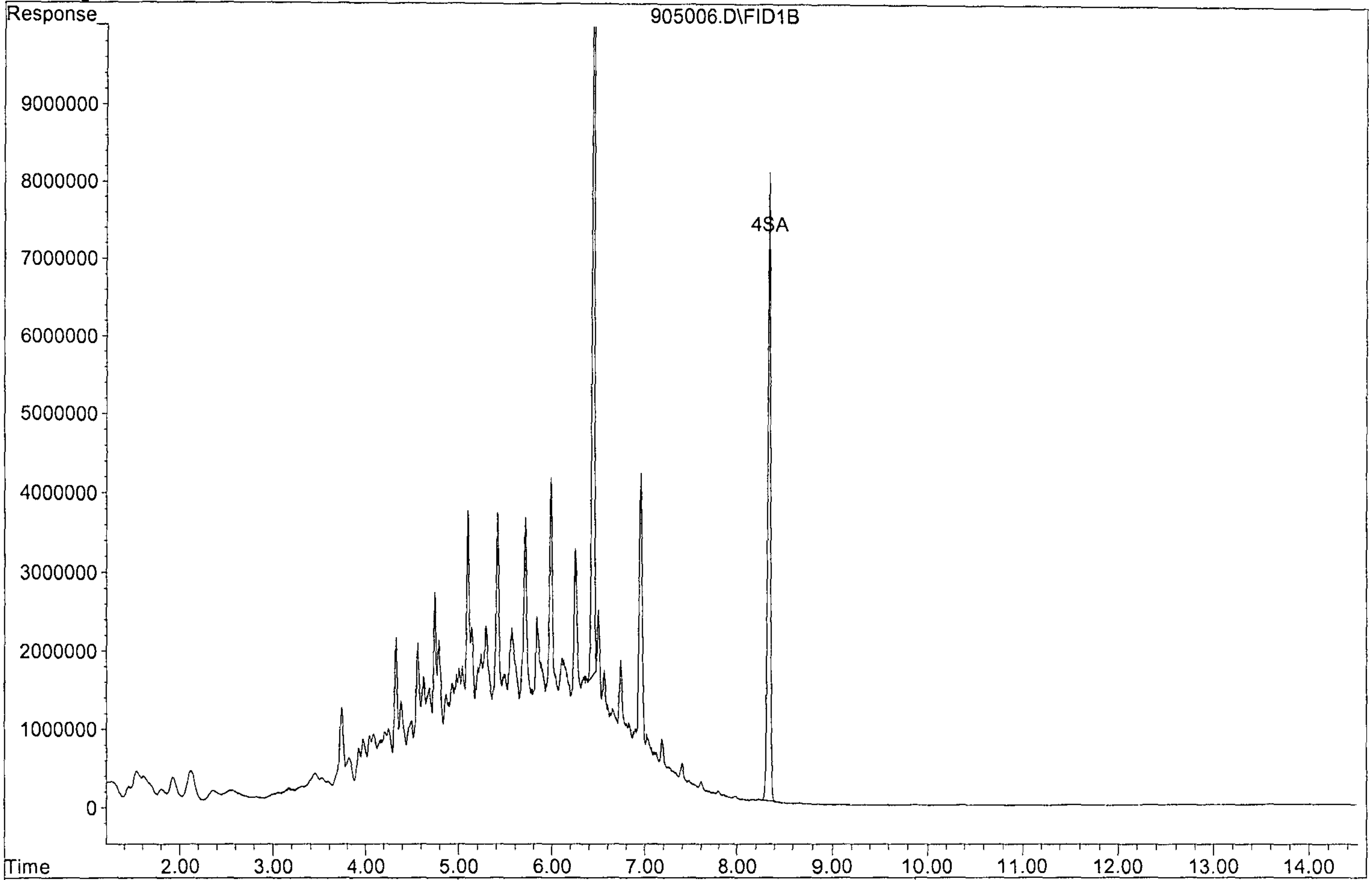


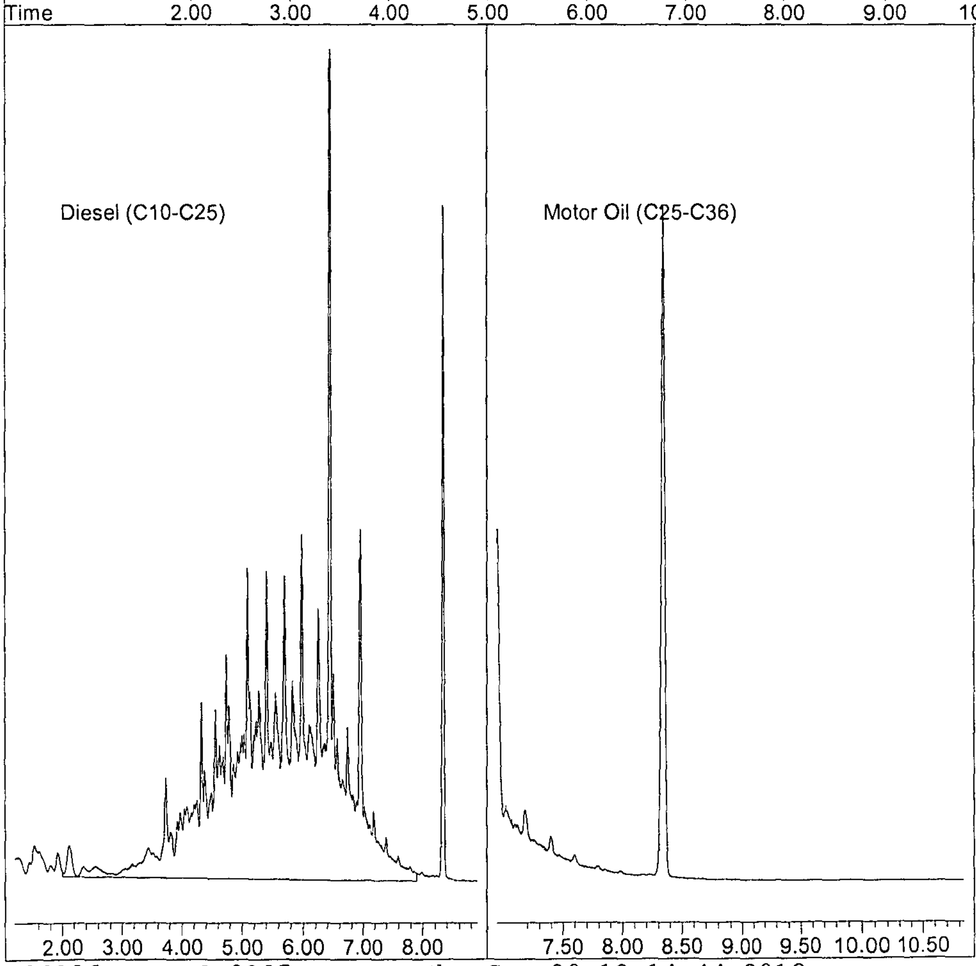
Quantitation Report (Not Reviewed)

```
Data File : G:\APOLLO\DATA\180905\905006.D              Vial: 6
Acq On    : 9-5-18 14:31:55                          Operator: DP
Sample    : Diesel - 4 9/5/18                        Inst    : Apollo
Misc      : Mix(A)                                   Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 10 10:54 2018  Quant Results File: AK0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	189189247	48.853 ppb
Surrogate Spike 30.000	Recovery	=	162.84%
4) SA Octacosane(S)	8.34	164654773	50.979 ppb
Surrogate Spike 30.000	Recovery	=	169.93%
Target Compounds			
1) HATM Diesel (C10-C25)	4.95	3255475300	977.806 ppb

Data File: G:\APOLLO\DATA\180905\905006.D
Sample : Diesel - 4 9/5/18





Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180905\905007.D Vial: 7
Acq On : 9-5-18 14:51:56 Operator: DP
Sample : Diesel - 5 9/5/18 Inst : Apollo
Misc : Mix(A) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 10 10:54 2018 Quant Results File: AK0905.RES

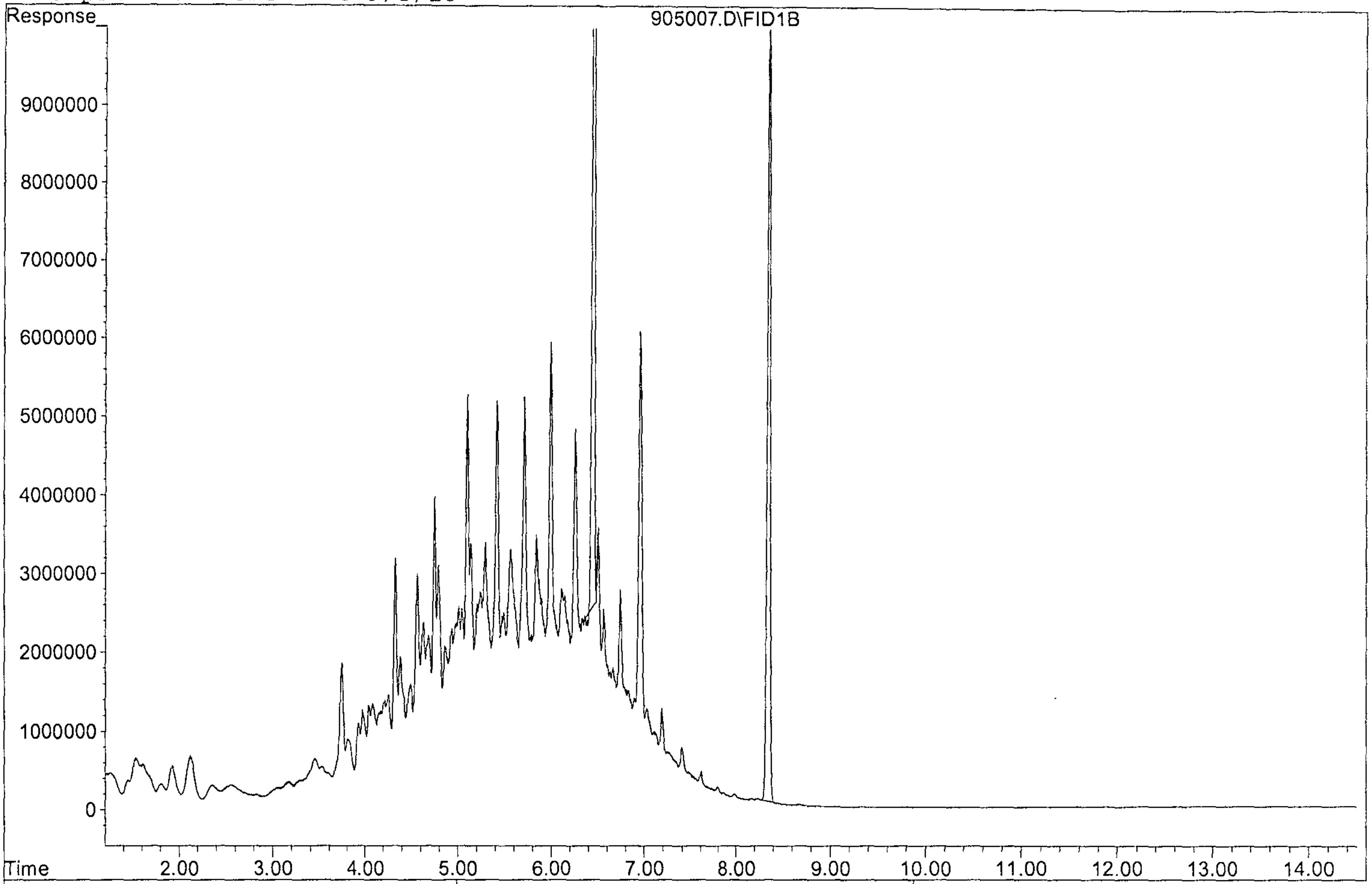
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

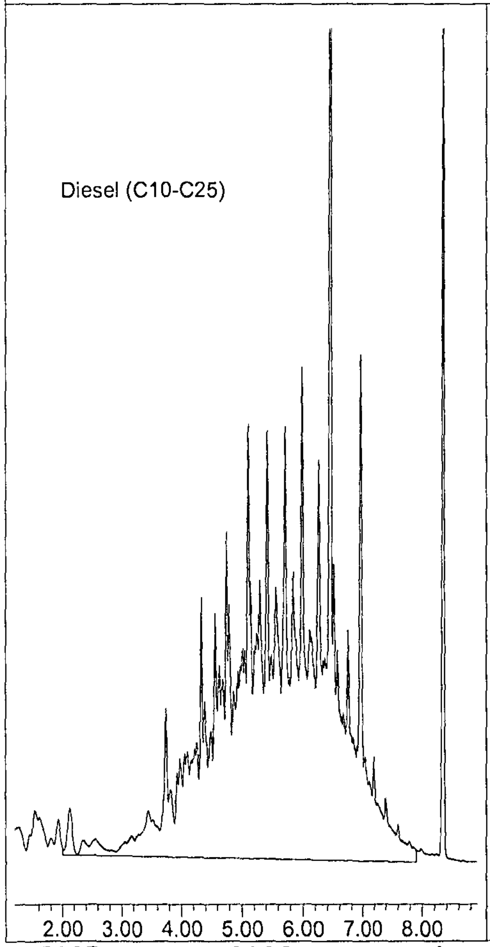
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

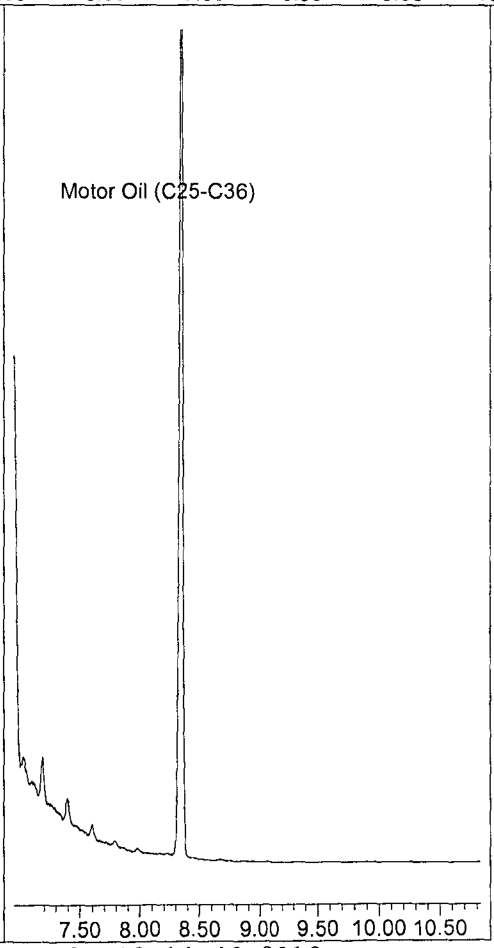
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.45	260146116	67.175 ppb
Surrogate Spike 30.000	Recovery	=	223.92%
4) SA Octacosane(S)	8.35	234144102	72.493 ppb
Surrogate Spike 30.000	Recovery	=	241.64%
Target Compounds			
1) HATM Diesel (C10-C25)	4.95	4753746354	1427.822 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180905\905007.D
Sample : Diesel - 5 9/5/18



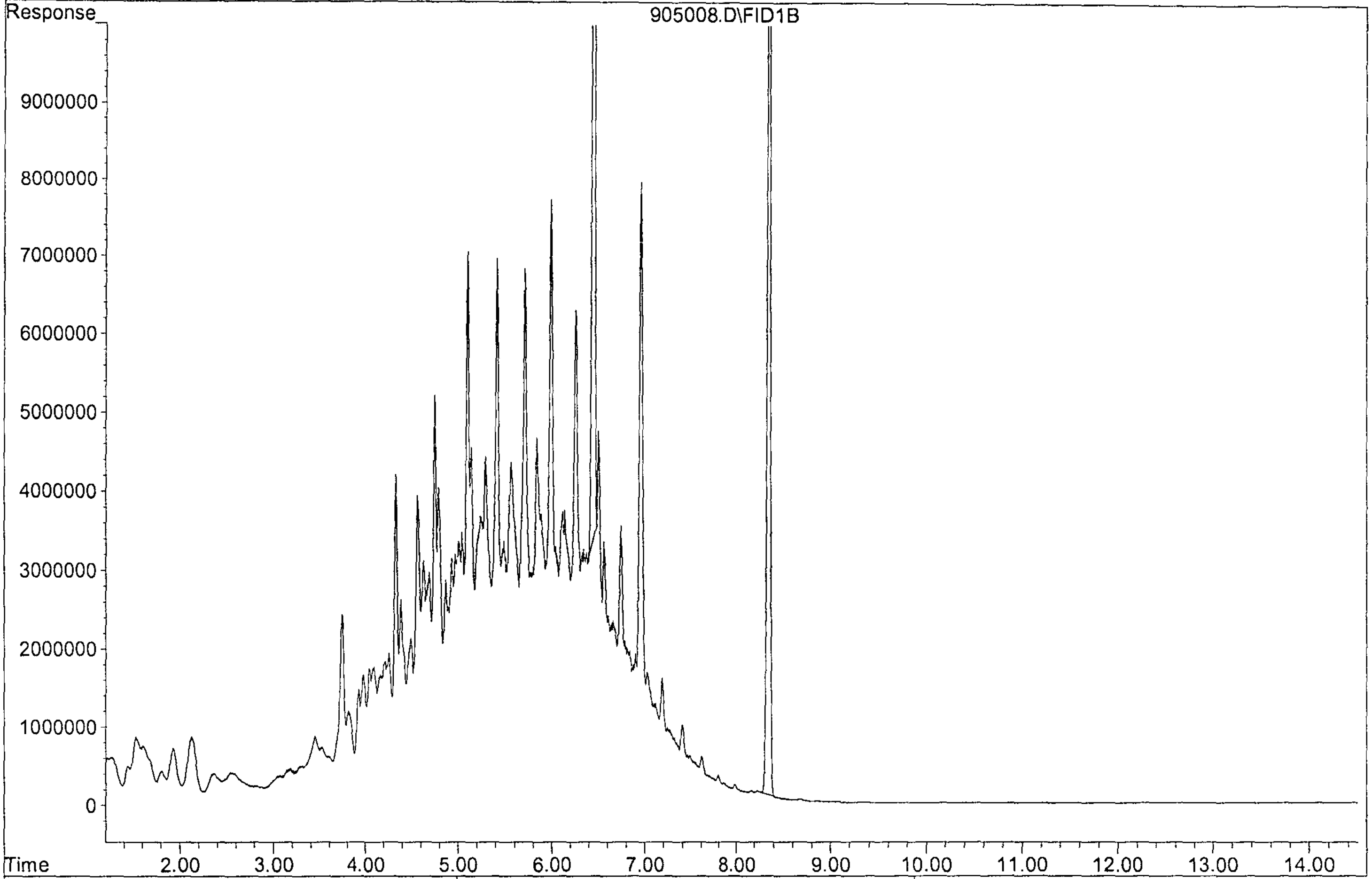


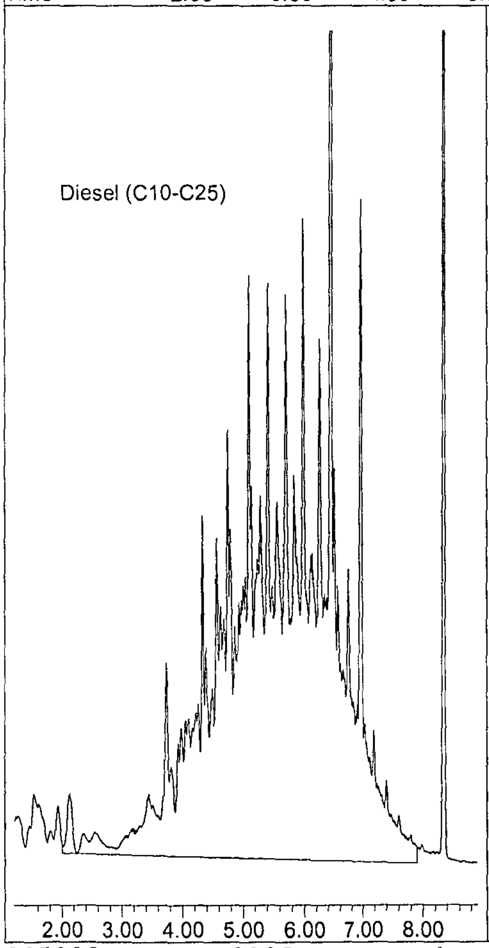


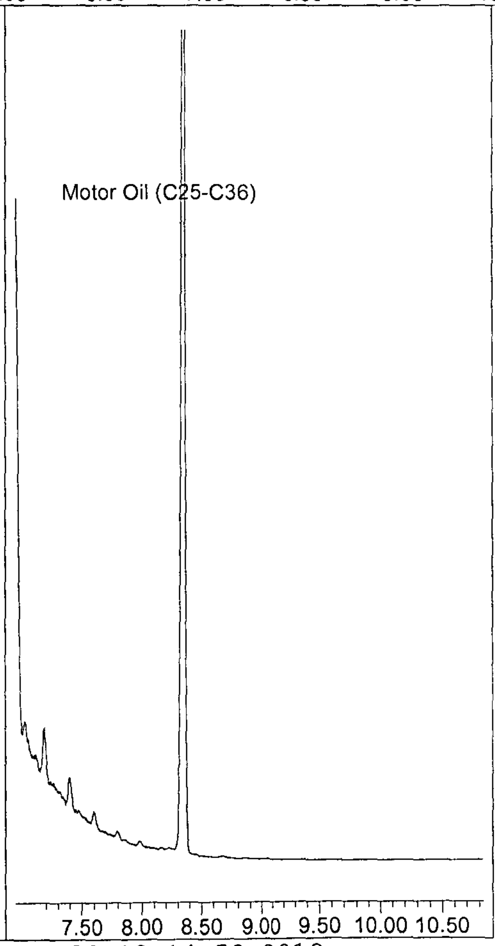
Quantitation Report (Not Reviewed)

```
Data File : G:\APOLLO\DATA\180905\905008.D              Vial: 8
Acq On    : 9-5-18 15:11:58                          Operator: DP
Sample    : Diesel - 6 9/5/18                        Inst    : Apollo
Misc      : Mix(A)                                   Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 10 10:54 2018  Quant Results File: AK0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A

      Compound                         R.T.       Response    Conc Units
-------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)             6.45      343927438   88.809 ppb
Surrogate Spike 30.000                    Recovery      =  296.03%
 4) SA  Octacosane(S)                  8.35      310020200   95.985 ppb
Surrogate Spike 30.000                    Recovery      =  319.95%

  Target Compounds
 1) HATM Diesel (C10-C25)               4.95     6332718431 1902.078 ppb
```

Data File: G:\APOLLO\DATA\180905\905008.D
Sample : Diesel - 6 9/5/18







Quantitation Report (Not Reviewed)

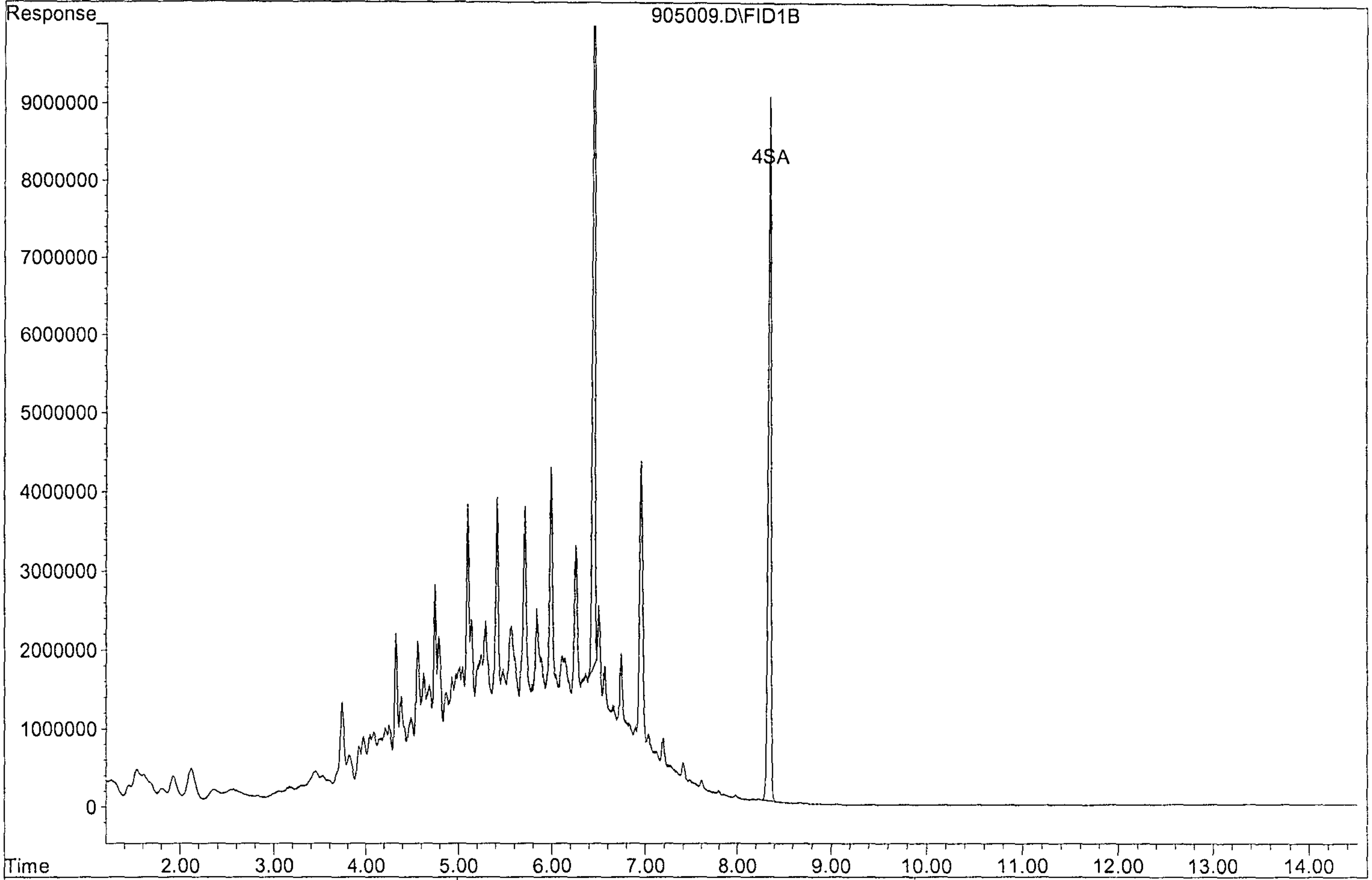
Data File : G:\APOLLO\DATA\180905\905009.D Vial: 9
Acq On : 9-5-18 15:32:03 Operator: DP
Sample : Diesel - SS 8/2/18 Inst : Apollo
Misc : Mix(A) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 10 10:54 2018 Quant Results File: AK0905.RES

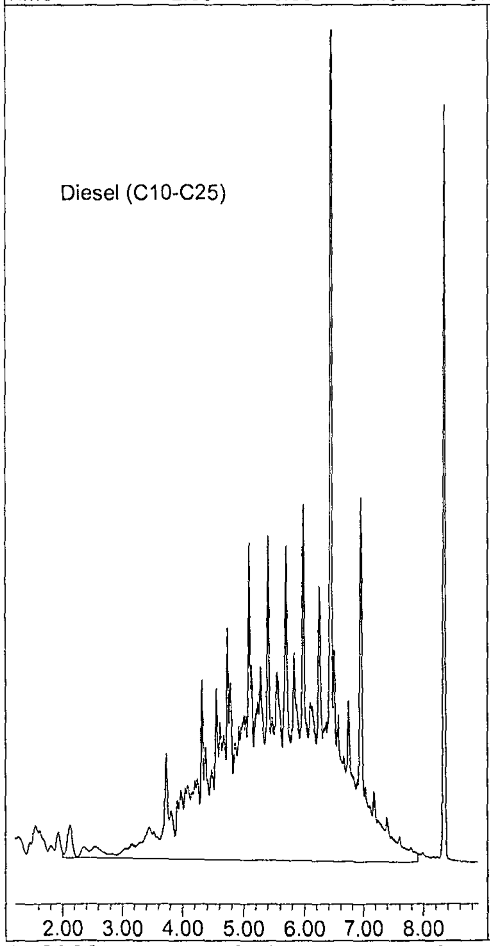
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

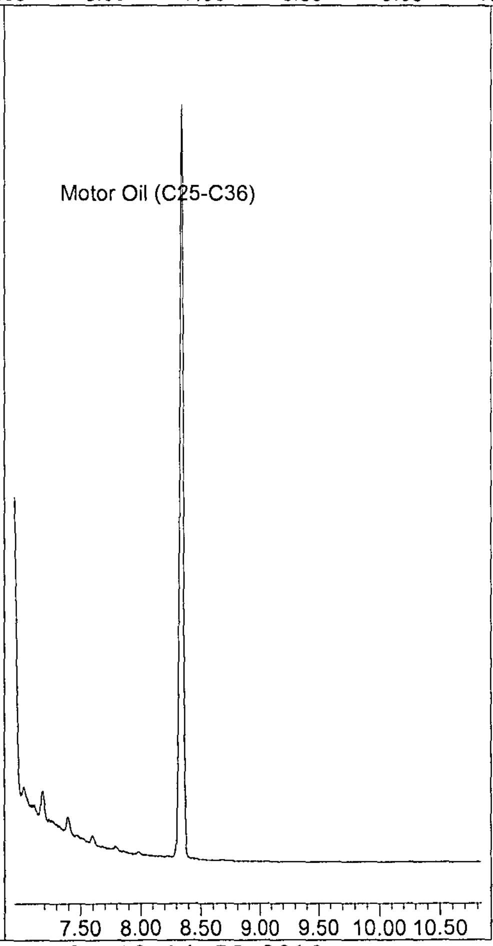
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	189576923	48.953 ppb
Surrogate Spike 30.000	Recovery	=	163.18%
4) SA Octacosane(S)	8.35	191937049	59.426 ppb
Surrogate Spike 30.000	Recovery	=	198.09%
Target Compounds			
1) HATM Diesel (C10-C25)	4.95	3343587379	1004.271 ppb

Data File: G:\APOLLO\DATA\180905\905009.D
Sample : Diesel - SS 8/2/18







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180905\905010.D Vial: 10
Acq On : 9-5-18 15:52:08 Operator: DP
Sample : Motor Oil - 1 9/5/18 Inst : Apollo
Misc : Mix(B) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 10 10:55 2018 Quant Results File: AK0905.RES

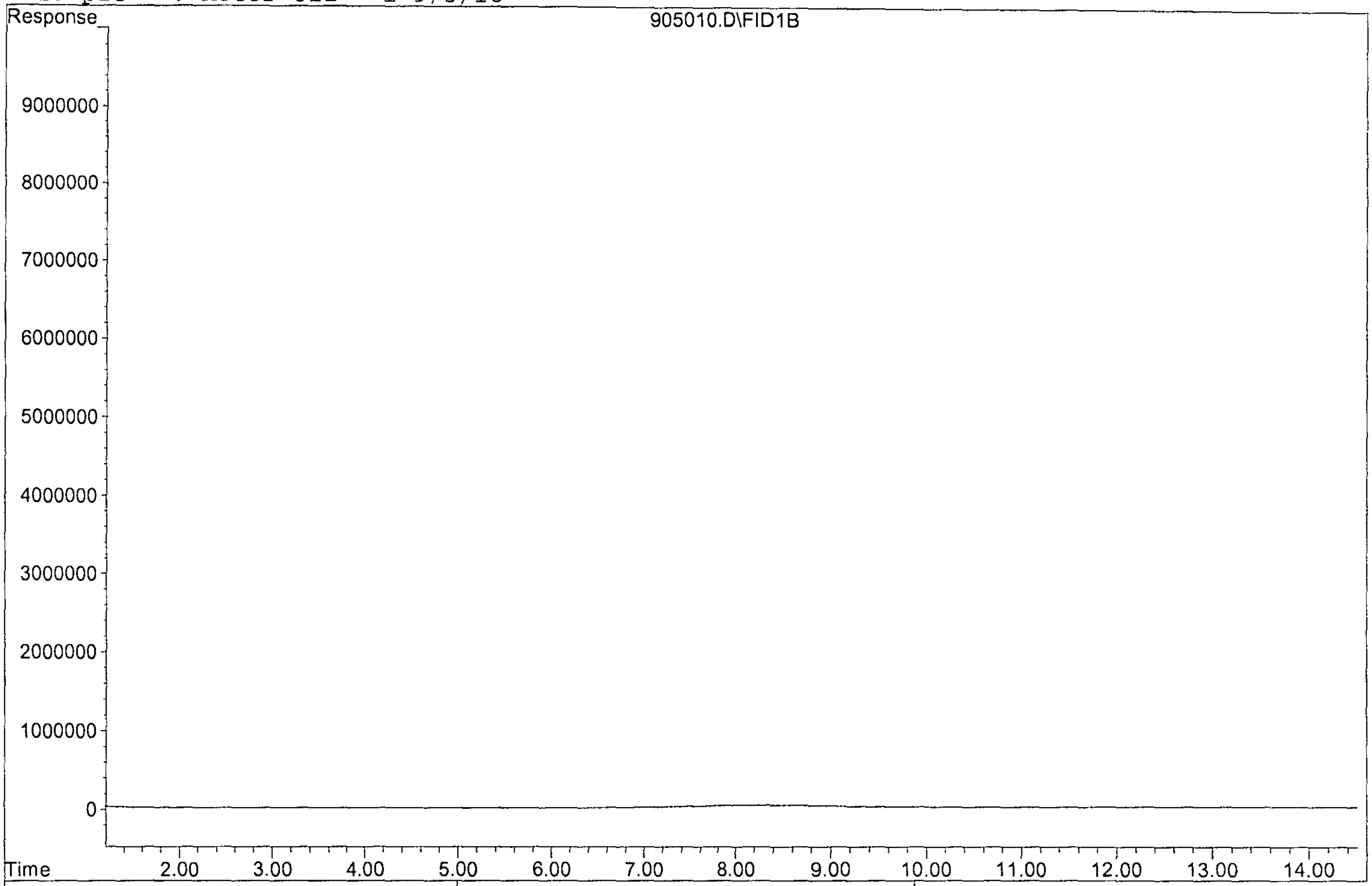
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

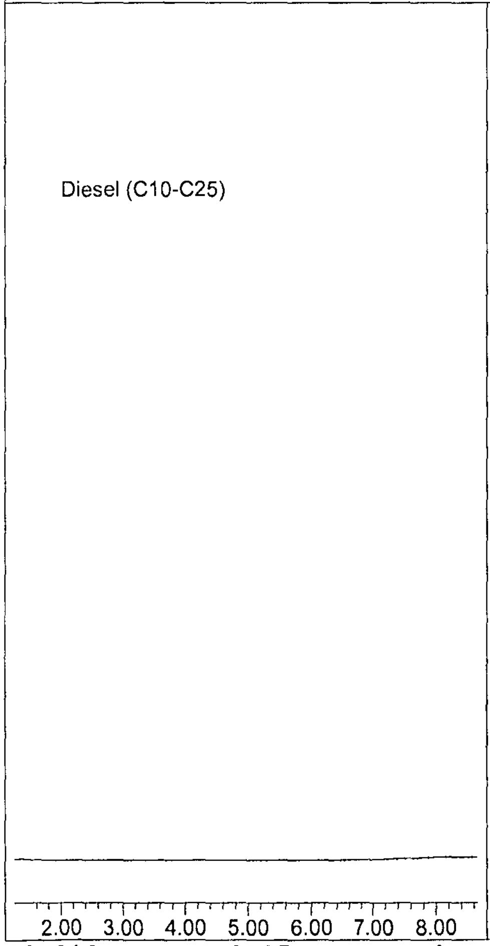
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

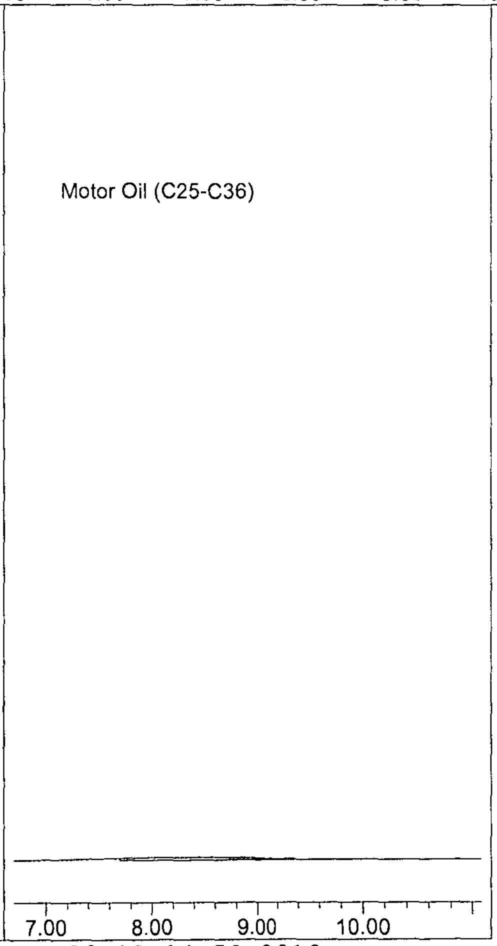
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C25-C36)	8.89	26321801	11.976 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180905\905010.D
Sample : Motor Oil - 1 9/5/18





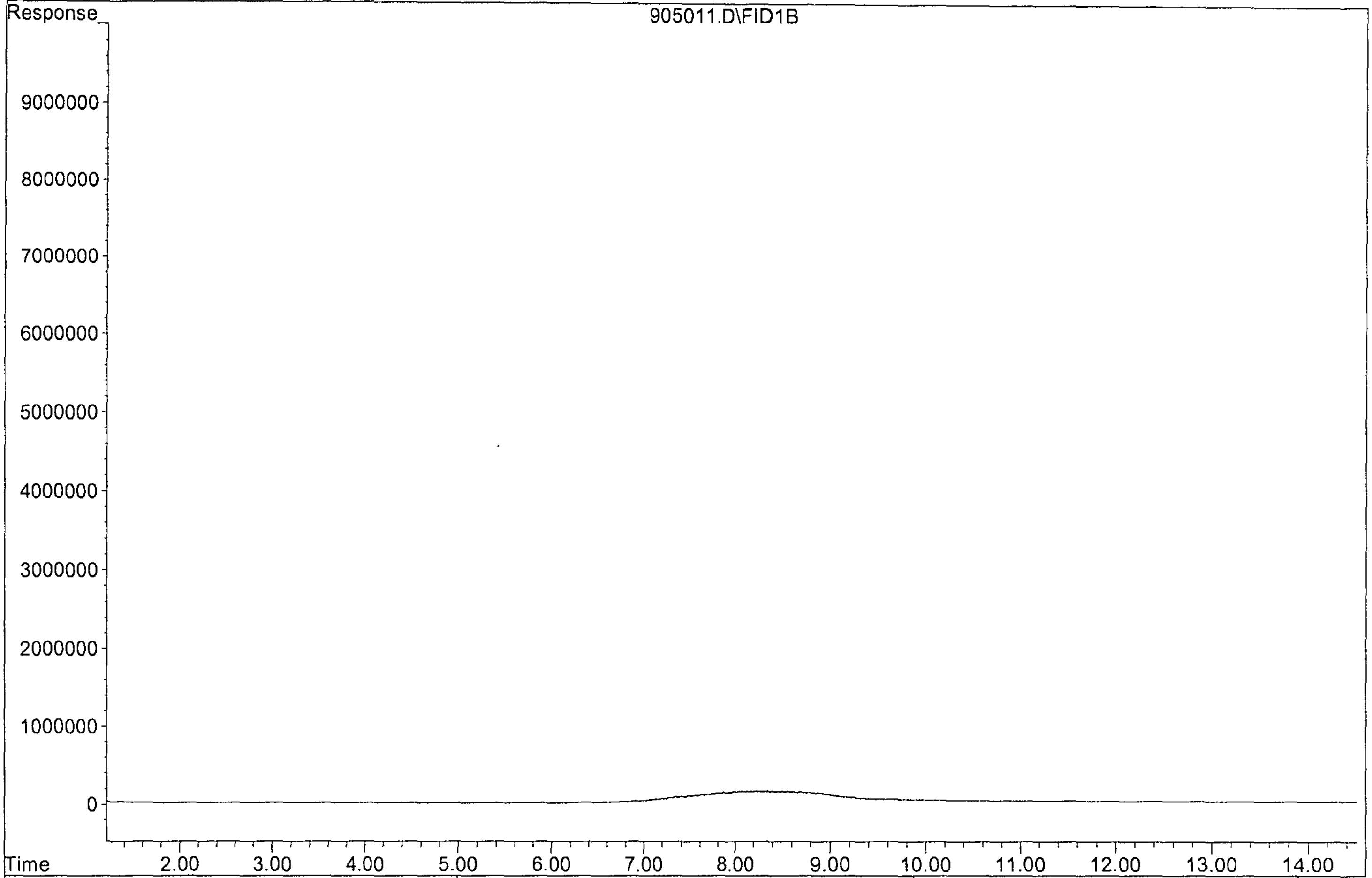


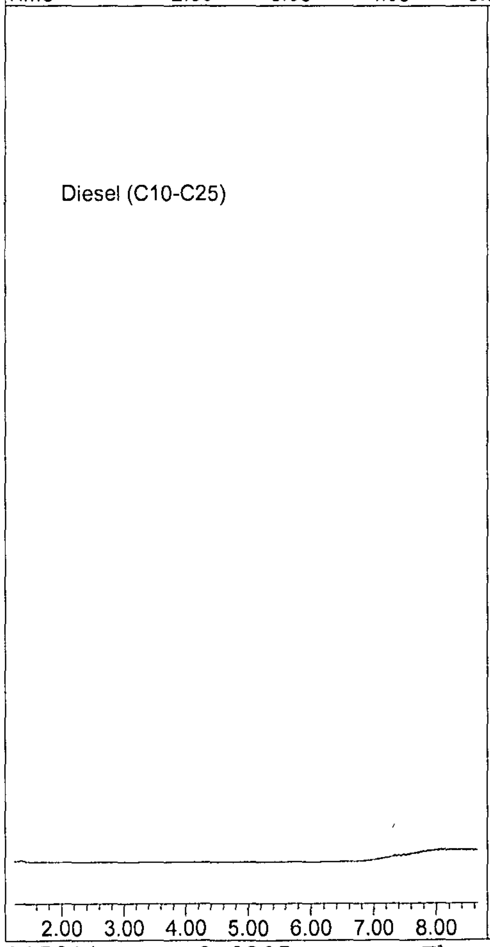
Quantitation Report (Not Reviewed)

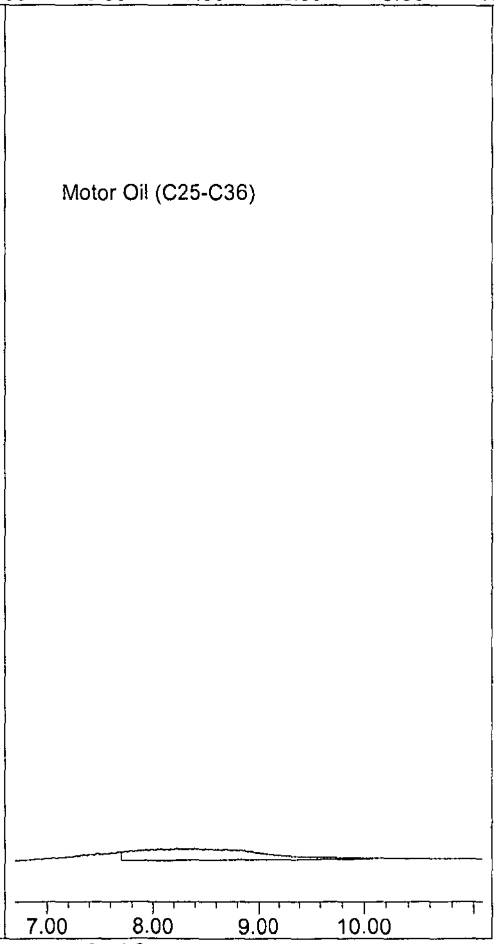
```
Data File : G:\APOLLO\DATA\180905\905011.D                Vial: 11
Acq On    : 9-5-18 16:12:11                            Operator: DP
Sample    : Motor Oil - 2 9/5/18                       Inst    : Apollo
Misc      : Mix(B)                                     Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 10 10:55 2018  Quant Results File: AK0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C25-C36)	8.89	116507474	53.008 ppb

Data File: G:\APOLLO\DATA\180905\905011.D
Sample : Motor Oil - 2 9/5/18



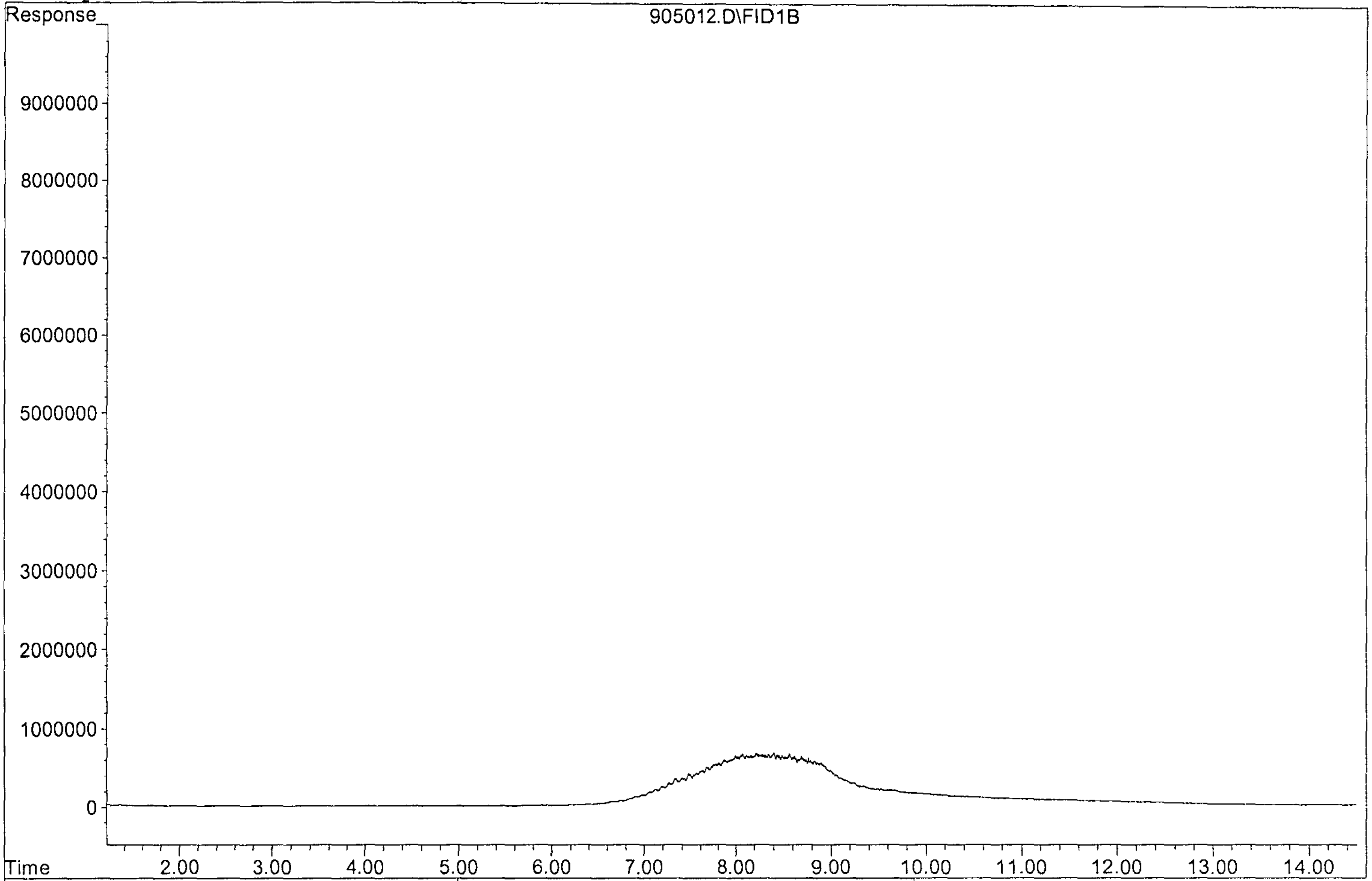


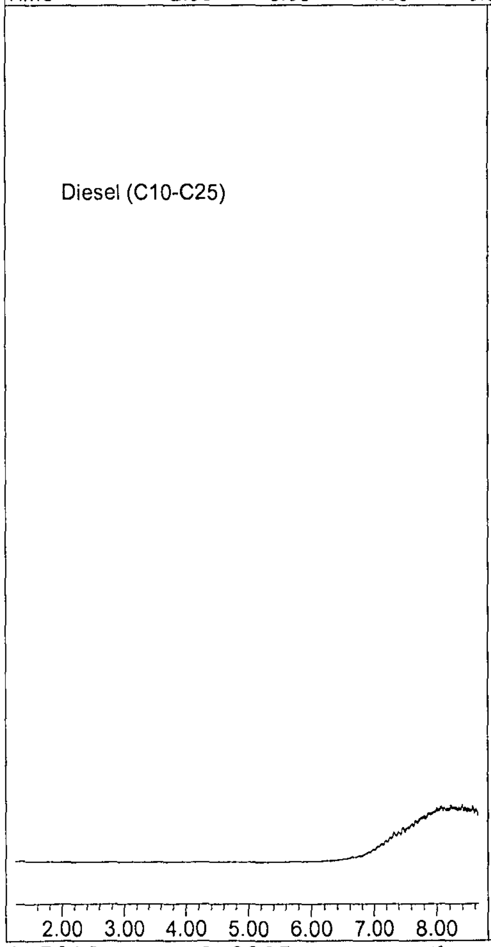


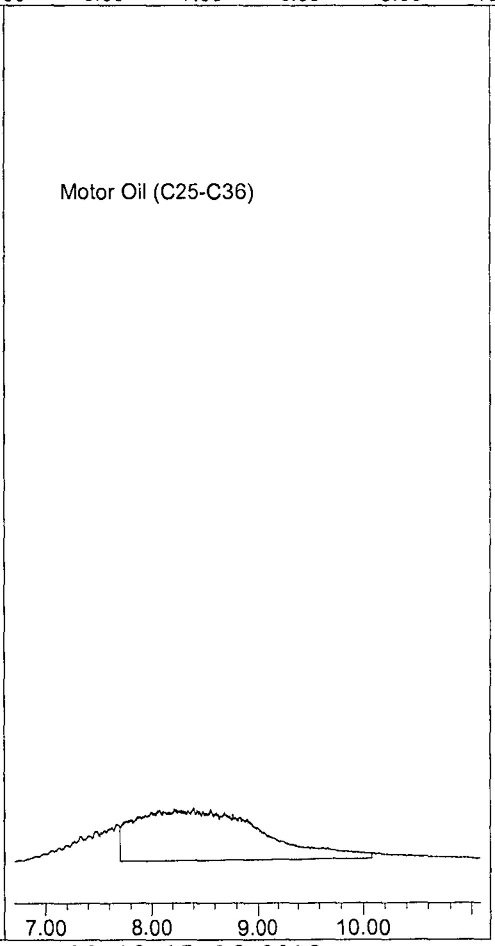
```
Data File : G:\APOLLO\DATA\180905\905012.D              Vial: 12
Acq On    : 9-5-18 16:32:11                         Operator: DP
Sample    : Motor Oil - 3 9/5/18                    Inst    : Apollo
Misc      : Mix(B)                                  Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 10 10:55 2018  Quant Results File: AK0905.RES

Method         : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title          : 8015 B&C
Last Update    : Tue Sep 11 10:13:20 2018
Response via   : Multiple Level Calibration

Volume Inj.    : 2UL
Signal Phase   : DB-5
Signal Info    : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C25-C36)	8.89	506924050	230.636 ppb

Data File: G:\APOLLO\DATA\180905\905012.D
Sample : Motor Oil - 3 9/5/18







Data File : G:\APOLLO\DATA\180905\905013.D   Vial: 13
Acq On : 9-5-18 16:52:14   Operator: DP
Sample : Motor Oil - 4 9/5/18   Inst : Apollo
Misc : Mix(B)   Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 10 10:55 2018 Quant Results File: AK0905.RES

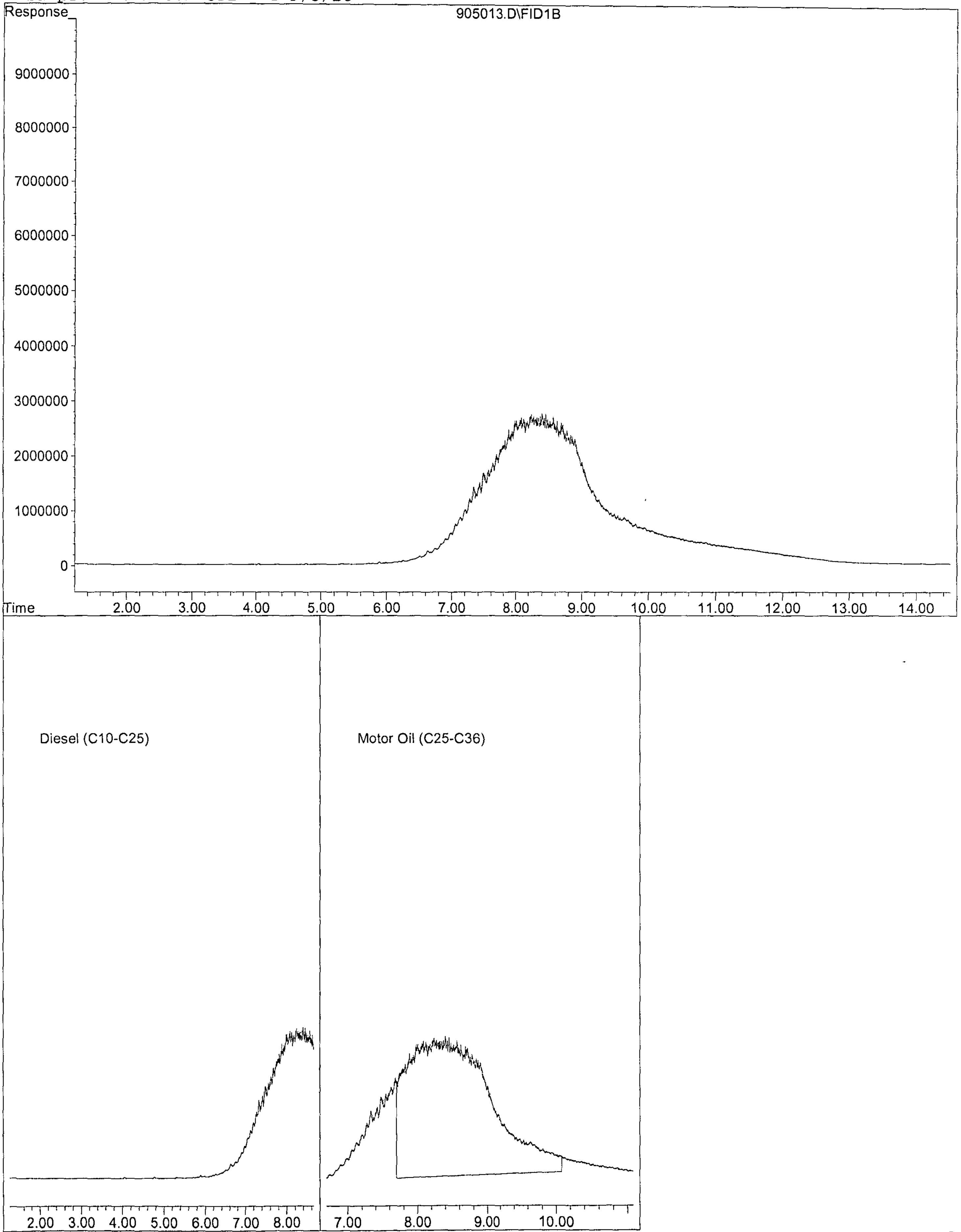
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C25-C36)	8.89	2092495343	952.027 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180905\905013.D
Sample : Motor Oil - 4 9/5/18



Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180905\905014.D Vial: 14
Acq On : 9-5-18 17:12:14 Operator: DP
Sample : Motor Oil - 5 9/5/18 Inst : Apollo
Misc : Mix(B) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 10 10:55 2018 Quant Results File: AK0905.RES

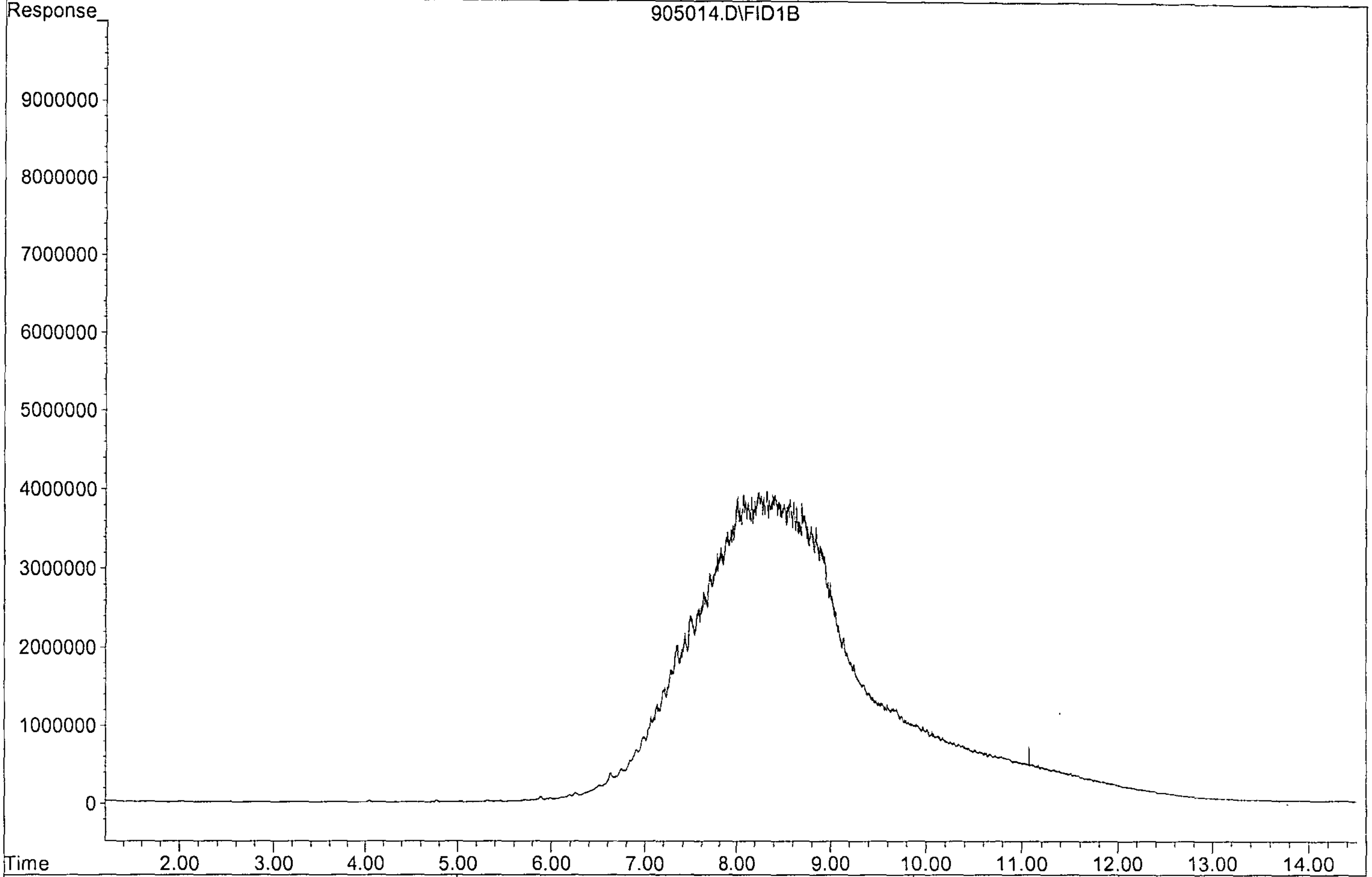
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

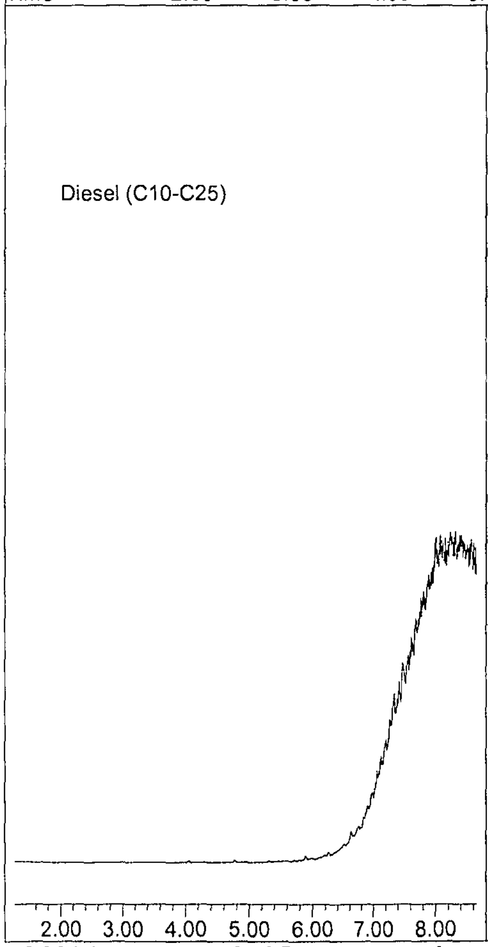
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

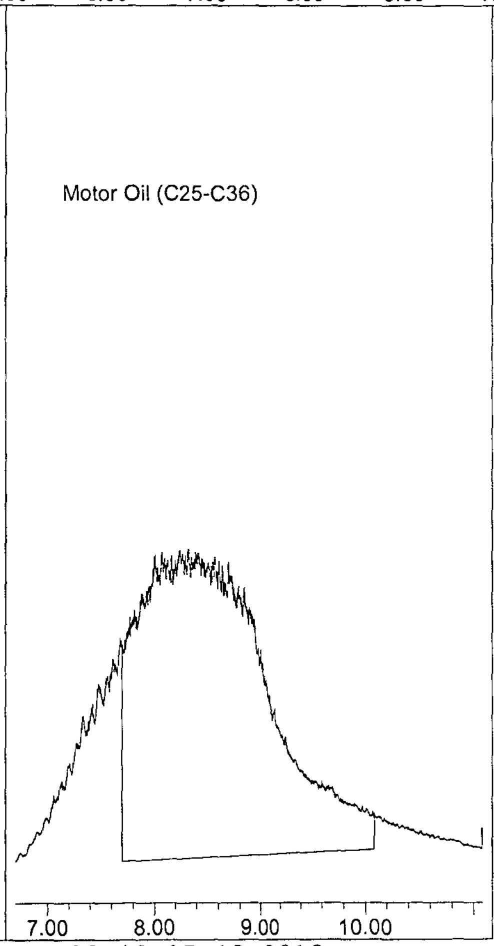
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C25-C36)	8.89	3050174539	1387.745 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180905\905014.D
Sample : Motor Oil - 5 9/5/18







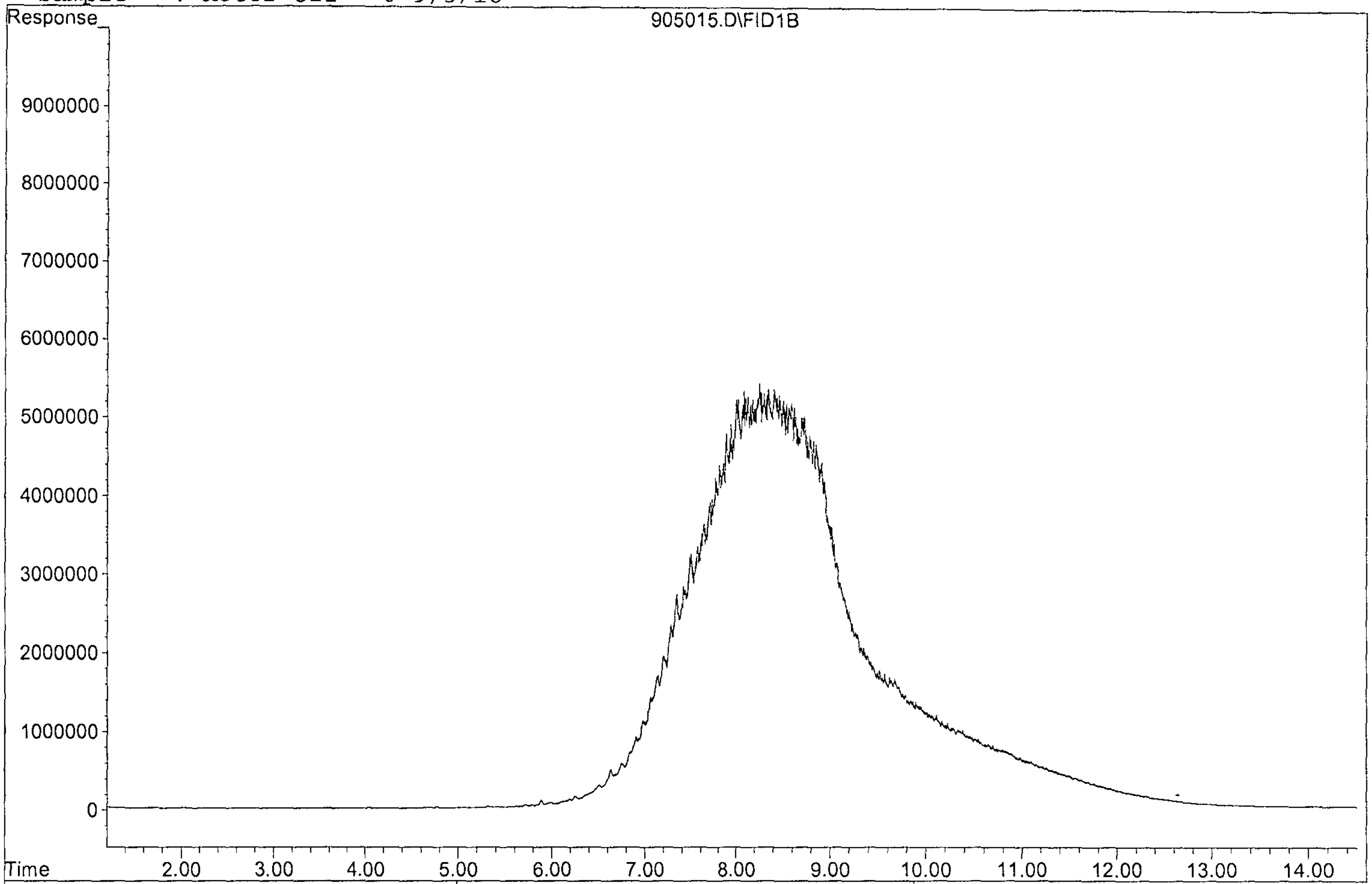
Quantitation Report (Not Reviewed)

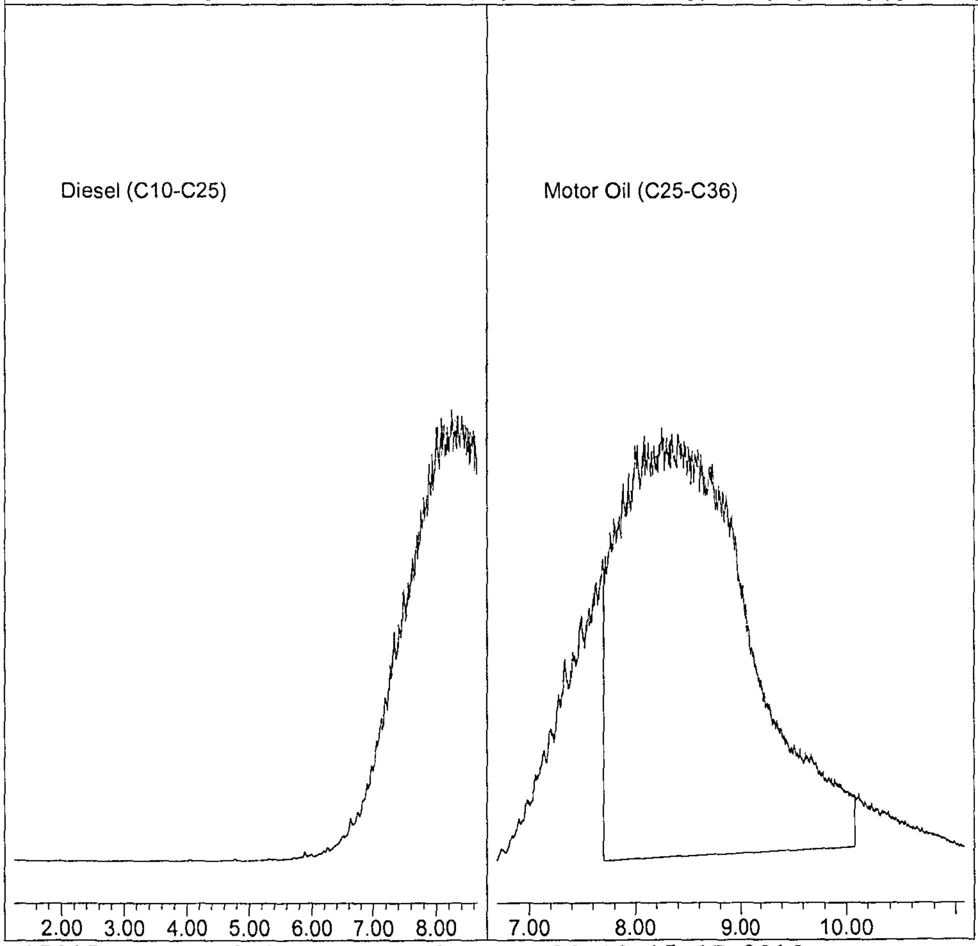
```
Data File : G:\APOLLO\DATA\180905\905015.D                Vial: 15
Acq On    : 9-5-18 17:31:25                            Operator: DP
Sample    : Motor Oil - 6 9/5/18                       Inst    : Apollo
Misc      : Mix(B)                                     Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 10 10:55 2018  Quant Results File: AK0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C25-C36)	8.89	4143295873	1885.084 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180905\905015.D
Sample : Motor Oil - 6 9/5/18





TPH Extractables
DROB0905

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:
SDG No:
Date Analyzed: 09/05/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 905009.D Diesel 905016.D Motor Oil

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1658050	0.45	HATM	
2	HBTM	Motor Oil (C24-C36)	1220680	1080250	12	HBTM	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
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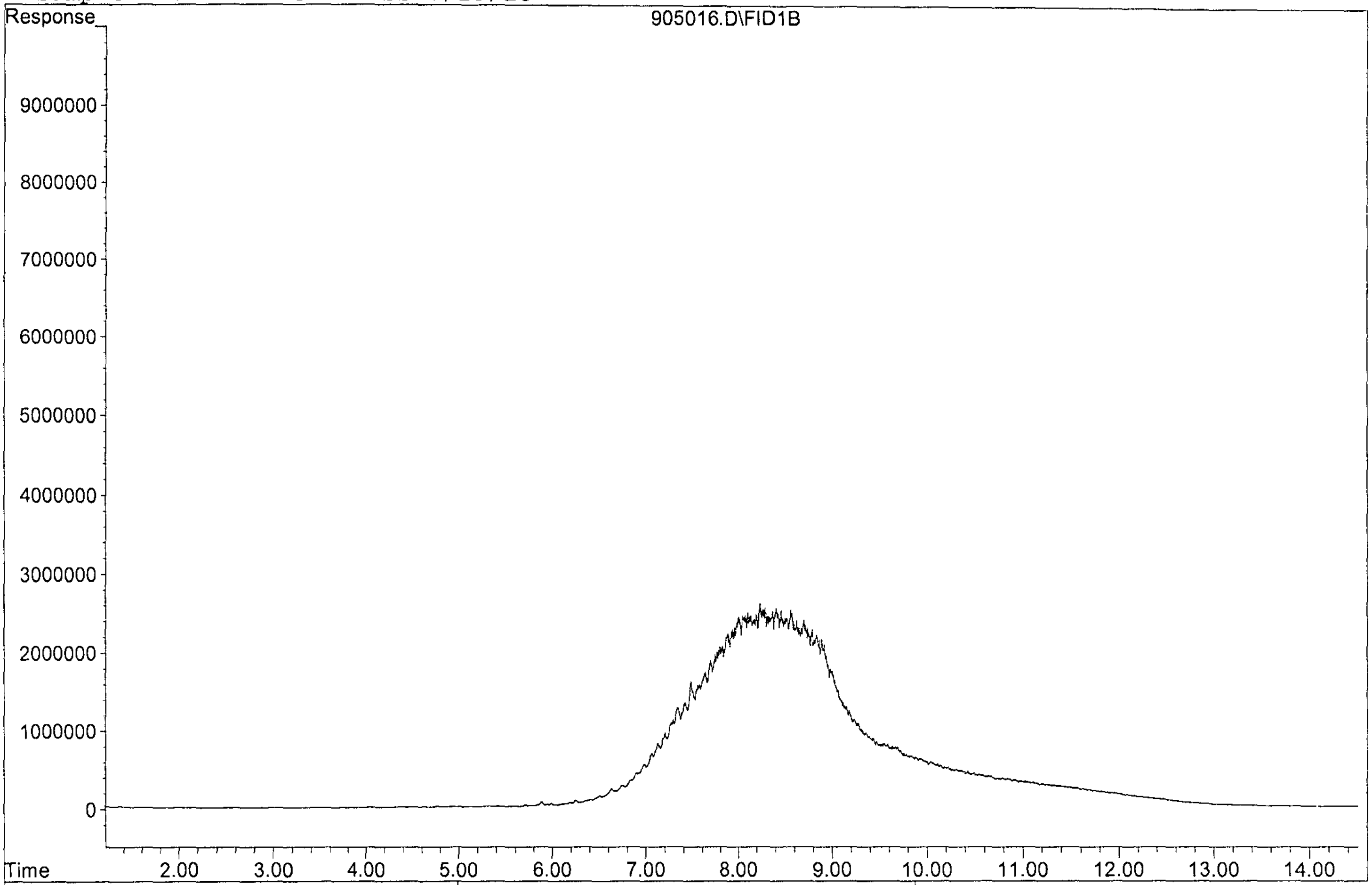
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			6.2		

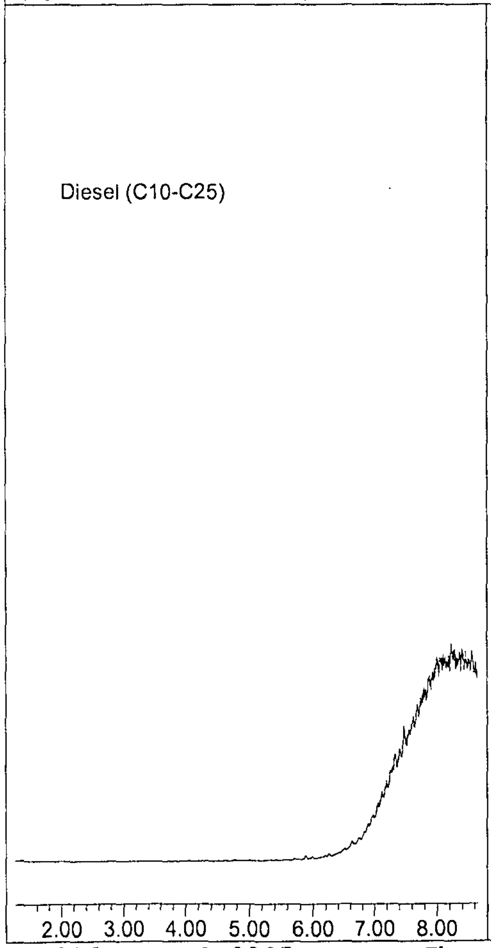
Quantitation Report (QT Reviewed)

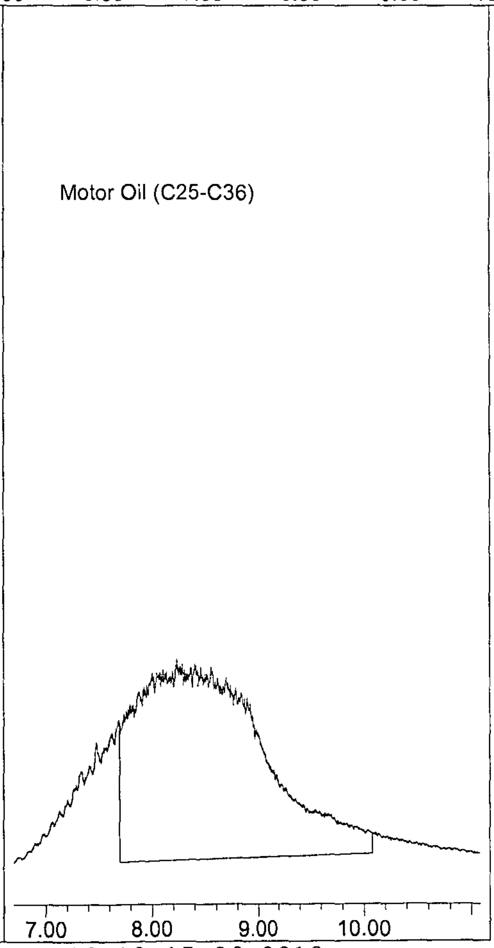
```
Data File : G:\APOLLO\DATA\180905\905016.D              Vial: 16
Acq On    : 9-5-18 17:51:24                         Operator: DP
Sample    : Motor Oil - SS 7/13/18                  Inst    : Apollo
Misc      : Mix(B)                                  Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 10 10:54 2018  Quant Results File: AK0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C25-C36)	8.89	1941944222	883.531 ppb

Data File: G:\APOLLO\DATA\180905\905016.D
Sample : Motor Oil - SS 7/13/18







TPH Extractables
DROB0905

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/10/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 910031-32.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1778540	7.7	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2214000	14	SA	
3	SA	Octacosane(S)	1614940	1887940	17	SA	
4	HBTM	Motor Oil (C24-C36)	1220680	1346830	10	HBTM	
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			12.2		

Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180910\910031.D Vial: 31
Acq On : 9-10-18 20:22:33 Operator: DP
Sample : Diesel - 3 8/13/18 Inst : Apollo
Misc : Mix(A) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 11 10:16 2018 Quant Results File: DROB0905.RES

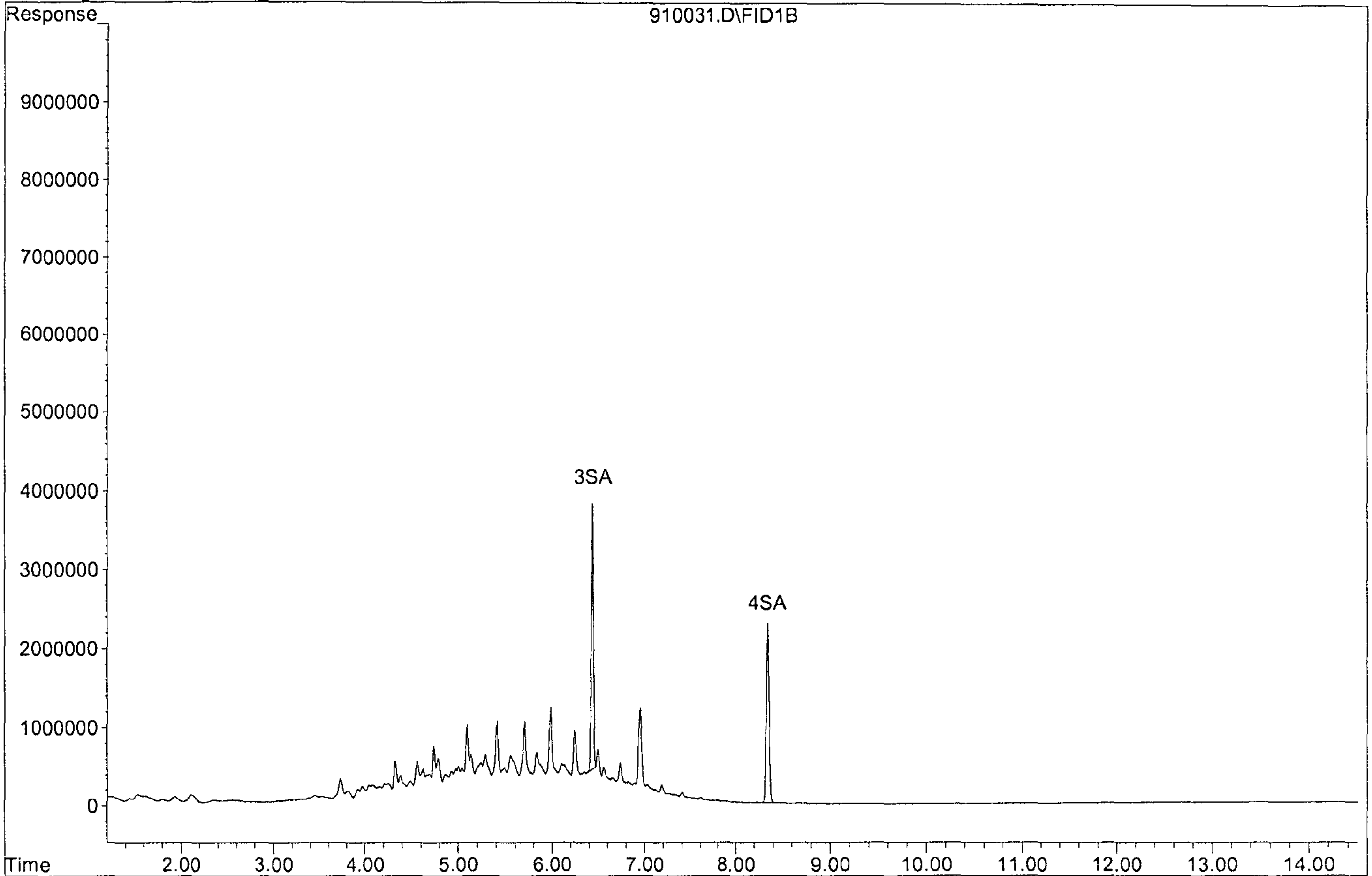
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

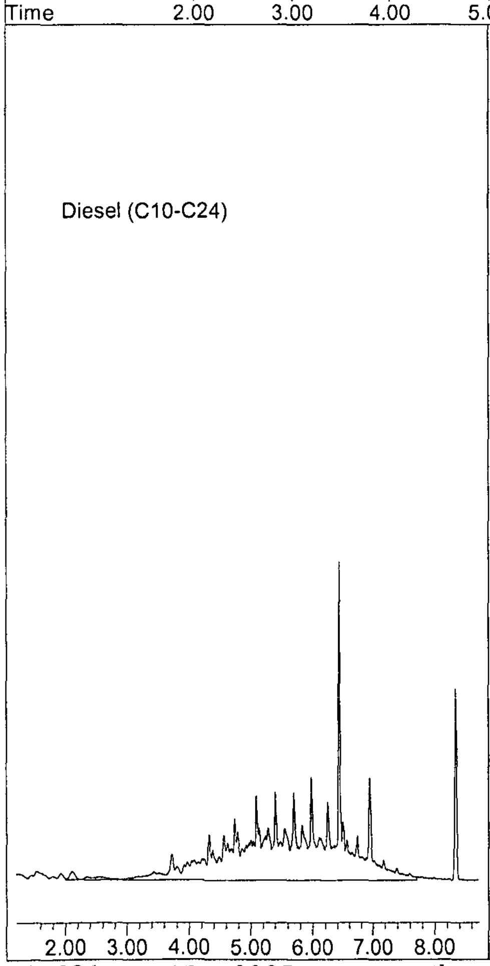
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

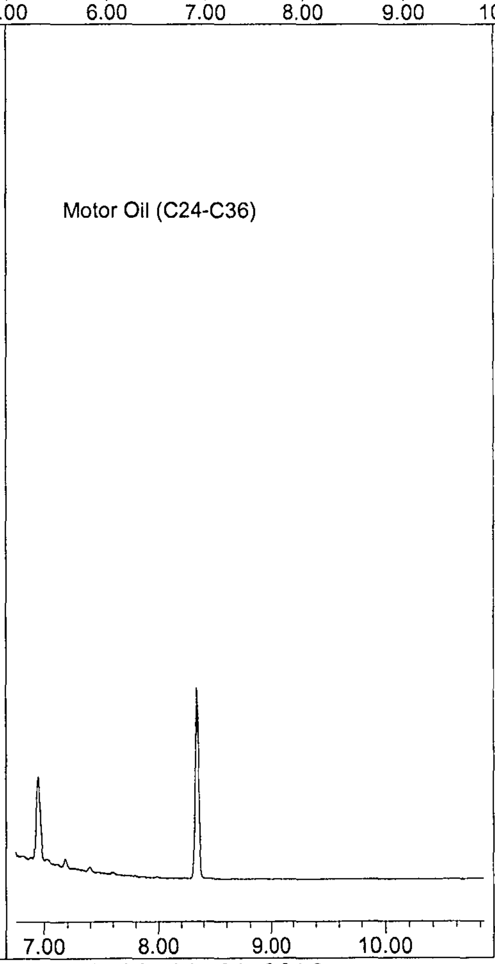
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	55349949	14.293 ppb
Surrogate Spike 30.000		Recovery =	47.64%
4) SA Octacosane(S)	8.34	47198424	14.613 ppb
Surrogate Spike 30.000		Recovery =	48.71%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	889269980	269.366 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910031.D
Sample : Diesel - 3 8/13/18







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180910\910032.D Vial: 32
Acq On : 9-10-18 20:42:34 Operator: DP
Sample : Motor Oil - 3 8/15/18 Inst : Apollo
Misc : Mix(B) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 11 10:16 2018 Quant Results File: DROB0905.RES

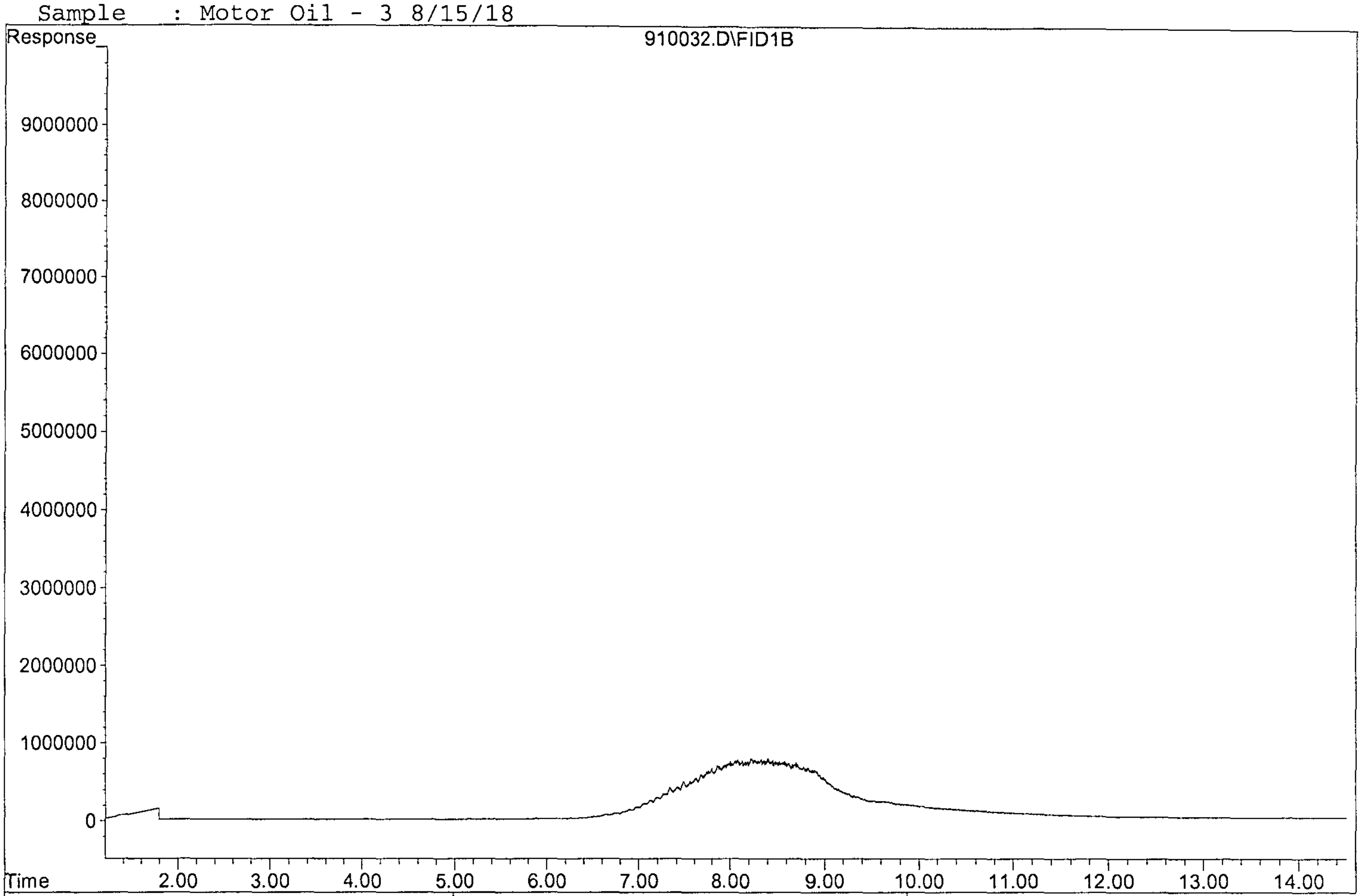
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

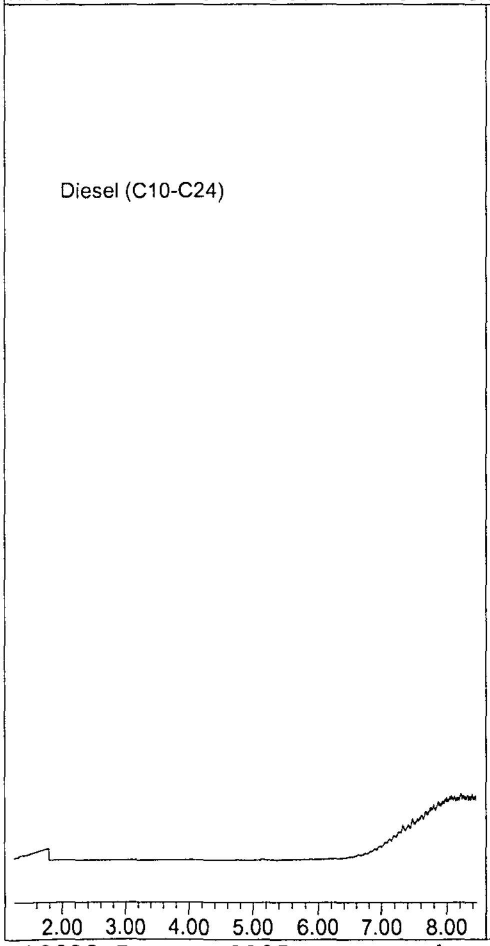
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

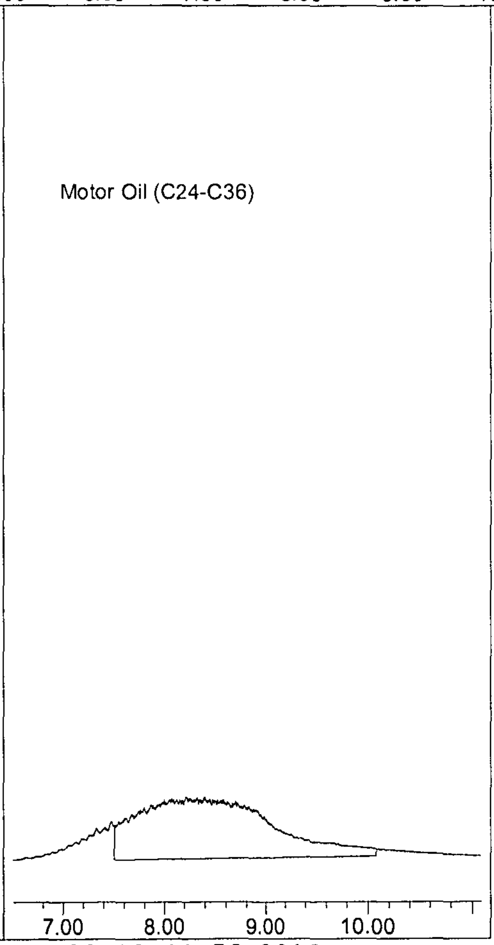
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	673415743	275.836 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180910\910032.D
Sample : Motor Oil - 3 8/15/18







TPH Extractables
DROB0905

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/11/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 910048-49.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1745590	5.8	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2225230	15	SA	
3	SA	Octacosane(S)	1614940	1877170	16	SA	
4	HBTM	Motor Oil (C24-C36)	1220680	1346770	10	HBTM	
5							
6							
7							
8							
9							
10							
11							
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29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			11.7		

Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180910\910048.D Vial: 48
Acq On : 9-11-18 2:02:02 Operator: DP
Sample : Diesel - 3 8/13/18 Inst : Apollo
Misc : Mix(A) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 11 10:17 2018 Quant Results File: DROB0905.RES

Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

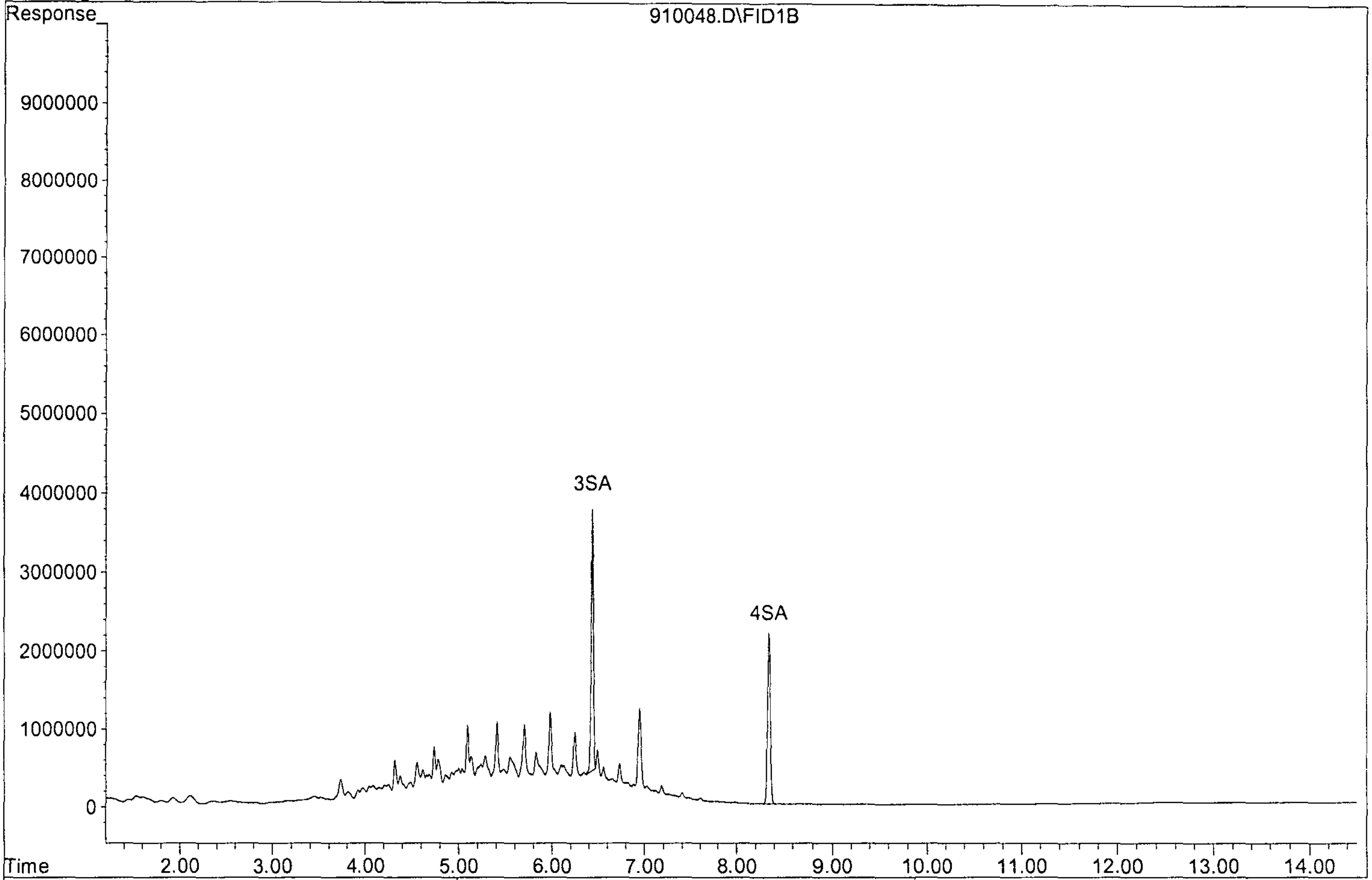
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

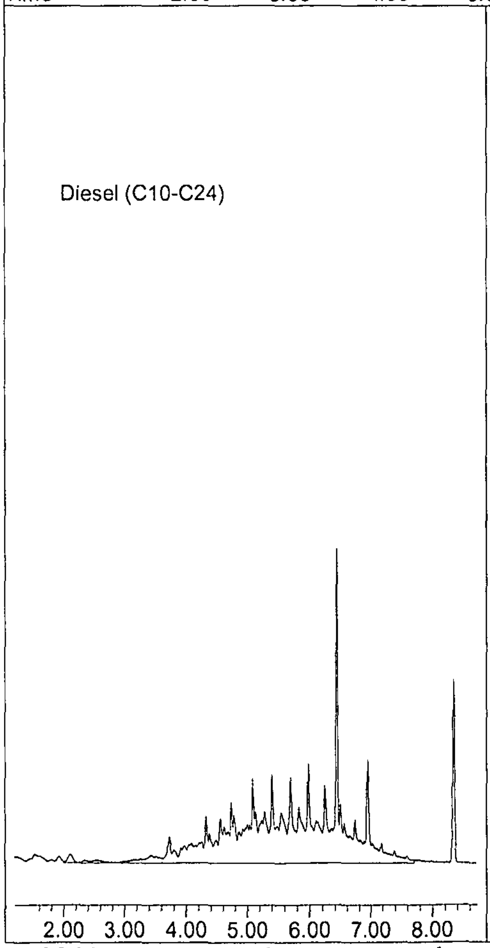
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	55630747	14.365 ppb
Surrogate Spike 30.000		Recovery =	47.88%
4) SA Octacosane(S)	8.34	46929237	14.530 ppb
Surrogate Spike 30.000		Recovery =	48.43%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	872794622	264.375 ppb

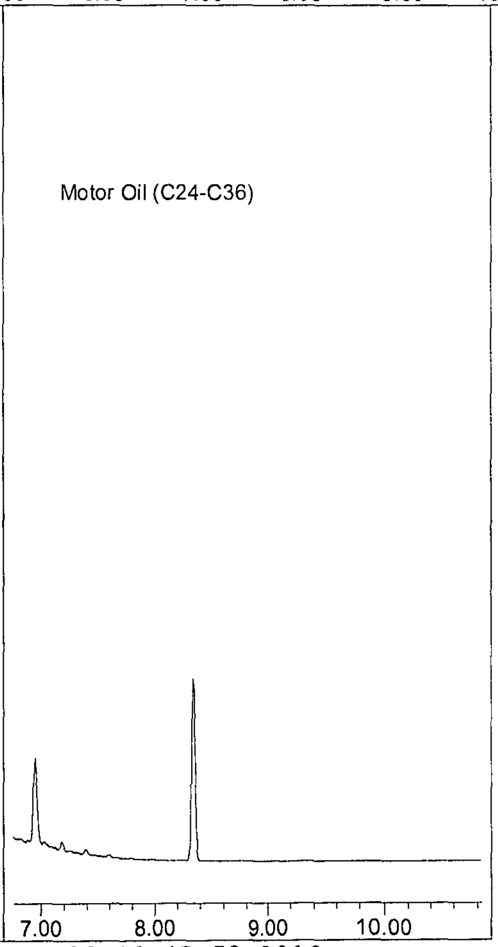
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910048.D
Sample : Diesel - 3 8/13/18







Quantitation Report (Not Reviewed)

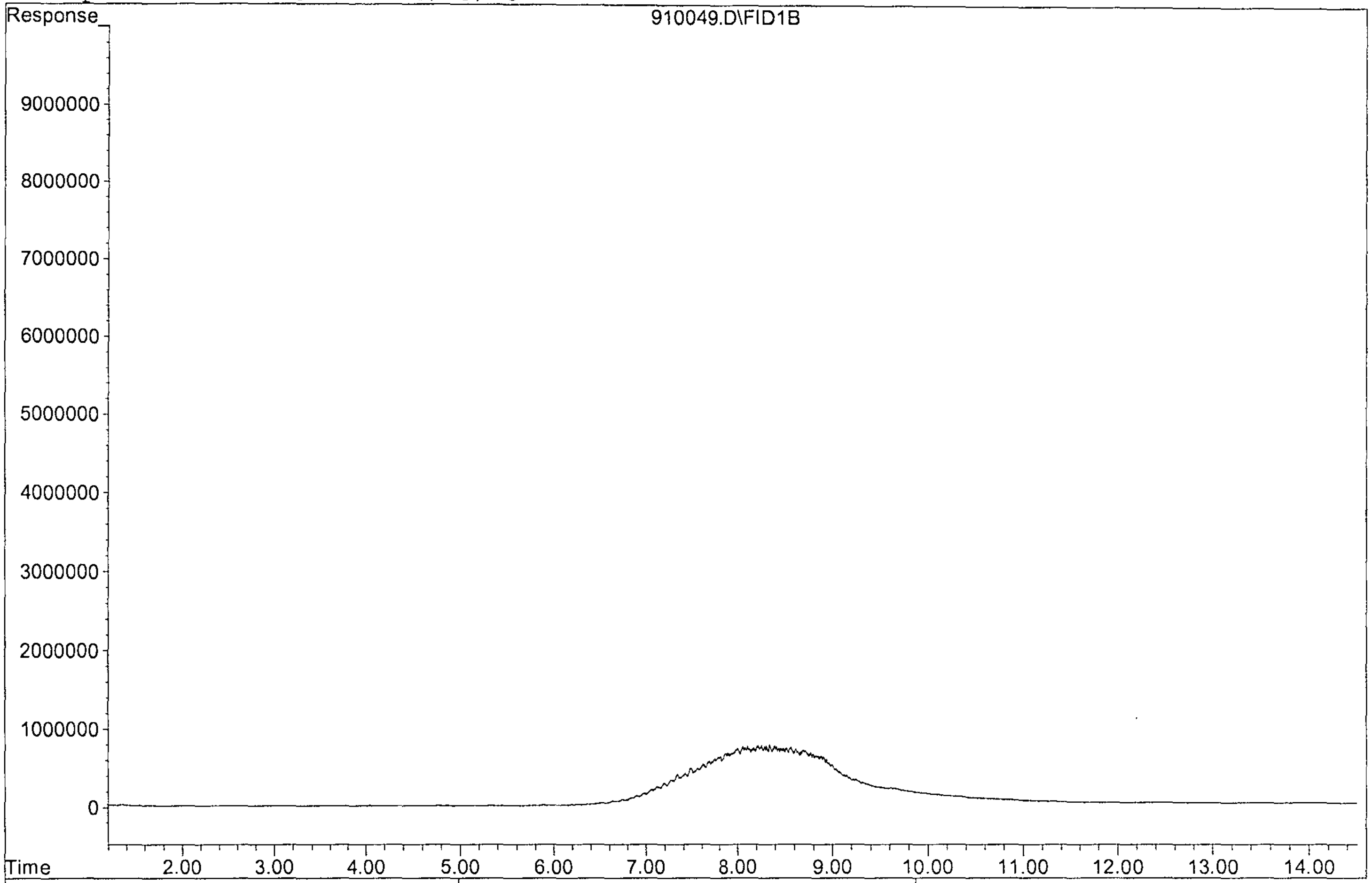
Data File : G:\APOLLO\DATA\180910\910049.D Vial: 49
Acq On : 9-11-18 2:21:58 Operator: DP
Sample : Motor Oil - 3 8/15/18 Inst : Apollo
Misc : Mix(B) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 11 10:17 2018 Quant Results File: DROB0905.RES

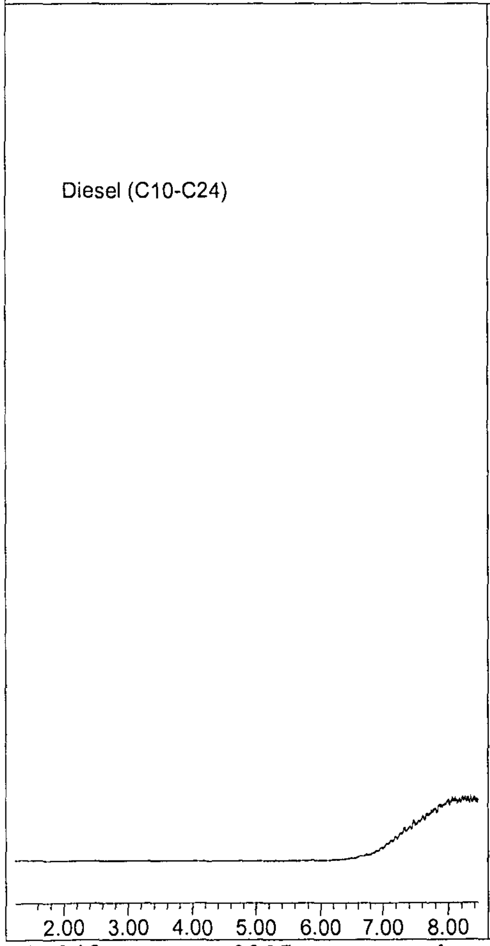
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

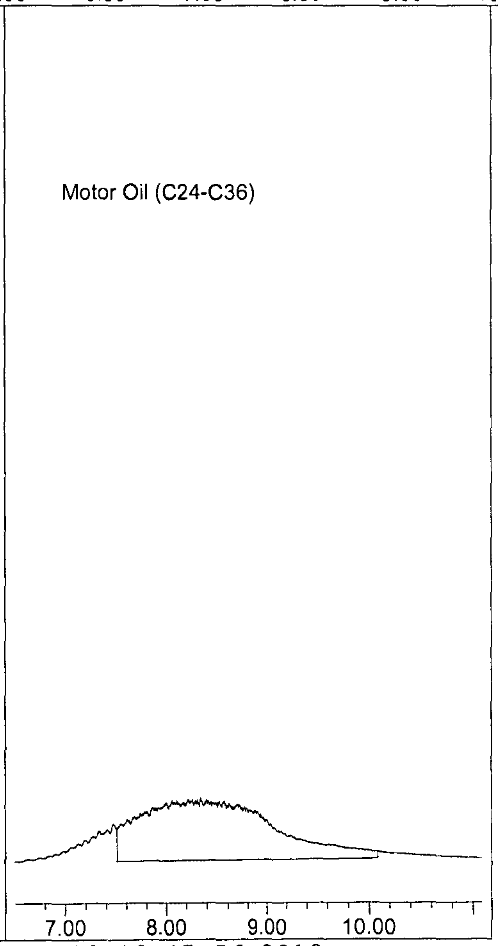
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	673383376	275.823 ppb

Data File: G:\APOLLO\DATA\180910\910049.D
Sample : Motor Oil - 3 8/15/18







TPH Extractables
DROB0905

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/11/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 910059-60.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1744890	5.7	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2190860	13	SA	
3	SA	Octacosane(S)	1614940	1882320	17	SA	
4	HBTM	Motor Oil (C24-C36)	1220680	1340500	9.8	HBTM	
5							
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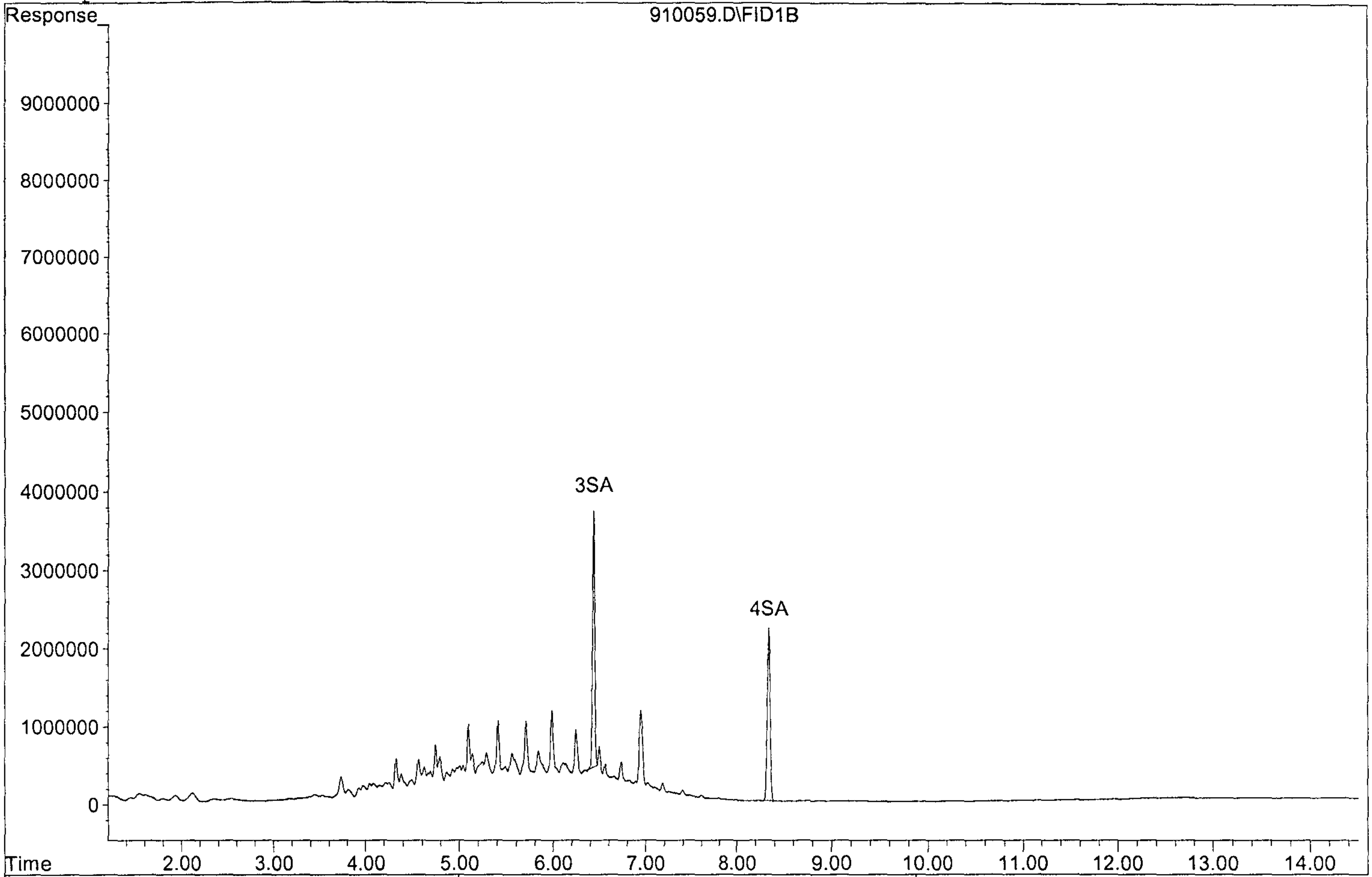
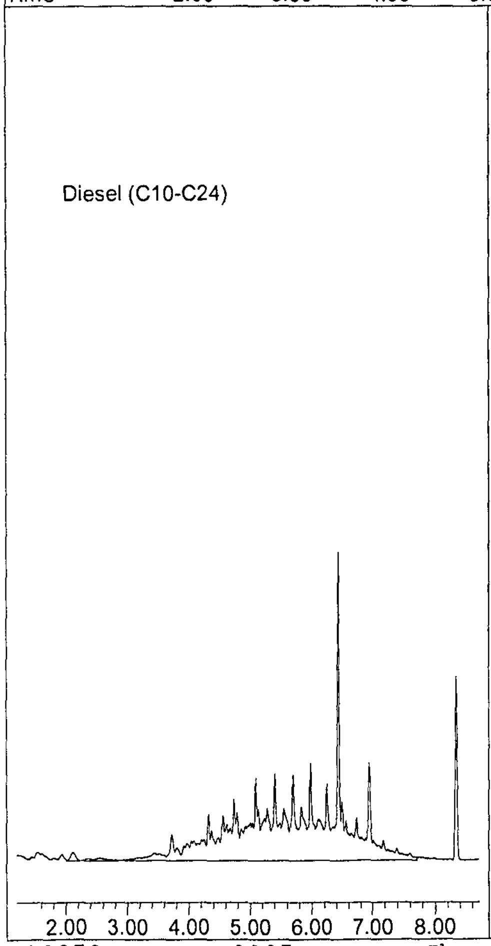
36							
37							
38							
39							
40							
		Average			11.4		

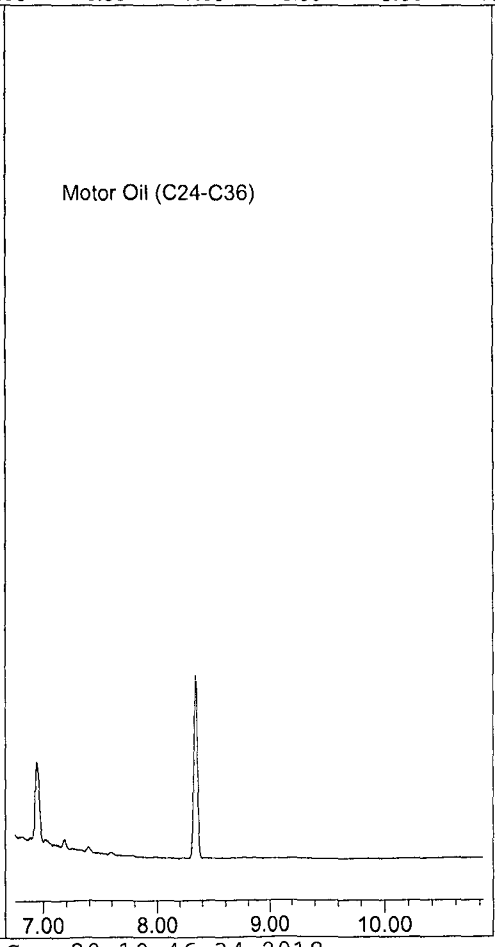
```
Data File : G:\APOLLO\DATA\180910\910059.D            Vial: 59
Acq On    : 9-11-18 5:41:05                        Operator: DP
Sample    : Diesel - 3 8/13/18                     Inst    : Apollo
Misc      : Mix(A)                                 Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 11 10:18 2018  Quant Results File: DROB0905.RES

Method         : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title          : 8015 B&C
Last Update    : Tue Sep 11 10:13:20 2018
Response via   : Multiple Level Calibration

Volume Inj.    : 2UL
Signal Phase   : DB-5
Signal Info    : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	54771388	14.143 ppb
Surrogate Spike 30.000		Recovery =	47.14%
4) SA Octacosane(S)	8.34	47058000	14.570 ppb
Surrogate Spike 30.000		Recovery =	48.57%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	872446752	264.270 ppb

Data File: G:\APOLLO\DATA\180910\910059.D
Sample : Diesel - 3 8/13/18







Quantitation Report (Not Reviewed)

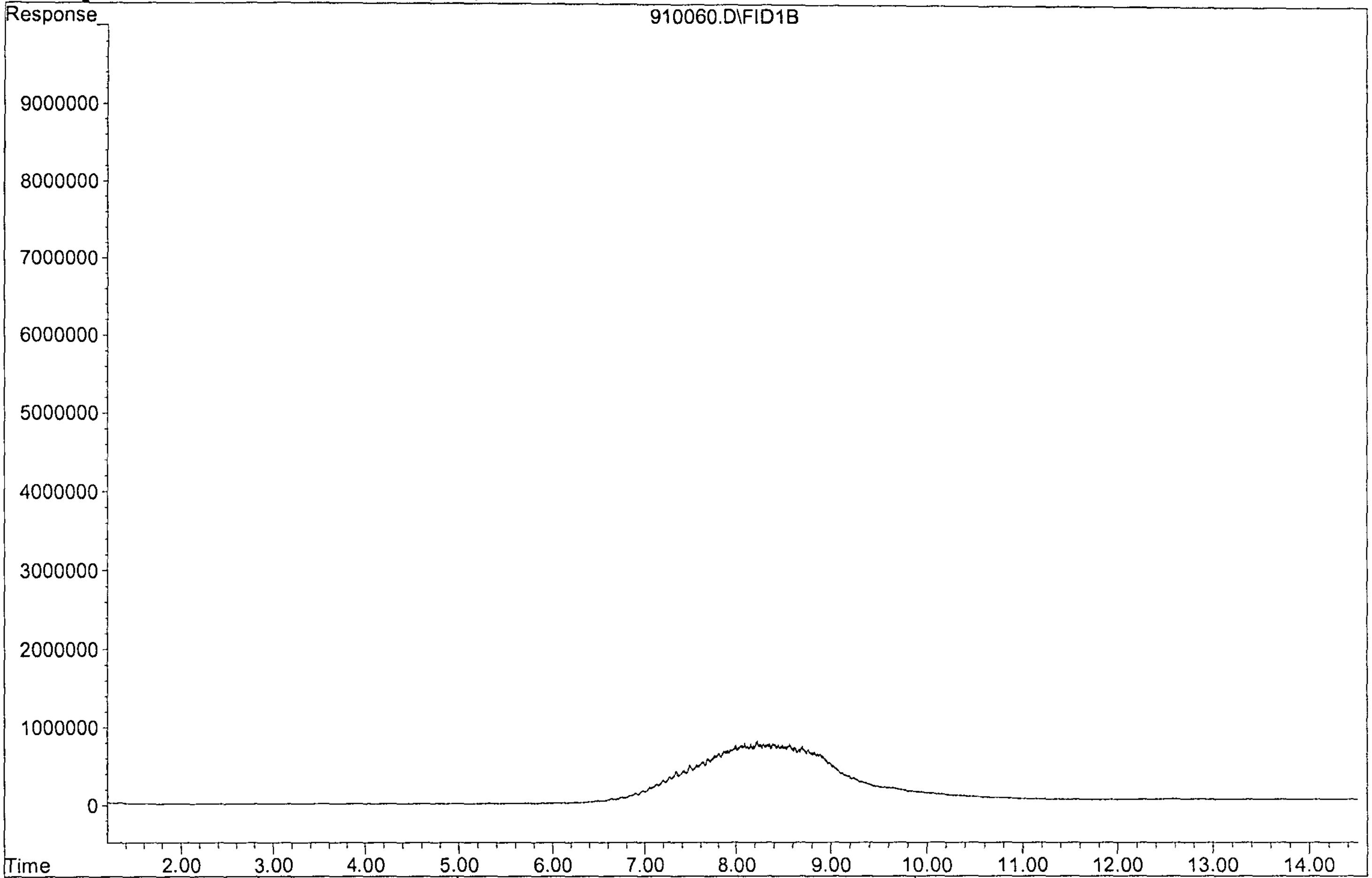
```
Data File : G:\APOLLO\DATA\180910\910060.D              Vial: 60
Acq On    : 9-11-18 6:01:01                         Operator: DP
Sample    : Motor Oil - 3 8/15/18                   Inst    : Apollo
Misc      : Mix(B)                                  Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 11 10:18 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

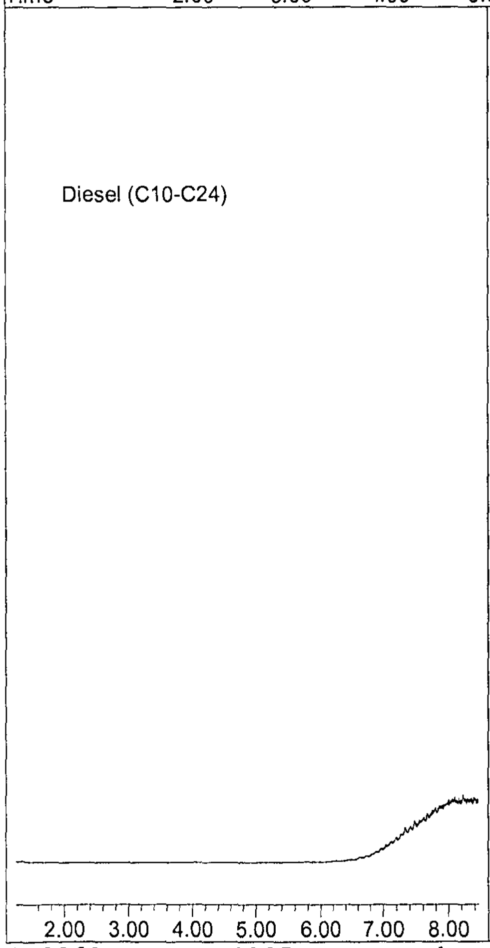
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	670250460	274.540 ppb

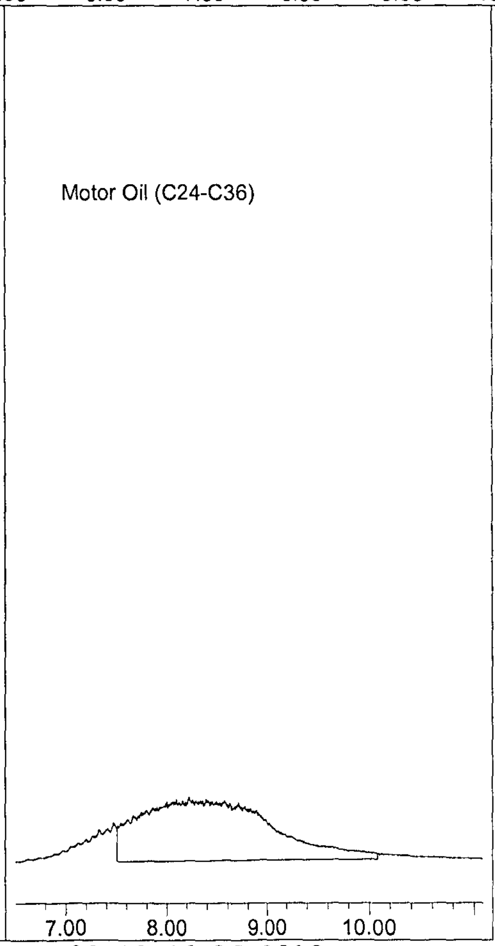
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910060.D
Sample : Motor Oil - 3 8/15/18







TPH Extractables
DROB0905

Form 7
Continuing Calibration

Lab Name:	APPL, Inc.	SDG No:	
Case No:		Date Analyzed:	09/11/18
Matrix:		Instrument:	Apollo
		Initial Cal. Date:	09/05/18
		Data File:	910067-68.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1804820	9.3	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2252710	16	SA	
3	SA	Octacosane(S)	1614940	1926850	19	SA	
4	HBTM	Motor Oil (C24-C36)	1220680	1362050	12	HBTM	
5							
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37							
38							
39							
40							
		Average			14.1		

Quantitation Report (Not Reviewed)

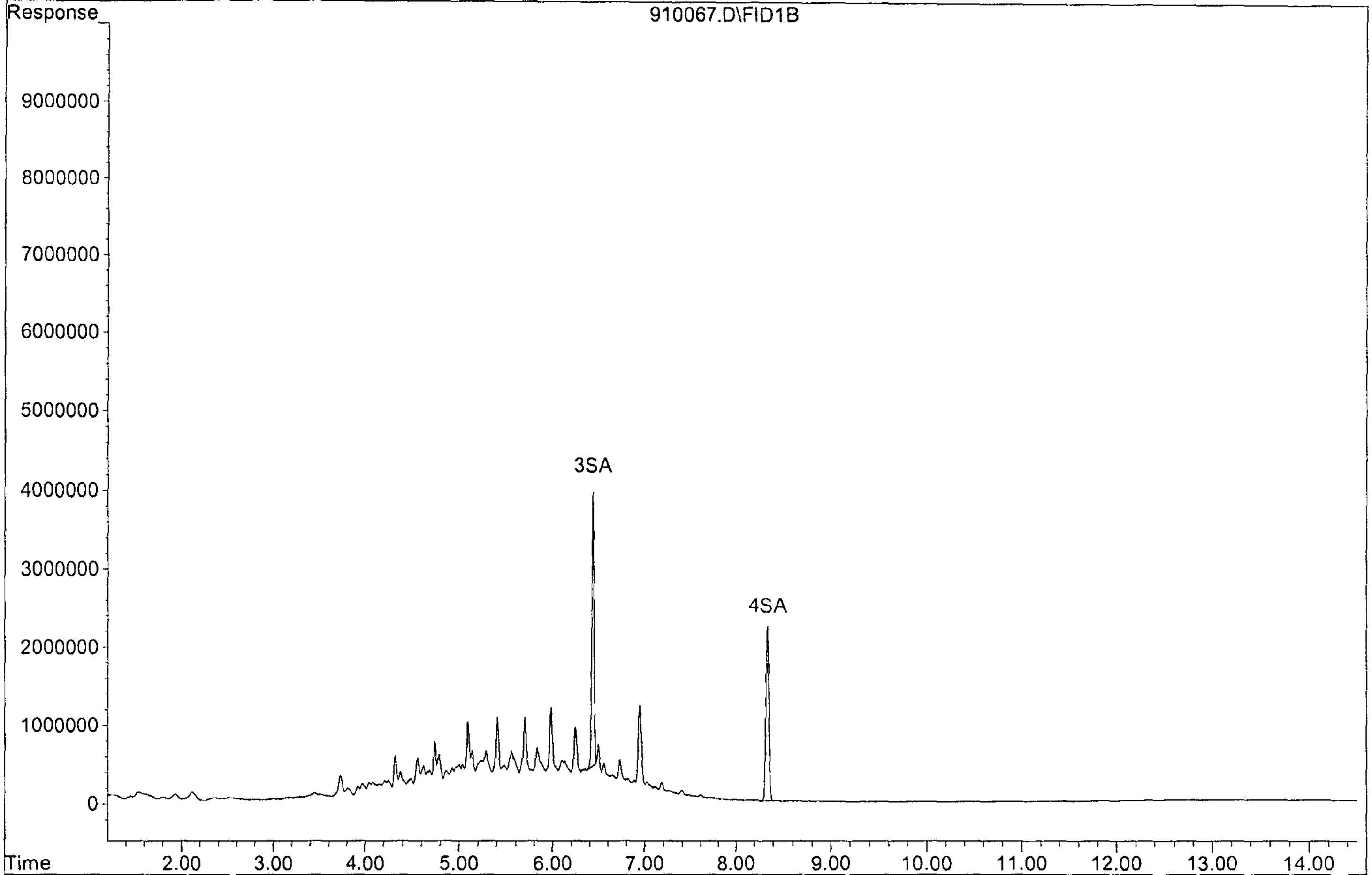
Data File : G:\APOLLO\DATA\180910\910067.D   Vial: 67
Acq On : 9-11-18 8:20:31   Operator: DP
Sample : Diesel - 3 8/13/18   Inst : Apollo
Misc : Mix(A)   Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 11 10:19 2018 Quant Results File: DROB0905.RES

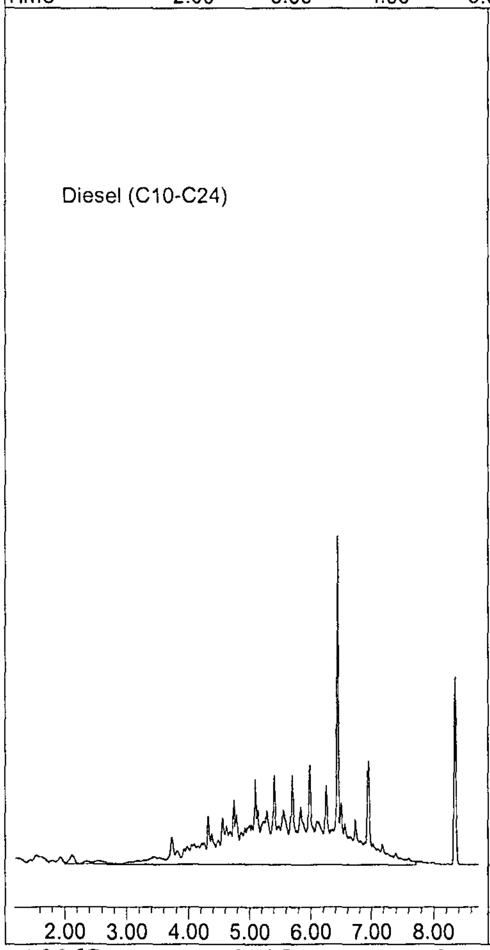
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

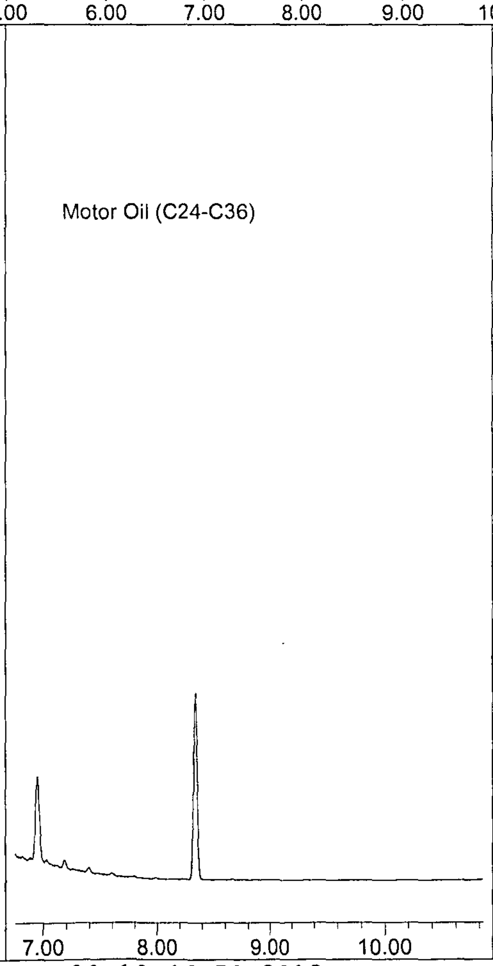
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	56317856	14.542 ppb
Surrogate Spike 30.000	Recovery	=	48.47%
4) SA Octacosane(S)	8.34	48171267	14.914 ppb
Surrogate Spike 30.000	Recovery	=	49.71%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	902407979	273.345 ppb

Data File: G:\APOLLO\DATA\180910\910067.D
Sample : Diesel - 3 8/13/18







Quantitation Report (Not Reviewed)

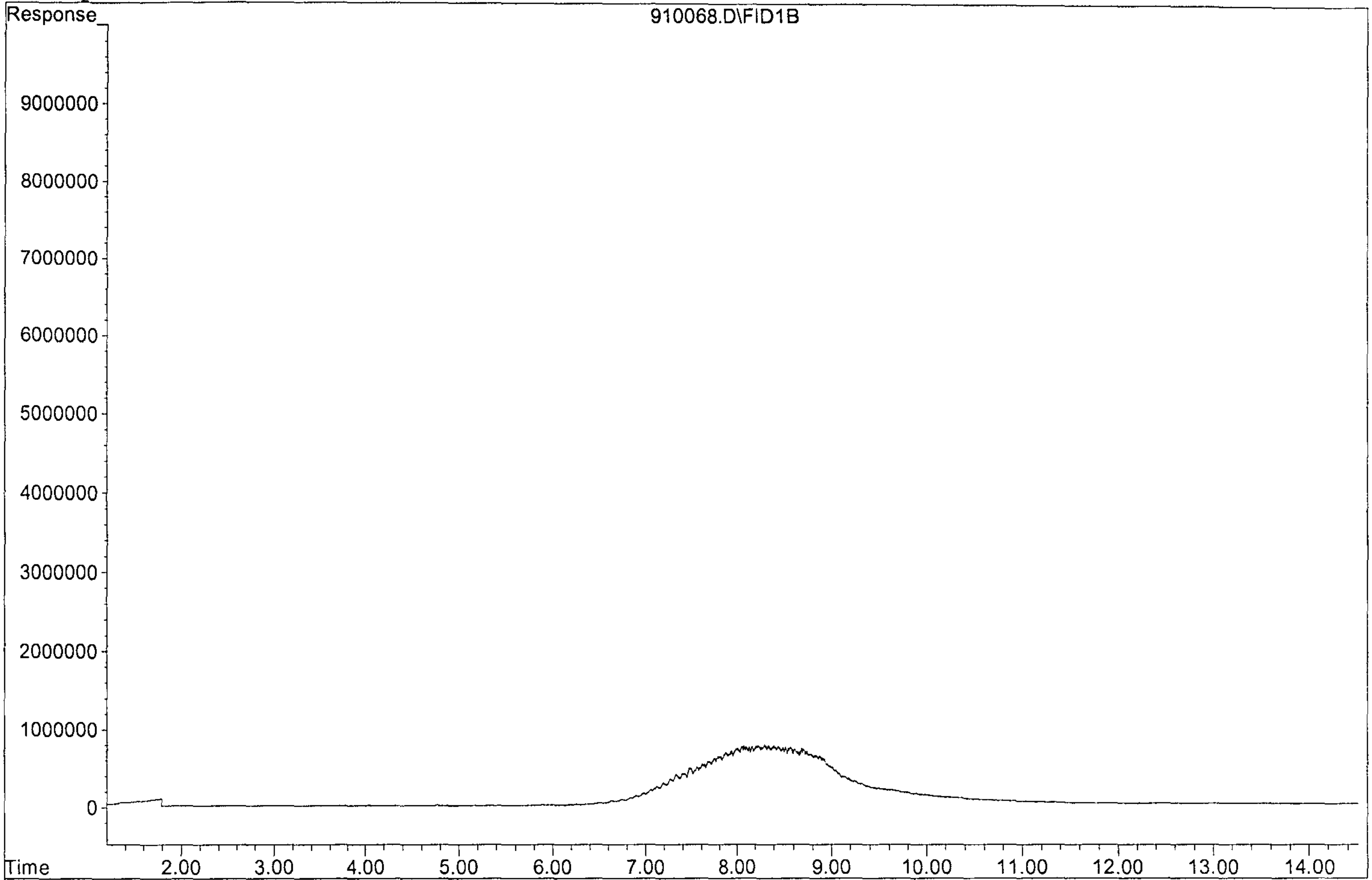
Data File : G:\APOLLO\DATA\180910\910068.D Vial: 68
Acq On : 9-11-18 8:40:11 Operator: DP
Sample : Motor Oil - 3 8/15/18 Inst : Apollo
Misc : Mix(B) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 11 10:19 2018 Quant Results File: DROB0905.RES

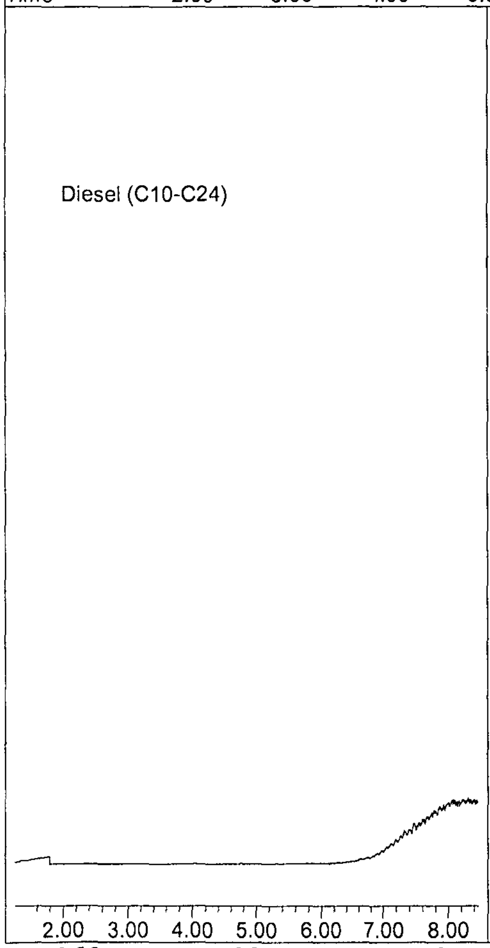
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

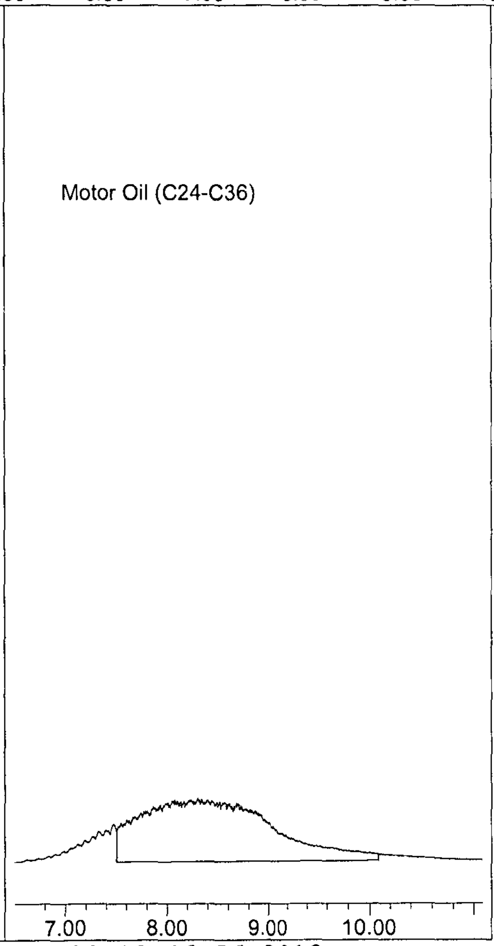
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	681026392	278.954 ppb

Data File: G:\APOLLO\DATA\180910\910068.D
Sample : Motor Oil - 3 8/15/18







TPH Extractables
DROB0905

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/12/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 912002.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1780270	7.9	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2185630	13	SA	
3	SA	Octacosane(S)	1614940	1891430	17	SA	
4							
5							
6							
7							
8							
9							
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11							
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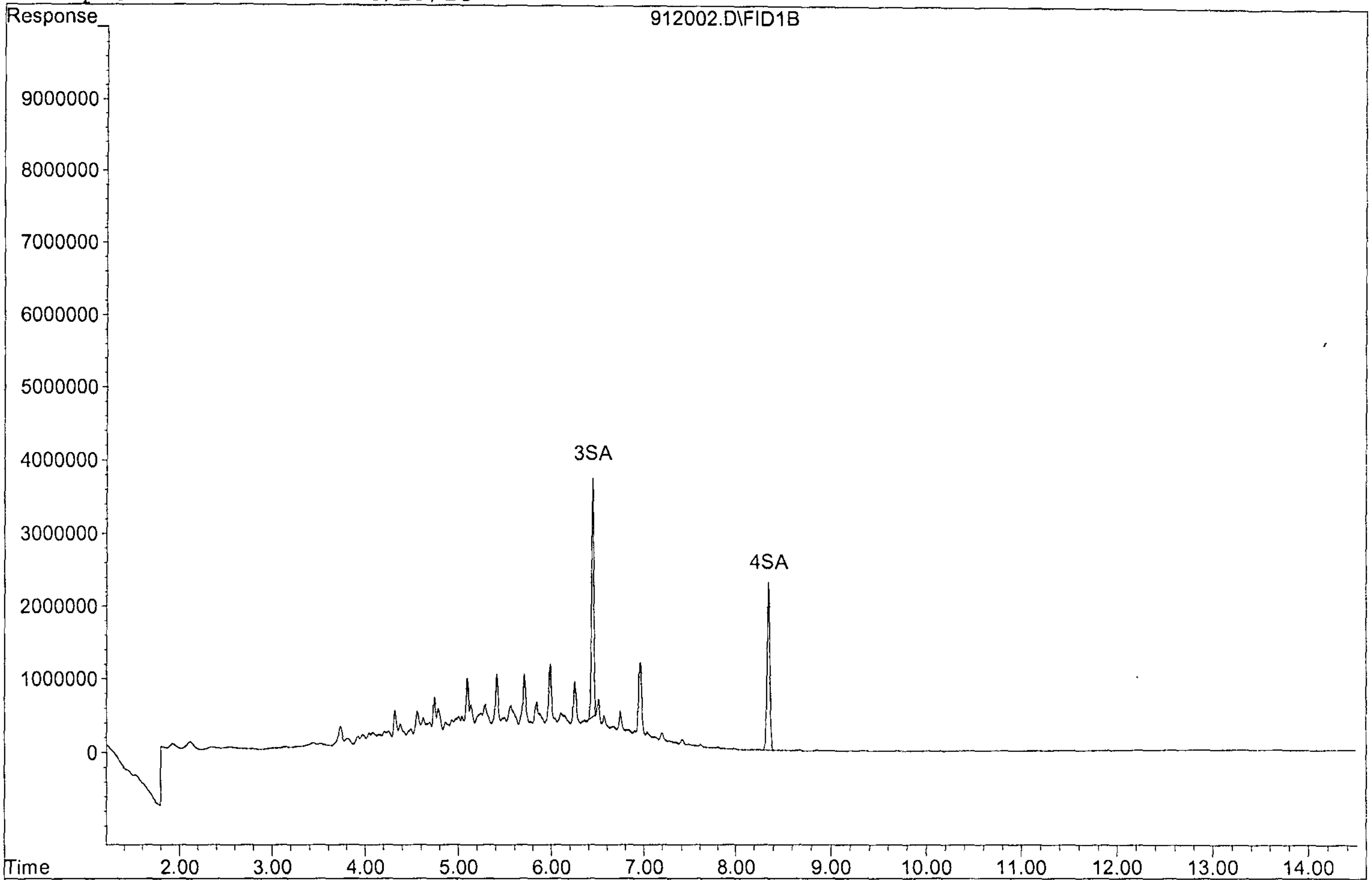
34							
35							
36							
37							
38							
39							
40							
		Average			12.6		

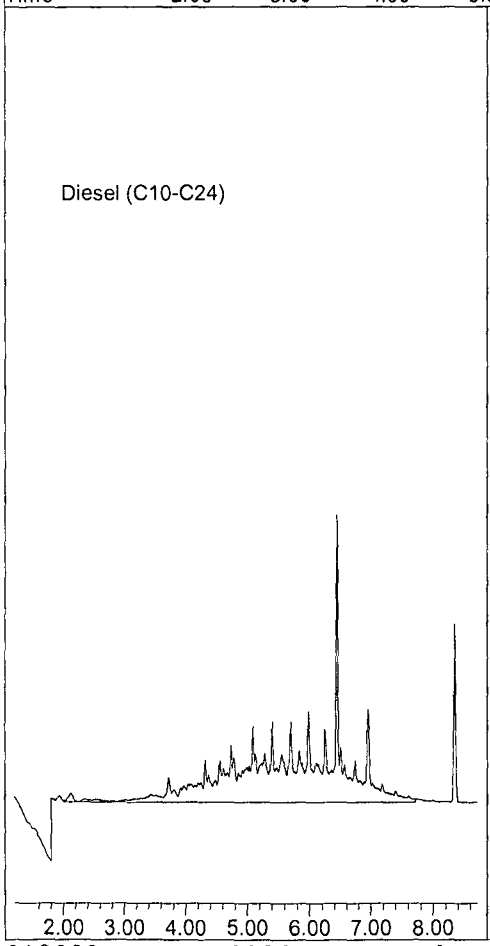
```
Data File : G:\APOLLO\DATA\180912\912002.D              Vial: 2
Acq On    : 9-12-18 16:17:19                        Operator: DP
Sample    : Diesel - 3 8/13/18                      Inst    : Apollo
Misc      : Mix(A)                                  Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 20 16:35 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180912\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A
```

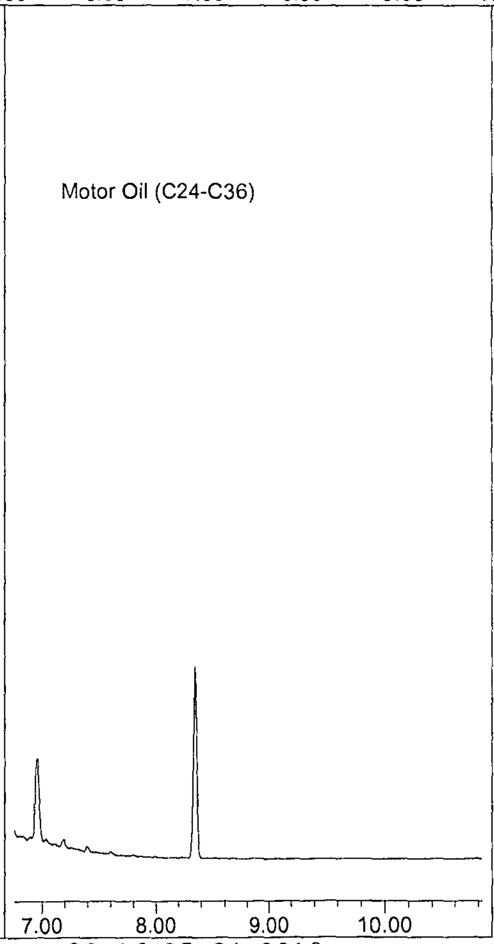
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	54640803	14.109 ppb
Surrogate Spike 30.000		Recovery =	47.03%
4) SA Octacosane(S)	8.35	47285744	14.640 ppb
Surrogate Spike 30.000		Recovery =	48.80%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	890137032	269.628 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180912\912002.D
Sample : Diesel - 3 8/13/18





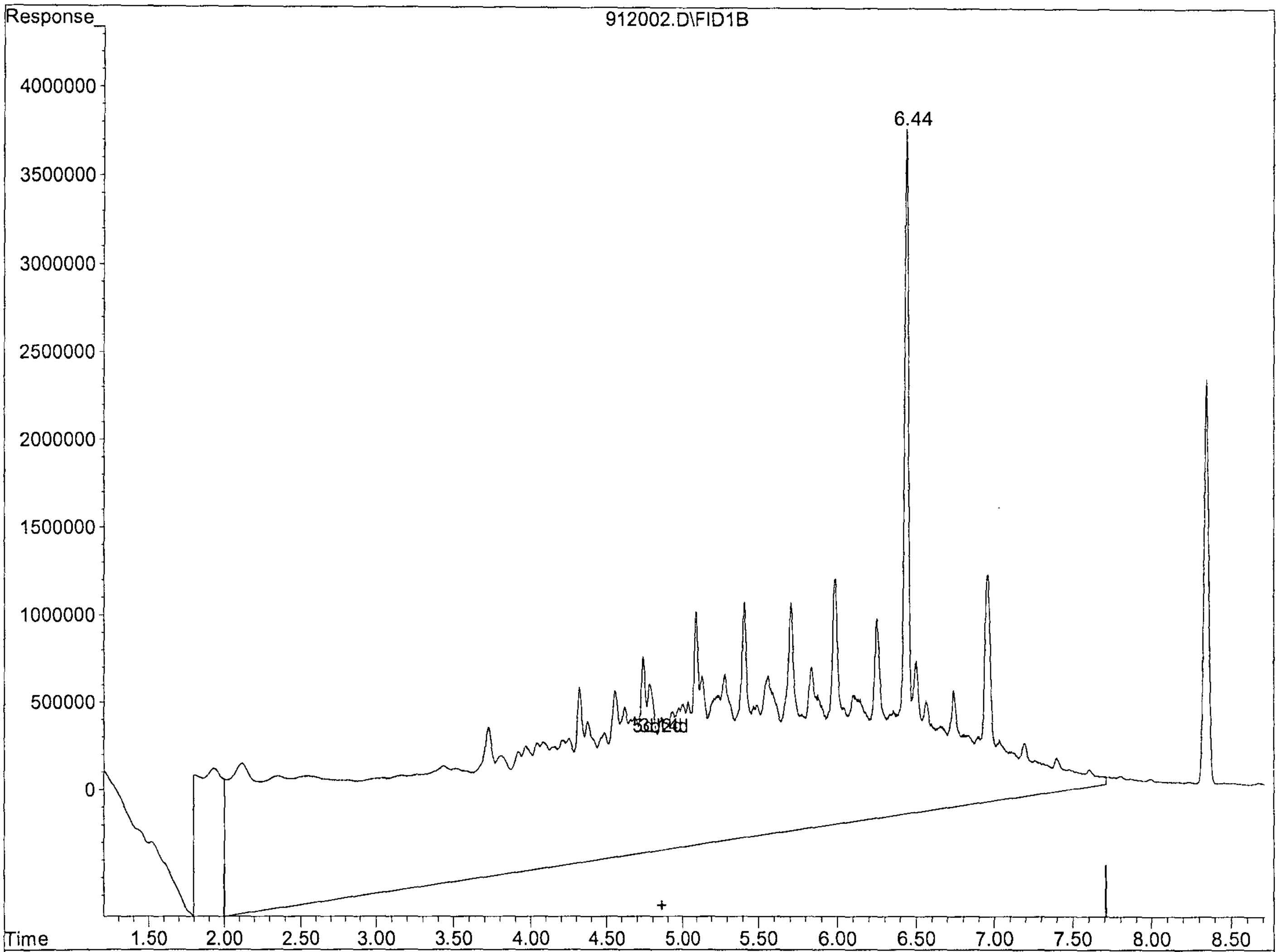


Quantitation Report

Data File : G:\APOLLO\DATA\180912\912002.D
Acq On : 9-12-18 16:17:19
Sample : Diesel - 3 8/13/18
Misc : Mix(A)
IntFile : events.e
Quant Time: Sep 20 16:34 2018 Quant Results File: DROB0905.RES

Vial: 2
Operator: DP
Inst : Apollo
Multiplr: 1.00

Method : G:\APOLLO\DATA\180912\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration



QEdit

(1) Diesel (C10-C24) (HATM)

4.86min 664.268ppb m

response 2192978956

(+) = Expected Retention Time

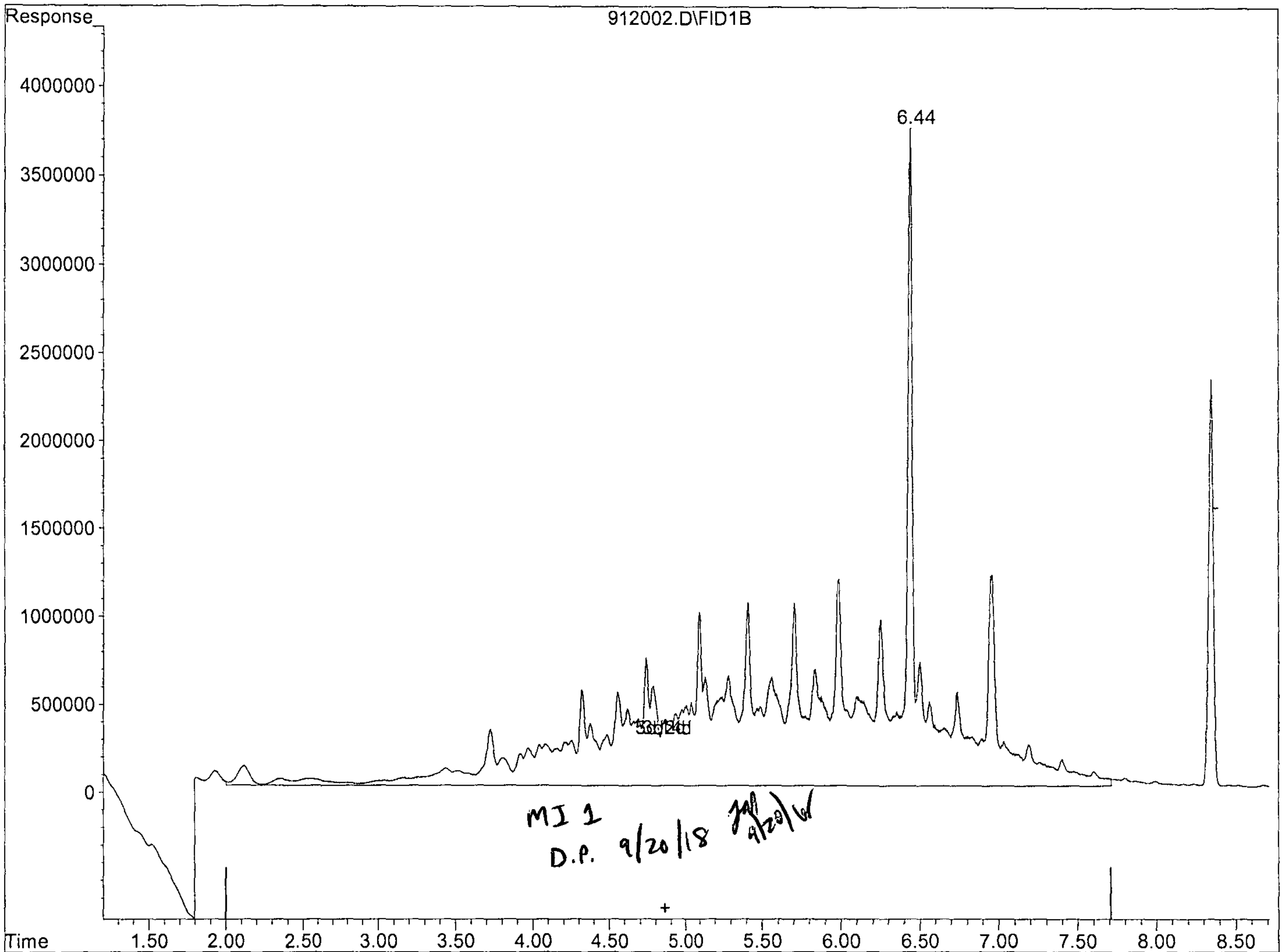
912002.D DROB0905.M Thu Sep 20 16:35:03 2018

Quantitation Report

Data File : G:\APOLLO\DATA\180912\912002.D
Acq On : 9-12-18 16:17:19
Sample : Diesel - 3 8/13/18
Misc : Mix(A)
IntFile : events.e
Quant Time: Sep 20 16:34 2018 Quant Results File: DROB0905.RES

Vial: 2
Operator: DP
Inst : Apollo
Multiplr: 1.00

Method : G:\APOLLO\DATA\180912\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration



QEdit

(1) Diesel (C10-C24) (HATM)

4.86min 269.628ppb m

response 890137032

(+) = Expected Retention Time

TPH Extractables
DROB0905

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/12/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 912020.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1791840	8.6	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2222730	15	SA	
3	SA	Octacosane(S)	1614940	1897290	17	SA	
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			13.5		

Quantitation Report (Not Reviewed)

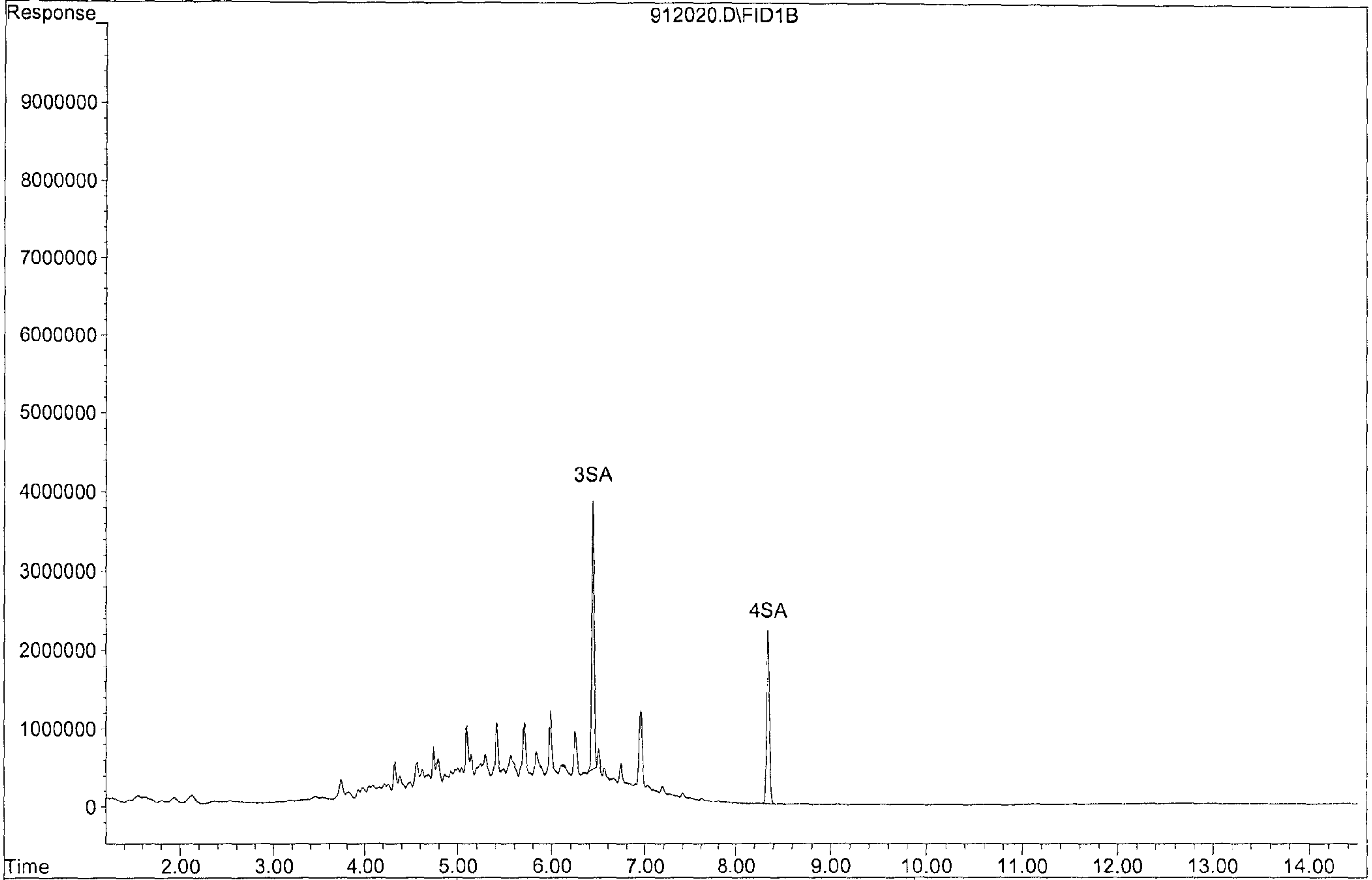
Data File : G:\APOLLO\DATA\180912\912020.D Vial: 20
Acq On : 9-12-18 22:20:25 Operator: DP
Sample : Diesel - 3 8/13/18 Inst : Apollo
Misc : Mix(A) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 20 16:35 2018 Quant Results File: DROB0905.RES

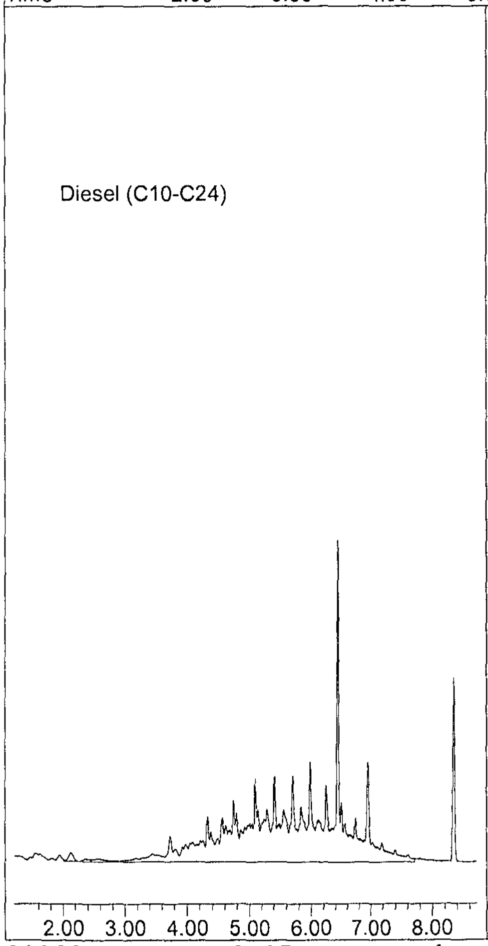
Method : G:\APOLLO\DATA\180912\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

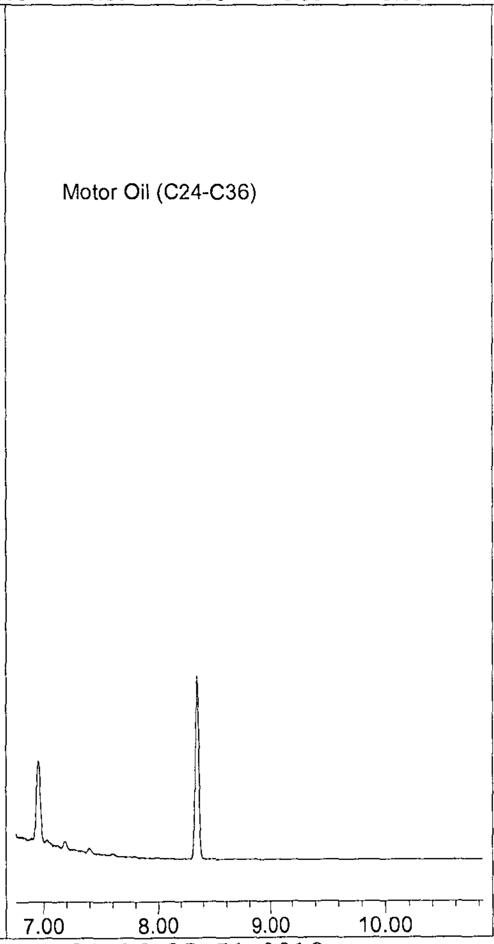
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	55568133	14.349 ppb
Surrogate Spike 30.000	Recovery	=	47.83%
4) SA Octacosane(S)	8.34	47432191	14.685 ppb
Surrogate Spike 30.000	Recovery	=	48.95%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	895920986	271.380 ppb

Data File: G:\APOLLO\DATA\180912\912020.D
Sample : Diesel - 3 8/13/18







TPH Extractables
DROB0905

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/14/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 914026-27.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1758870	6.6	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2162770	12	SA	
3	SA	Octacosane(S)	1614940	1881670	17	SA	
4	HBTM	Motor Oil (C24-C36)	1220680	1287200	5.4	HBTM	
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
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29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			10.3		

Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180914\914026.D Vial: 26
Acq On : 9-14-18 16:57:35 Operator: DP
Sample : Diesel - 3 8/13/18 Inst : Apollo
Misc : Mix(A) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 17 8:34 2018 Quant Results File: DROB0905.RES

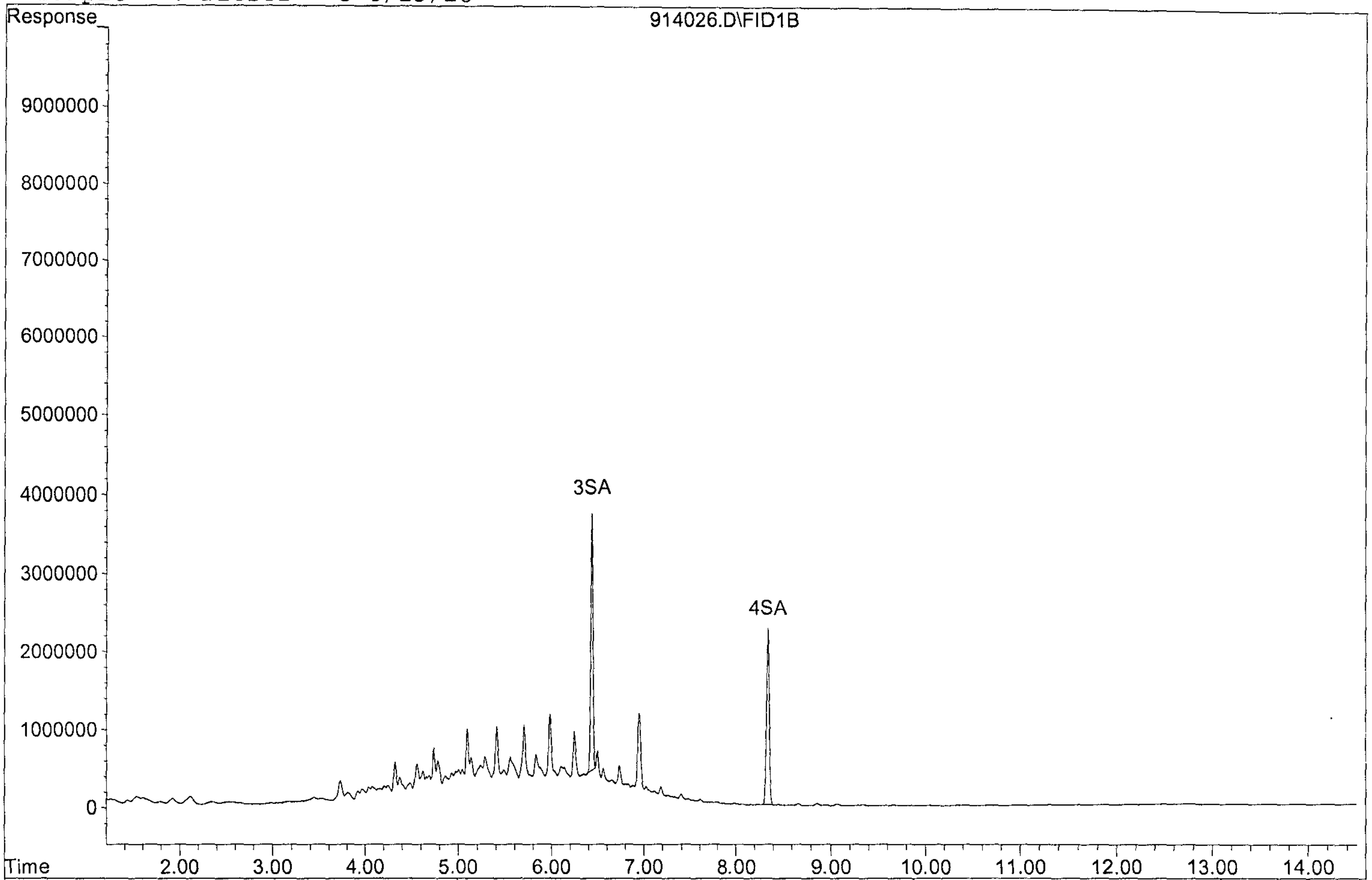
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

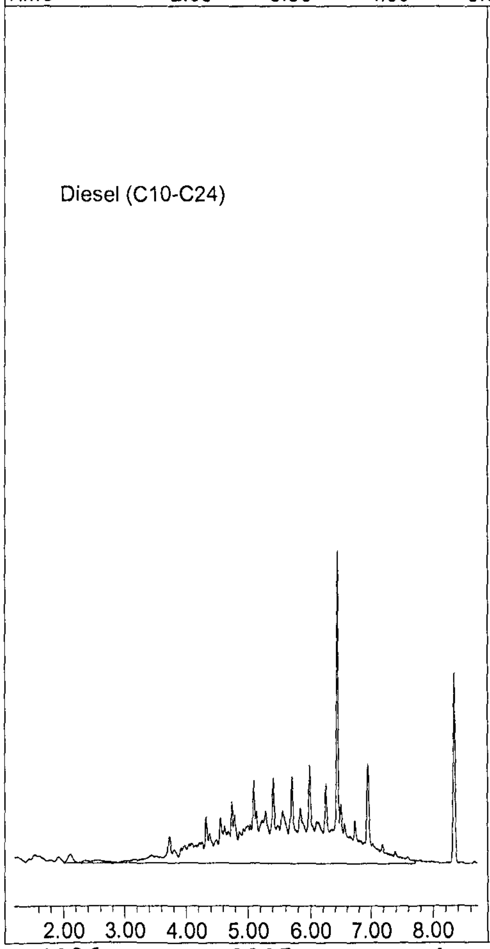
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

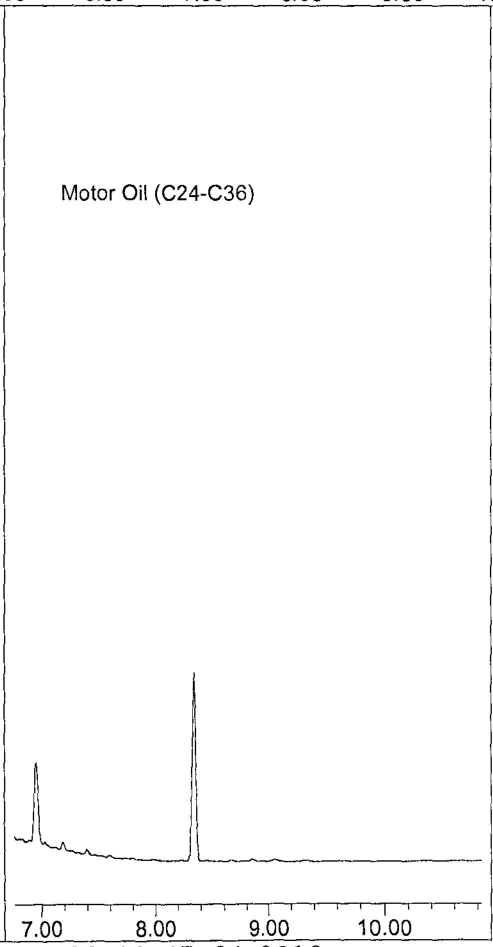
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	54069263	13.962 ppb
Surrogate Spike 30.000		Recovery =	46.54%
4) SA Octacosane(S)	8.34	47041817	14.565 ppb
Surrogate Spike 30.000		Recovery =	48.55%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	879433121	266.386 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180914\914026.D
Sample : Diesel - 3 8/13/18







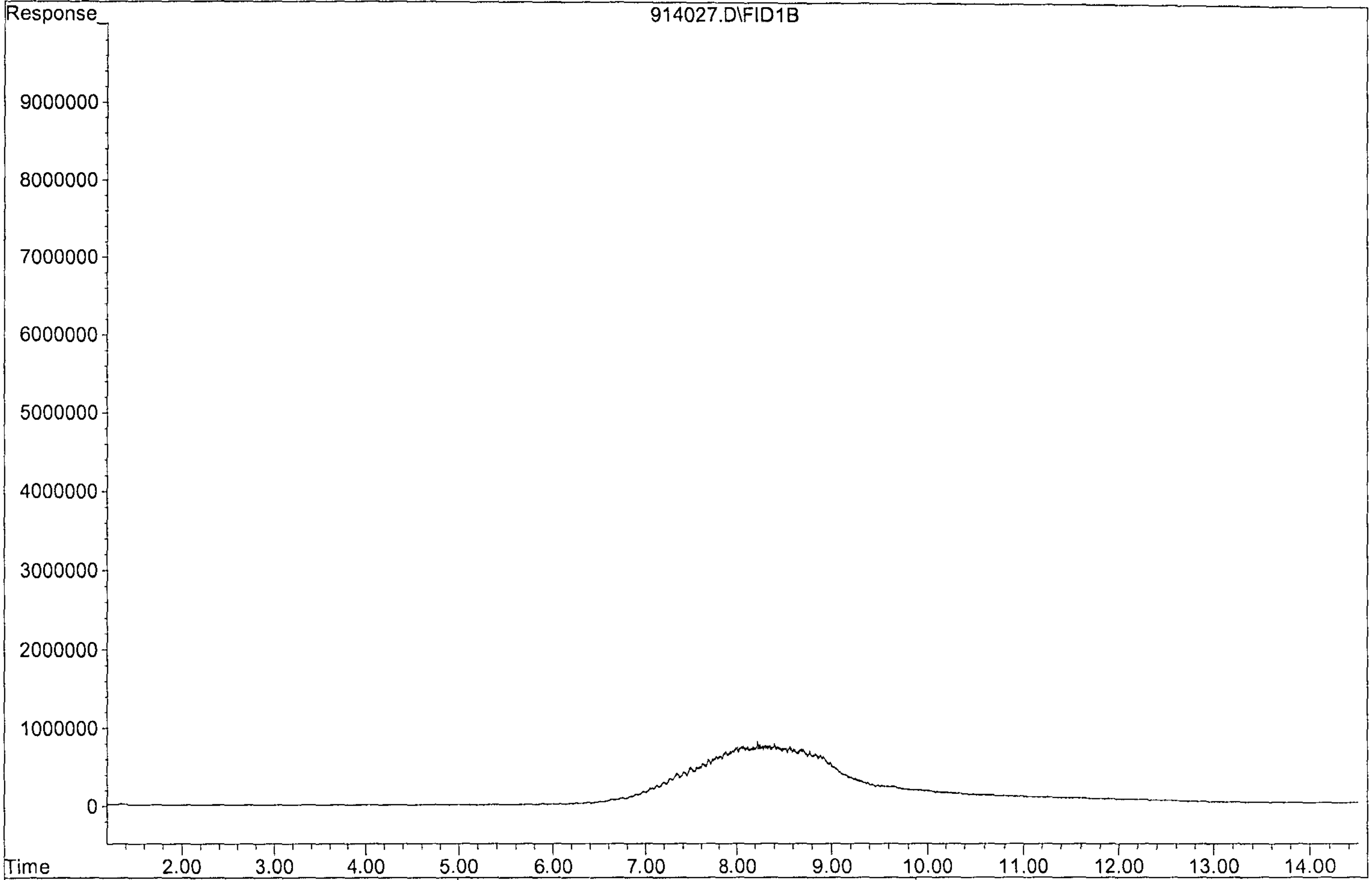
Quantitation Report (Not Reviewed)

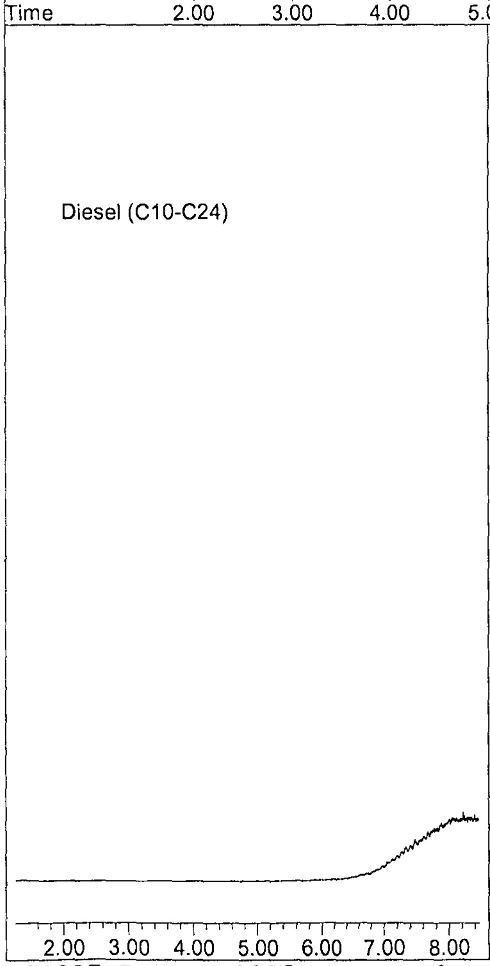
```
Data File : G:\APOLLO\DATA\180914\914027.D          Vial: 27
Acq On    : 9-14-18 17:17:47                    Operator: DP
Sample    : Motor Oil - 3 8/15/18               Inst    : Apollo
Misc      : Mix(B)                              Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 17  8:35 2018  Quant Results File: DROB0905.RES

Method         : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title          : 8015 B&C
Last Update    : Tue Sep 11 10:13:20 2018
Response via   : Multiple Level Calibration

Volume Inj.    : 2UL
Signal Phase   : DB-5
Signal Info    : FID02A

     Compound                        R.T.      Response    Conc Units
-------------------------------------------------------------------------

  System Monitoring Compounds

  Target Compounds
 2) HBTM Motor Oil (C24-C36)          8.80      643601872  263.624 ppb
```

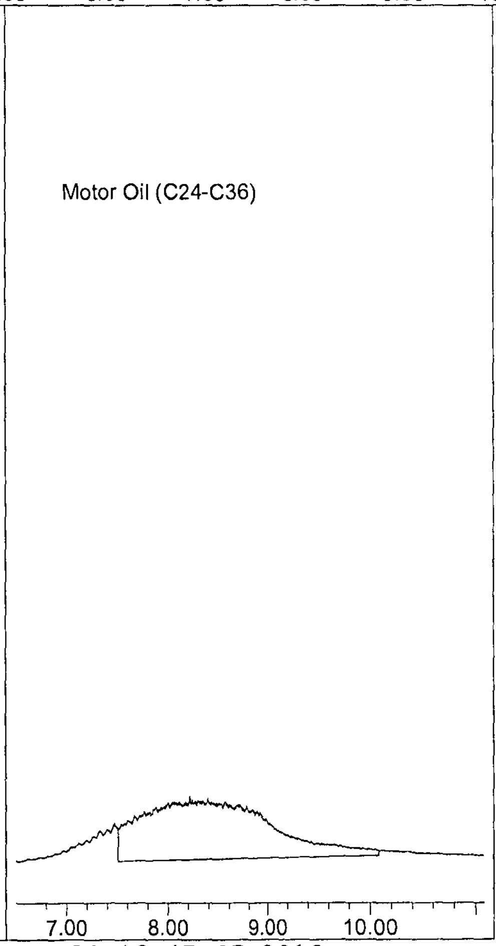
```
-------------------------------------------------------------------------
(f)=RT Delta > 1/2 Window                          (m)=manual int.
```

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914027.D
Sample : Motor Oil - 3 8/15/18







914027.D DROB0905.M Thu Sep 20 10:47:07 2018 Page 2

TPH Extractables
DROB0905

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/14/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 914043-44.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1726280	4.6	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2183070	13	SA	
3	SA	Octacosane(S)	1614940	1851110	15	SA	
4	HBTM	Motor Oil (C24-C36)	1220680	1314120	7.7	HBTM	
5							
6							
7							
8							
9							
10							
11							
12							
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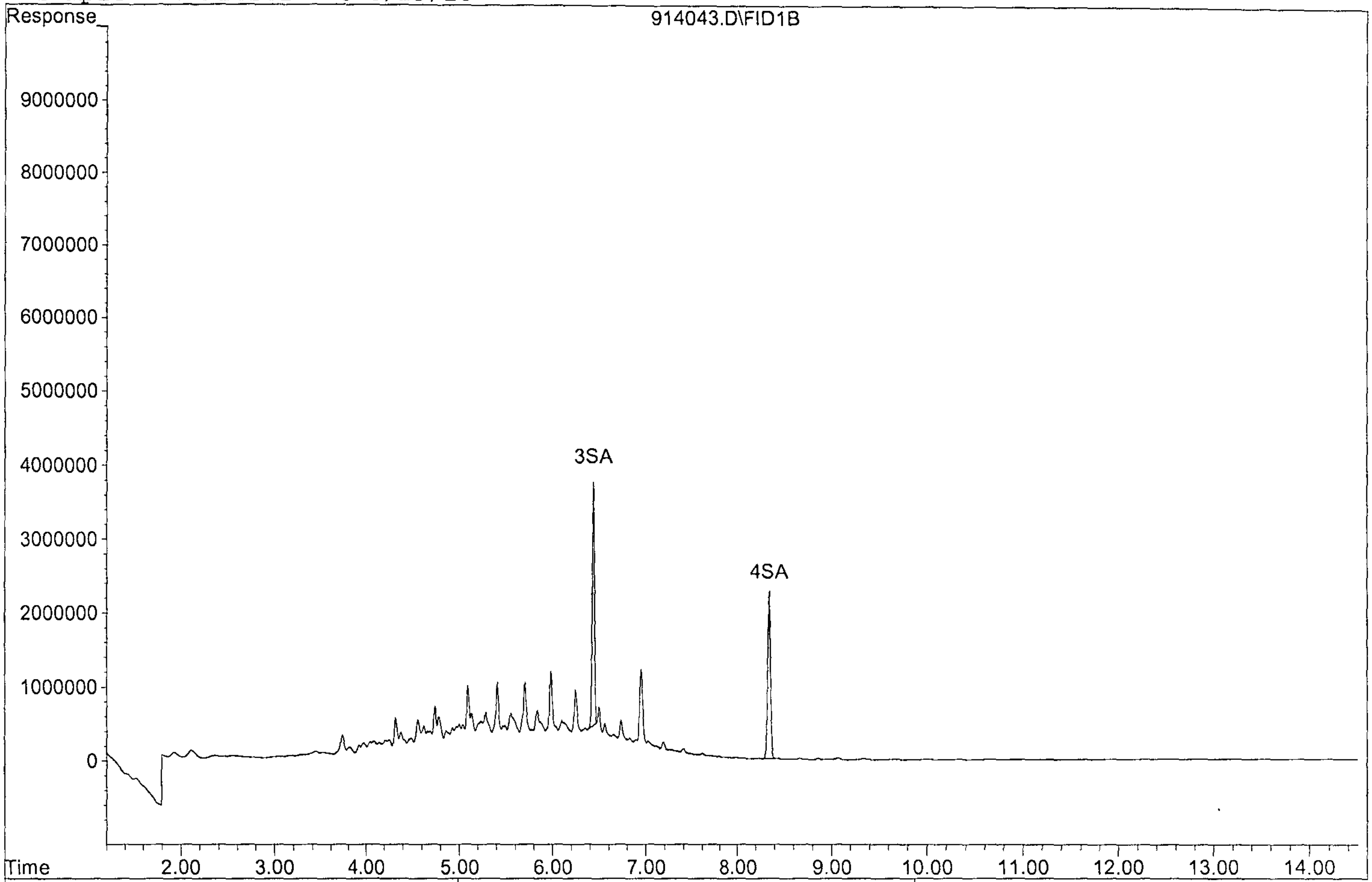
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			10.1		

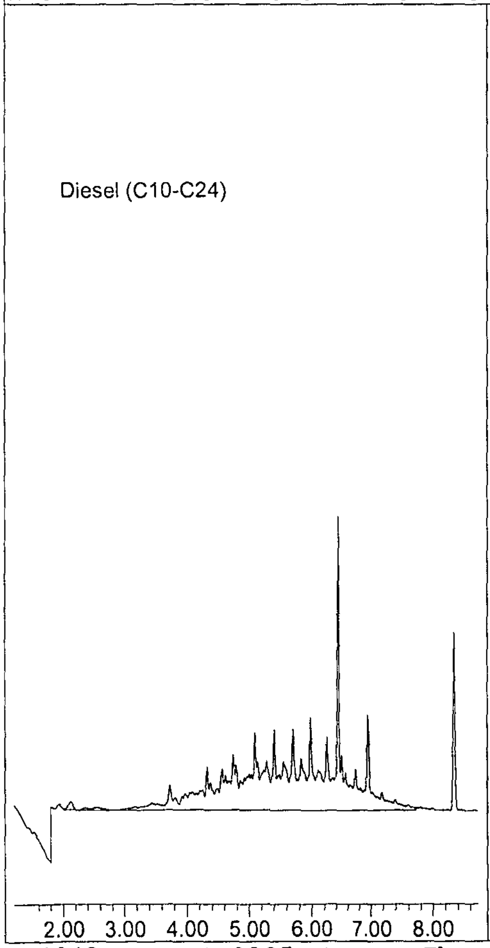
Quantitation Report (QT Reviewed)

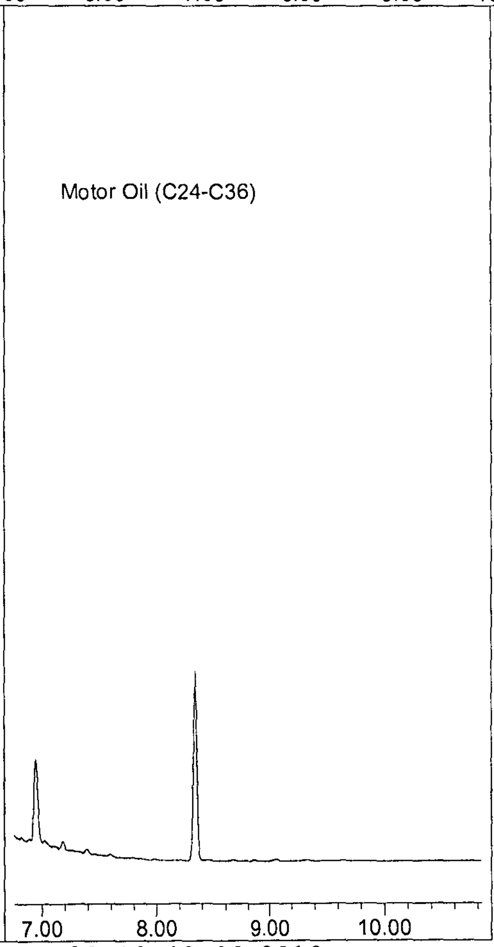
```
Data File : G:\APOLLO\DATA\180914\914043.D              Vial: 43
Acq On    : 9-14-18 22:37:09                        Operator: DP
Sample    : Diesel - 3 8/13/18                      Inst    : Apollo
Misc      : Mix(A)                                  Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 17  8:35 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A

    Compound                      R.T.      Response   Conc Units
--------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)          6.43      54576852   14.093 ppb
Surrogate Spike 30.000                  Recovery     =   46.98%
 4) SA  Octacosane(S)               8.34      46277655   14.328 ppb
Surrogate Spike 30.000                  Recovery     =   47.76%

  Target Compounds
 1) HATM Diesel (C10-C24)           4.86     863138795  261.451 ppb
```

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914043.D
Sample : Diesel - 3 8/13/18

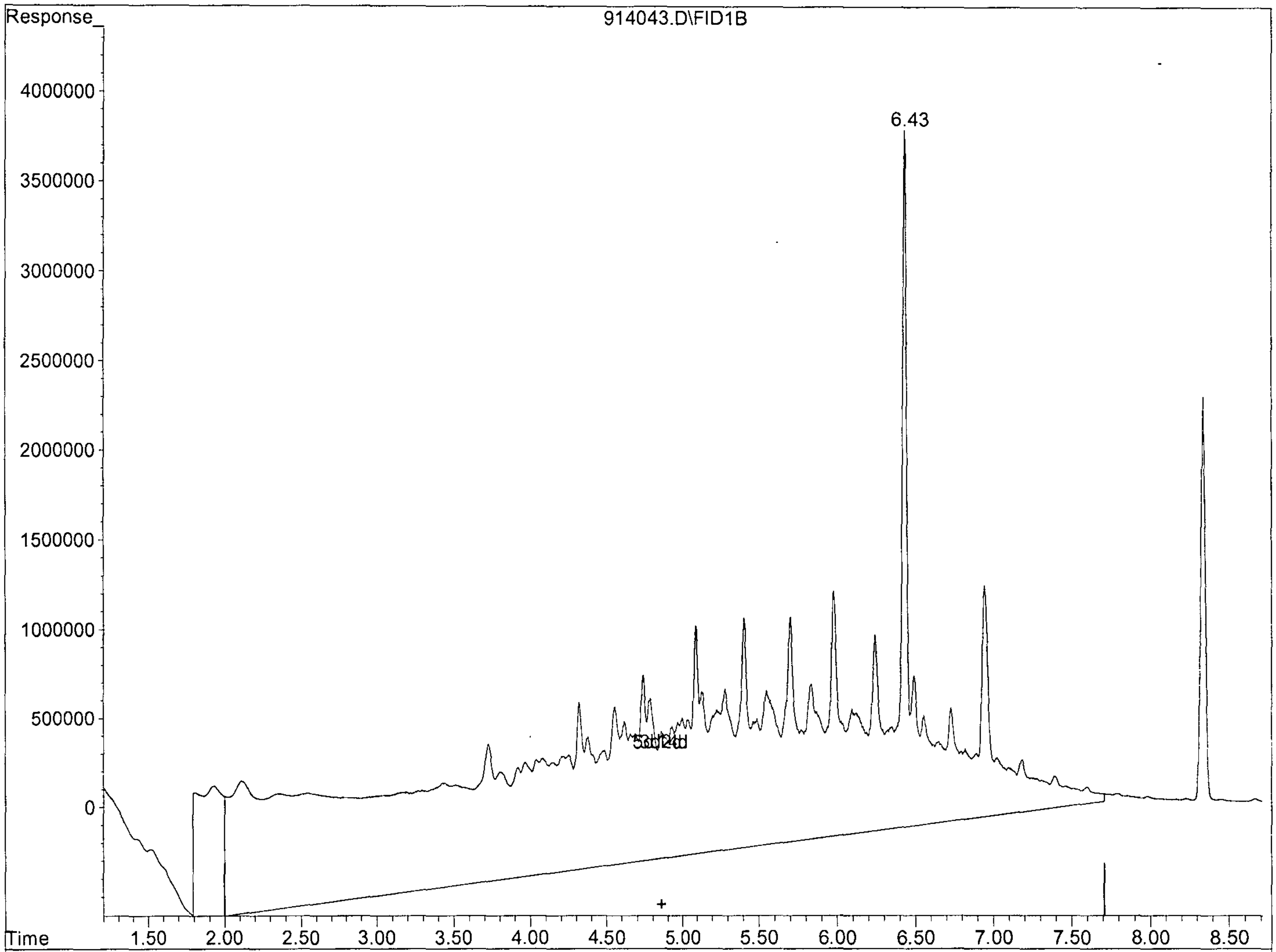






Quantitation Report

```
Data File : G:\APOLLO\DATA\180914\914043.D              Vial: 43
Acq On    : 9-14-18 22:37:09                        Operator: DP
Sample    : Diesel - 3 8/13/18                      Inst     : Apollo
Misc      : Mix(A)                                  Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 17  8:35 2018  Quant Results File: DROB0905.RES

Method         : G:\APOLLO\DATA\180914\DROB0905.M (Chemstation Integrator)
Title          : 8015 B&C
Last Update    : Tue Sep 11 10:13:20 2018
Response via   : Multiple Level Calibration
```



QEdit

(1) Diesel (C10-C24) (HATM)

4.86min 605.830ppb m

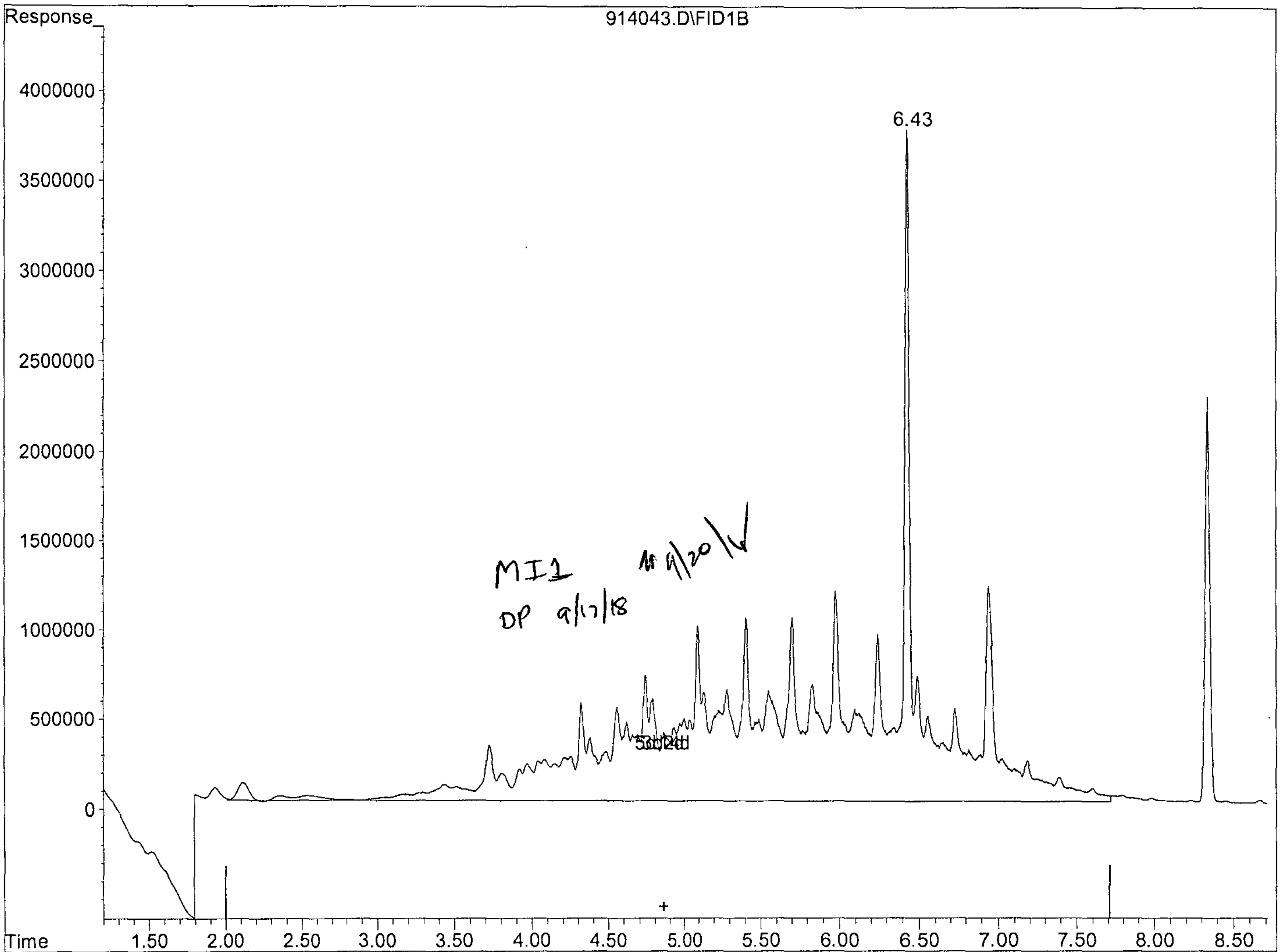
response 2000055188

(+) = Expected Retention Time

914043.D DROB0905.M   Mon Sep 17 08:35:36 2018

Quantitation Report

```
Data File : G:\APOLLO\DATA\180914\914043.D                 Vial: 43
Acq On    : 9-14-18 22:37:09                           Operator: DP
Sample    : Diesel - 3 8/13/18                         Inst    : Apollo
Misc      : Mix(A)                                     Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 17  8:35 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180914\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration
```



QEdit

(1) Diesel (C10-C24) (HATM)

4.86min 261.451ppb m

response 863138795

(+) = Expected Retention Time

Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180914\914044.D Vial: 44
Acq On : 9-14-18 22:57:09 Operator: DP
Sample : Motor Oil - 3 8/15/18 Inst : Apollo
Misc : Mix(B) Multiplr: 1.00
IntFile : events.e
Quant Time: Sep 17 8:36 2018 Quant Results File: DROB0905.RES

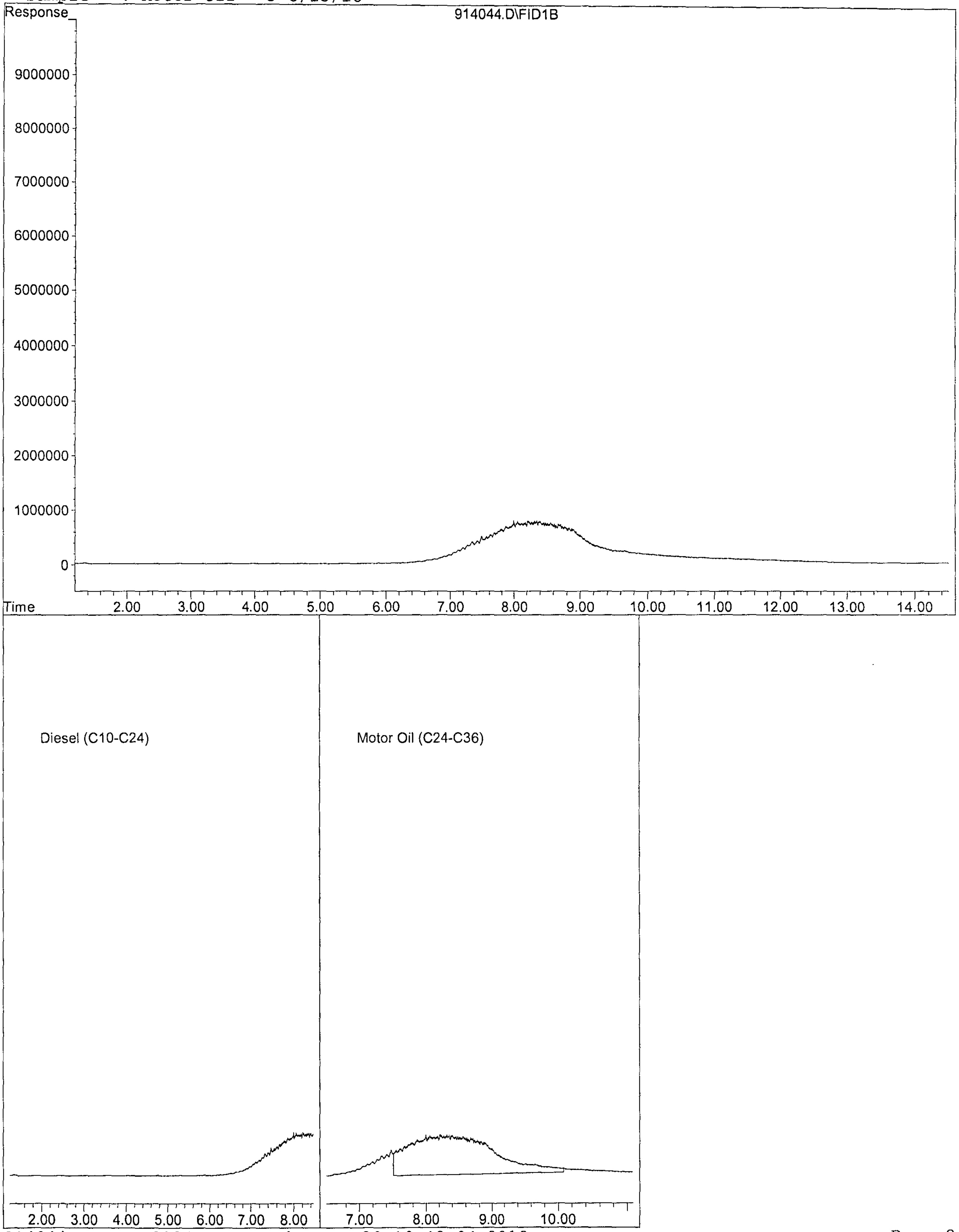
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	657057666	269.136 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180914\914044.D
Sample : Motor Oil - 3 8/15/18



TPH Extractables
DROB0905

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/15/18
Instrument: Apollo
Initial Cal. Date: 09/05/18
Data File: 914054-55.D

		Compound	MEAN	CCRF	%D		%Drift
1	HATM	Diesel (C10-C24)	1650670	1789620	8.4	HATM	
2	SA	Ortho-Terphenyl(S)	1936320	2199490	14	SA	
3	SA	Octacosane(S)	1614940	1873170	16	SA	
4	HBTM	Motor Oil (C24-C36)	1220680	1288940	5.6	HBTM	
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
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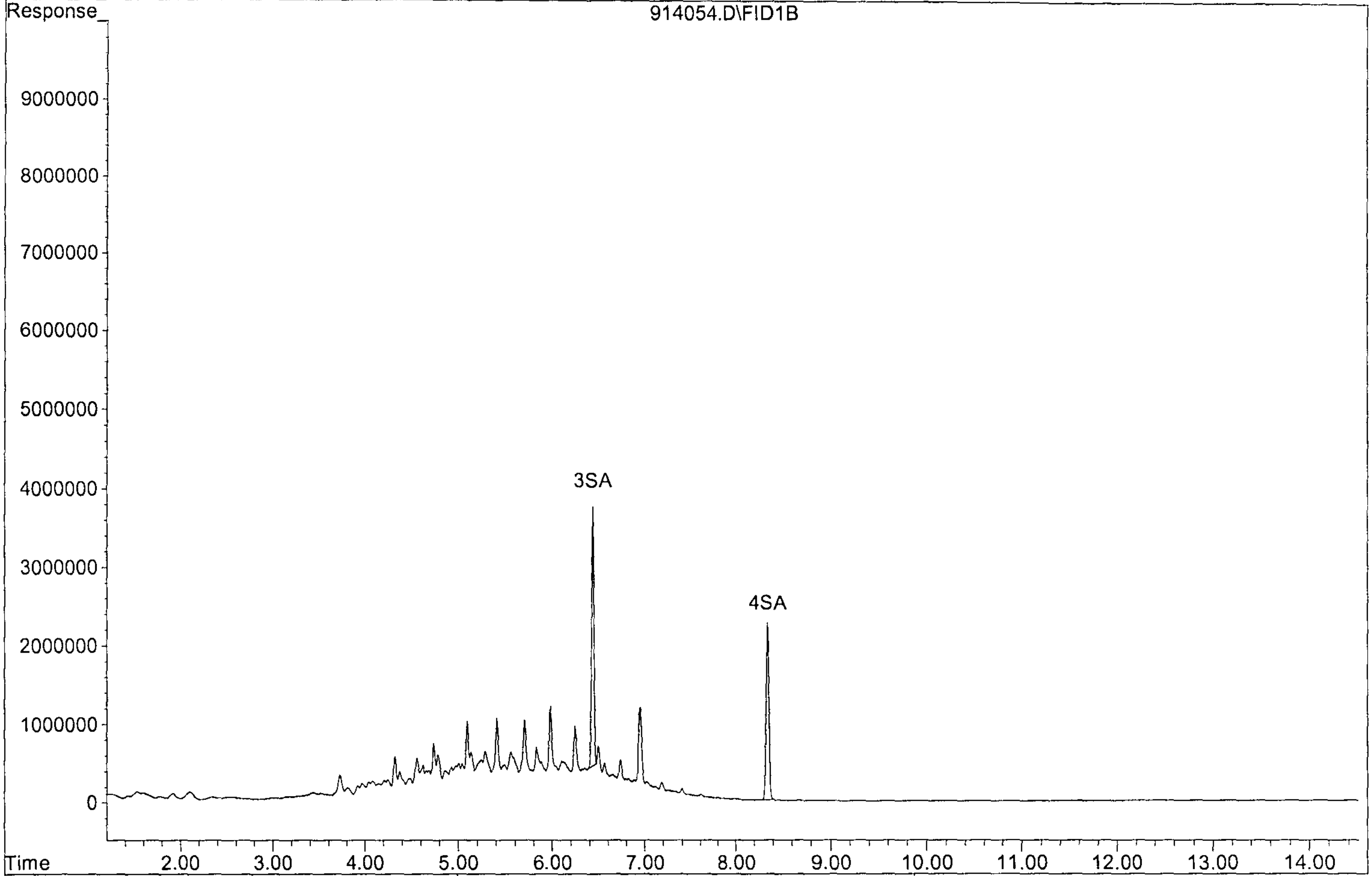
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			11.0		

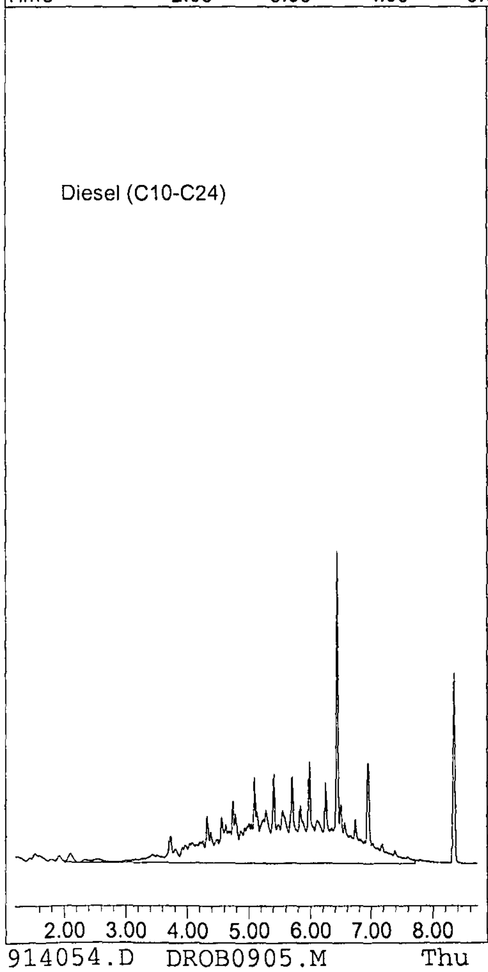
Quantitation Report (Not Reviewed)

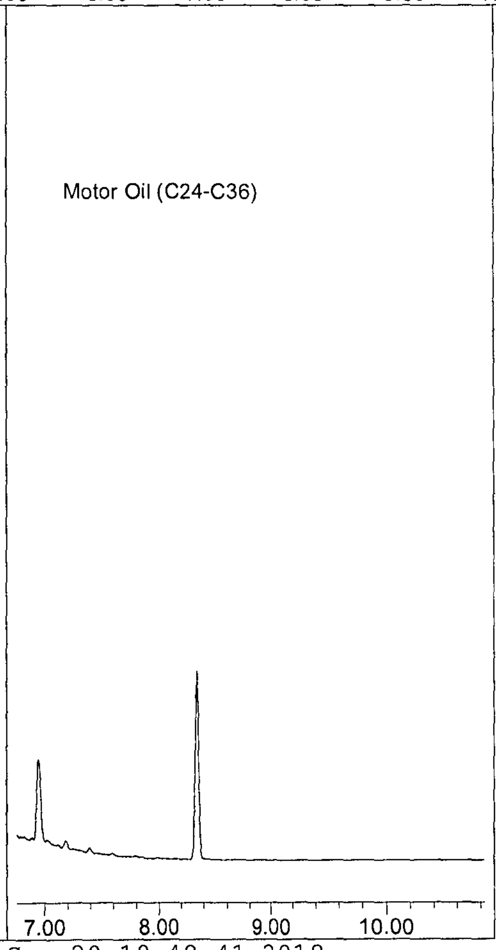
```
Data File : G:\APOLLO\DATA\180914\914054.D              Vial: 54
Acq On    : 9-15-18 2:16:36                          Operator: DP
Sample    : Diesel - 3 8/13/18                       Inst    : Apollo
Misc      : Mix(A)                                   Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 17  8:36 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	54987256	14.199 ppb
Surrogate Spike 30.000		Recovery =	47.33%
4) SA Octacosane(S)	8.34	46829148	14.499 ppb
Surrogate Spike 30.000		Recovery =	48.33%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	894808190	271.043 ppb

Data File: G:\APOLLO\DATA\180914\914054.D
Sample : Diesel - 3 8/13/18







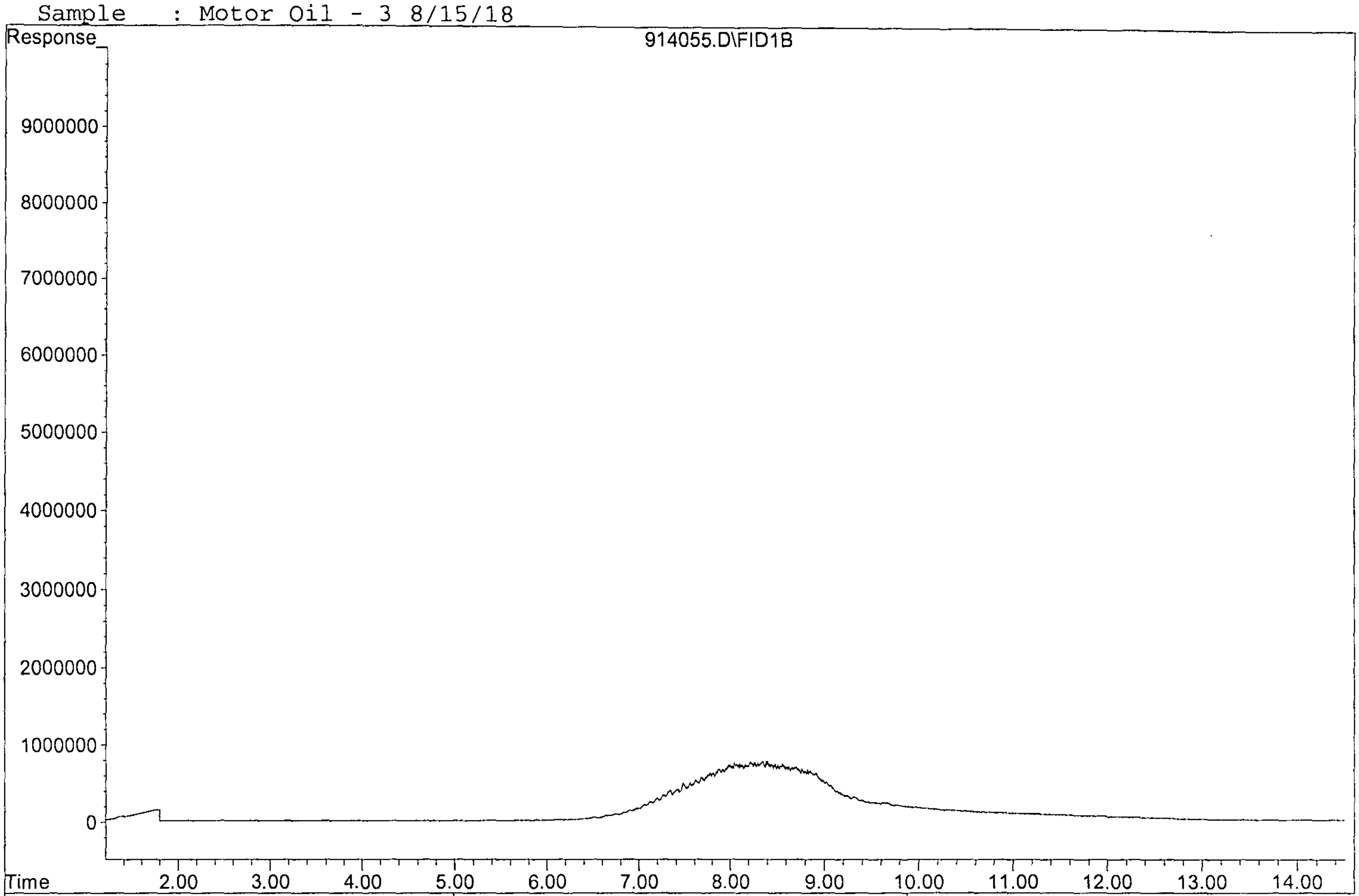
Quantitation Report (Not Reviewed)

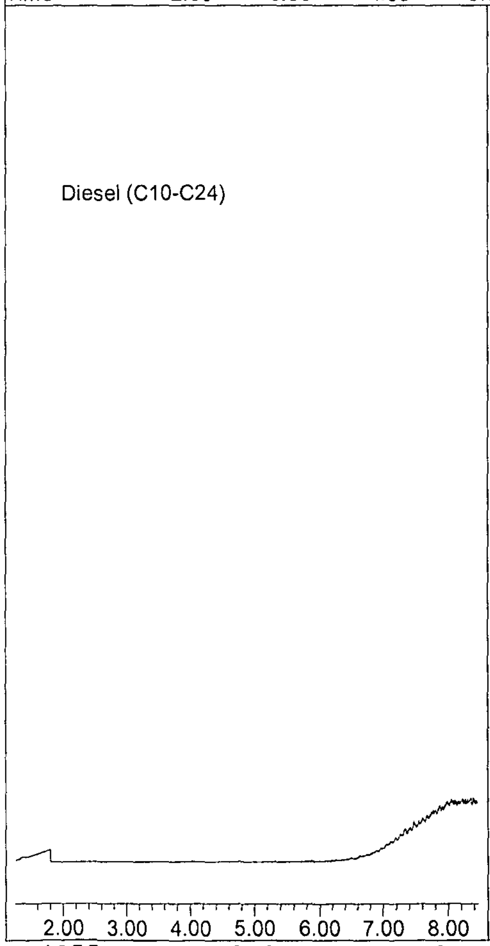
```
Data File : G:\APOLLO\DATA\180914\914055.D              Vial: 55
Acq On    : 9-15-18 2:36:32                         Operator: DP
Sample    : Motor Oil - 3 8/15/18                   Inst    : Apollo
Misc      : Mix(B)                                  Multiplr: 1.00
IntFile   : events.e
Quant Time: Sep 17  8:36 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

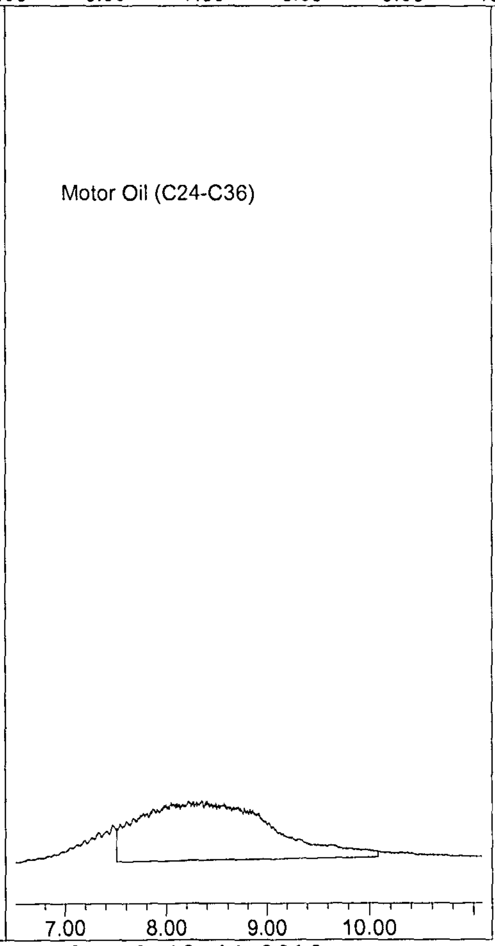
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	644468279	263.979 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914055.D
Sample : Motor Oil - 3 8/15/18







ORGANICS
Raw Data

APPL, INC.

Quantitation Report (QT Reviewed)

Data File : G:\APOLLO\DATA\180910\910038.D Vial: 38
Acq On : 9-10-18 22:42:24 Operator: DP
Sample : AZ79146S01 5/50.17G DF5 Inst : Apollo
Misc : soil Multiplr: 498.31
IntFile : events.e
Quant Time: Sep 11 11:34 2018 Quant Results File: DROB0905.RES

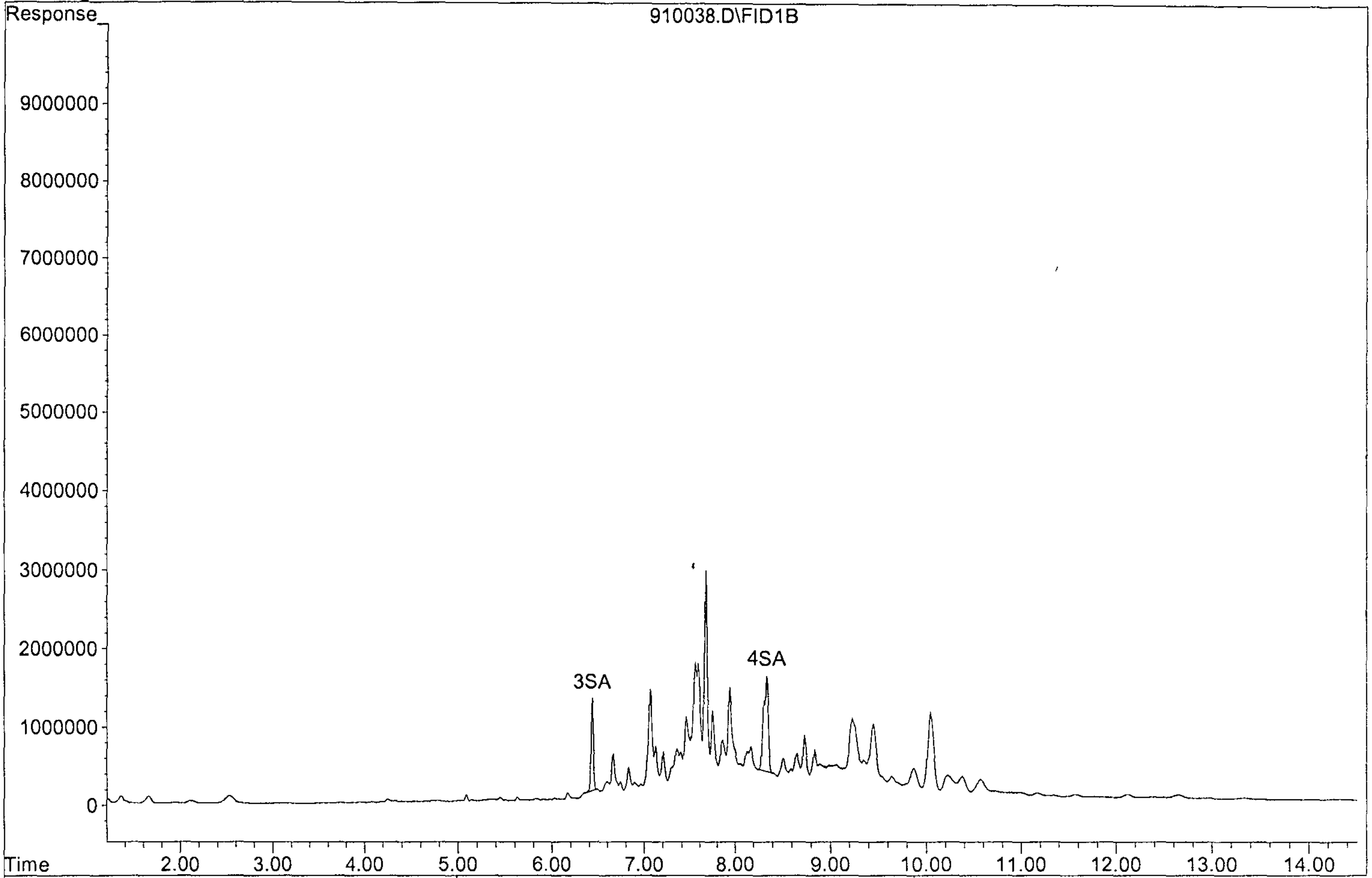
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

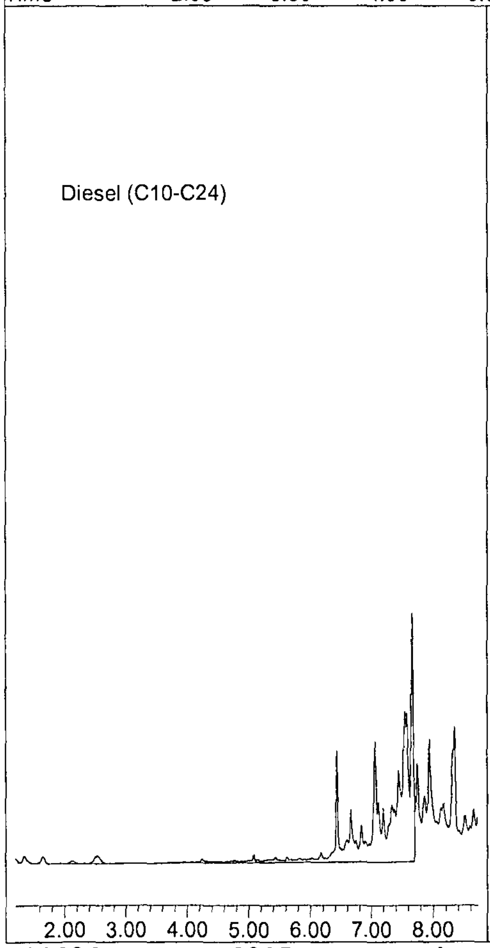
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

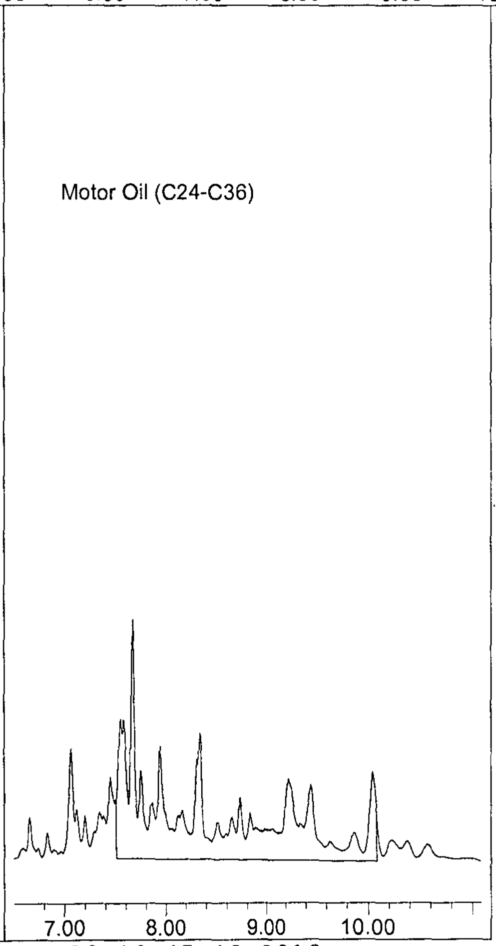
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	20389990	2623.649 ppb
Surrogate Spike 2989.835		Recovery	= 87.75%
4) SA Octacosane(S)	8.34	42361251	6535.508 ppb
Surrogate Spike 2989.835		Recovery	= 218.59%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	510925410	77119.190 ppb
2) HBTM Motor Oil (C24-C36)	8.80	745371205	152137.625 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180910\910038.D
Sample : AZ79146S01 5/50.17G DF5







Quantitation Report (QT Reviewed)

Data File : G:\APOLLO\DATA\180914\914033.D Vial: 33
Acq On : 9-14-18 19:19:08 Operator: DP
Sample : AZ79146S01 5/50.17G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 498.31
IntFile : events.e
Quant Time: Sep 17 8:57 2018 Quant Results File: DROB0905.RES

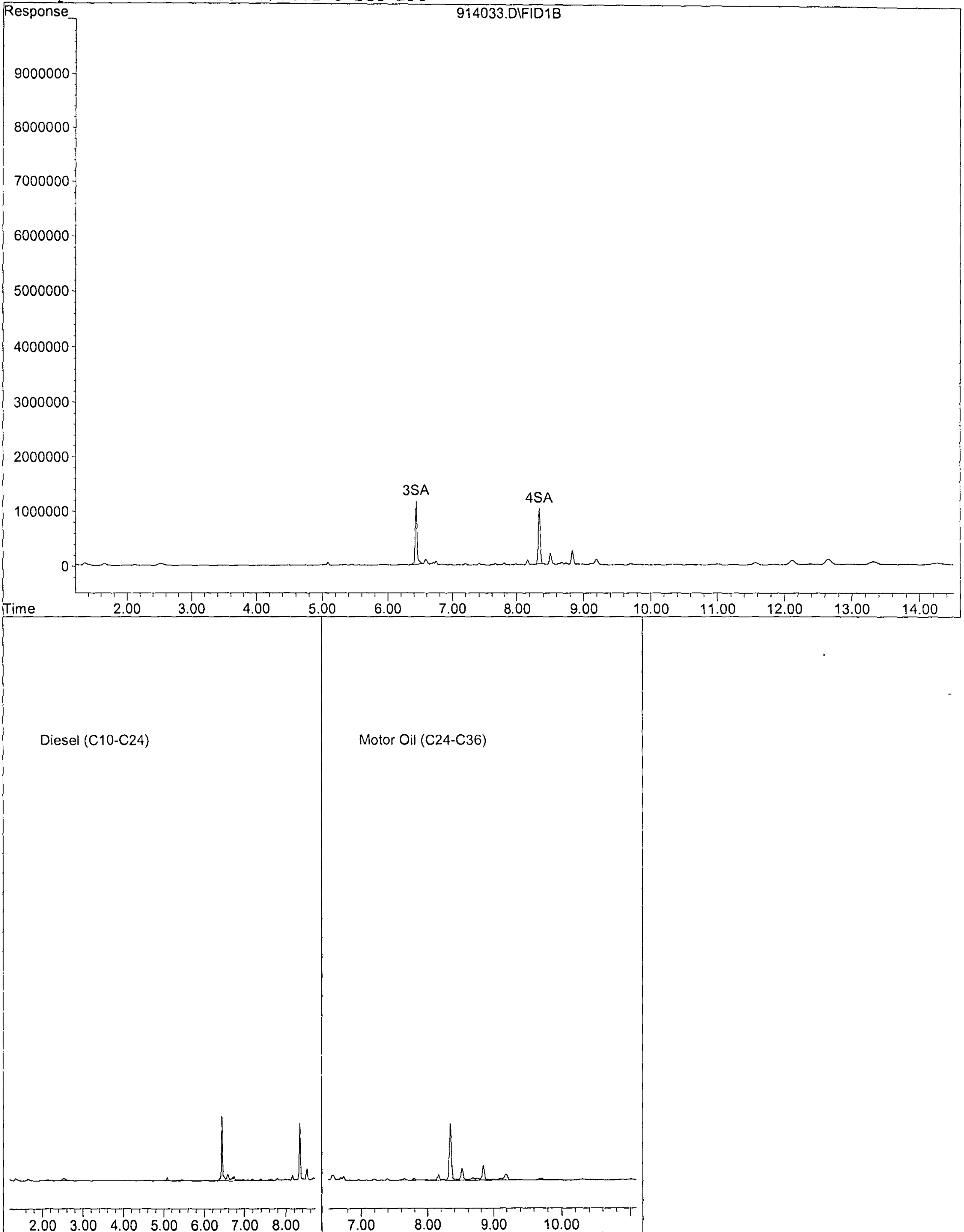
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	22073525	2840.275 ppb
Surrogate Spike 2989.835		Recovery	= 95.00%
4) SA Octacosane(S)	8.34	20411694	3149.123 ppb
Surrogate Spike 2989.835		Recovery	= 105.33%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	27424078	4139.396 ppb
2) HBTM Motor Oil (C24-C36)	8.80	32997678	6735.152 ppb

Quantitation Report

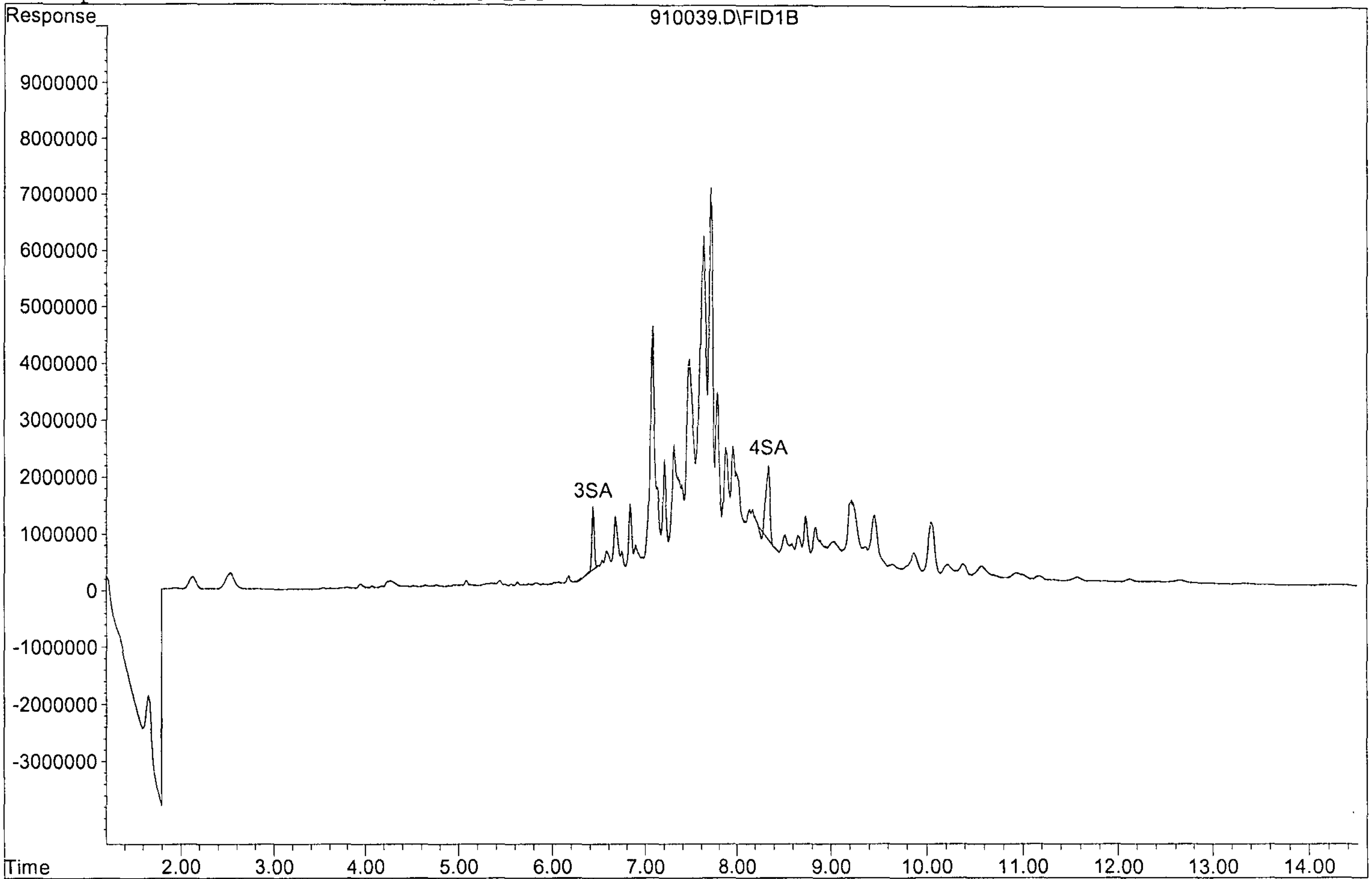
Data File: G:\APOLLO\DATA\180914\914033.D
Sample : AZ79146S01 5/50.17G SGC DF5

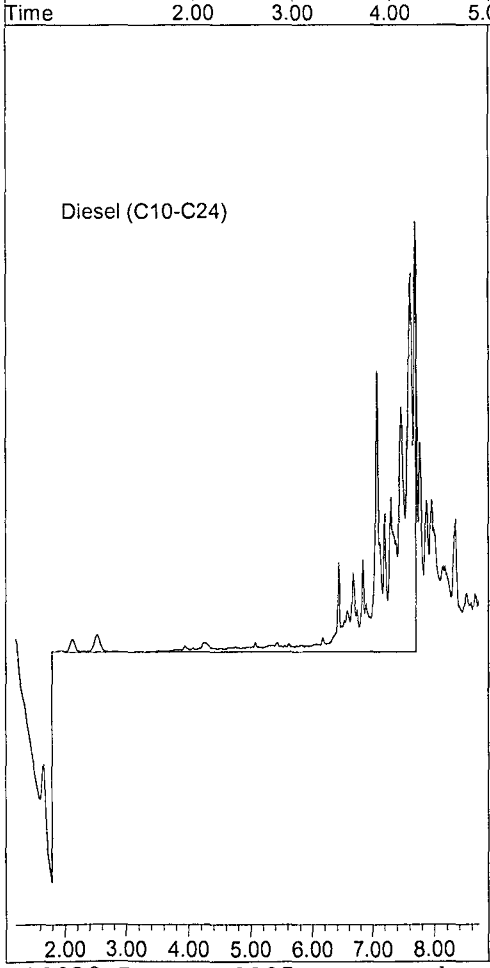


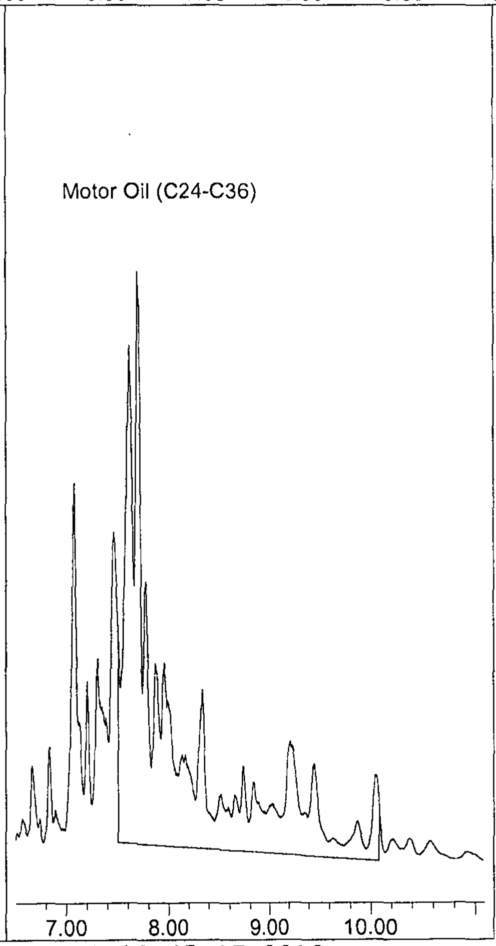
Quantitation Report (QT Reviewed)

```
Data File : G:\APOLLO\DATA\180910\910039.D              Vial: 39
Acq On    : 9-10-18 23:02:28                        Operator: DP
Sample    : AZ79147S01 5/50.14G DF5                 Inst    : Apollo
Misc      : soil                                    Multiplr: 498.60
IntFile   : events.e
Quant Time: Sep 11 14:05 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A

     Compound                        R.T.       Response    Conc Units
------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)           6.43       19130210 2463.020 ppb
Surrogate Spike 2991.623                   Recovery     =   82.33%
 4) SA  Octacosane(S)                8.34       37124942 5731.074 ppb
Surrogate Spike 2991.623                   Recovery     =  191.57%

  Target Compounds
 1) HATM Diesel (C10-C24)             4.86    1601584239 241888.036 ppb
 2) HBTM Motor Oil (C24-C36)          8.80    1536676136 313838.349 ppb
```

Data File: G:\APOLLO\DATA\180910\910039.D
Sample : AZ79147S01 5/50.14G DF5



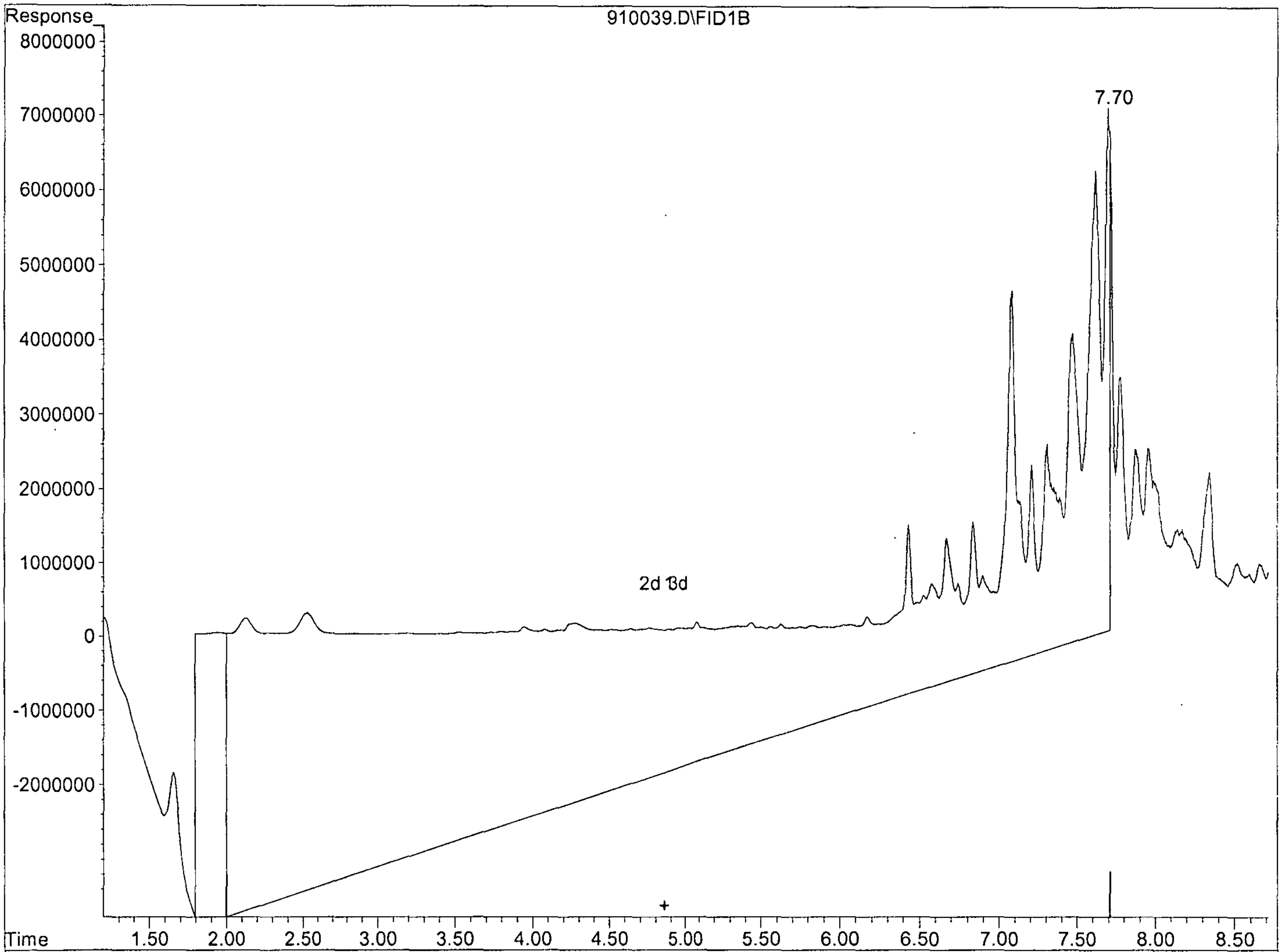




Quantitation Report

Data File : G:\APOLLO\DATA\180910\910039.D　　Vial: 39
Acq On : 9-10-18 23:02:28　　Operator: DP
Sample : AZ79147S01 5/50.14G DF5　　Inst : Apollo
Misc : soil　　Multiplr: 498.60
IntFile : events.e
Quant Time: Sep 11 11:35 2018 Quant Results File: DROB0905.RES

Method : G:\APOLLO\DATA\180910\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration



QEdit

(1) Diesel (C10-C24) (HATM)

4.86min 1206702.274ppb m

response 7989793032

(+) = Expected Retention Time

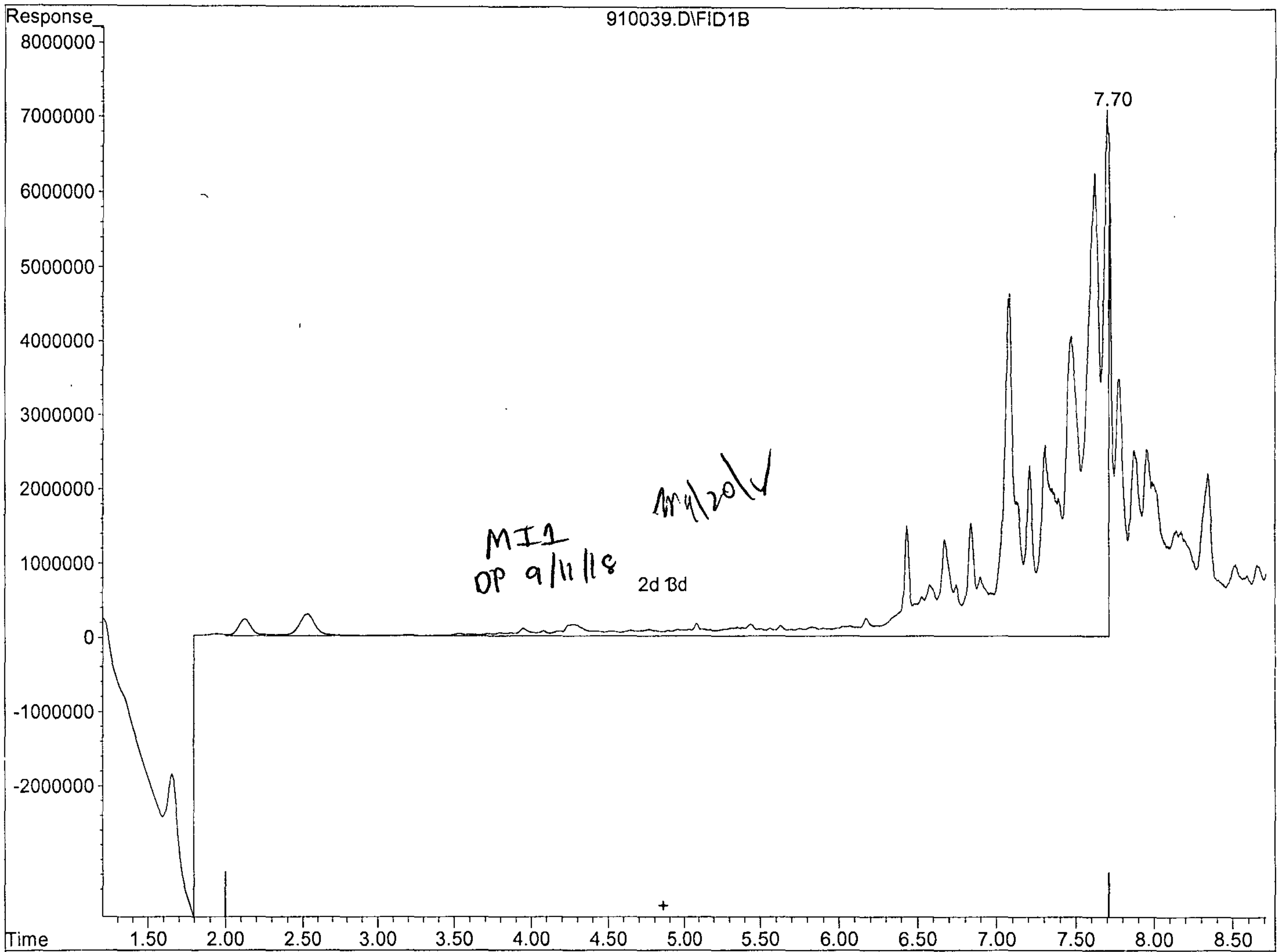
910039.D DROB0905.M Tue Sep 11 14:05:44 2018

Quantitation Report

Data File : G:\APOLLO\DATA\180910\910039.D
Acq On : 9-10-18 23:02:28
Sample : AZ79147S01 5/50.14G DF5
Misc : soil
IntFile : events.e
Quant Time: Sep 11 11:35 2018 Quant Results File: DROB0905.RES

Vial: 39
Operator: DP
Inst : Apollo
Multiplr: 498.60

Method : G:\APOLLO\DATA\180910\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration



(1) Diesel (C10-C24) (HATM)

4.86min 241888.036ppb m

response 1601584239

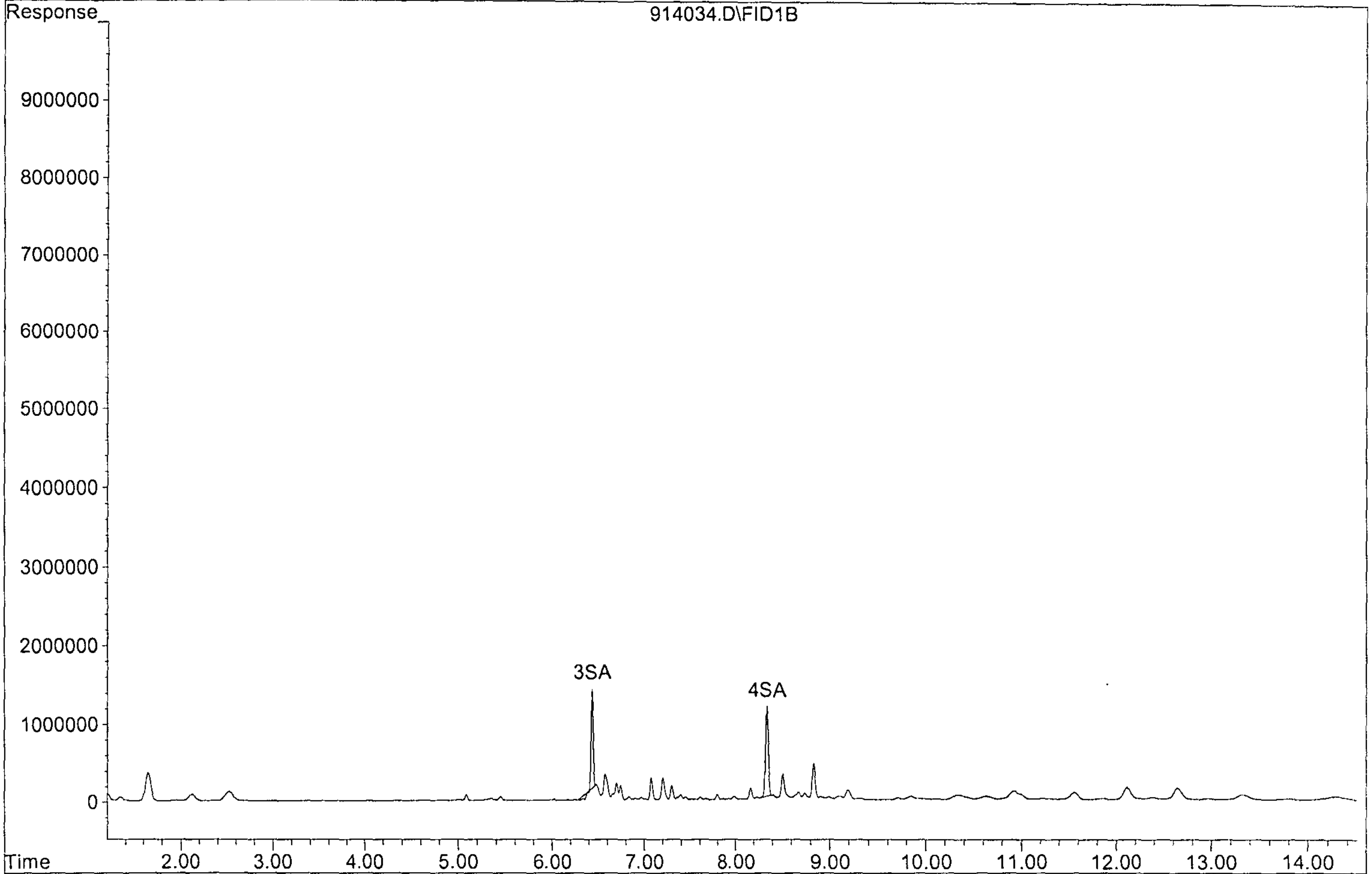
(+) = Expected Retention Time
910039.D DROB0905.M Tue Sep 11 14:05:54 2018

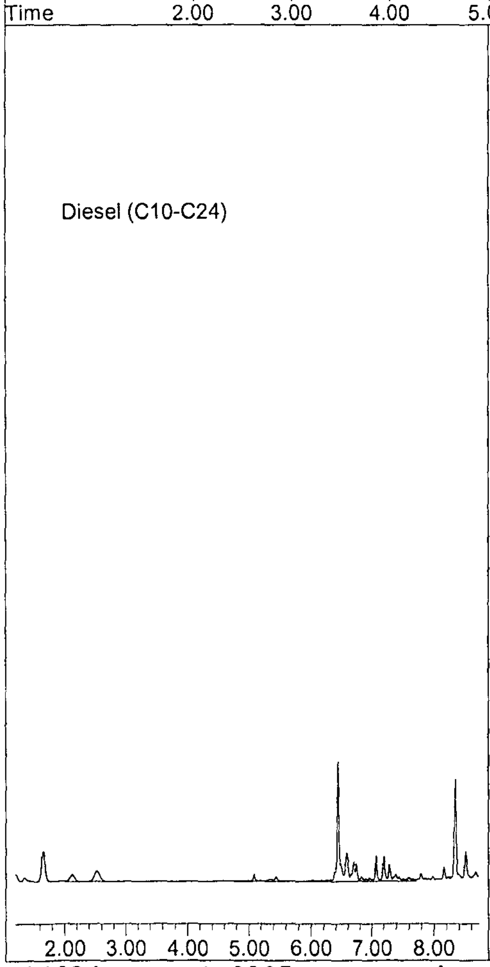
Quantitation Report (Not Reviewed)

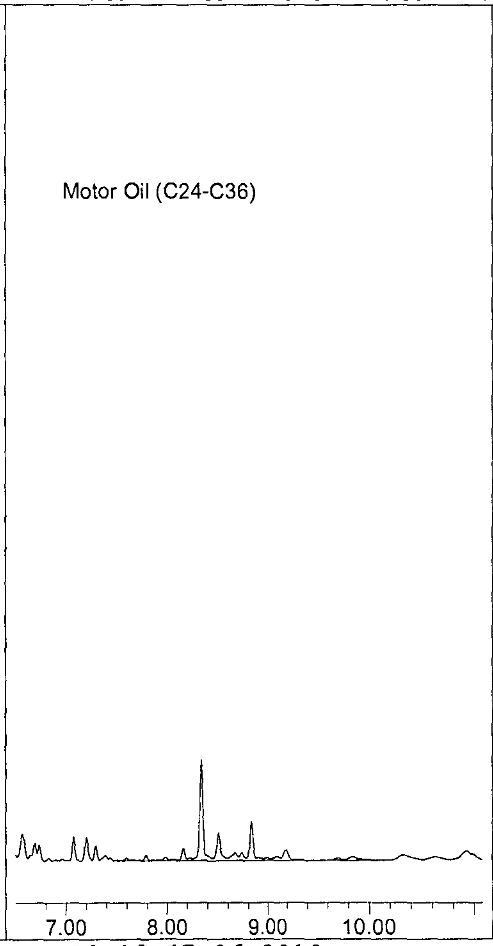
```
Data File : G:\APOLLO\DATA\180914\914034.D               Vial: 34
Acq On    : 9-14-18 19:39:29                         Operator: DP
Sample    : AZ79147S01 5/50.14G SGC DF5              Inst    : Apollo
Misc      : soil                                     Multiplr: 498.60
IntFile   : events.e
Quant Time: Sep 17  8:59 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	18315211	2358.089 ppb
Surrogate Spike 2991.623		Recovery	= 78.82%
4) SA Octacosane(S)	8.34	23879077	3686.275 ppb
Surrogate Spike 2991.623		Recovery	= 123.22%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	92915652	14033.095 ppb
2) HBTM Motor Oil (C24-C36)	8.80	58243488	11895.180 ppb

Data File: G:\APOLLO\DATA\180914\914034.D
Sample : AZ79147S01 5/50.14G SGC DF5







Quantitation Report (QT Reviewed)

Data File : G:\APOLLO\DATA\180910\910040.D Vial: 40
Acq On : 9-10-18 23:22:38 Operator: DP
Sample : AZ79148S01 5/50.13G DF5 Inst : Apollo
Misc : soil Multiplr: 498.70
IntFile : events.e
Quant Time: Sep 11 14:06 2018 Quant Results File: DROB0905.RES

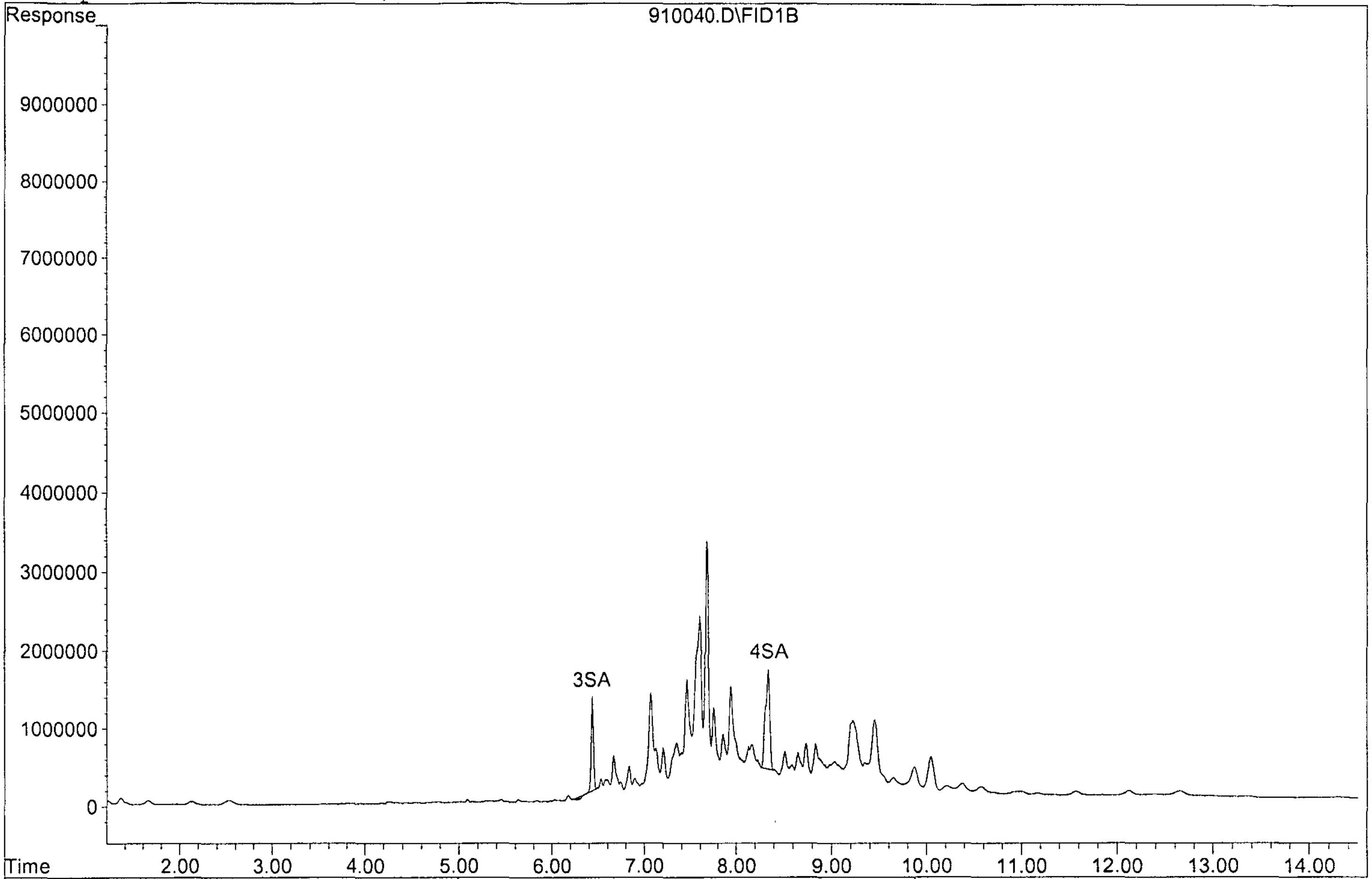
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

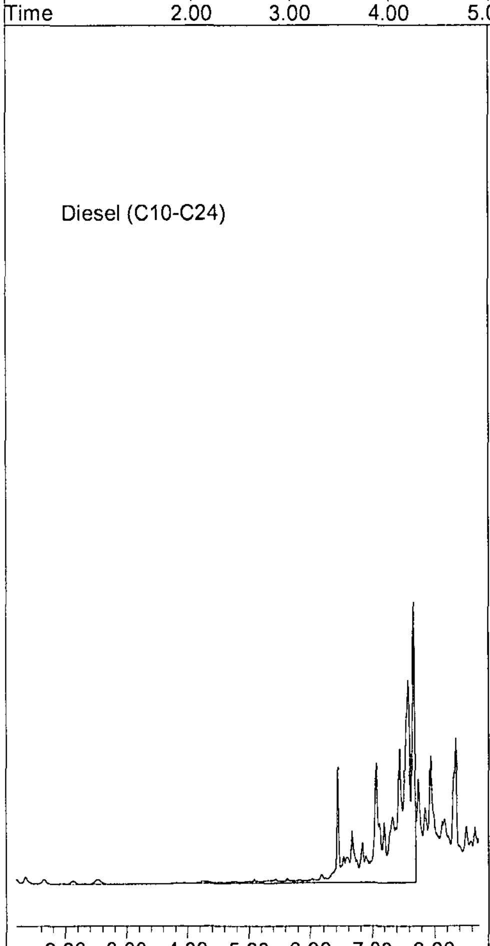
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

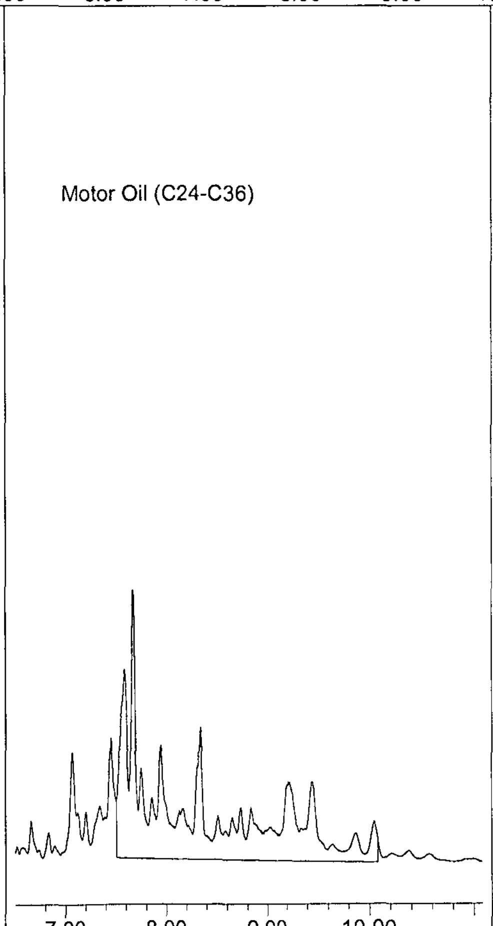
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	19708022	2537.918 ppb
Surrogate Spike 2992.220		Recovery	= 84.82%
4) SA Octacosane(S)	8.34	41524027	6411.444 ppb
Surrogate Spike 2992.220		Recovery	= 214.27%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	582757282	88031.587 ppb
2) HBTM Motor Oil (C24-C36)	8.80	773709498	158047.567 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180910\910040.D
Sample : AZ79148S01 5/50.13G DF5







Quantitation Report (QT Reviewed)

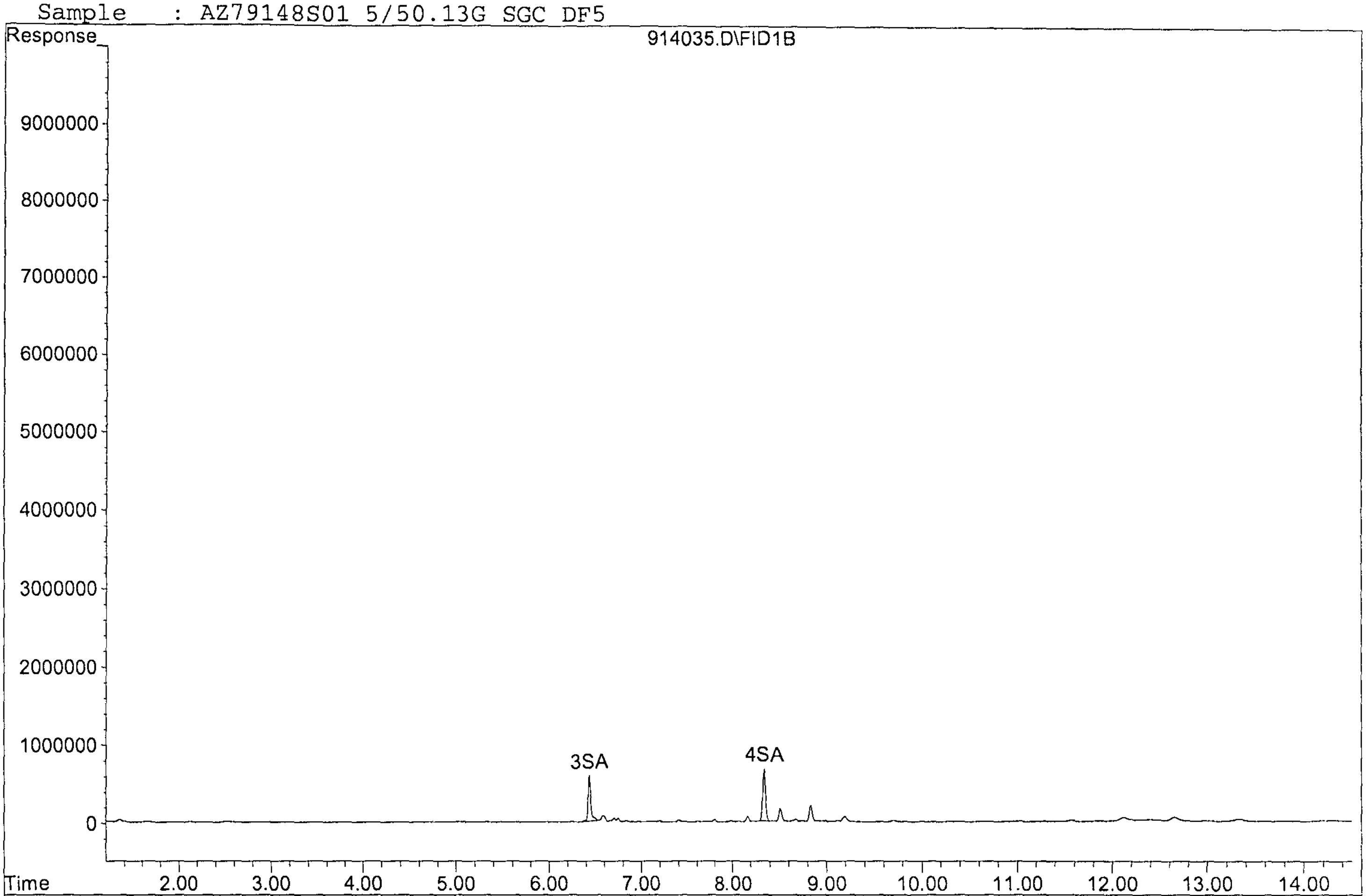
Data File : G:\APOLLO\DATA\180914\914035.D Vial: 35
Acq On : 9-14-18 19:59:38 Operator: DP
Sample : AZ79148S01 5/50.13G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 498.70
IntFile : events.e
Quant Time: Sep 17 8:59 2018 Quant Results File: DROB0905.RES

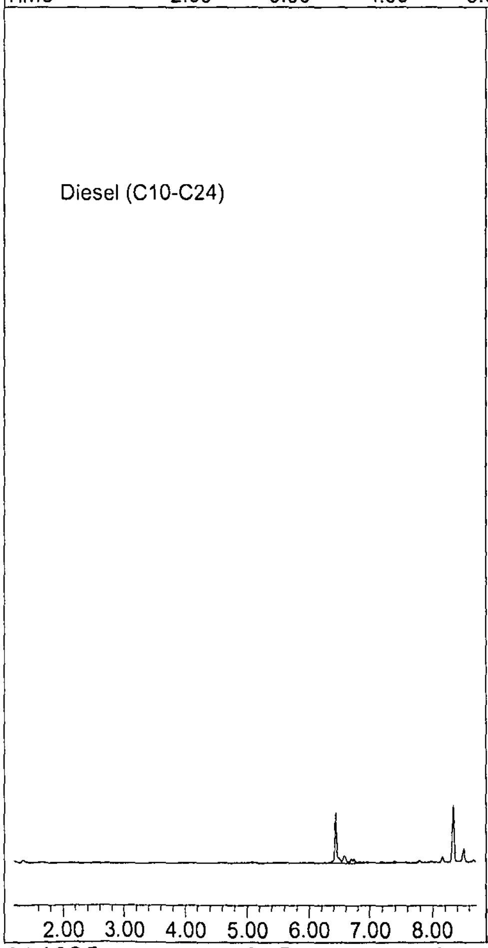
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

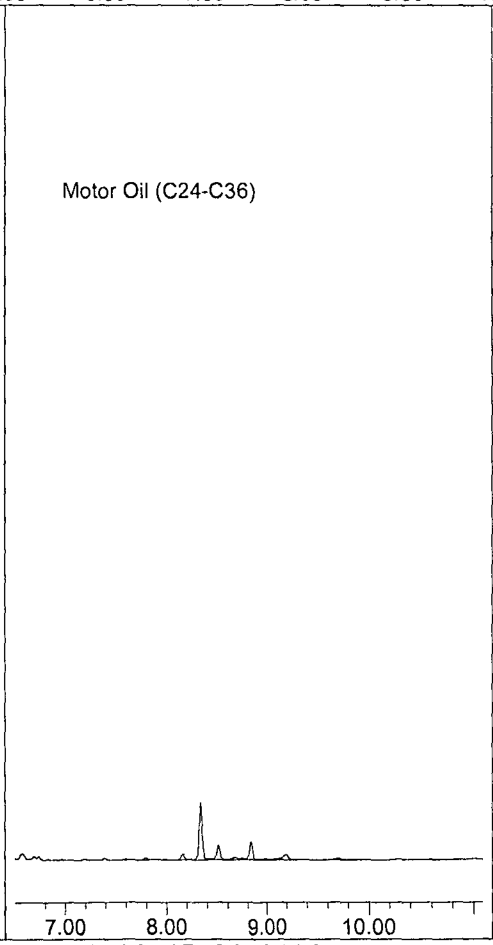
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	11800265	1519.589 ppb
Surrogate Spike 2992.220		Recovery =	50.78%
4) SA Octacosane(S)	8.34	13744182	2122.146 ppb
Surrogate Spike 2992.220		Recovery =	70.92%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	17440140	2634.516 ppb
2) HBTM Motor Oil (C24-C36)	8.80	22863682	4670.421 ppb

Data File: G:\APOLLO\DATA\180914\914035.D
Sample : AZ79148S01 5/50.13G SGC DF5







Quantitation Report (QT Reviewed)

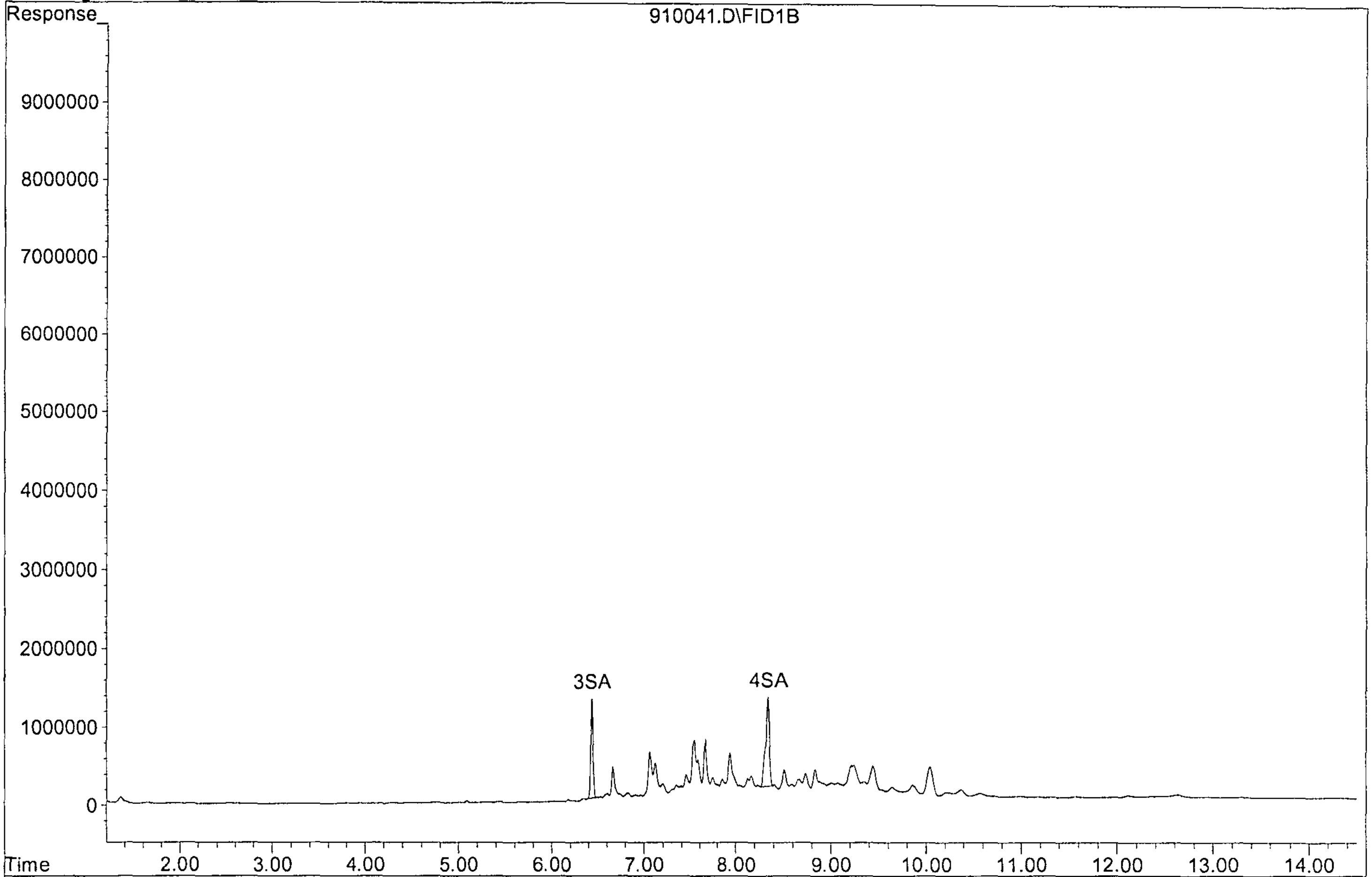
Data File : G:\APOLLO\DATA\180910\910041.D Vial: 41
Acq On : 9-10-18 23:42:40 Operator: DP
Sample : AZ79149S01 5/50.23G DF5 Inst : Apollo
Misc : soil Multiplr: 497.71
IntFile : events.e
Quant Time: Sep 11 14:06 2018 Quant Results File: DROB0905.RES

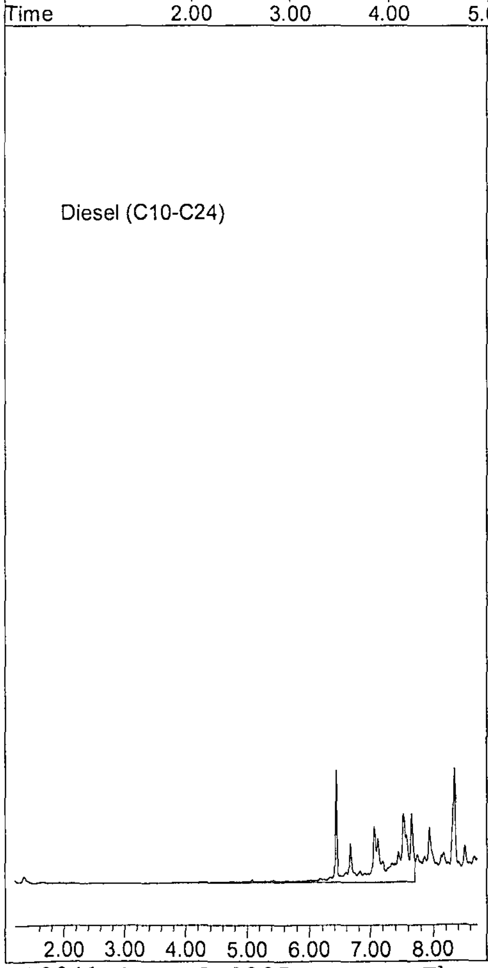
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

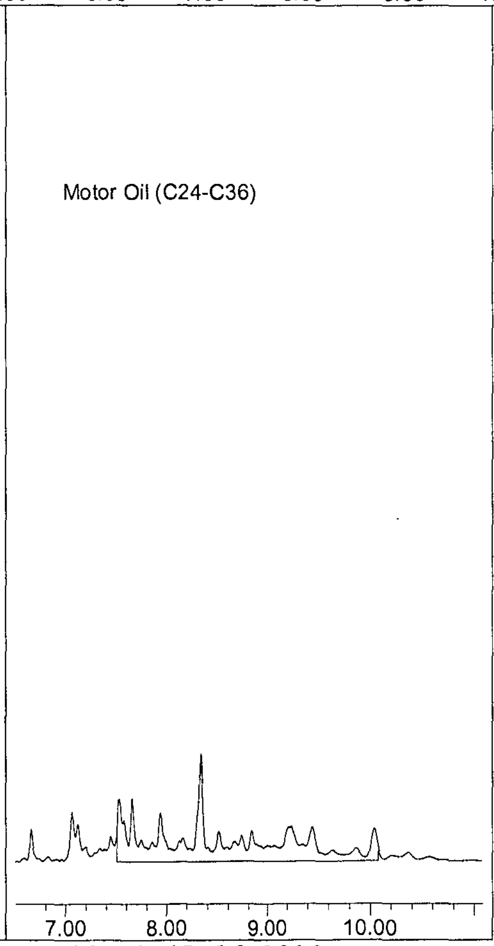
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	21548467	2769.403 ppb
Surrogate Spike 2986.263		Recovery	= 92.74%
4) SA Octacosane(S)	8.34	31717520	4887.546 ppb
Surrogate Spike 2986.263		Recovery	= 163.67%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	207289021	31250.889 ppb
2) HBTM Motor Oil (C24-C36)	8.80	326592371	66581.133 ppb

Data File: G:\APOLLO\DATA\180910\910041.D
Sample : AZ79149S01 5/50.23G DF5







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180914\914036.D Vial: 36
Acq On : 9-14-18 20:19:37 Operator: DP
Sample : AZ79149S01 5/50.23G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 497.71
IntFile : events.e
Quant Time: Sep 17 8:59 2018 Quant Results File: DROB0905.RES

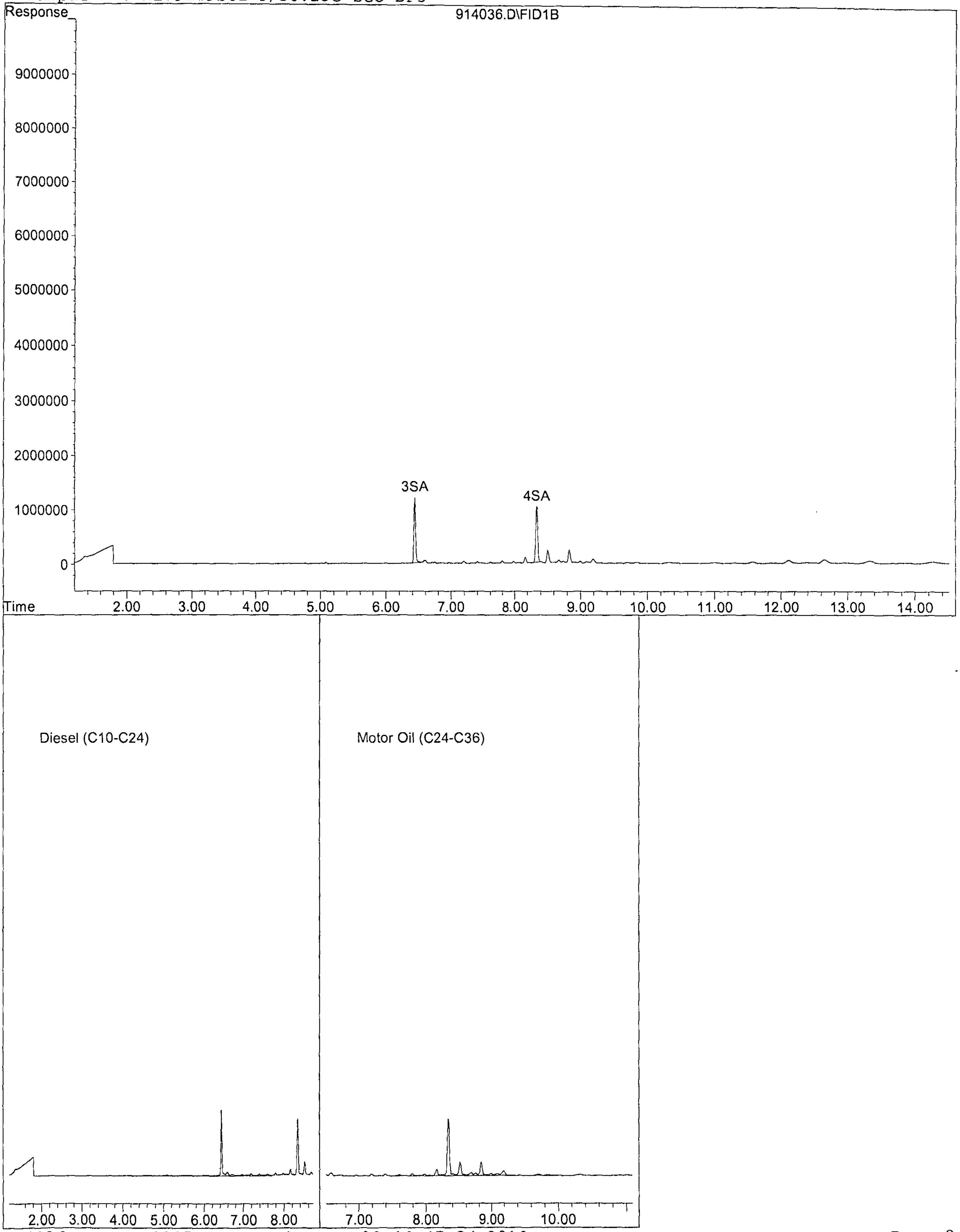
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	21324111	2740.569 ppb
Surrogate Spike 2986.263		Recovery	= 91.77%
4) SA Octacosane(S)	8.34	21666492	3338.722 ppb
Surrogate Spike 2986.263		Recovery	= 111.80%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	21317450	3213.818 ppb
2) HBTM Motor Oil (C24-C36)	8.80	35396295	7216.107 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914036.D
Sample : AZ79149S01 5/50.23G SGC DF5



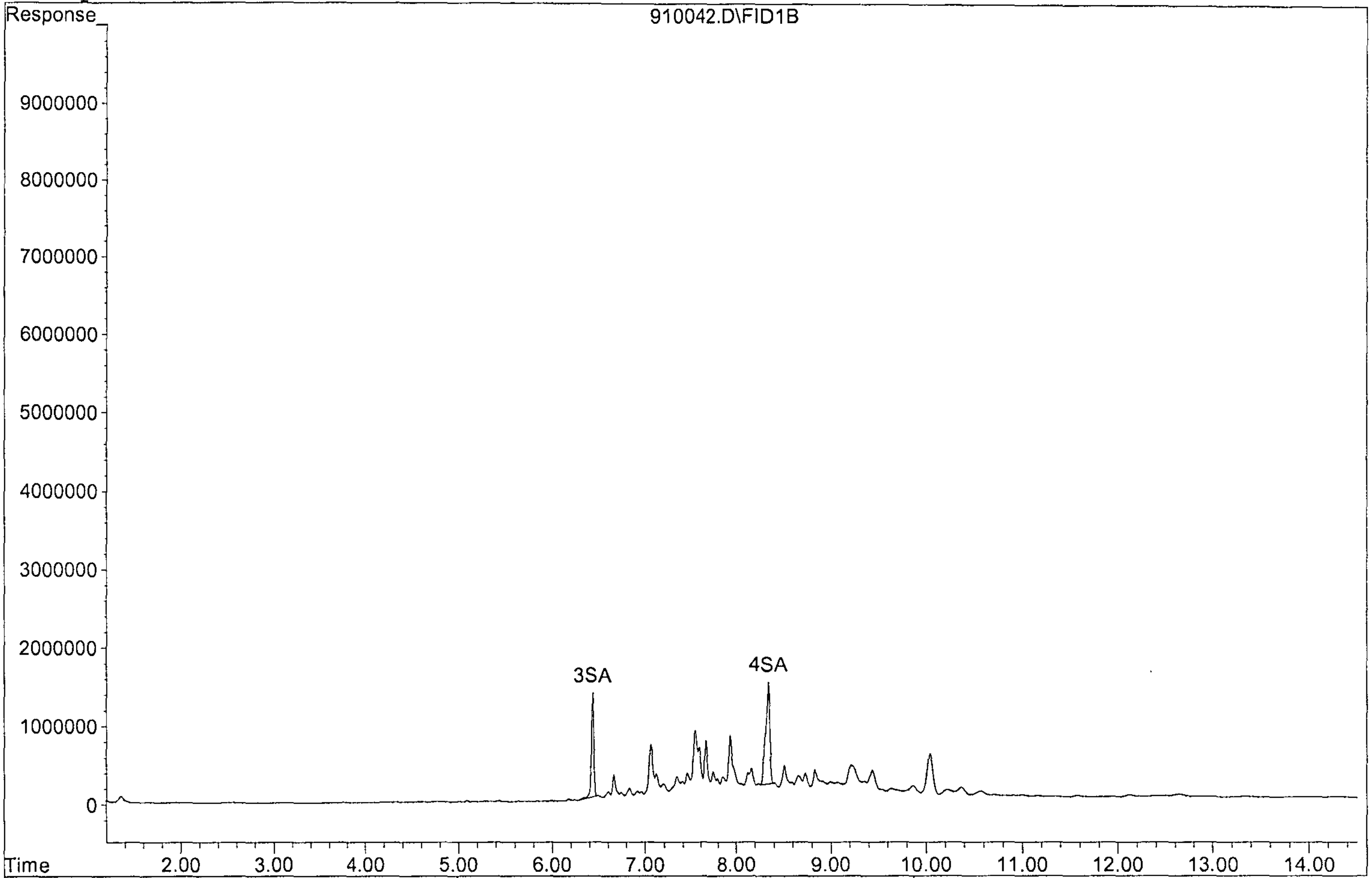
Quantitation Report (Not Reviewed)

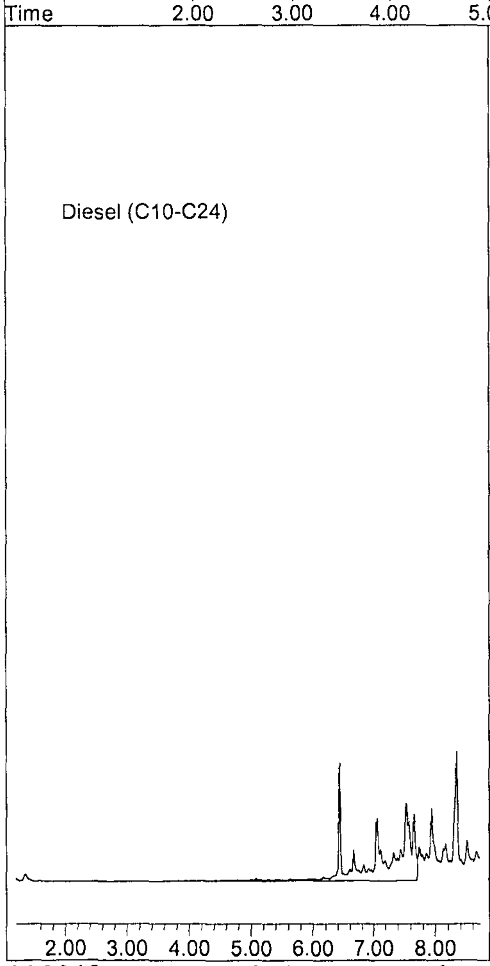
```
Data File : G:\APOLLO\DATA\180910\910042.D            Vial: 42
Acq On    : 9-11-18 0:02:44                        Operator: DP
Sample    : AZ79150S01 5/50.53G DF5                Inst    : Apollo
Misc      : soil                                   Multiplr: 494.76
IntFile   : events.e
Quant Time: Sep 11 14:06 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

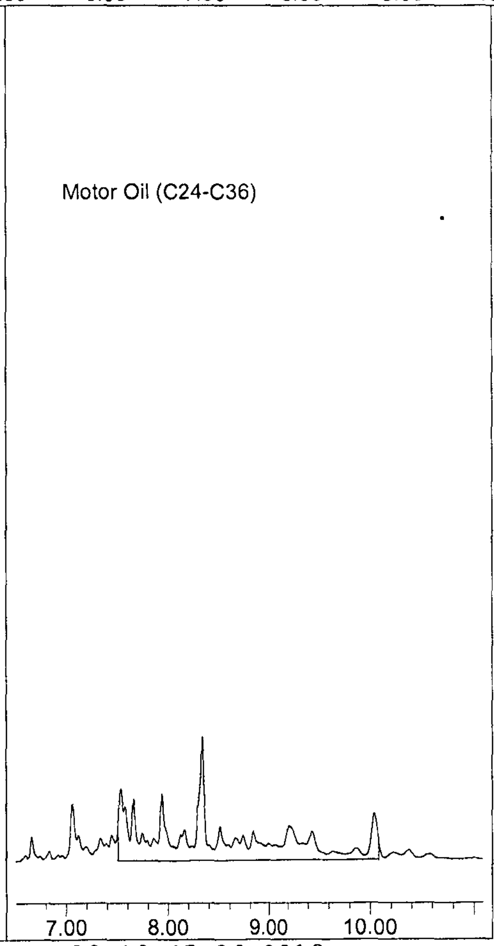
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	25097154	3206.329 ppb
Surrogate Spike 2968.534		Recovery	= 108.01%
4) SA Octacosane(S)	8.34	39215410	6007.064 ppb
Surrogate Spike 2968.534		Recovery	= 202.36%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	220077205	32981.847 ppb
2) HBTM Motor Oil (C24-C36)	8.80	353157282	71569.361 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910042.D
Sample : AZ79150S01 5/50.53G DF5





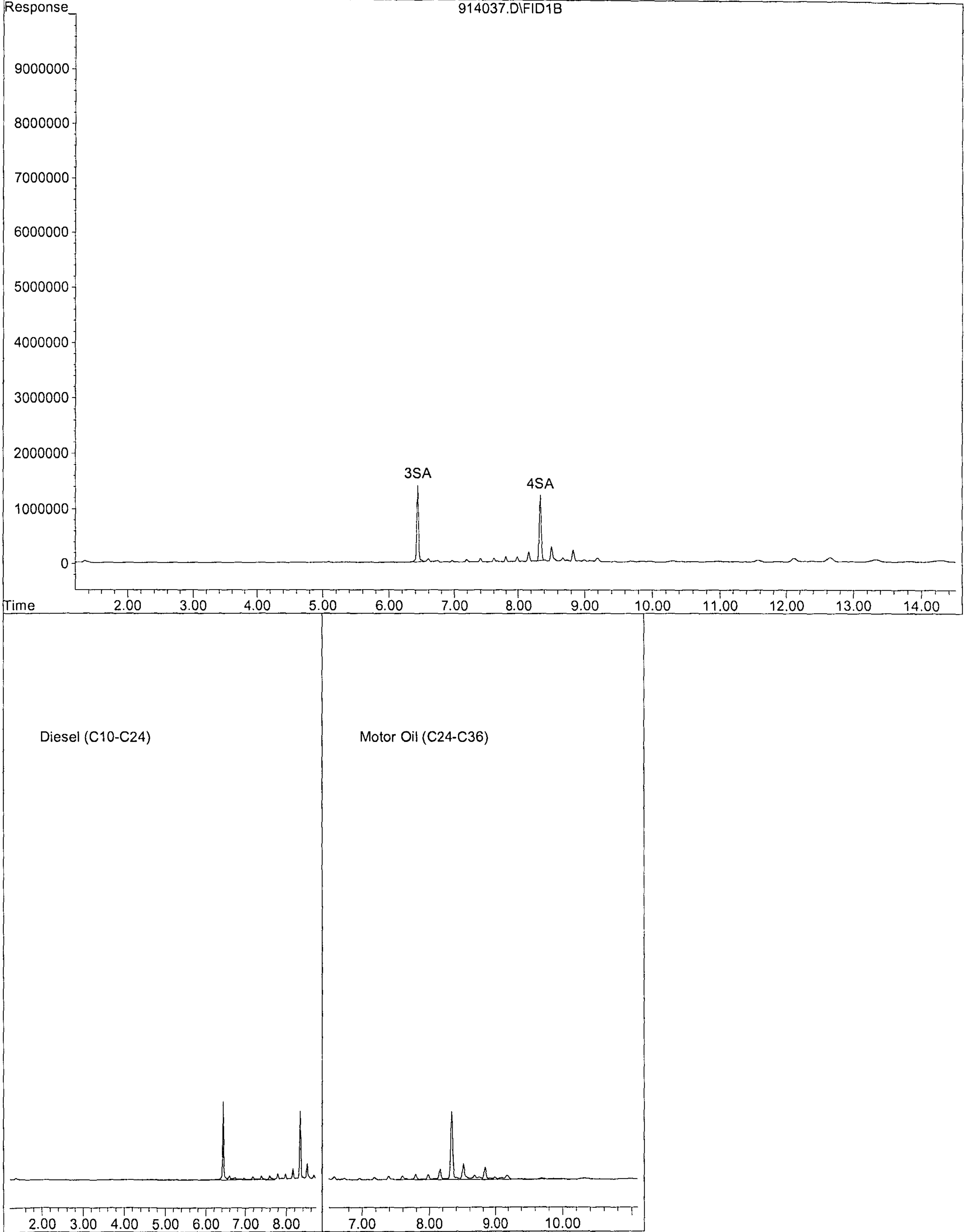


```
Data File : G:\APOLLO\DATA\180914\914037.D              Vial: 37
Acq On    : 9-14-18 20:39:33                        Operator: DP
Sample    : AZ79150S01 5/50.53G SGC DF5             Inst    : Apollo
Misc      : soil                                    Multiplr: 494.76
IntFile   : events.e
Quant Time: Sep 17  8:59 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	26238904	3352.195 ppb
Surrogate Spike 2968.534		Recovery	= 112.92%
4) SA Octacosane(S)	8.34	24884074	3811.773 ppb
Surrogate Spike 2968.534		Recovery	= 128.41%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	22398271	3356.715 ppb
2) HBTM Motor Oil (C24-C36)	8.80	45455170	9211.753 ppb

Quantitation Report

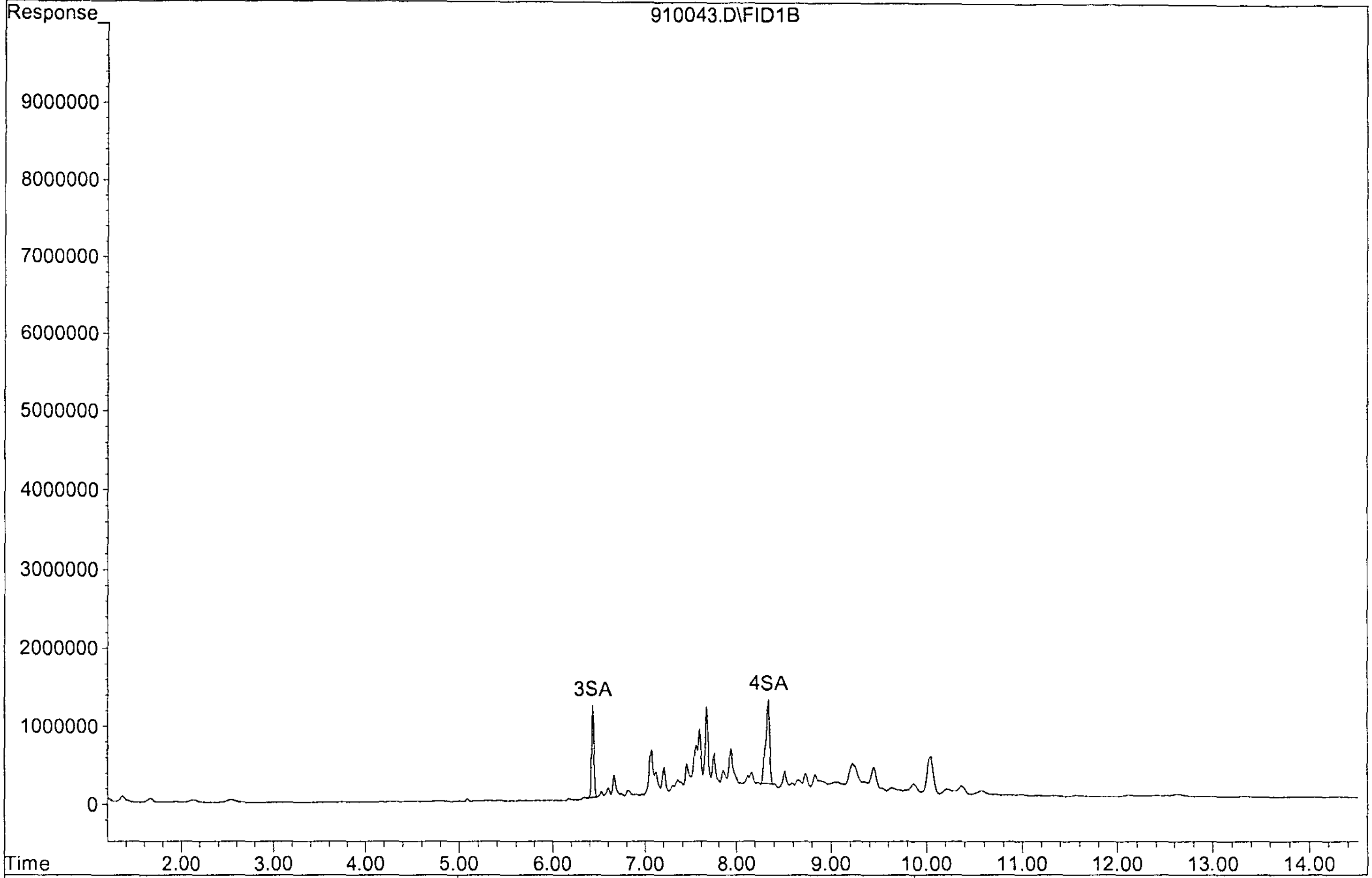
Data File: G:\APOLLO\DATA\180914\914037.D
Sample : AZ79150S01 5/50.53G SGC DF5

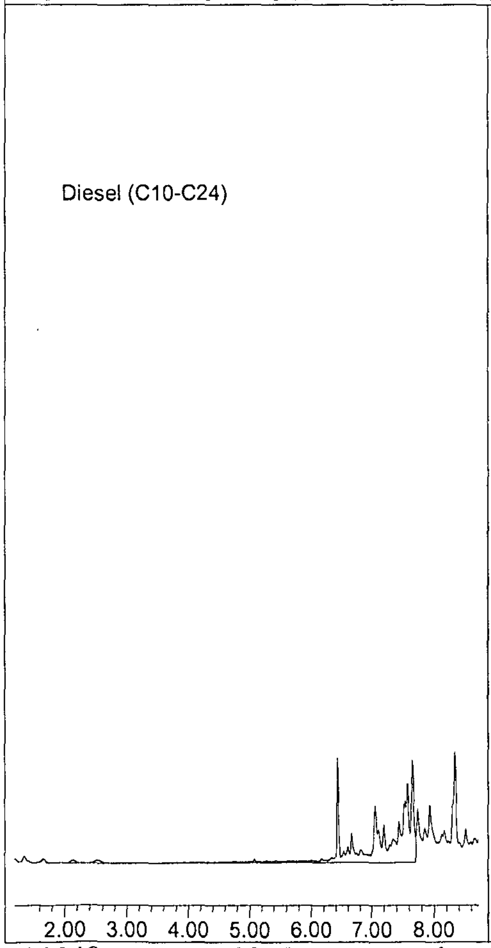


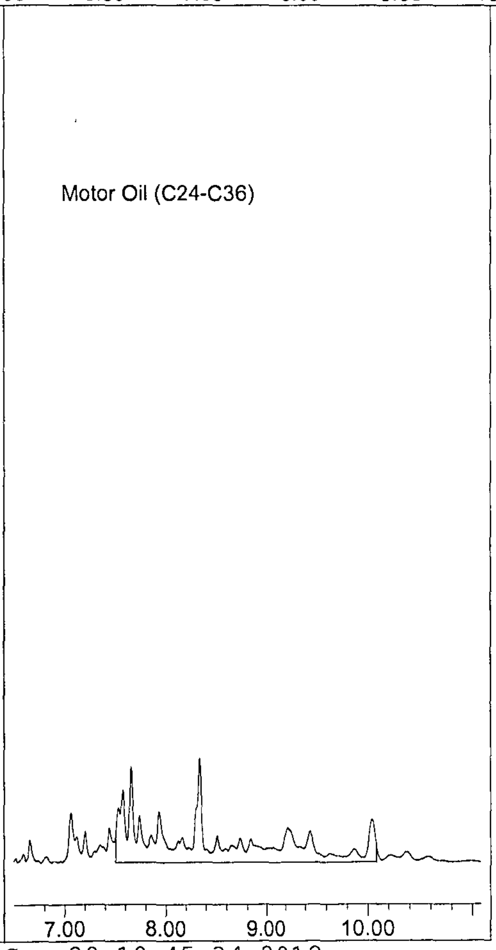
Quantitation Report (Not Reviewed)

```
Data File : G:\APOLLO\DATA\180910\910043.D              Vial: 43
Acq On    : 9-11-18 0:22:01                         Operator: DP
Sample    : AZ79151S01 5/50.02G DF5                 Inst    : Apollo
Misc      : soil                                    Multiplr: 499.80
IntFile   : events.e
Quant Time: Sep 11 14:06 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A

     Compound                          R.T.       Response    Conc Units
-----------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)             6.43       20871388 2693.643 ppb
Surrogate Spike 2998.800                     Recovery      =   89.82%
 4) SA  Octacosane(S)                  8.34       31618176 4892.688 ppb
Surrogate Spike 2998.800                     Recovery      =  163.15%

  Target Compounds
 1) HATM Diesel (C10-C24)               4.86      237550917 35963.488 ppb
 2) HBTM Motor Oil (C24-C36)            8.80      351293167 71917.380 ppb
```

Data File: G:\APOLLO\DATA\180910\910043.D
Sample : AZ79151S01 5/50.02G DF5







Quantitation Report (Not Reviewed)

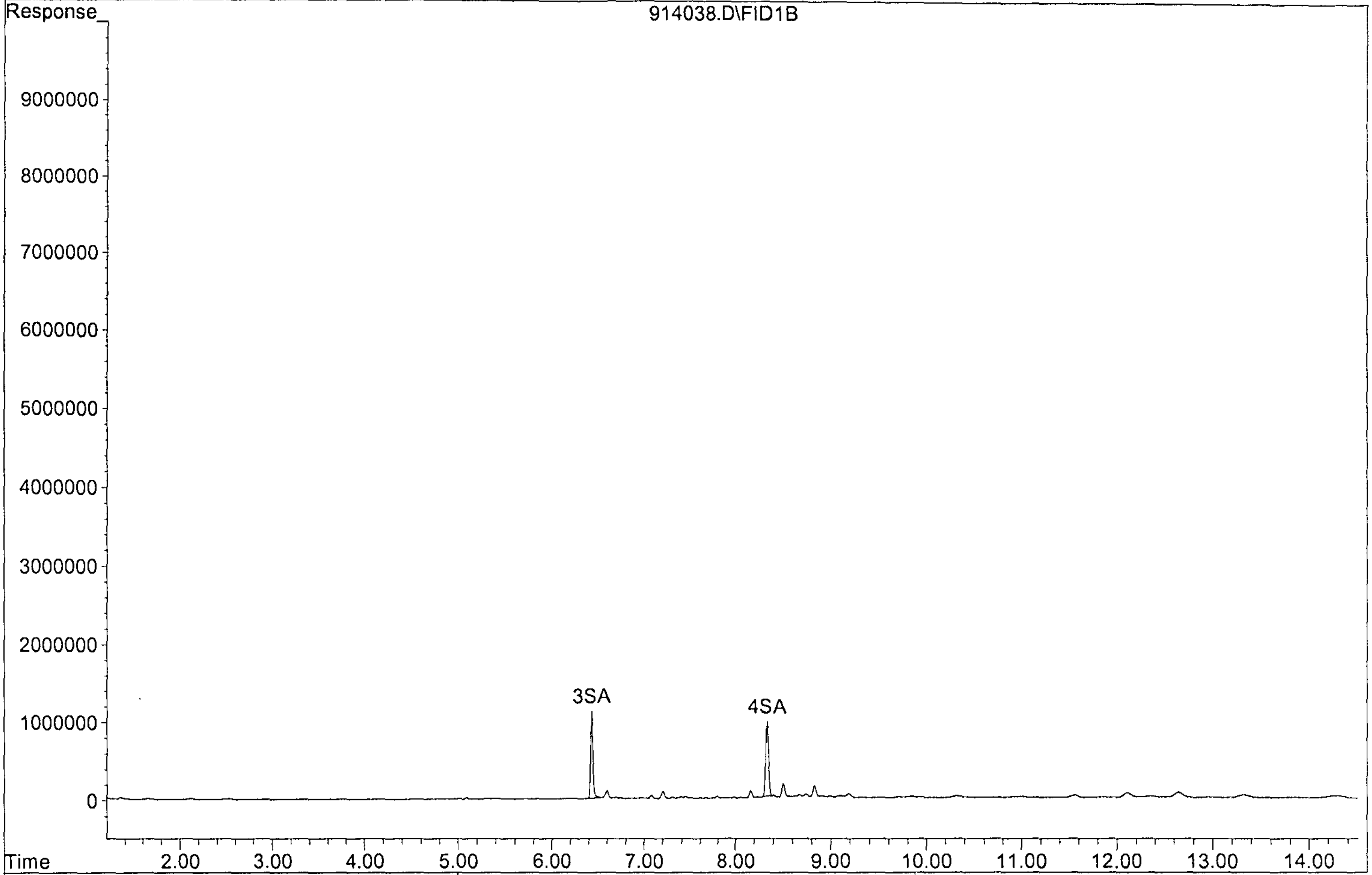
Data File : G:\APOLLO\DATA\180914\914038.D Vial: 38
Acq On : 9-14-18 20:59:31 Operator: DP
Sample : AZ79151S01 5/50.02G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 499.80
IntFile : events.e
Quant Time: Sep 17 8:59 2018 Quant Results File: DROB0905.RES

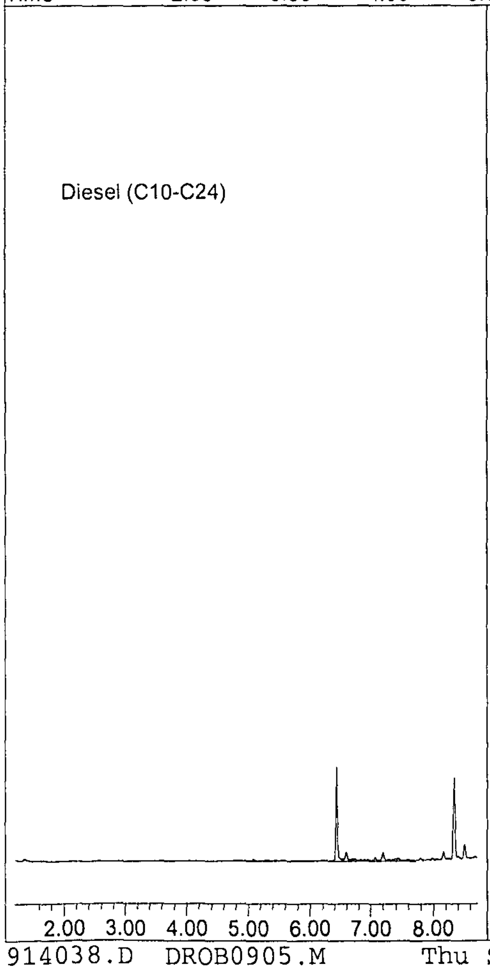
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

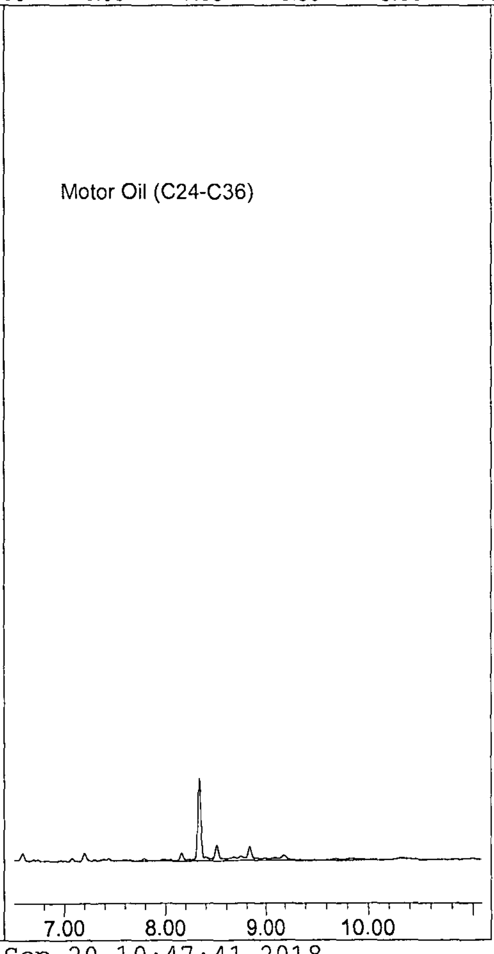
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	19206393	2478.761 ppb
Surrogate Spike 2998.800		Recovery	= 82.66%
4) SA Octacosane(S)	8.34	19935541	3084.883 ppb
Surrogate Spike 2998.800		Recovery	= 102.87%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	23493219	3556.703 ppb
2) HBTM Motor Oil (C24-C36)	8.80	33057839	6767.661 ppb

Data File: G:\APOLLO\DATA\180914\914038.D
Sample : AZ79151S01 5/50.02G SGC DF5







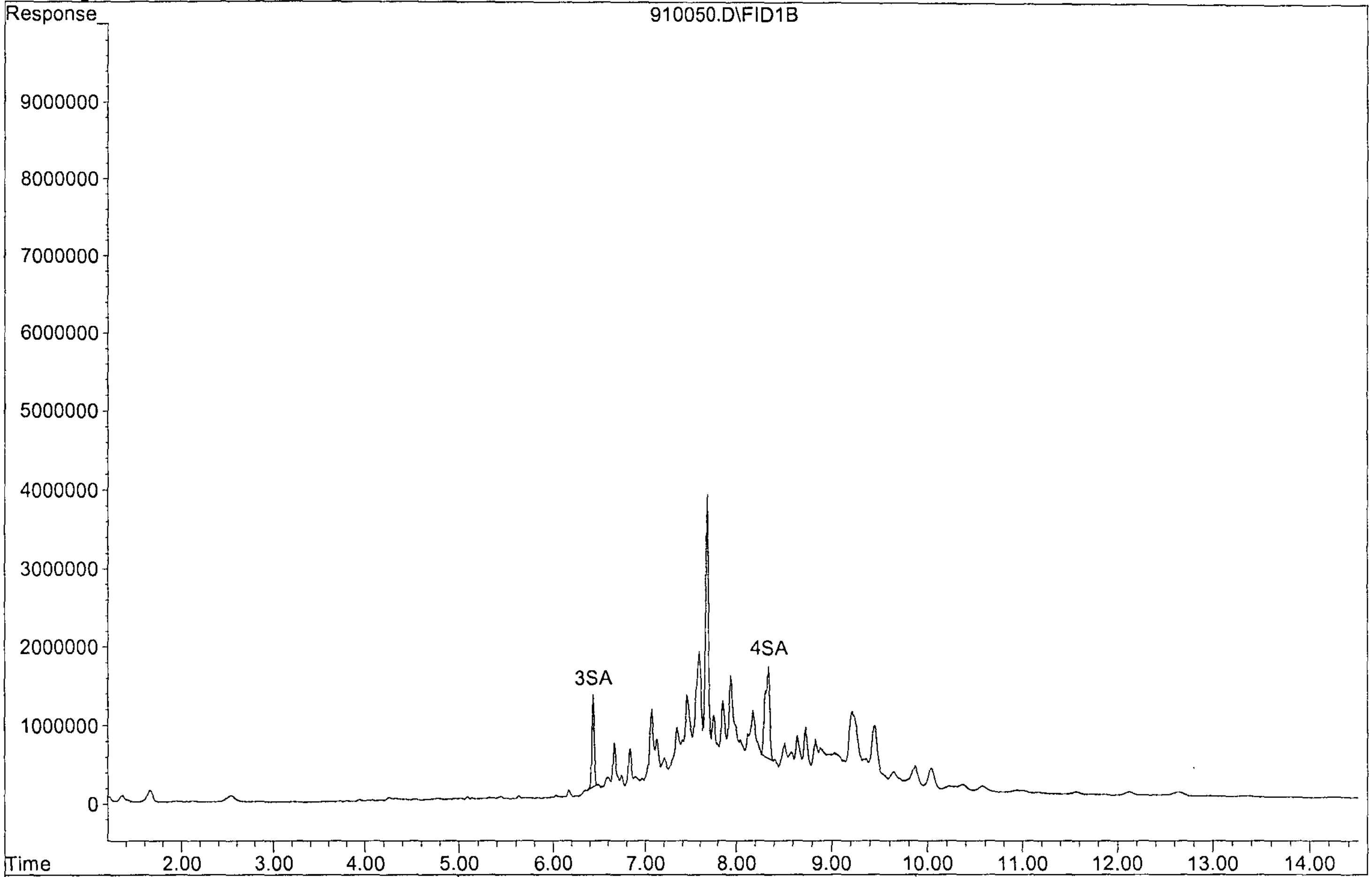
Quantitation Report (Not Reviewed)

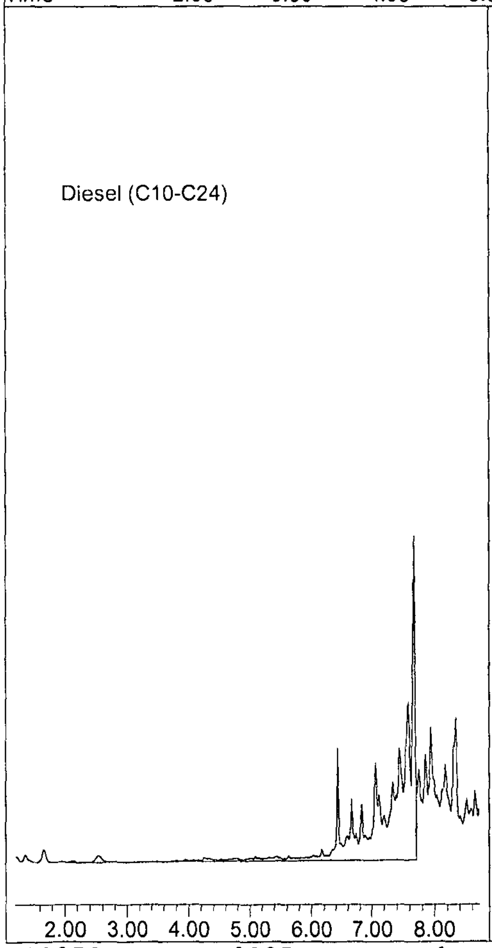
```
Data File : G:\APOLLO\DATA\180910\910050.D                  Vial: 50
Acq On    : 9-11-18 2:41:53                               Operator: DP
Sample    : AZ79152S01 5/50.09G DF5                        Inst    : Apollo
Misc      : soil                                          Multiplr: 499.10
IntFile   : events.e
Quant Time: Sep 11 14:07 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A
```

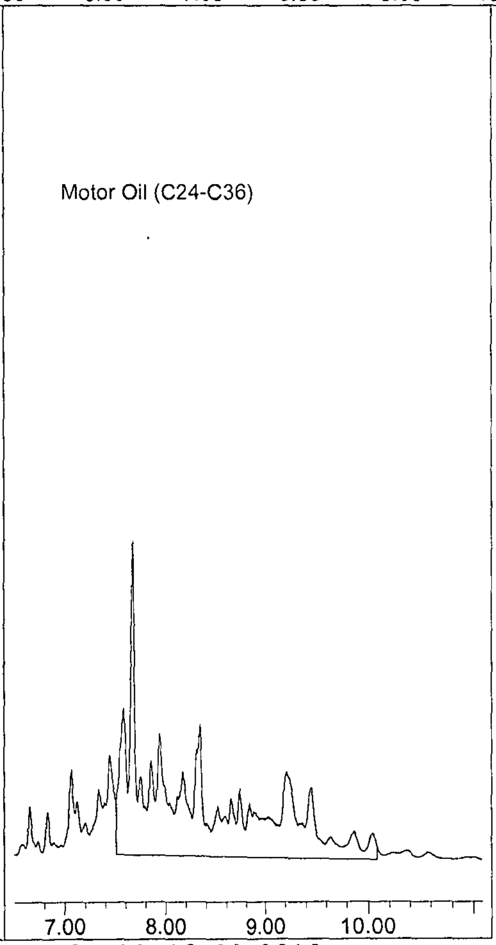
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	20445532	2634.998 ppb
Surrogate Spike 2994.610		Recovery	= 87.99%
4) SA Octacosane(S)	8.34	40137318	6202.290 ppb
Surrogate Spike 2994.610		Recovery	= 207.12%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	578967489	87529.073 ppb
2) HBTM Motor Oil (C24-C36)	8.80	869432532	177743.244 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910050.D
Sample : AZ79152S01 5/50.09G DF5







Quantitation Report (Not Reviewed)

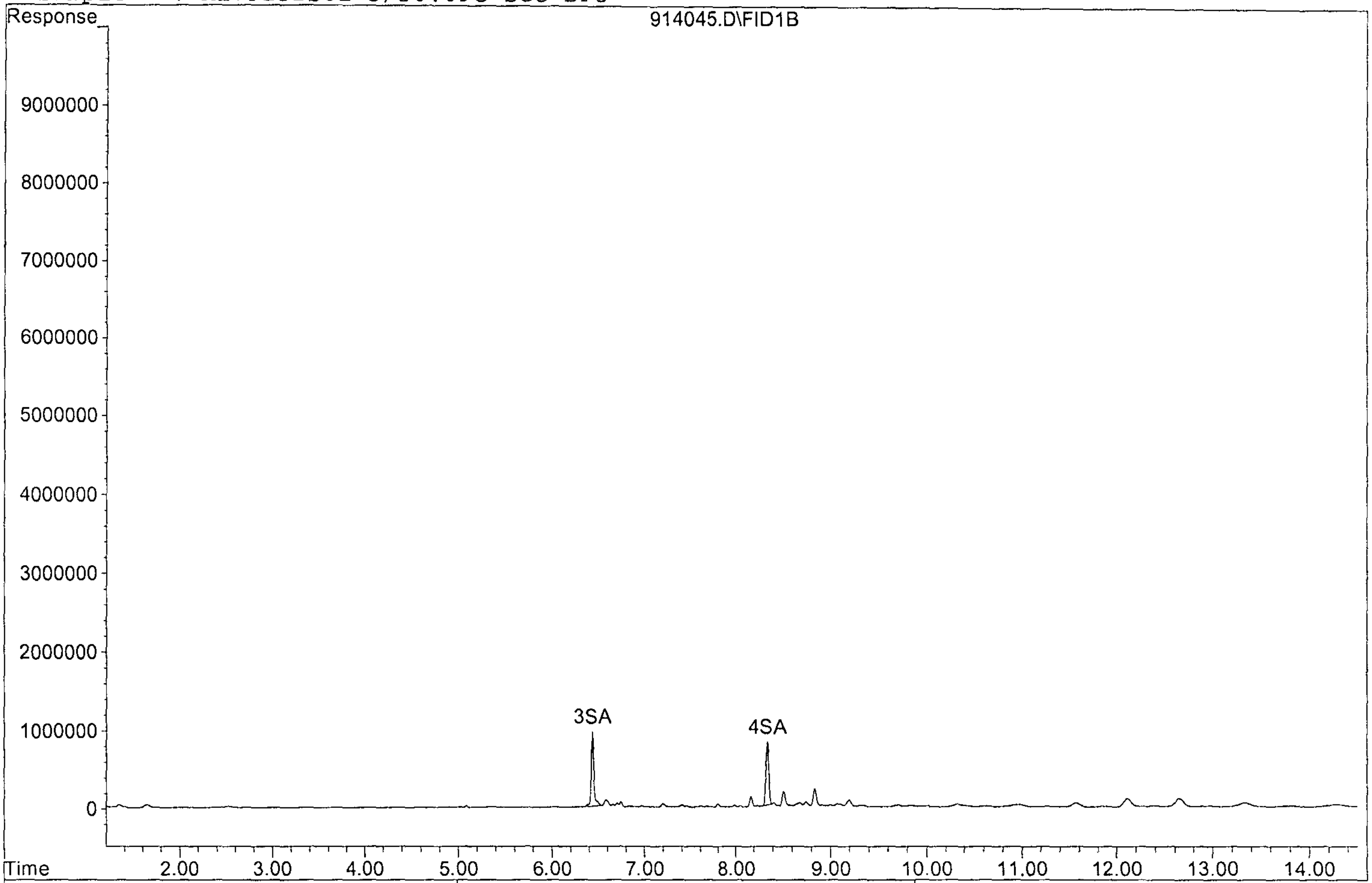
```
Data File : G:\APOLLO\DATA\180914\914045.D              Vial: 45
Acq On    : 9-14-18 23:17:15                        Operator: DP
Sample    : AZ79152S01 5/50.09G SGC DF5             Inst    : Apollo
Misc      : soil                                    Multiplr: 500.00
IntFile   : events.e
Quant Time: Sep 17  9:01 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

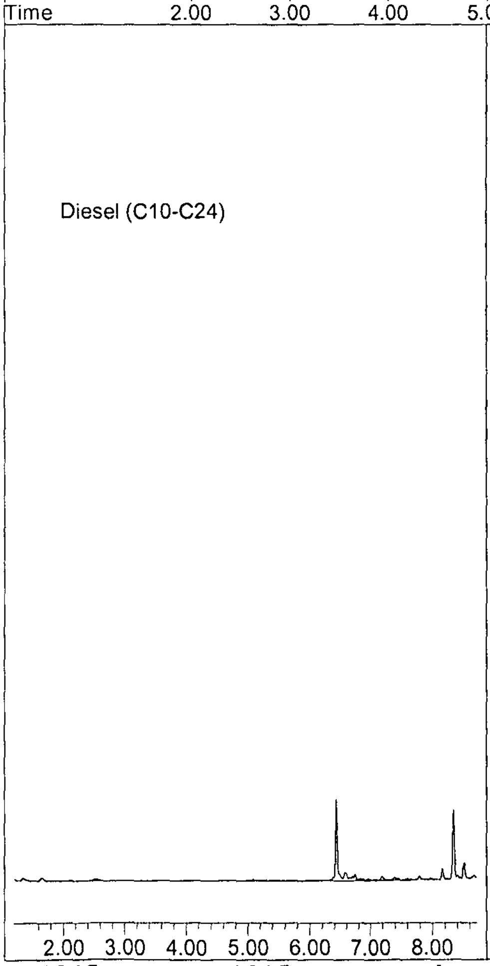
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	18698853	2414.224 ppb
Surrogate Spike 3000.000		Recovery	= 80.47%
4) SA Octacosane(S)	8.34	16673261	2581.101 ppb
Surrogate Spike 3000.000		Recovery	= 86.04%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	24725817	3744.807 ppb
2) HBTM Motor Oil (C24-C36)	8.80	38842994	7955.191 ppb

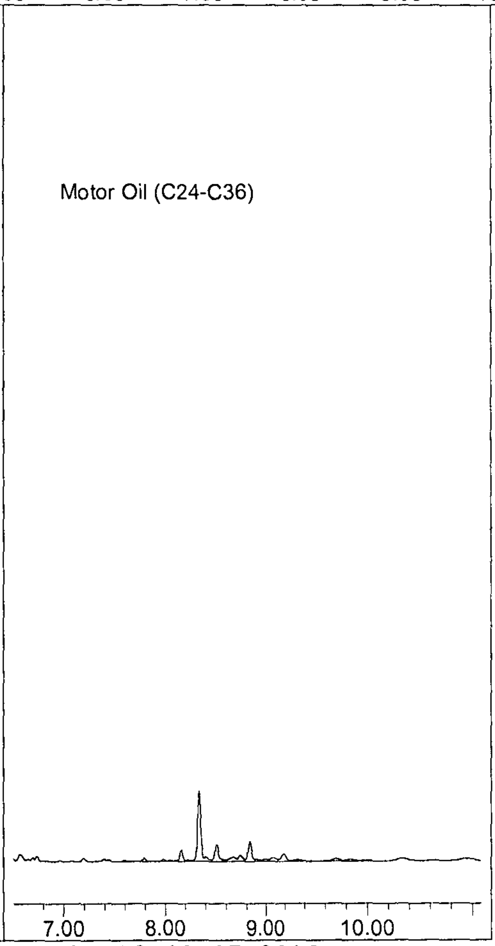
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914045.D
Sample : AZ79152S01 5/50.09G SGC DF5







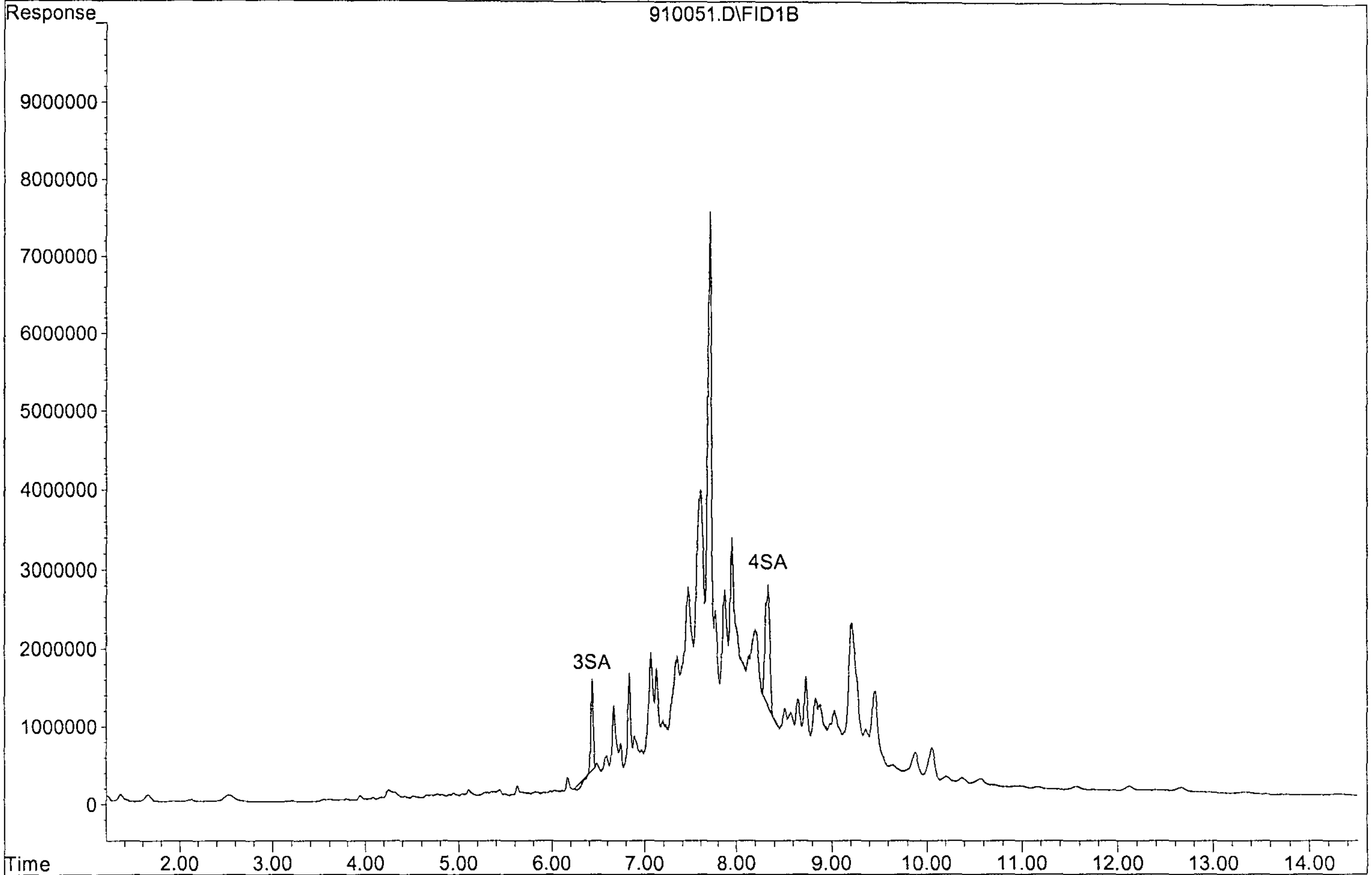
Quantitation Report (Not Reviewed)

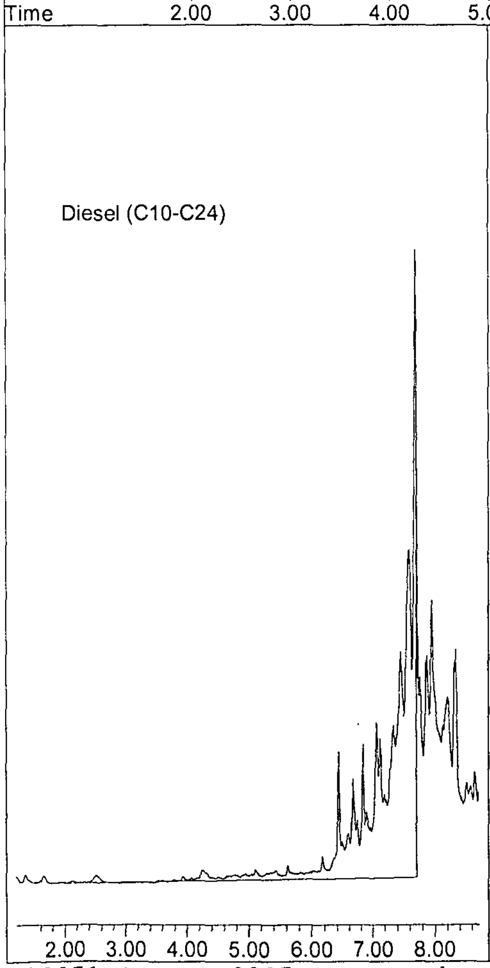
```
Data File : G:\APOLLO\DATA\180910\910051.D              Vial: 51
Acq On    : 9-11-18 3:01:54                         Operator: DP
Sample    : AZ79153S01 5/50.19G DF5                 Inst    : Apollo
Misc      : soil                                    Multiplr: 498.11
IntFile   : events.e
Quant Time: Sep 11 14:07 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

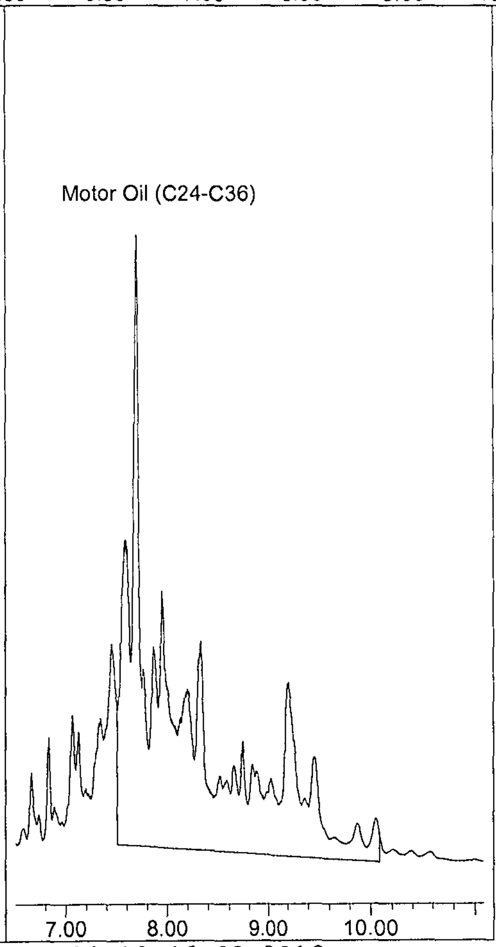
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	17602478	2264.065 ppb
Surrogate Spike 2988.643		Recovery =	75.76%
4) SA Octacosane(S)	8.33	51273998	7907.410 ppb
Surrogate Spike 2988.643		Recovery =	264.58%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	1235756727	186450.895 ppb
2) HBTM Motor Oil (C24-C36)	8.80	1775794725	362312.495 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910051.D
Sample : AZ79153S01 5/50.19G DF5







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180914\914046.D Vial: 46
Acq On : 9-14-18 23:37:26 Operator: DP
Sample : AZ79153S01 5/50.19G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 499.10
IntFile : events.e
Quant Time: Sep 17 9:01 2018 Quant Results File: DROB0905.RES

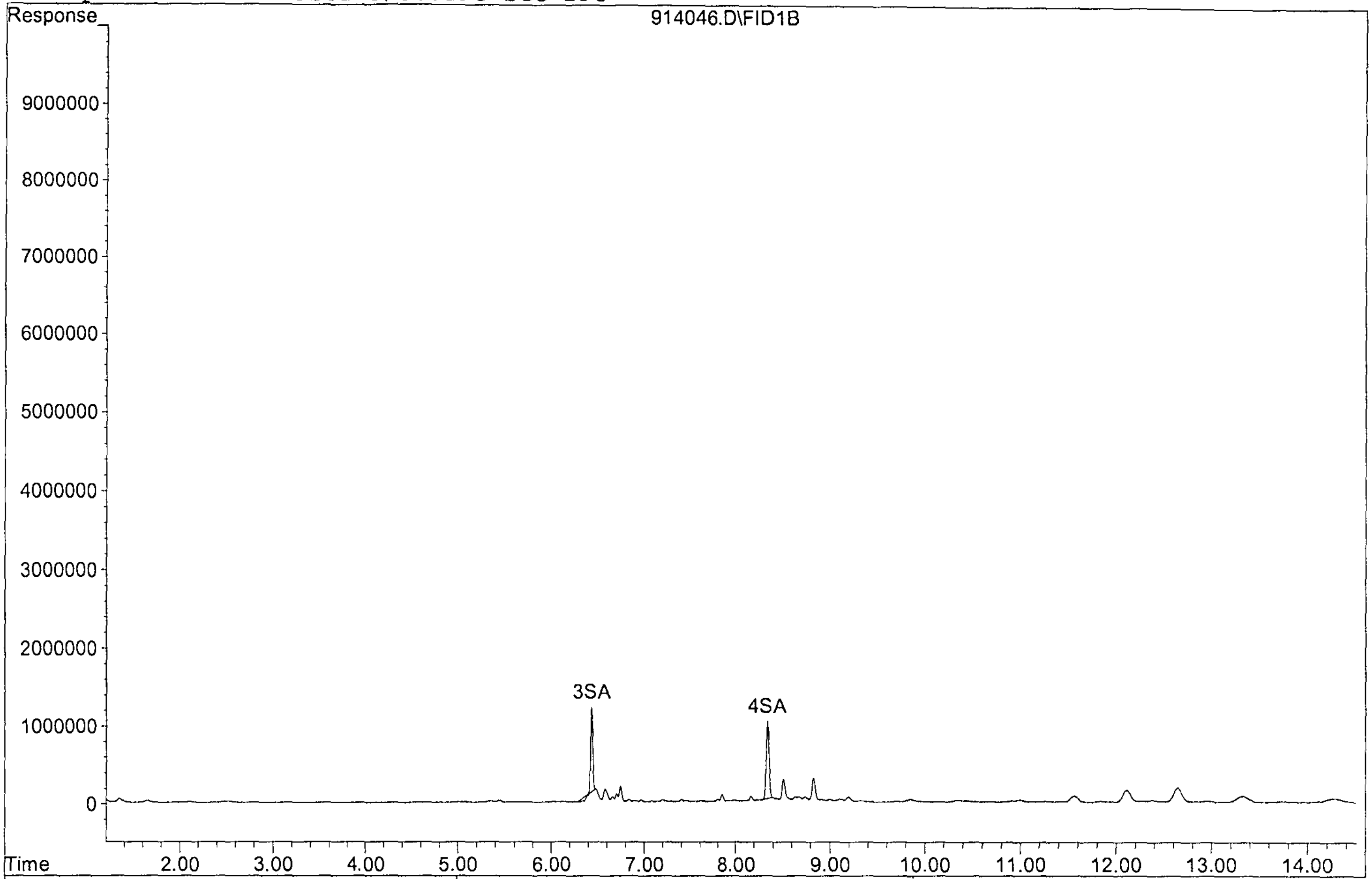
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

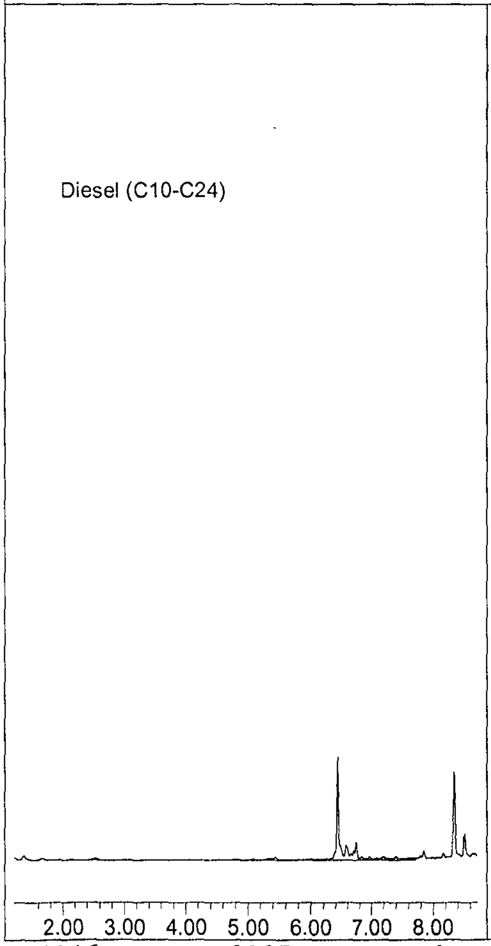
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

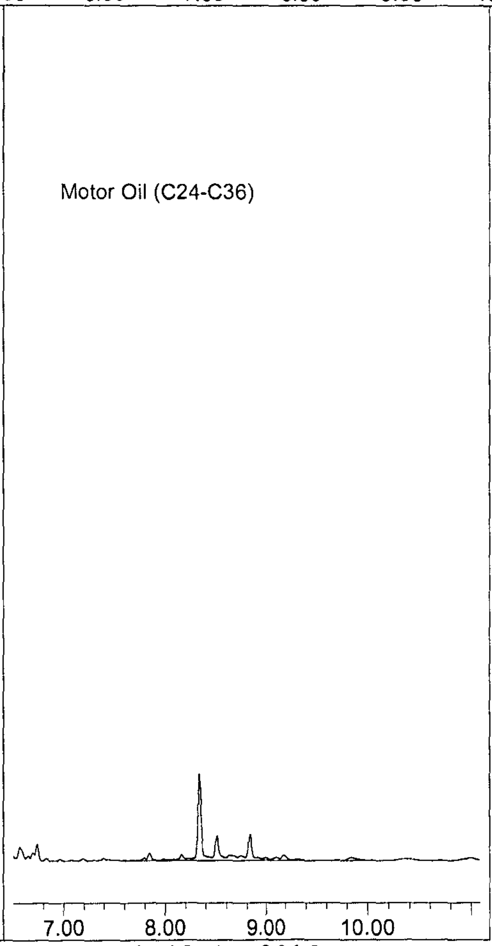
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	15843356	2041.874 ppb
Surrogate Spike 2994.610		Recovery =	68.18%
4) SA Octacosane(S)	8.34	20713972	3200.863 ppb
Surrogate Spike 2994.610		Recovery =	106.89%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	51283314	7753.080 ppb
2) HBTM Motor Oil (C24-C36)	8.80	46739005	9555.132 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914046.D
Sample : AZ79153S01 5/50.19G SGC DF5







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180910\910052.D
Vial: 52
Acq On : 9-11-18 3:21:53
Operator: DP
Sample : AZ79154S01 5/50.26G DF5
Inst : Apollo
Misc : soil
Multiplr: 497.41
IntFile : events.e
Quant Time: Sep 11 14:07 2018 Quant Results File: DROB0905.RES

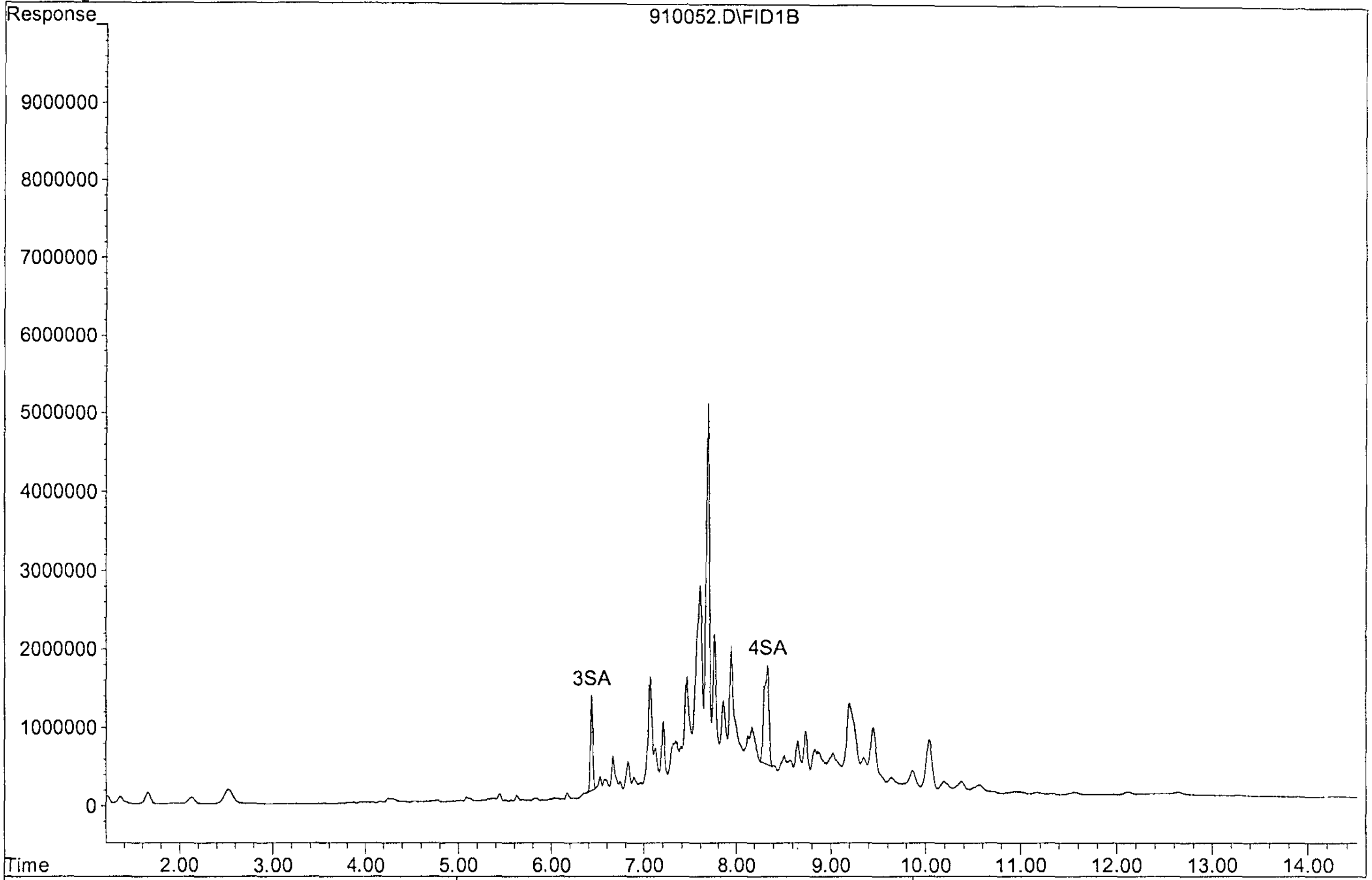
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

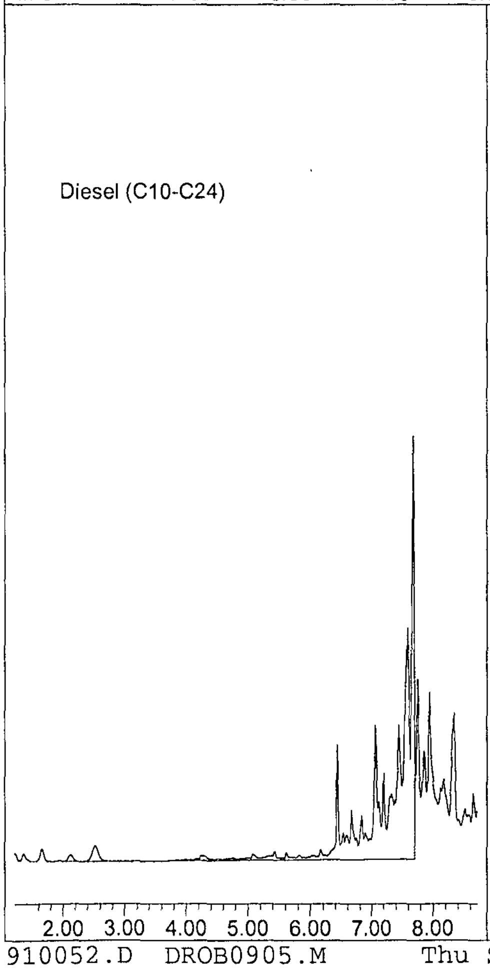
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

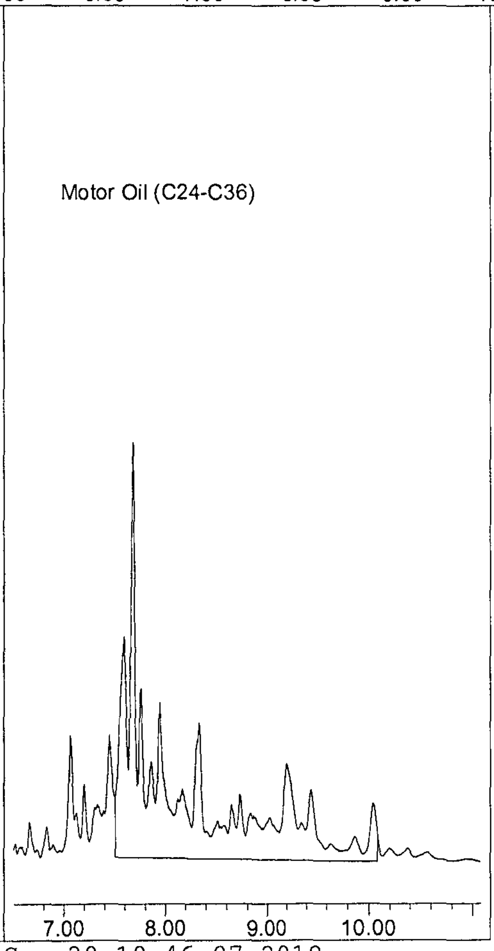
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	21109484	2711.361 ppb
Surrogate Spike 2984.481		Recovery	= 90.85%
4) SA Octacosane(S)	8.34	45035031	6935.568 ppb
Surrogate Spike 2984.481		Recovery	= 232.39%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	683773161	103023.909 ppb
2) HBTM Motor Oil (C24-C36)	8.80	961748544	195950.589 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180910\910052.D
Sample : AZ79154S01 5/50.26G DF5







Quantitation Report (Not Reviewed)

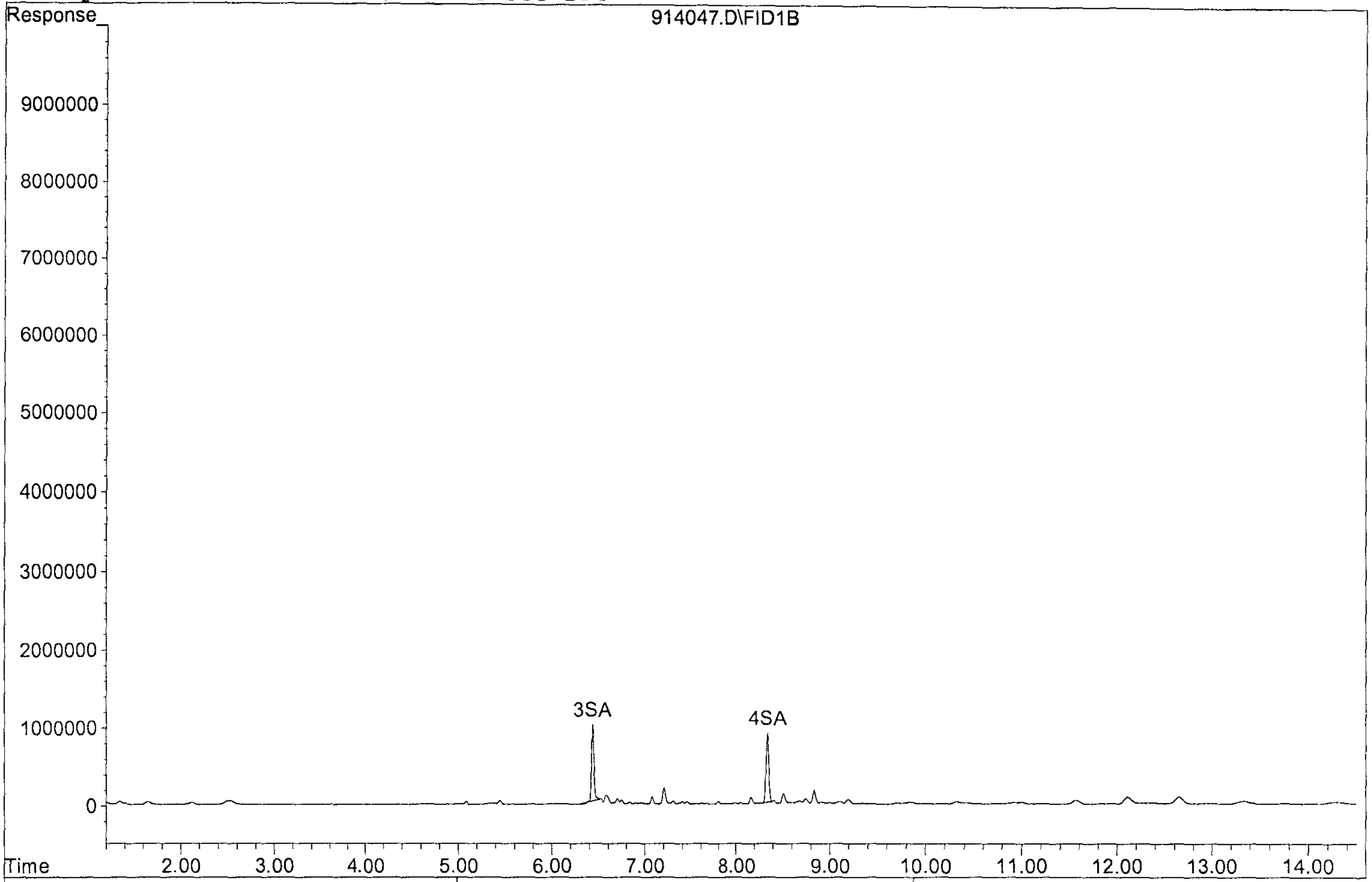
Data File : G:\APOLLO\DATA\180914\914047.D Vial: 47
Acq On : 9-14-18 23:57:18 Operator: DP
Sample : AZ79154S01 5/50.26G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 497.41
IntFile : events.e
Quant Time: Sep 17 9:01 2018 Quant Results File: DROB0905.RES

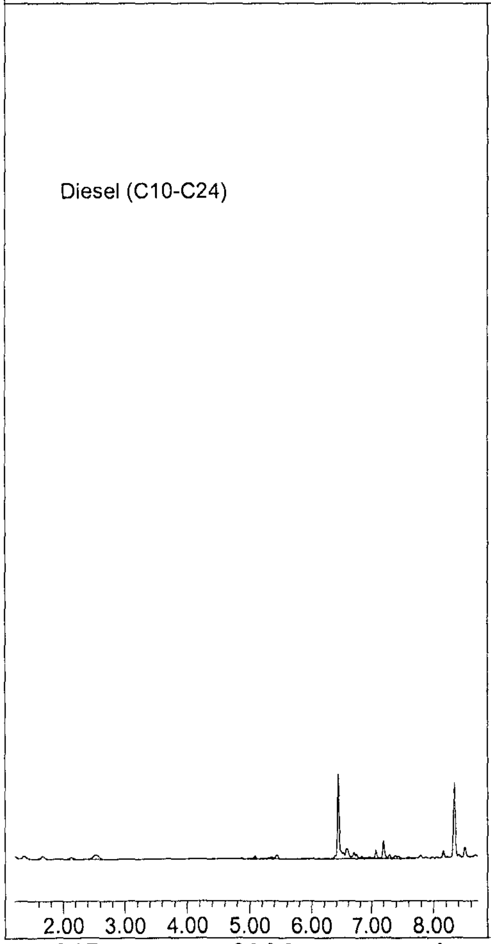
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

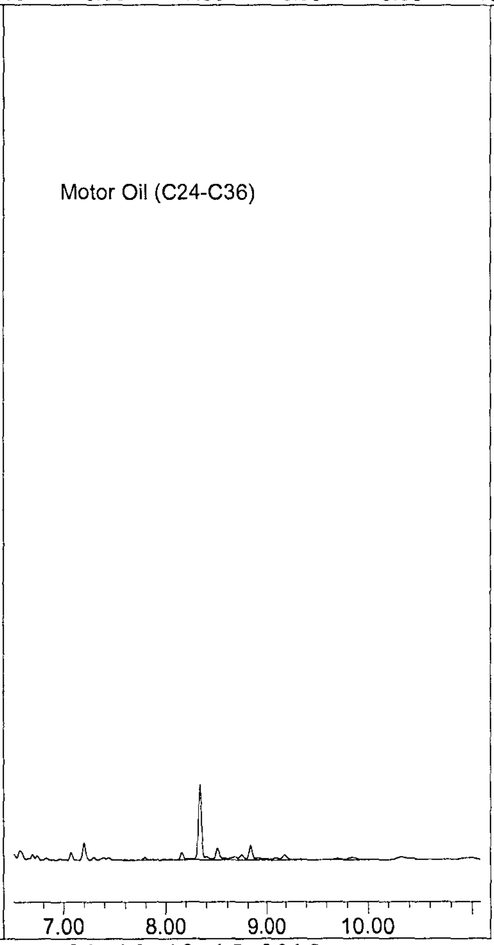
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	17311948	2223.595 ppb
Surrogate Spike 2984.481		Recovery =	74.51%
4) SA Octacosane(S)	8.34	18091353	2786.138 ppb
Surrogate Spike 2984.481		Recovery =	93.35%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	39798608	5996.445 ppb
2) HBTM Motor Oil (C24-C36)	8.80	29001835	5908.953 ppb

Data File: G:\APOLLO\DATA\180914\914047.D
Sample : AZ79154S01 5/50.26G SGC DF5







Quantitation Report (Not Reviewed)

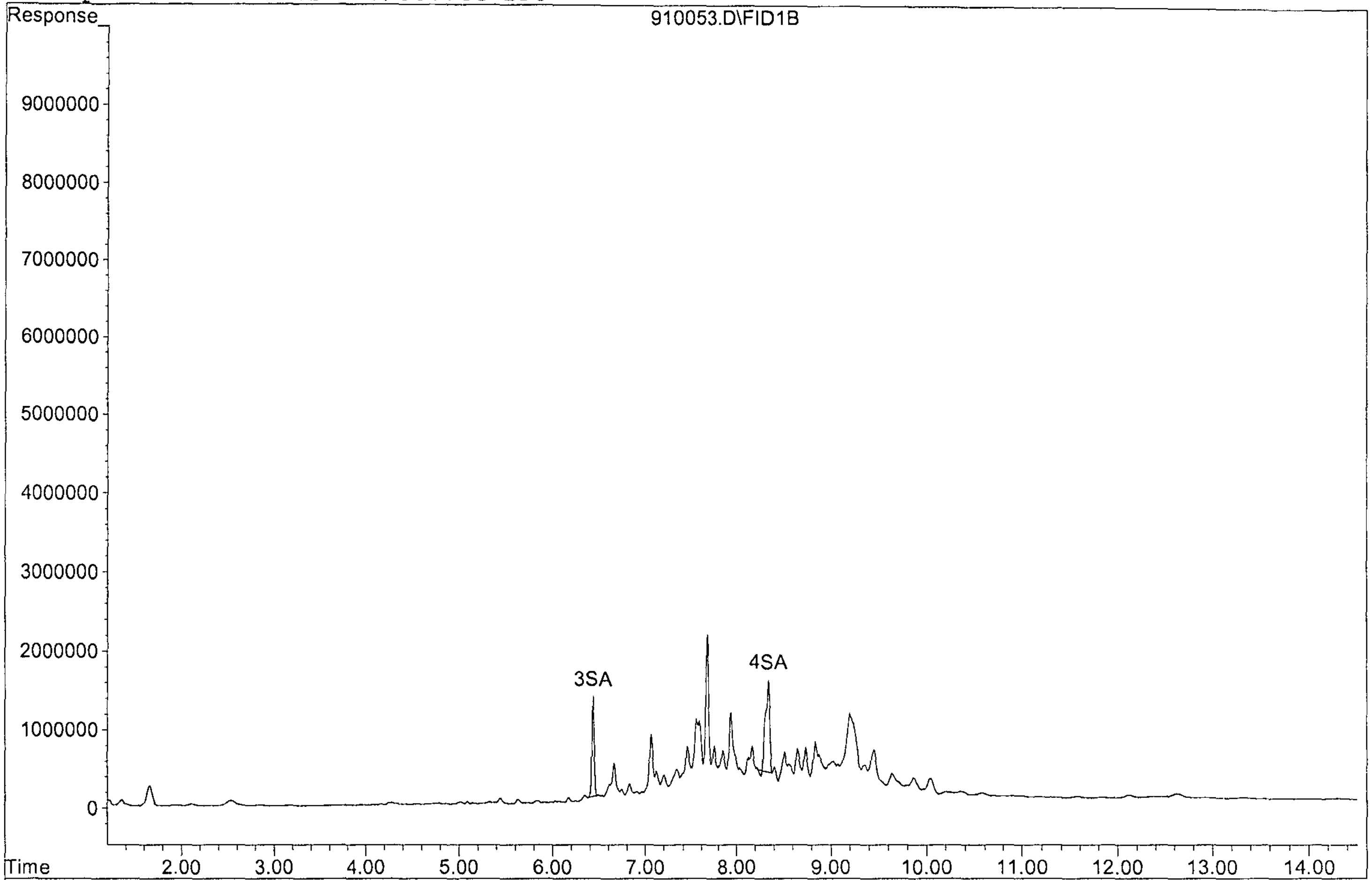
Data File : G:\APOLLO\DATA\180910\910053.D Vial: 53
Acq On : 9-11-18 3:41:56 Operator: DP
Sample : AZ79155S01 5/50.74G DF5 Inst : Apollo
Misc : soil Multiplr: 492.71
IntFile : events.e
Quant Time: Sep 11 14:07 2018 Quant Results File: DROB0905.RES

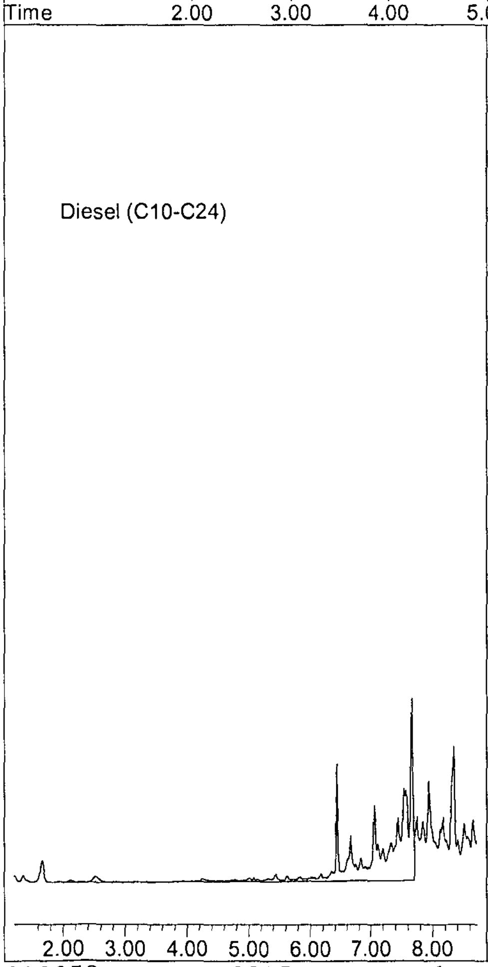
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

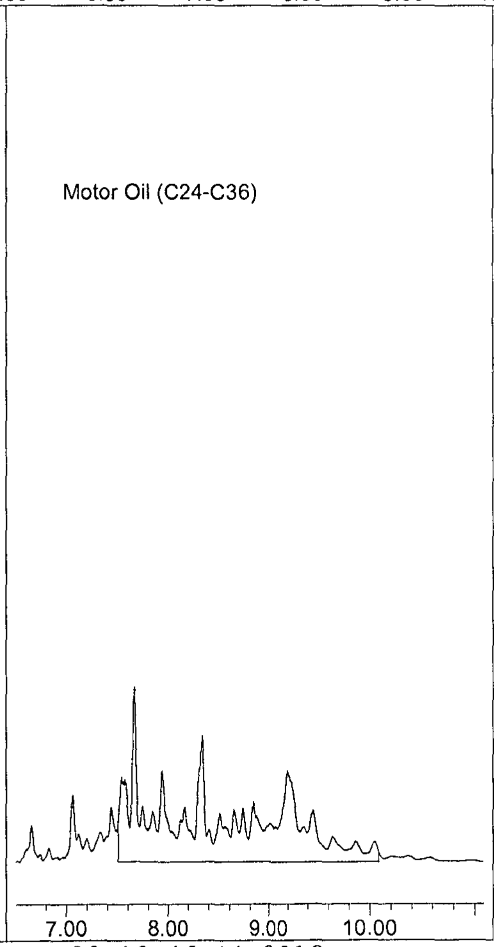
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	22170601	2820.718 ppb
Surrogate Spike 2956.248		Recovery =	95.42%
4) SA Octacosane(S)	8.34	36632324	5588.156 ppb
Surrogate Spike 2956.248		Recovery =	189.03%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	363828440	54299.409 ppb
2) HBTM Motor Oil (C24-C36)	8.80	671616008	135543.457 ppb

Data File: G:\APOLLO\DATA\180910\910053.D
Sample : AZ79155S01 5/50.74G DF5





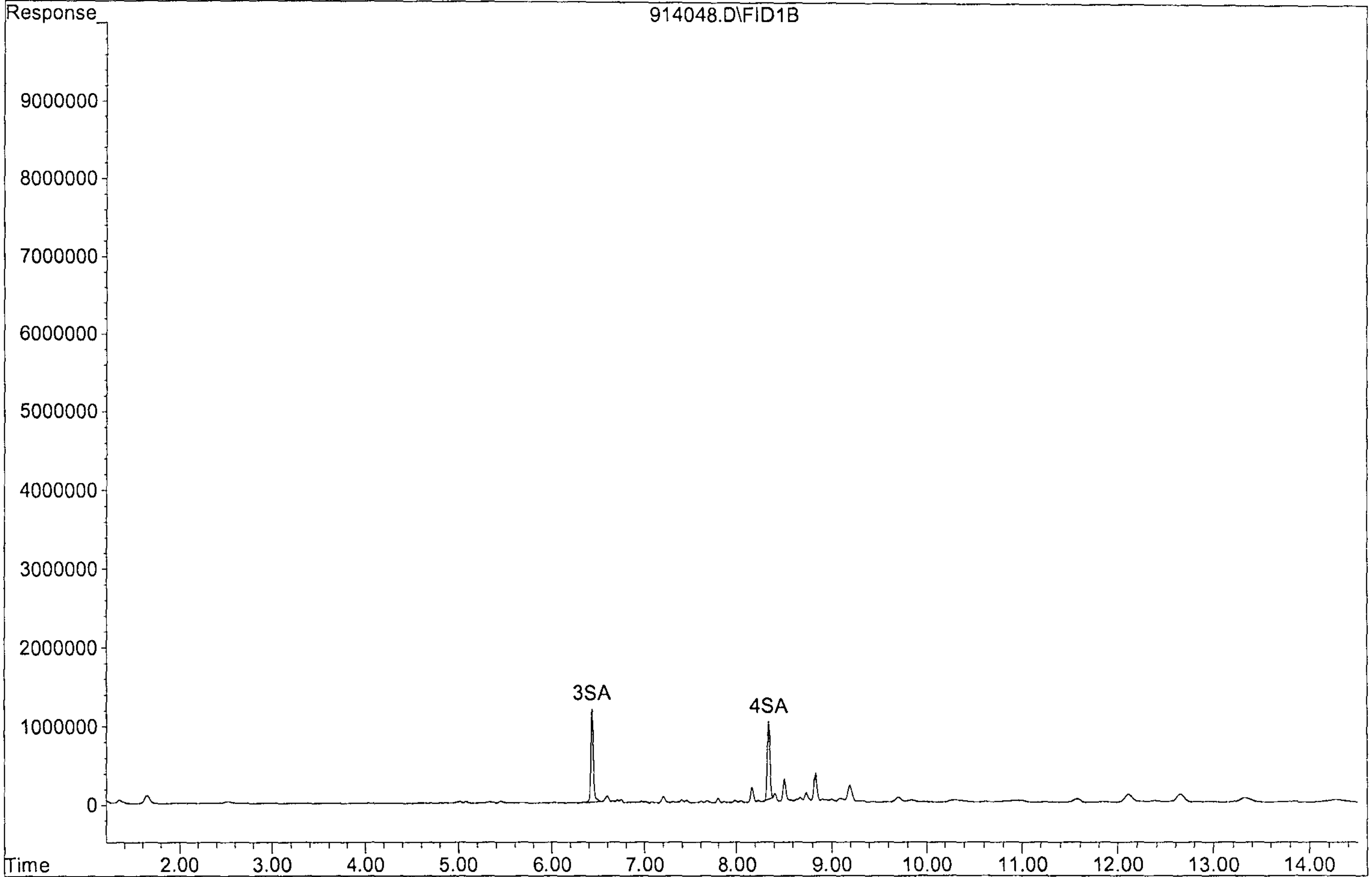


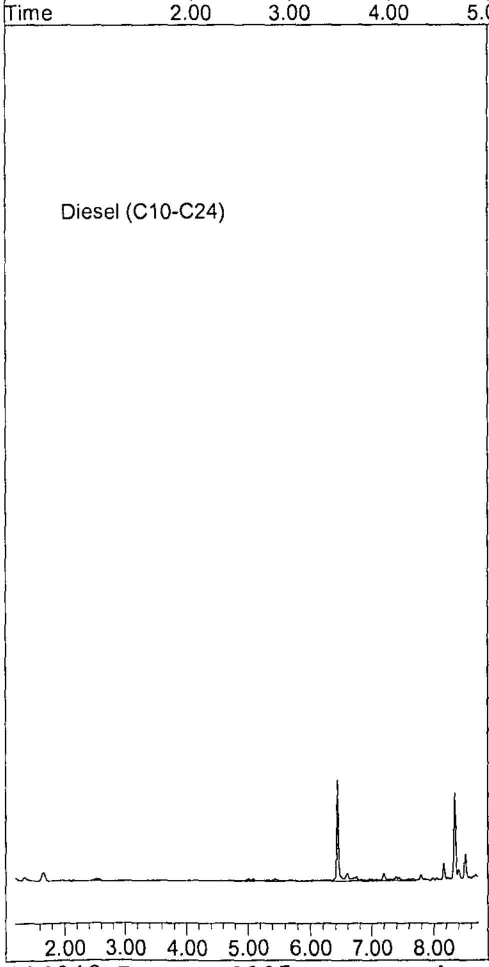
Quantitation Report (Not Reviewed)

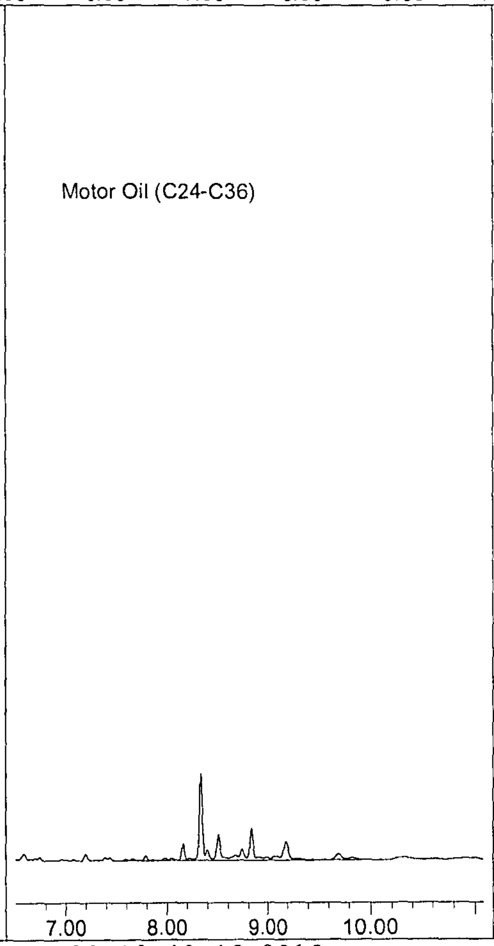
```
Data File : G:\APOLLO\DATA\180914\914048.D              Vial: 48
Acq On    : 9-15-18 0:17:25                         Operator: DP
Sample    : AZ79155S01 5/50.74G SGC DF5             Inst    : Apollo
Misc      : soil                                    Multiplr: 492.71
IntFile   : events.e
Quant Time: Sep 17  9:01 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	21939851	2791.360 ppb
Surrogate Spike 2956.248		Recovery =	94.42%
4) SA Octacosane(S)	8.34	20019716	3053.950 ppb
Surrogate Spike 2956.248		Recovery =	103.30%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	26950495	4022.214 ppb
2) HBTM Motor Oil (C24-C36)	8.80	57893016	11683.789 ppb

Data File: G:\APOLLO\DATA\180914\914048.D
Sample : AZ79155S01 5/50.74G SGC DF5





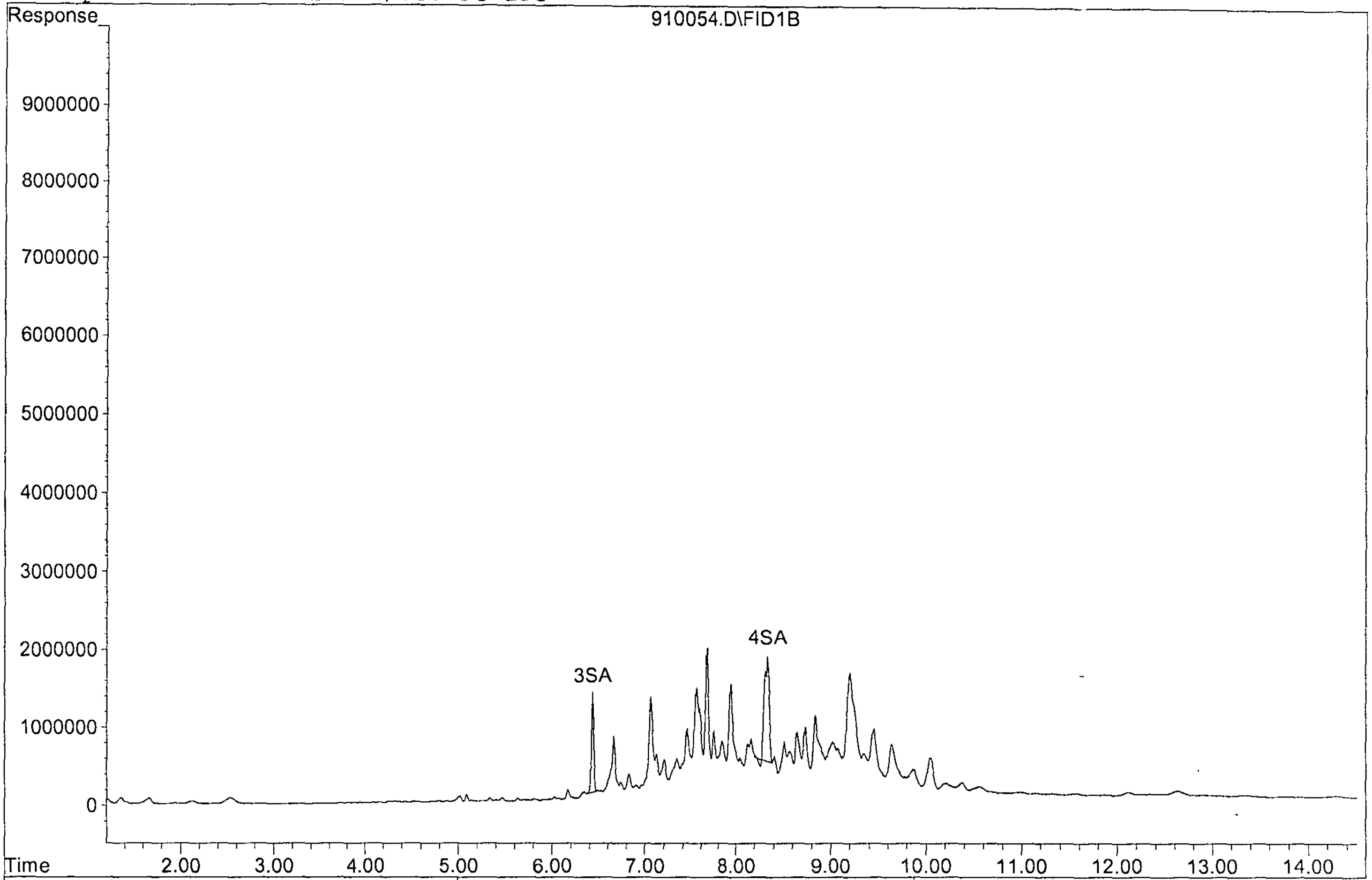


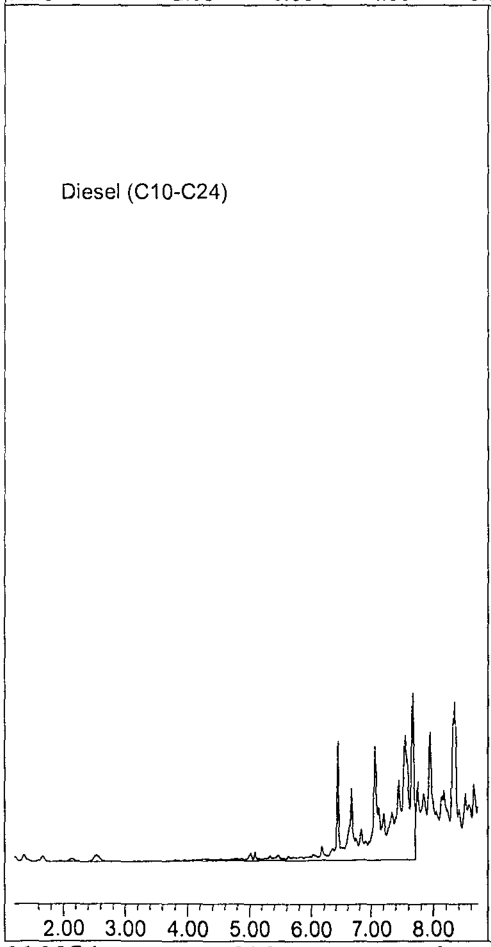
Quantitation Report (Not Reviewed)

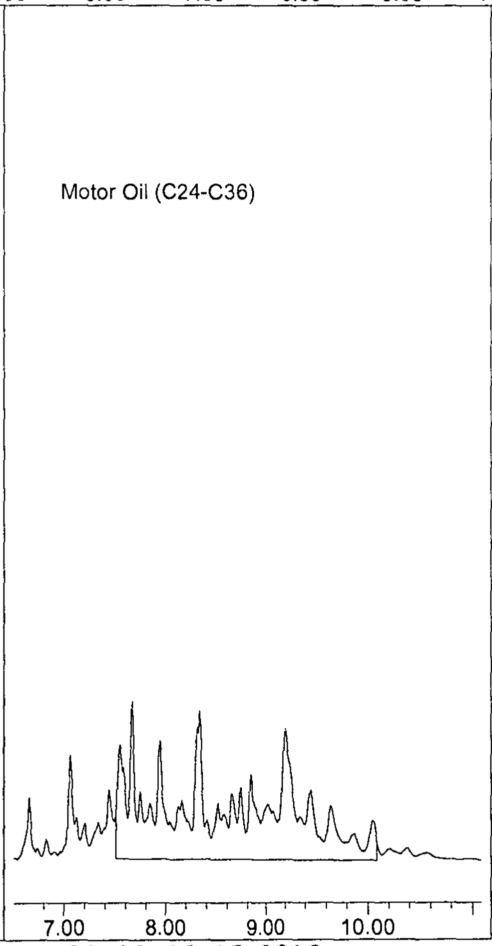
```
Data File : G:\APOLLO\DATA\180910\910054.D                 Vial: 54
Acq On    : 9-11-18 4:01:55                            Operator: DP
Sample    : AZ79156S01 5/50.19G DF5                    Inst    : Apollo
Misc      : soil                                       Multiplr: 498.11
IntFile   : events.e
Quant Time: Sep 11 14:07 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A

     Compound                       R.T.      Response   Conc Units
-------------------------------------------------------------------------

 System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)          6.43      22217325 2857.636 ppb
Surrogate Spike 2988.643                   Recovery      =   95.62%
 4) SA  Octacosane(S)               8.34      46077949 7106.082 ppb
Surrogate Spike 2988.643                   Recovery      =  237.77%

 Target Compounds
 1) HATM Diesel (C10-C24)            4.86     449388402 67803.693 ppb
 2) HBTM Motor Oil (C24-C36)         8.80     836099661 170588.047 ppb
```

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910054.D
Sample : AZ79156S01 5/50.19G DF5







910054.D DROB0905.M Thu Sep 20 10:46:15 2018 Page 2

Quantitation Report (Not Reviewed)

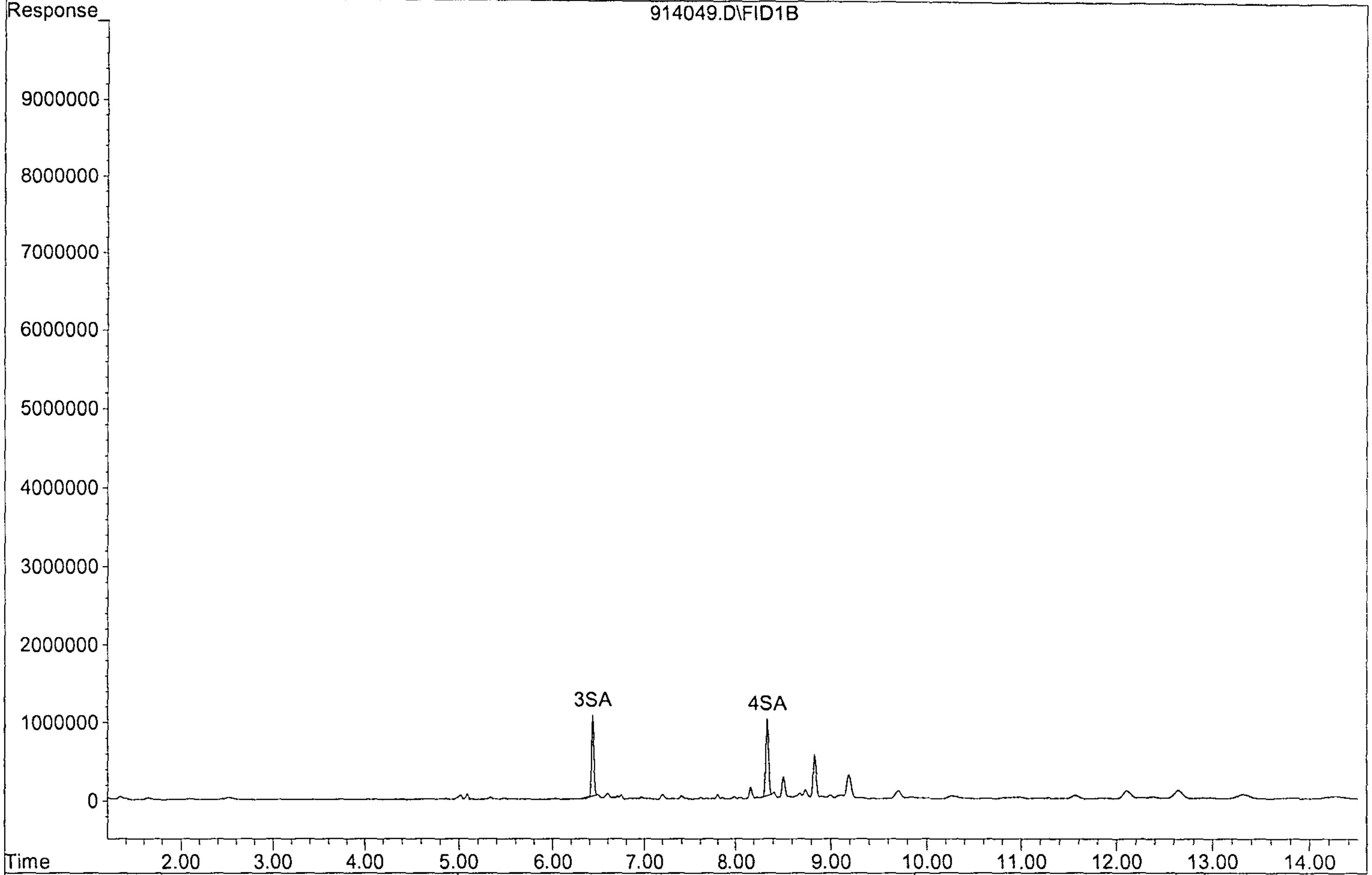
```
Data File : G:\APOLLO\DATA\180914\914049.D              Vial: 49
Acq On    : 9-15-18 0:37:24                          Operator: DP
Sample    : AZ79156S01 5/50.19G SGC DF5              Inst    : Apollo
Misc      : soil                                     Multiplr: 498.11
IntFile   : events.e
Quant Time: Sep 17  9:01 2018  Quant Results File: DROB0905.RES

Method         : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title          : 8015 B&C
Last Update    : Tue Sep 11 10:13:20 2018
Response via   : Multiple Level Calibration

Volume Inj.    : 2UL
Signal Phase   : DB-5
Signal Info    : FID02A
```

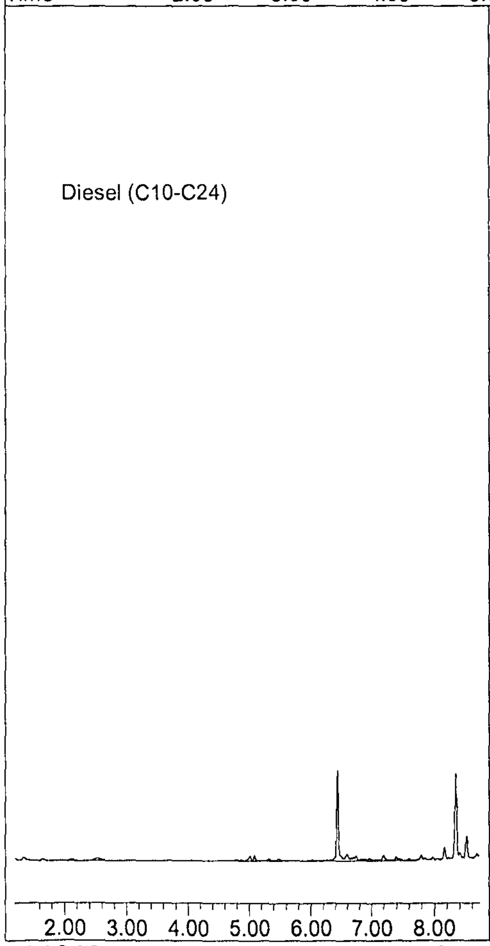
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	17409142	2239.198 ppb
Surrogate Spike 2988.643		Recovery	= 74.92%
4) SA Octacosane(S)	8.34	19741241	3044.469 ppb
Surrogate Spike 2988.643		Recovery	= 101.87%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	30400321	4586.798 ppb
2) HBTM Motor Oil (C24-C36)	8.80	63936900	13044.941 ppb

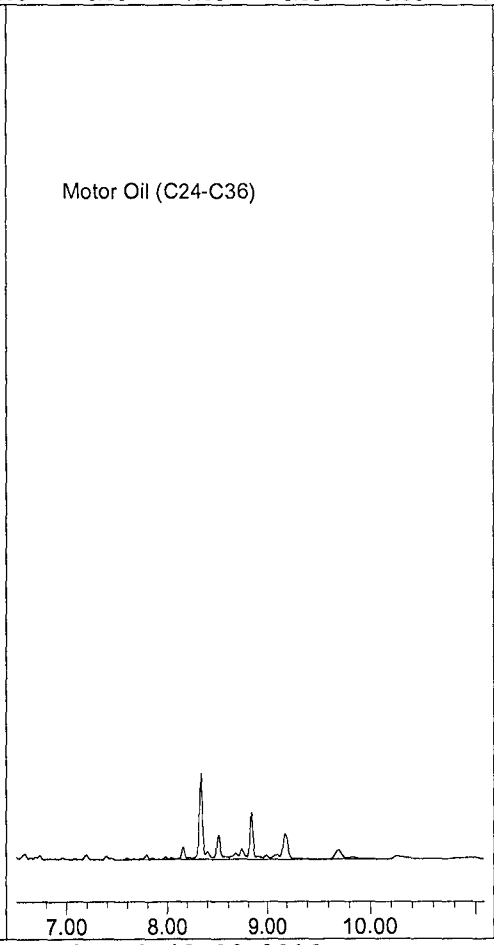
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914049.D
Sample : AZ79156S01 5/50.19G SGC DF5







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180910\910055.D   Vial: 55
Acq On : 9-11-18 4:21:55   Operator: DP
Sample : AZ79157S01 5/50.25G DF5   Inst : Apollo
Misc : soil   Multiplr: 497.51
IntFile : events.e
Quant Time: Sep 11 14:08 2018 Quant Results File: DROB0905.RES

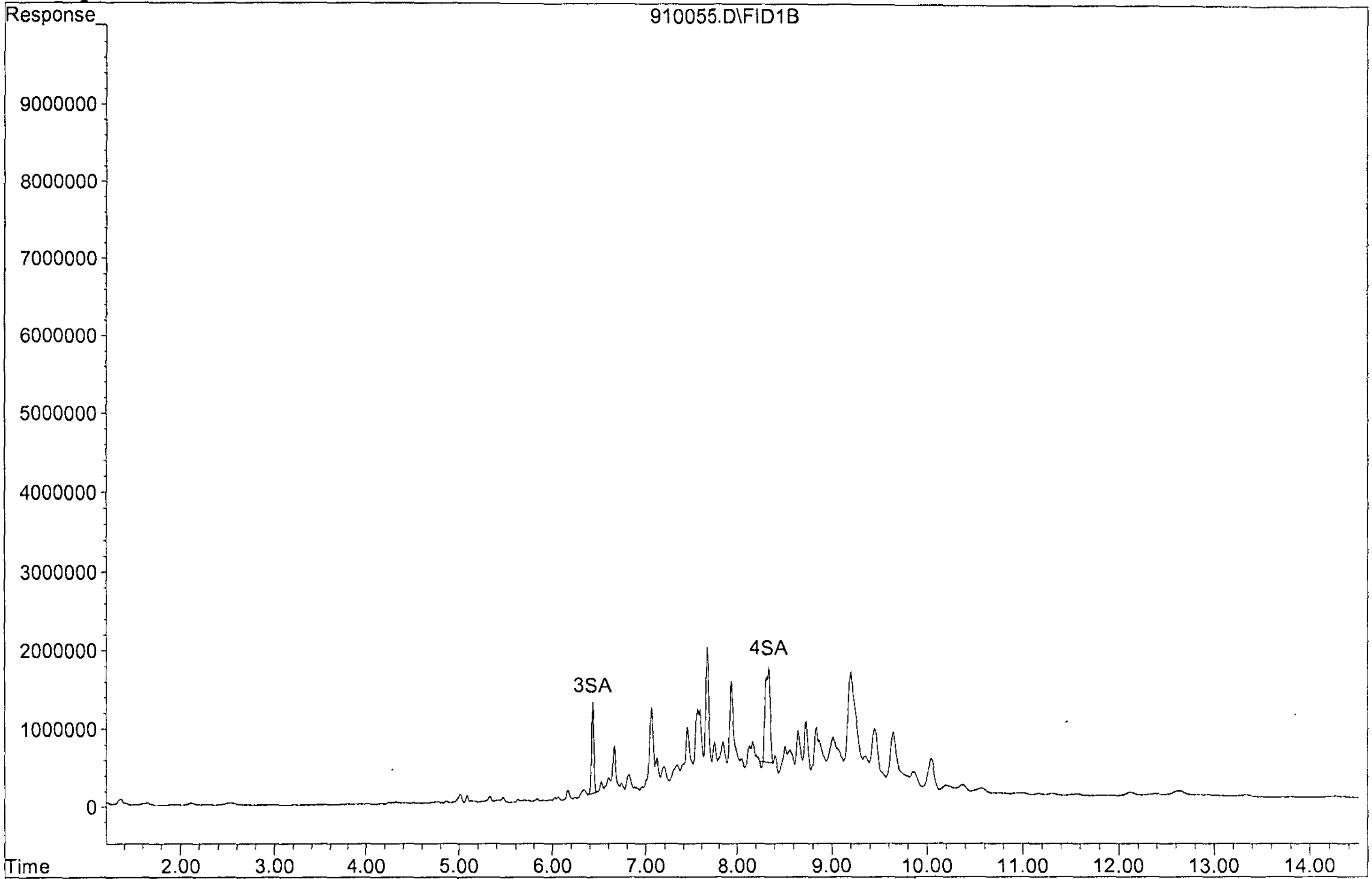
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

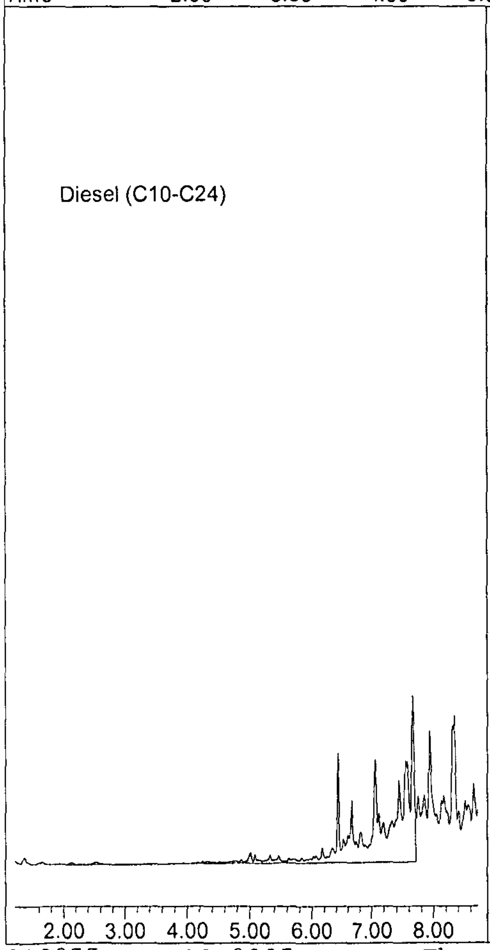
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

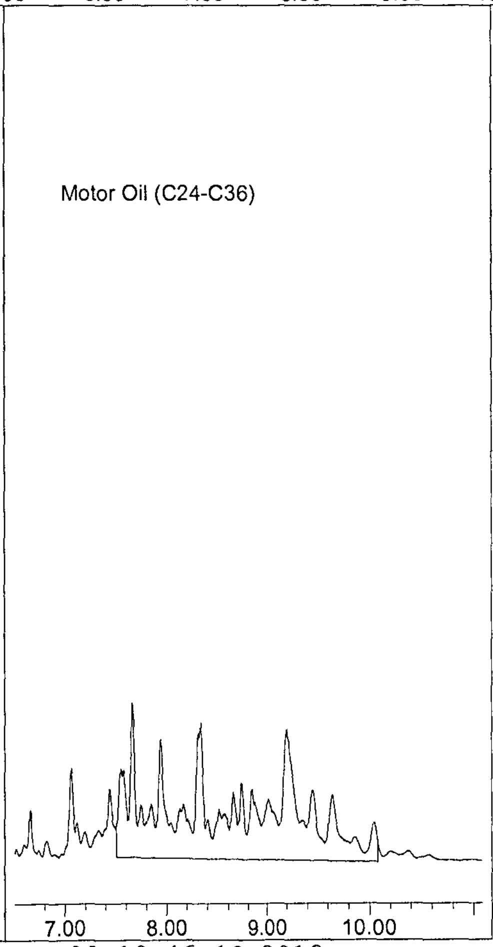
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	20210701	2596.435 ppb
Surrogate Spike 2985.075		Recovery	= 86.98%
4) SA Octacosane(S)	8.34	43544028	6707.282 ppb
Surrogate Spike 2985.075		Recovery	= 224.69%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	433707118	65359.535 ppb
2) HBTM Motor Oil (C24-C36)	8.80	804989766	164044.557 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910055.D
Sample : AZ79157S01 5/50.25G DF5







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180914\914050.D Vial: 50
Acq On : 9-15-18 0:56:36 Operator: DP
Sample : AZ79157S01 5/50.25G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 497.51
IntFile : events.e
Quant Time: Sep 17 9:02 2018 Quant Results File: DROB0905.RES

Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

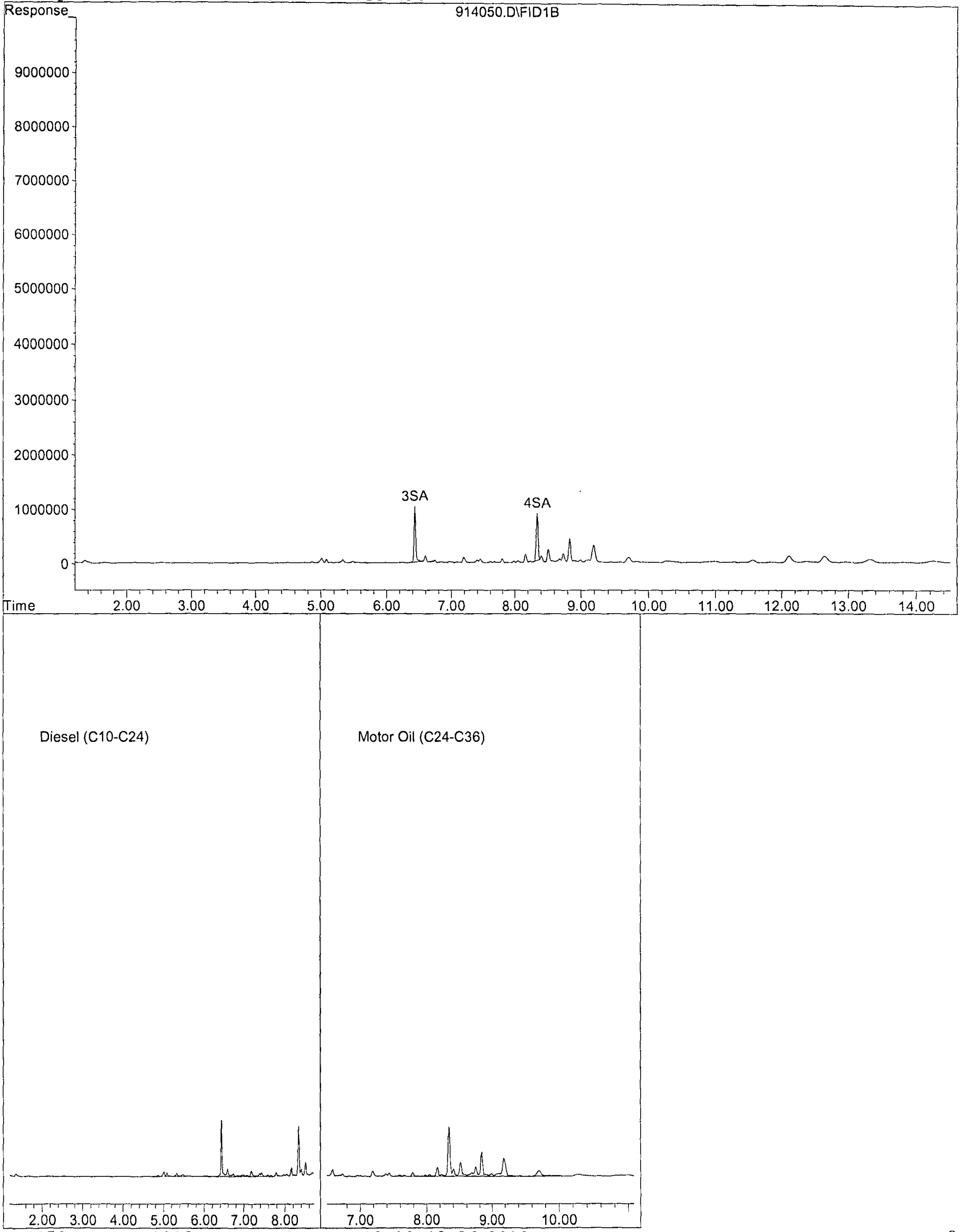
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	18226831	2341.571 ppb
Surrogate Spike 2985.075		Recovery =	78.44%
4) SA Octacosane(S)	8.34	17271661	2660.432 ppb
Surrogate Spike 2985.075		Recovery =	89.12%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	33522731	5051.866 ppb
2) HBTM Motor Oil (C24-C36)	8.80	62019335	12638.588 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

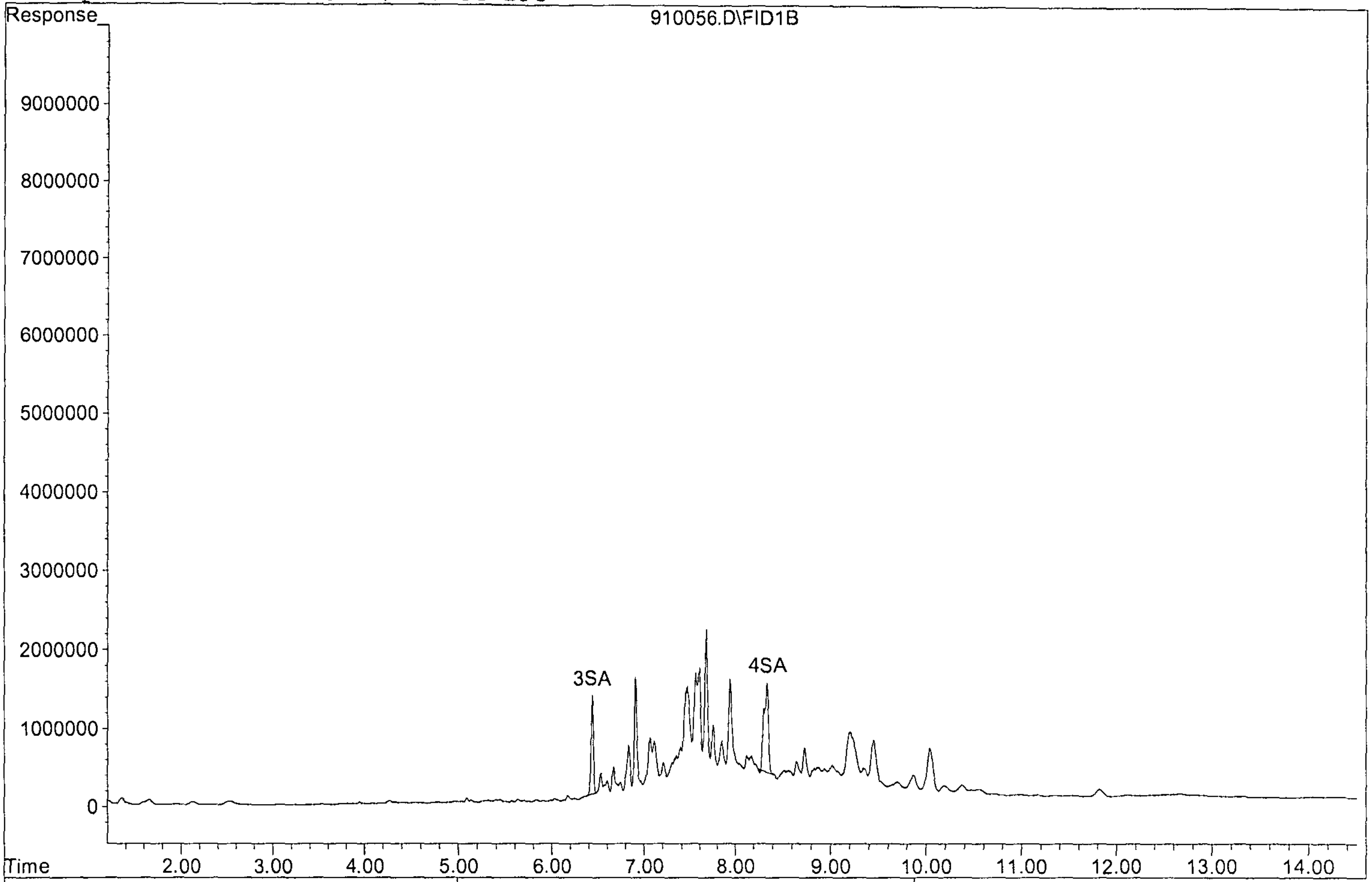
Data File: G:\APOLLO\DATA\180914\914050.D
Sample : AZ79157S01 5/50.25G SGC DF5

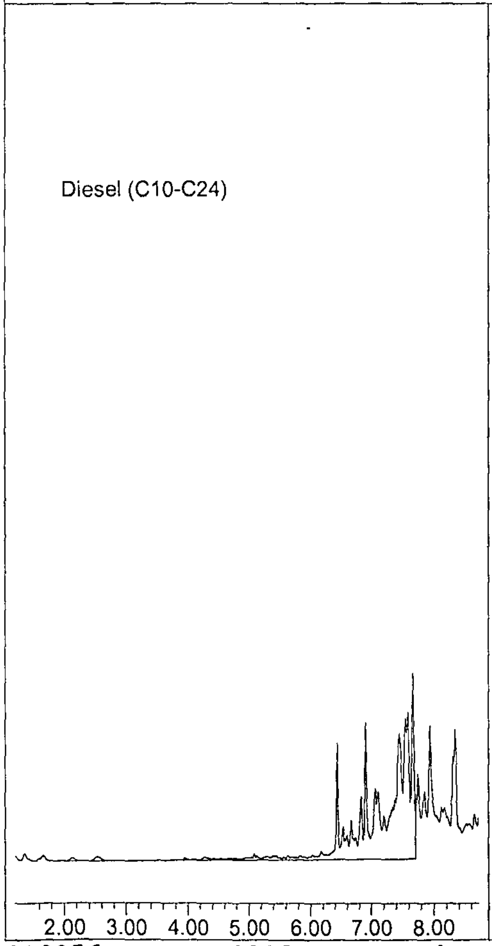


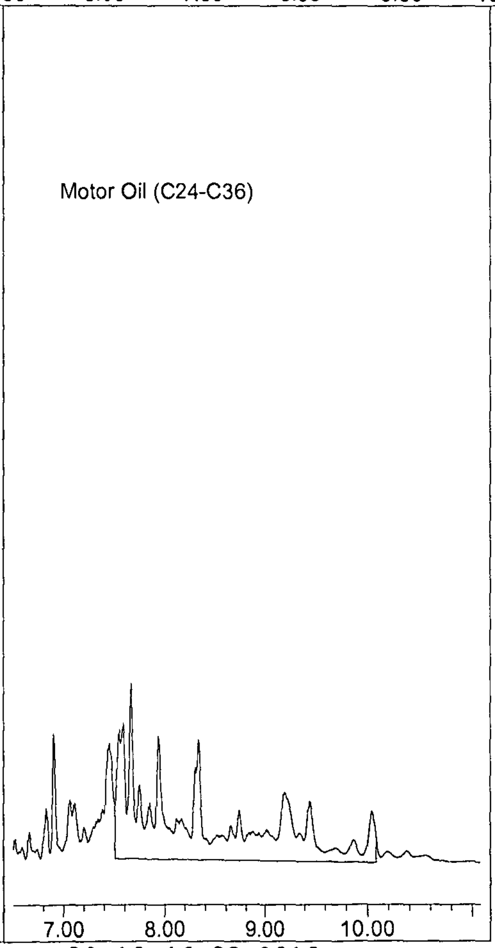
Quantitation Report (QT Reviewed)

```
Data File : G:\APOLLO\DATA\180910\910056.D              Vial: 56
Acq On    : 9-11-18 4:41:57                          Operator: DP
Sample    : AZ79158S01 5/50.78G DF5                  Inst    : Apollo
Misc      : soil                                     Multiplr: 492.32
IntFile   : events.e
Quant Time: Sep 11 14:08 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A

     Compound                        R.T.       Response    Conc Units
  ------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)           6.43       21865102 2779.659 ppb
Surrogate Spike 2953.919                   Recovery      =   94.10%
 4) SA  Octacosane(S)                8.34       38717100 5901.532 ppb
Surrogate Spike 2953.919                   Recovery      =  199.79%

  Target Compounds
 1) HATM Diesel (C10-C24)             4.86      530562856 79121.255 ppb
 2) HBTM Motor Oil (C24-C36)          8.80      627604598 126561.467 ppb
```

Data File: G:\APOLLO\DATA\180910\910056.D
Sample : AZ79158S01 5/50.78G DF5



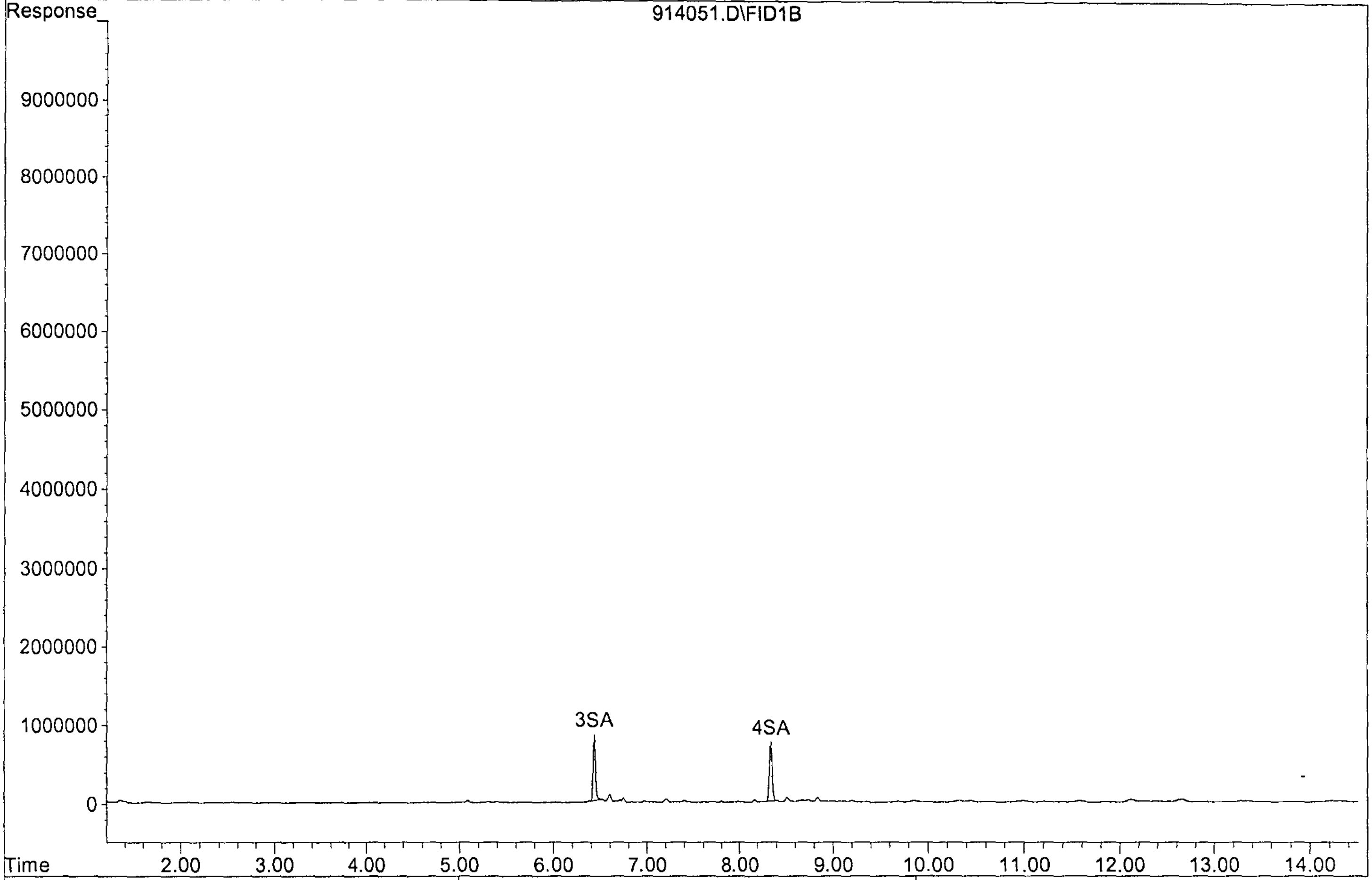


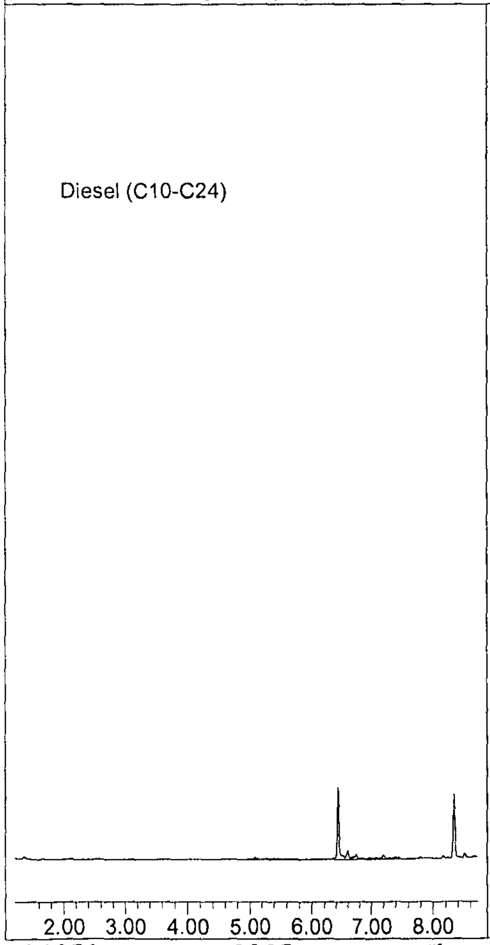


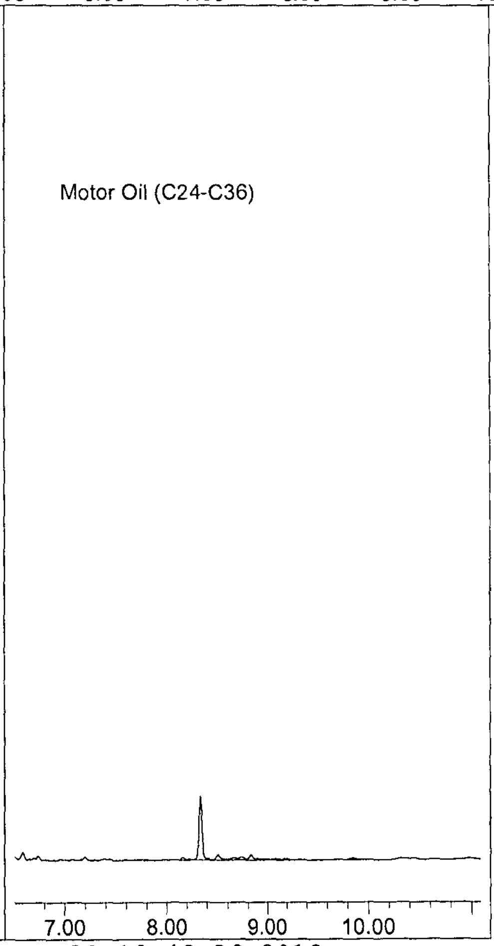
Quantitation Report (QT Reviewed)

```
Data File : G:\APOLLO\DATA\180914\914051.D                Vial: 51
Acq On    : 9-15-18 1:16:40                            Operator: DP
Sample    : AZ79158S01 5/50.28G SGC DF5                Inst    : Apollo
Misc      : soil                                       Multiplr: 497.22
IntFile   : events.e
Quant Time: Sep 17  9:02 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A

     Compound                          R.T.       Response    Conc Units
---------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)            6.43        14401597 1849.048 ppb
Surrogate Spike 2983.294                    Recovery      =   61.98%
 4) SA  Octacosane(S)                 8.34        15342098 2361.806 ppb
Surrogate Spike 2983.294                    Recovery      =   79.17%

  Target Compounds
 1) HATM Diesel (C10-C24)              4.86       23437877 3529.980 ppb
 2) HBTM Motor Oil (C24-C36)           8.80       16582109 3377.169 ppb
```

Data File: G:\APOLLO\DATA\180914\914051.D
Sample : AZ79158S01 5/50.28G SGC DF5







Quantitation Report (QT Reviewed)

Data File : G:\APOLLO\DATA\180910\910057.D Vial: 57
Acq On : 9-11-18 5:01:08 Operator: DP
Sample : AZ79159S01 5/50.41G DF5 Inst : Apollo
Misc : soil Multiplr: 495.93
IntFile : events.e
Quant Time: Sep 11 14:09 2018 Quant Results File: DROB0905.RES

Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

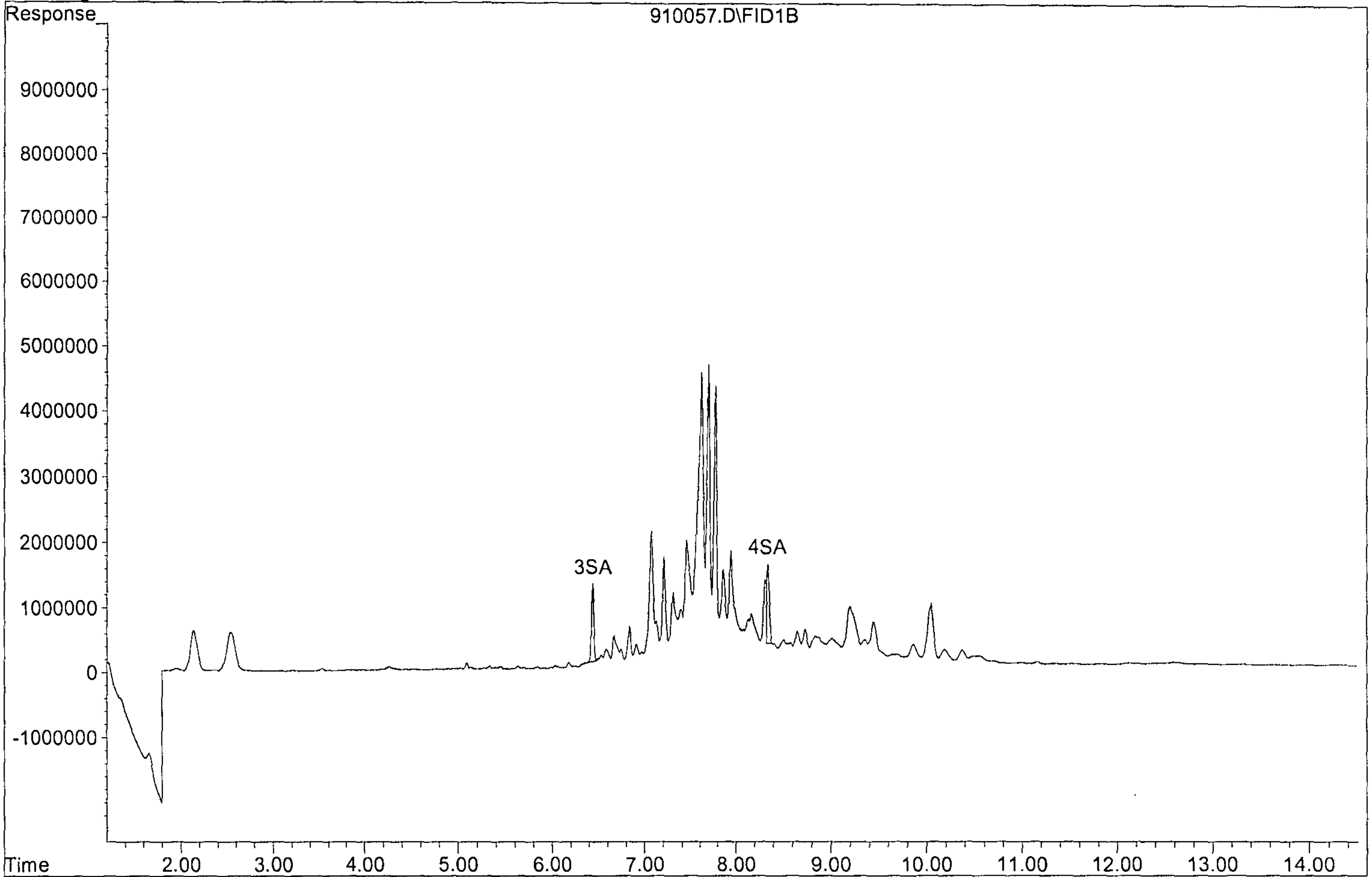
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

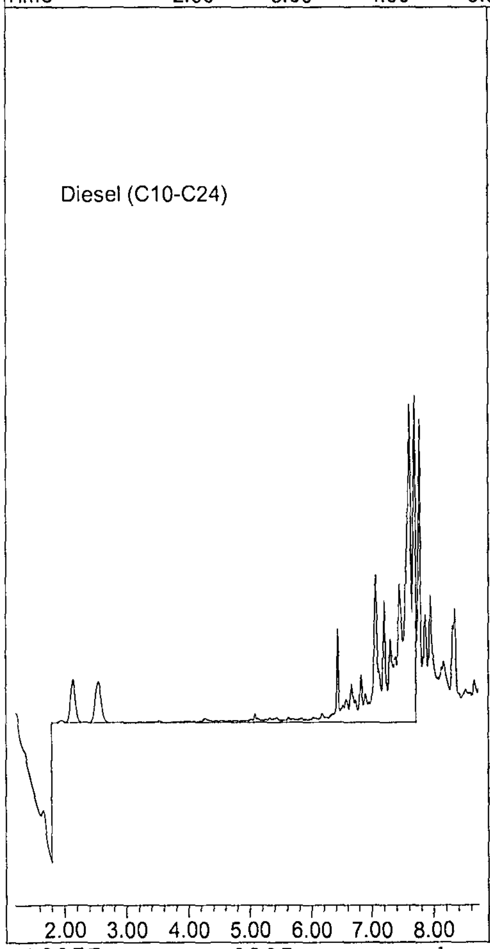
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	21537227	2758.070 ppb
Surrogate Spike 2975.600		Recovery	= 92.69%
4) SA Octacosane(S)	8.34	22683461	3482.946 ppb m
Surrogate Spike 2975.600		Recovery	= 117.05%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	900564914	135284.137 ppb
2) HBTM Motor Oil (C24-C36)	8.80	1025098646	208236.364 ppb

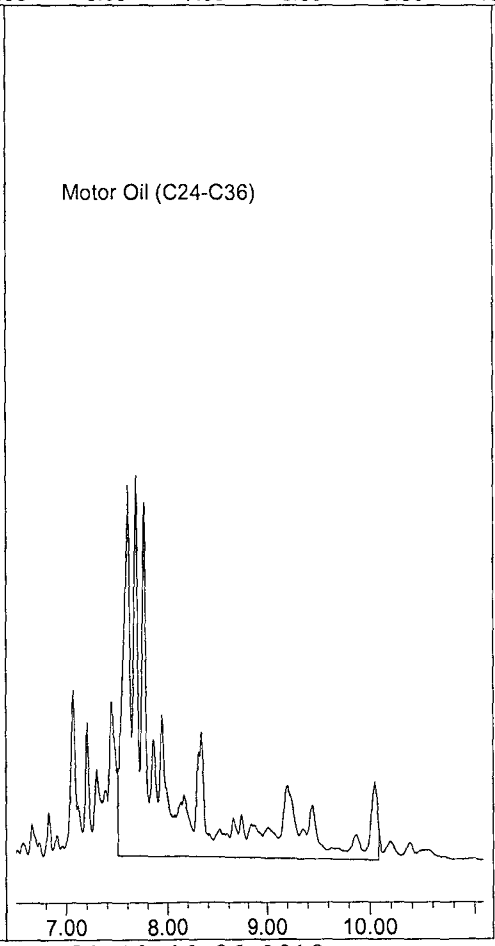
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910057.D
Sample : AZ79159S01 5/50.41G DF5

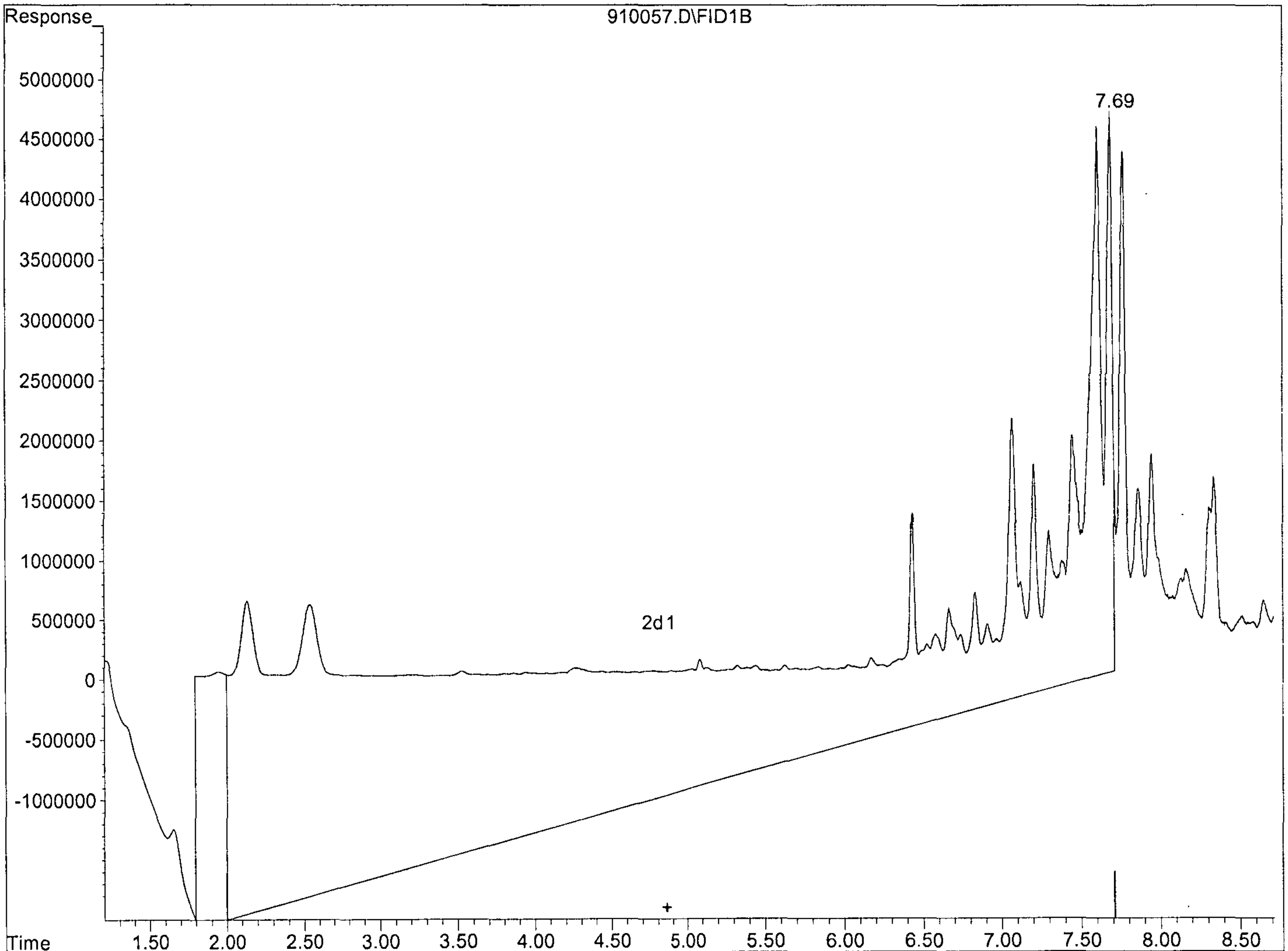






Quantitation Report

```
Data File : G:\APOLLO\DATA\180910\910057.D              Vial: 57
Acq On    : 9-11-18 5:01:08                         Operator: DP
Sample    : AZ79159S01 5/50.41G DF5                 Inst     : Apollo
Misc      : soil                                    Multiplr: 495.93
IntFile   : events.e
Quant Time: Sep 11 14:08 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180910\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration
```



QEdit

(1) Diesel (C10-C24) (HATM)

4.86min 651022.999ppb m

response 4333756243

(+) = Expected Retention Time

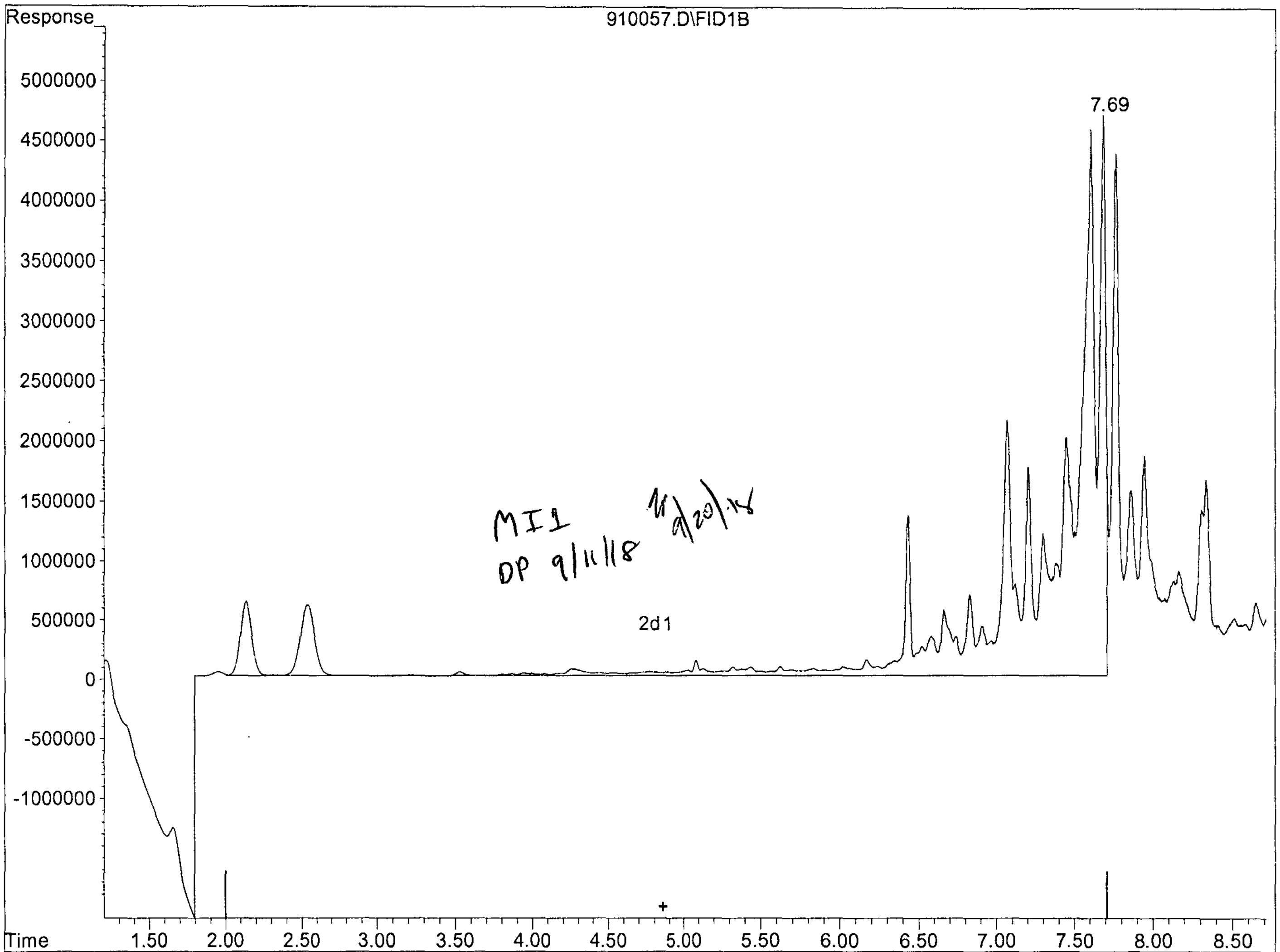
910057.D DROB0905.M Tue Sep 11 14:08:35 2018

Quantitation Report

Data File : G:\APOLLO\DATA\180910\910057.D
Acq On : 9-11-18 5:01:08
Sample : AZ79159S01 5/50.41G DF5
Misc : soil
IntFile : events.e
Quant Time: Sep 11 14:08 2018 Quant Results File: DROB0905.RES

Vial: 57
Operator: DP
Inst : Apollo
Multiplr: 495.93

Method : G:\APOLLO\DATA\180910\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration



QEdit

(1) Diesel (C10-C24) (HATM)

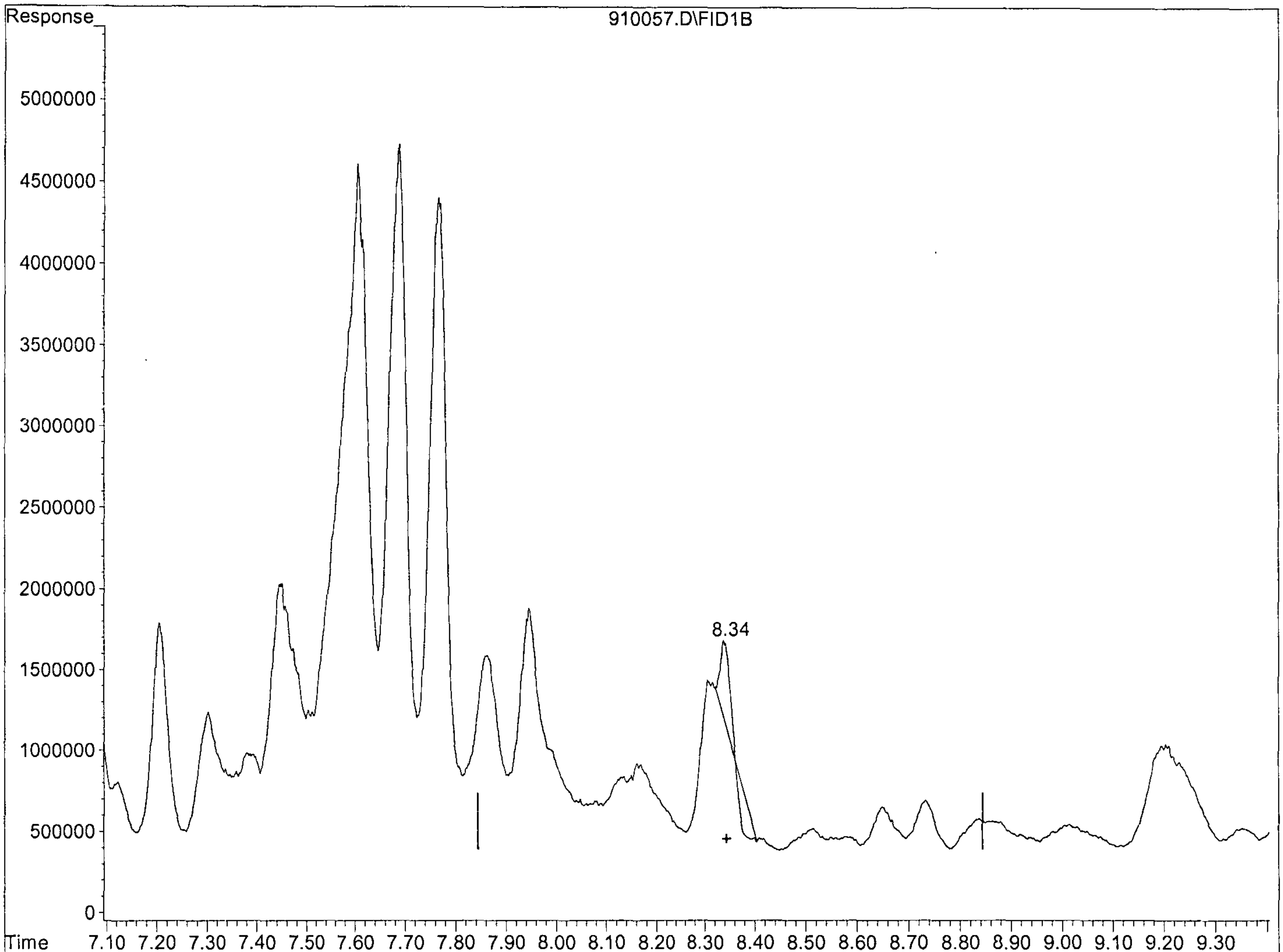
4.86min 135284.137ppb m

response 900564914

(+) = Expected Retention Time

Quantitation Report

```
Data File : G:\APOLLO\DATA\180910\910057.D              Vial: 57
Acq On    : 9-11-18 5:01:08                          Operator: DP
Sample    : AZ79159S01 5/50.41G DF5                  Inst    : Apollo
Misc      : soil                                     Multiplr: 495.93
IntFile   : events.e
Quant Time: Sep 11 14:08 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180910\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration
```



QEdit

(4) Octacosane(S) (SA)

8.34min 456.043ppb

response 2970080

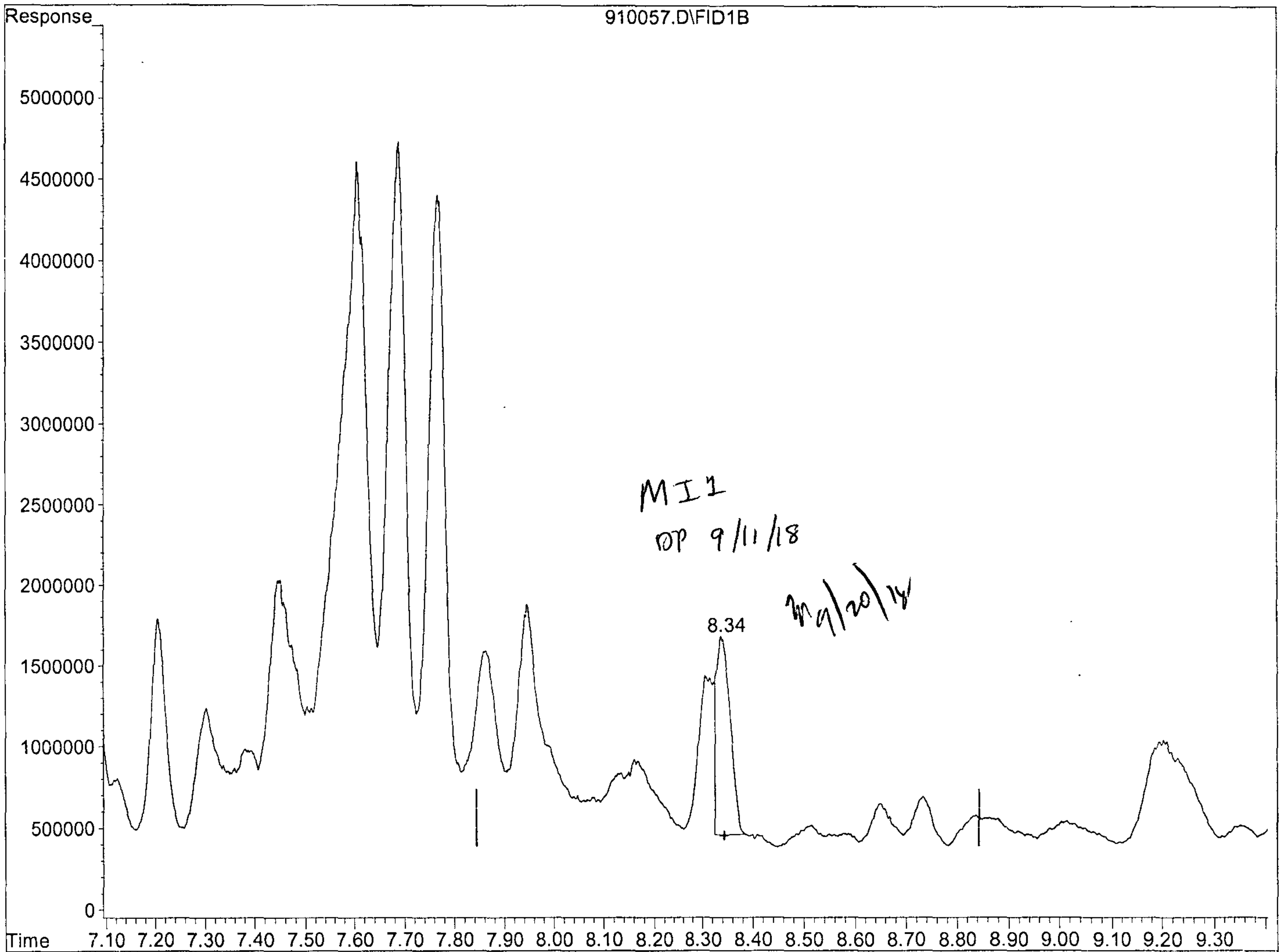
(+) = Expected Retention Time

Quantitation Report

Data File : G:\APOLLO\DATA\180910\910057.D
Acq On : 9-11-18 5:01:08
Sample : AZ79159S01 5/50.41G DF5
Misc : soil
IntFile : events.e
Quant Time: Sep 11 14:08 2018 Quant Results File: DROB0905.RES

Vial: 57
Operator: DP
Inst : Apollo
Multiplr: 495.93

Method : G:\APOLLO\DATA\180910\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration



QEdit

(4) Octacosane(S) (SA)

8.34min 3482.946ppb m

response 22683461

(+) = Expected Retention Time

910057.D DROB0905.M Tue Sep 11 14:09:05 2018

Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180914\914052.D Vial: 52
Acq On : 9-15-18 1:36:42 Operator: DP
Sample : AZ79159S01 5/50.41G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 495.93
IntFile : events.e
Quant Time: Sep 17 9:02 2018 Quant Results File: DROB0905.RES

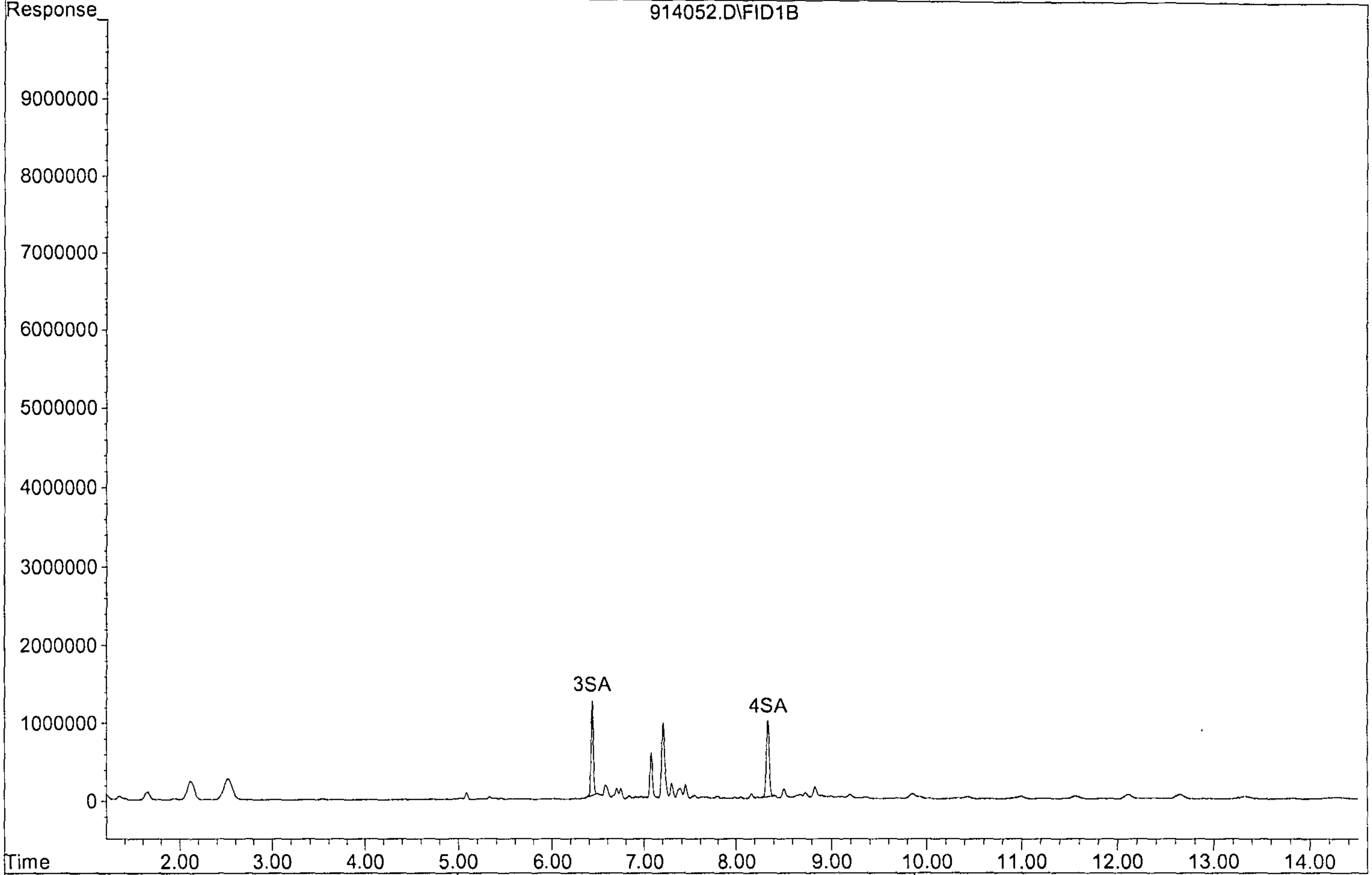
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

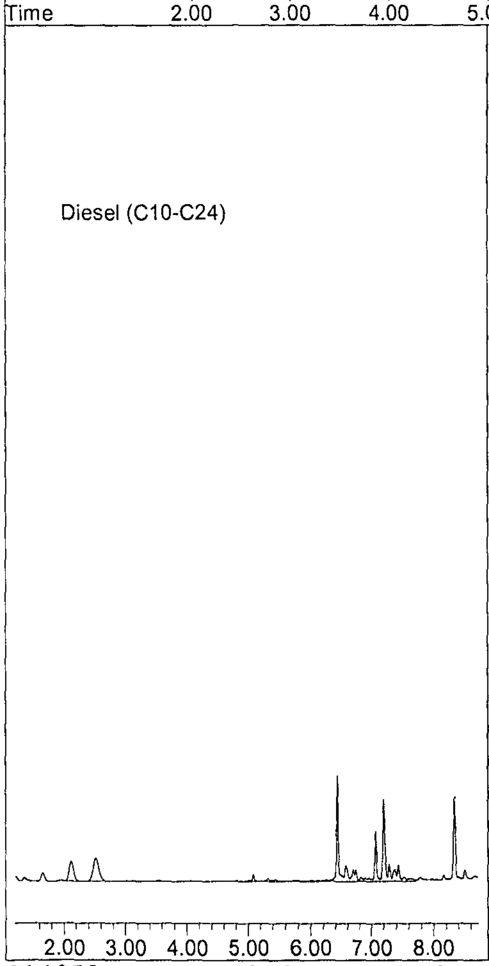
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

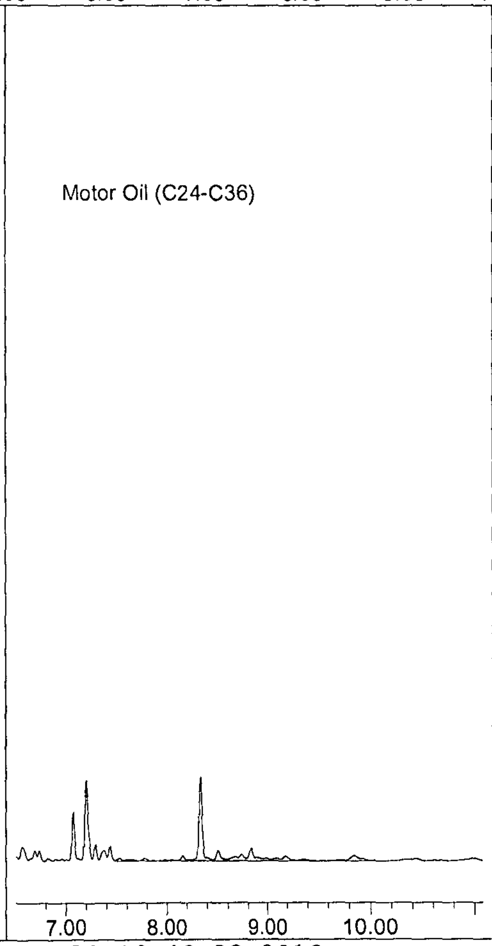
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	20515831	2627.270 ppb
Surrogate Spike 2975.600		Recovery =	88.29%
4) SA Octacosane(S)	8.34	21001157	3224.636 ppb
Surrogate Spike 2975.600		Recovery =	108.37%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	120483158	18099.151 ppb
2) HBTM Motor Oil (C24-C36)	8.80	34897183	7088.940 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914052.D
Sample : AZ79159S01 5/50.41G SGC DF5







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180910\910058.D Vial: 58
Acq On : 9-11-18 5:21:04 Operator: DP
Sample : AZ79160S01 5/50.88G DF5 Inst : Apollo
Misc : soil Multiplr: 491.35
IntFile : events.e
Quant Time: Sep 11 14:09 2018 Quant Results File: DROB0905.RES

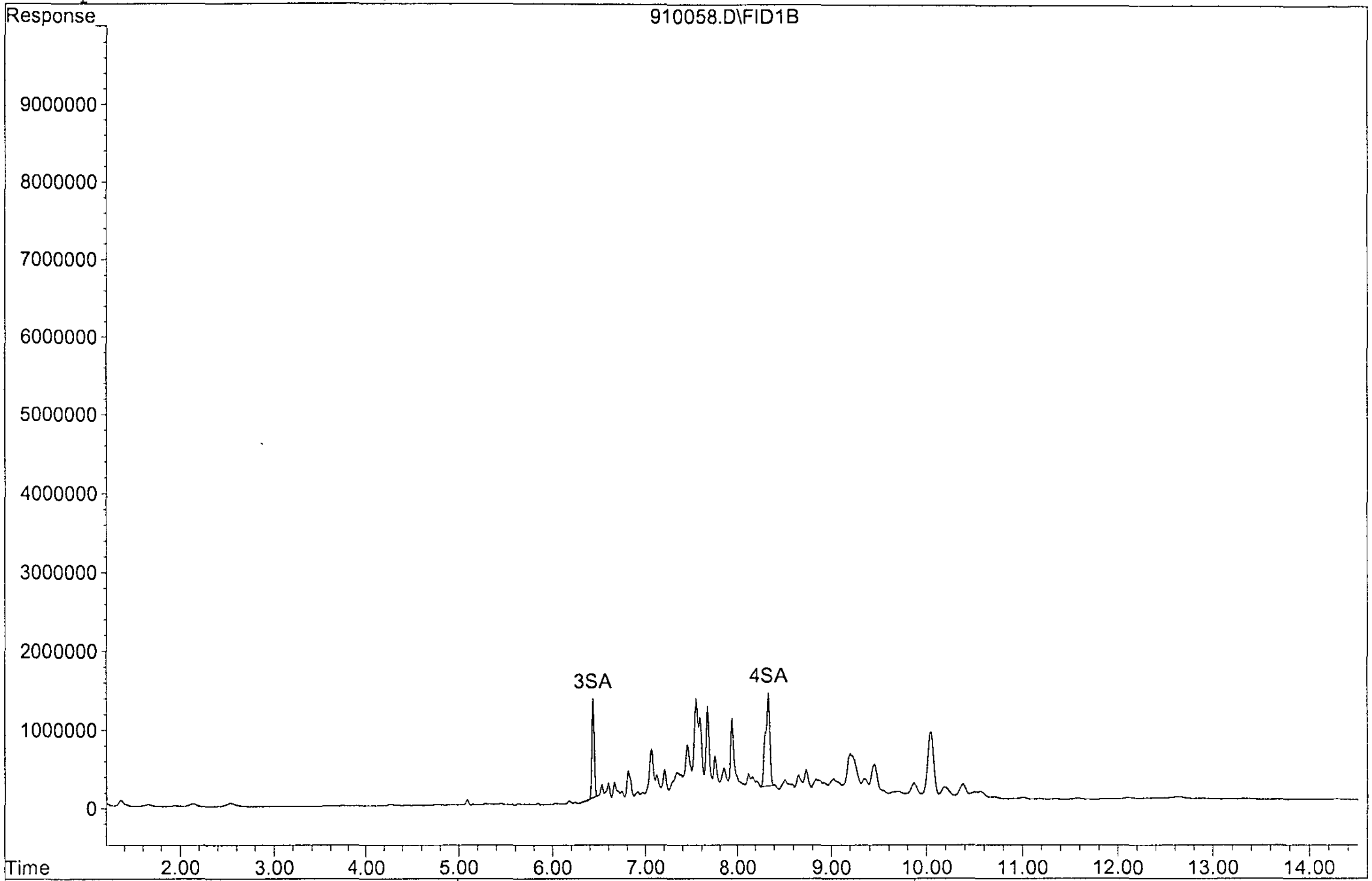
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

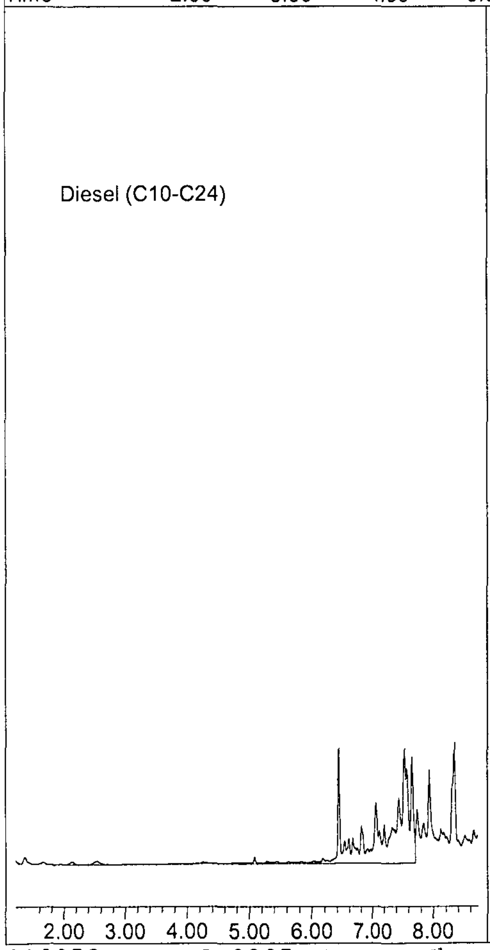
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

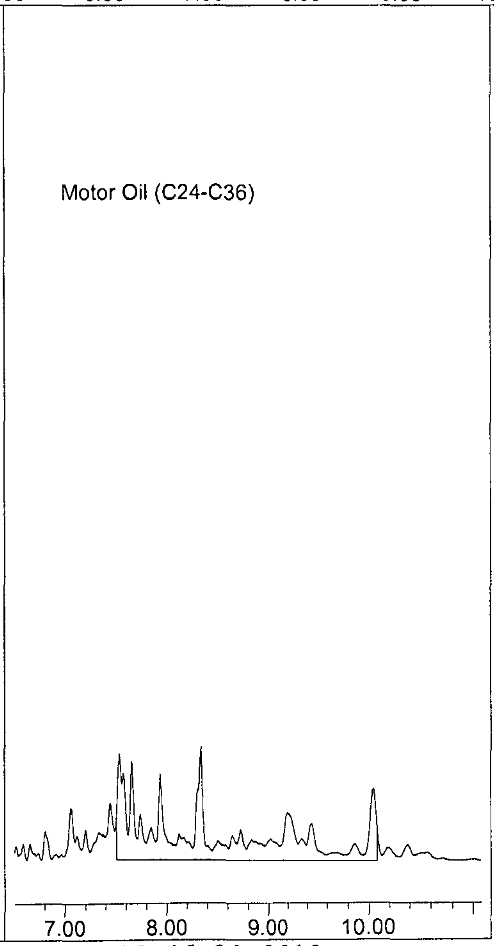
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	21292634	2701.560 ppb
Surrogate Spike 2948.113		Recovery	= 91.64%
4) SA Octacosane(S)	8.34	37809596	5751.872 ppb
Surrogate Spike 2948.113		Recovery	= 195.10%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	316056263	47039.855 ppb
2) HBTM Motor Oil (C24-C36)	8.80	422544151	85041.855 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180910\910058.D
Sample : AZ79160S01 5/50.88G DF5







Quantitation Report (Not Reviewed)

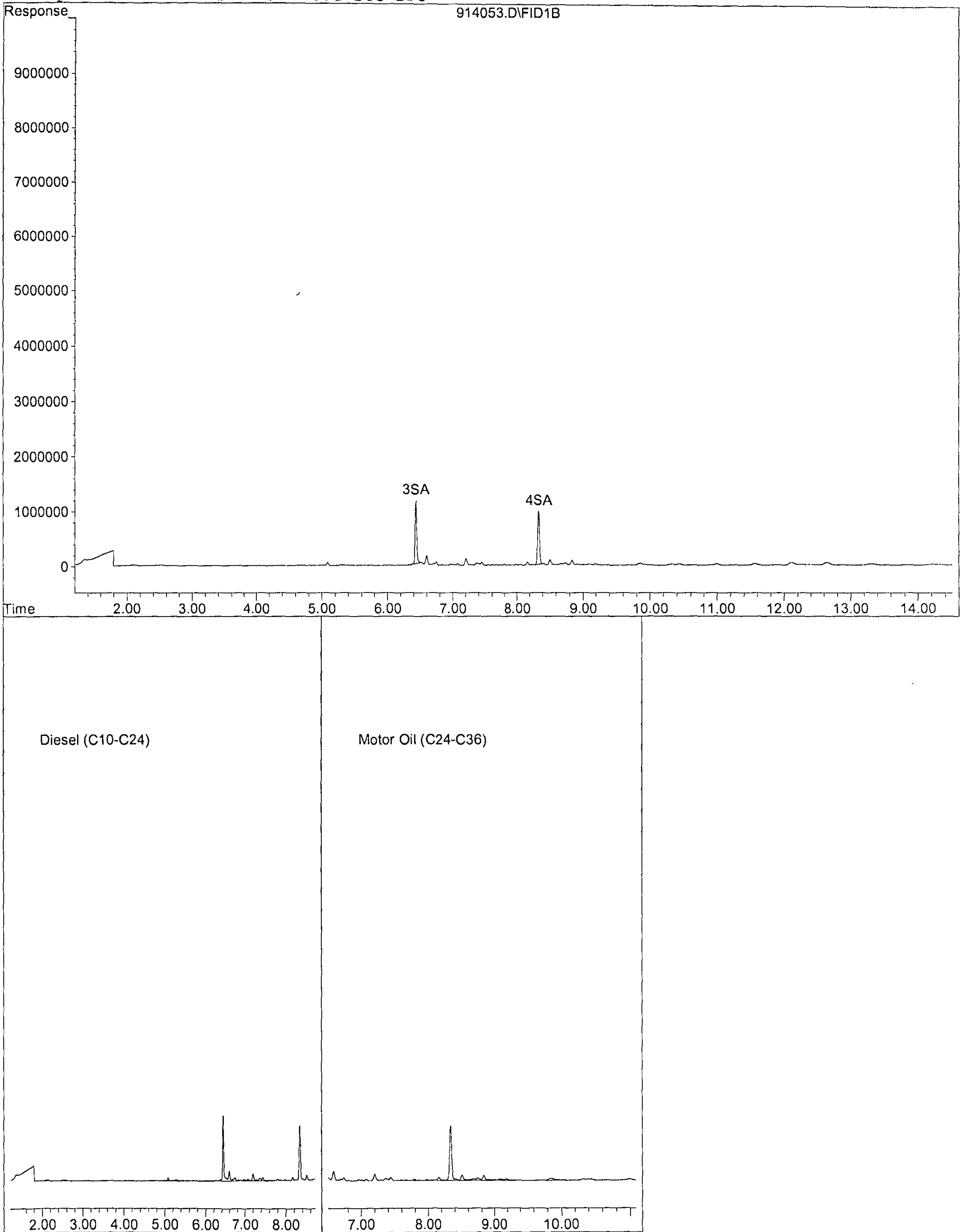
Data File : G:\APOLLO\DATA\180914\914053.D Vial: 53
Acq On : 9-15-18 1:56:38 Operator: DP
Sample : AZ79160S01 5/50.88G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 491.35
IntFile : events.e
Quant Time: Sep 17 9:02 2018 Quant Results File: DROB0905.RES

Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	19762538	2507.425 ppb
Surrogate Spike 2948.113		Recovery	= 85.05%
4) SA Octacosane(S)	8.34	20527294	3122.762 ppb
Surrogate Spike 2948.113		Recovery	= 105.92%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	31607302	4704.235 ppb
2) HBTM Motor Oil (C24-C36)	8.80	21607206	4348.698 ppb

Data File: G:\APOLLO\DATA\180914\914053.D
Sample : AZ79160S01 5/50.88G SGC DF5

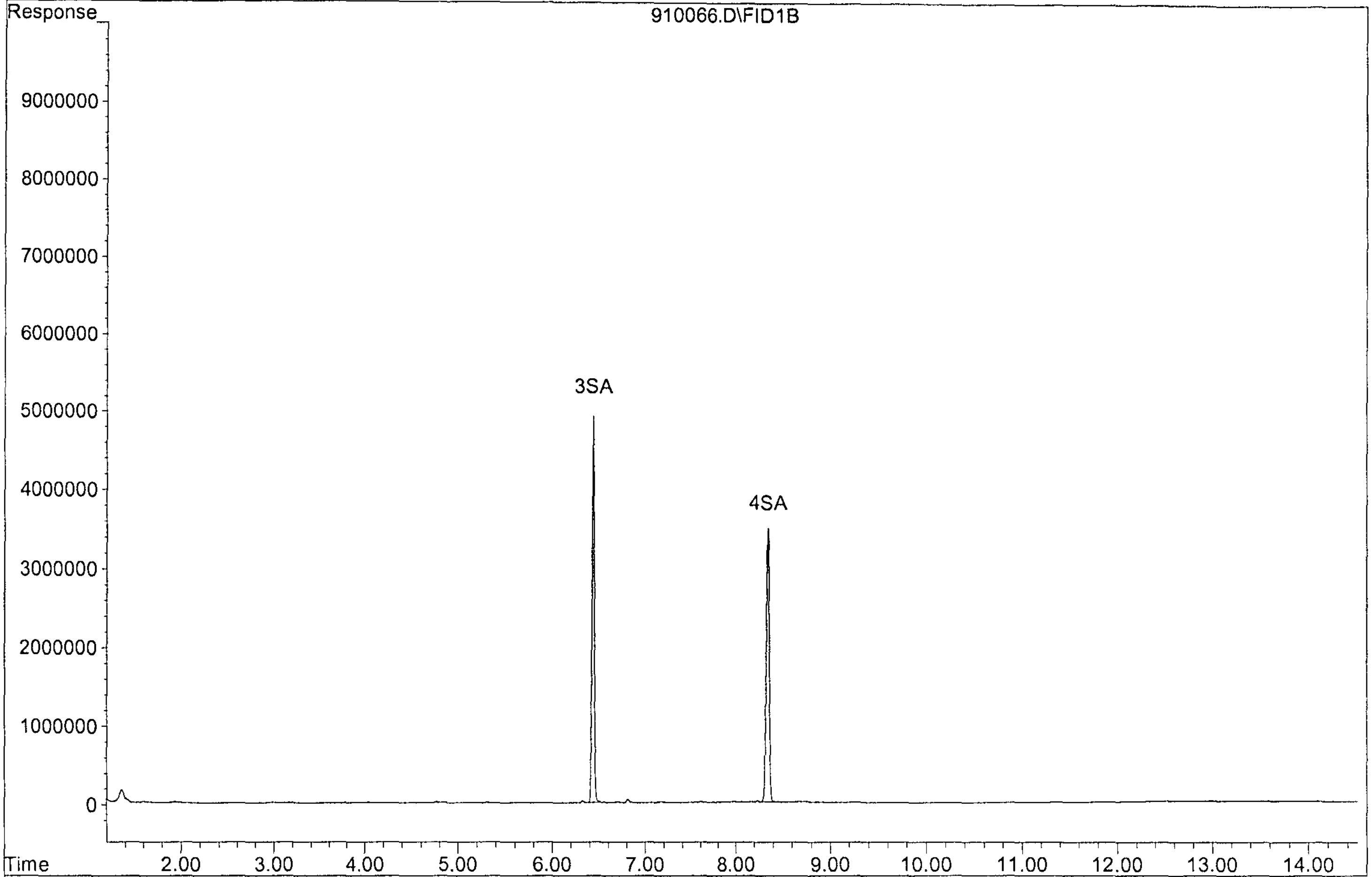


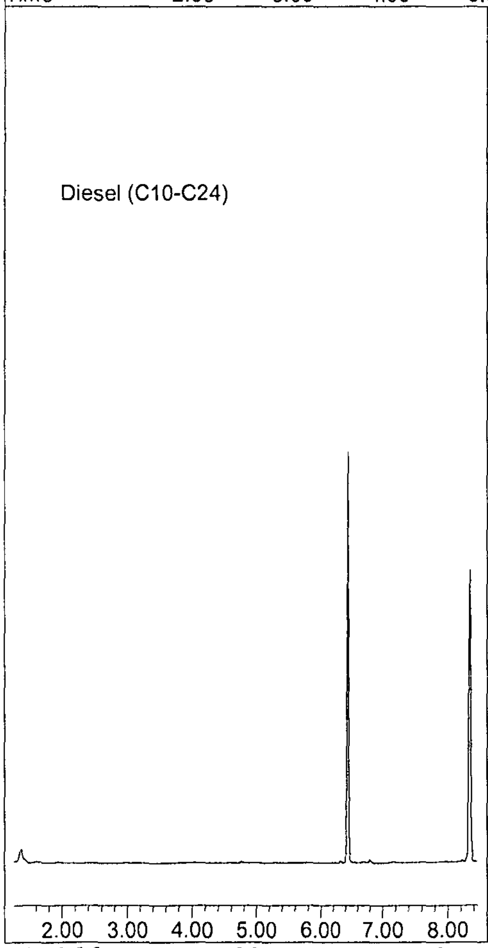
Quantitation Report (QT Reviewed)

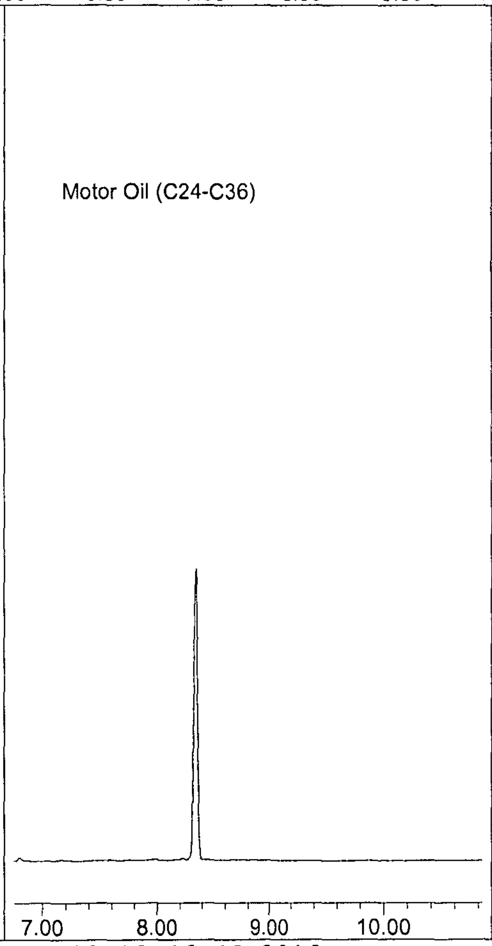
```
Data File : G:\APOLLO\DATA\180910\910066.D                Vial: 66
Acq On    : 9-11-18 8:00:11                            Operator: DP
Sample    : AZ79179W01 5/1050                          Inst     : Apollo
Misc      : water                                      Multiplr: 4.76
IntFile   : events.e
Quant Time: Sep 11 14:16 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A

    Compound                          R.T.       Response    Conc Units
-------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)            6.44       82078366  100.926 ppb
Surrogate Spike 142.857                    Recovery      =   70.65%
 4) SA  Octacosane(S)                 8.34       79096364  116.614 ppb
Surrogate Spike 142.857                    Recovery      =   81.63%

  Target Compounds
```

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910066.D
Sample : AZ79179W01 5/1050



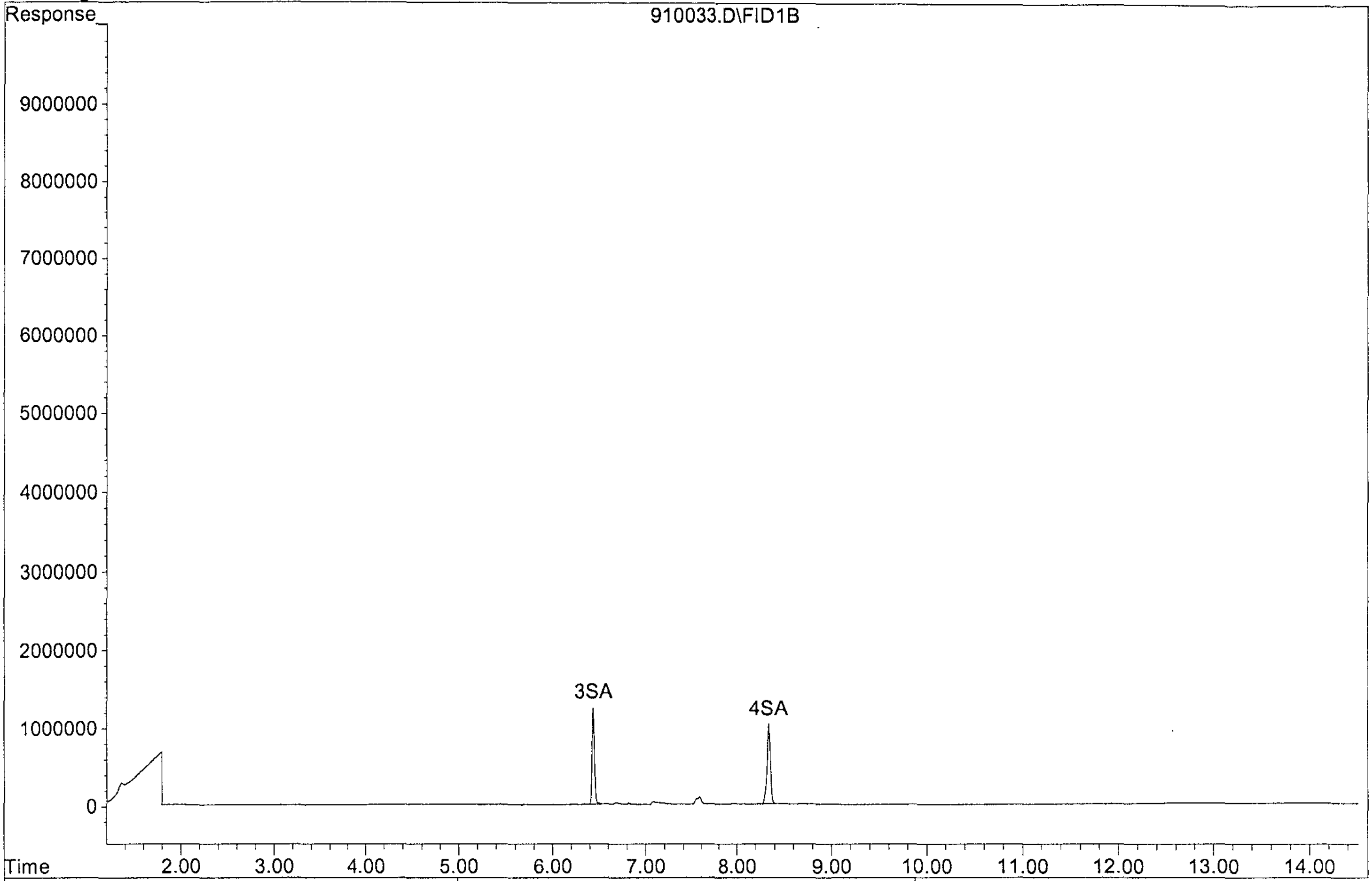


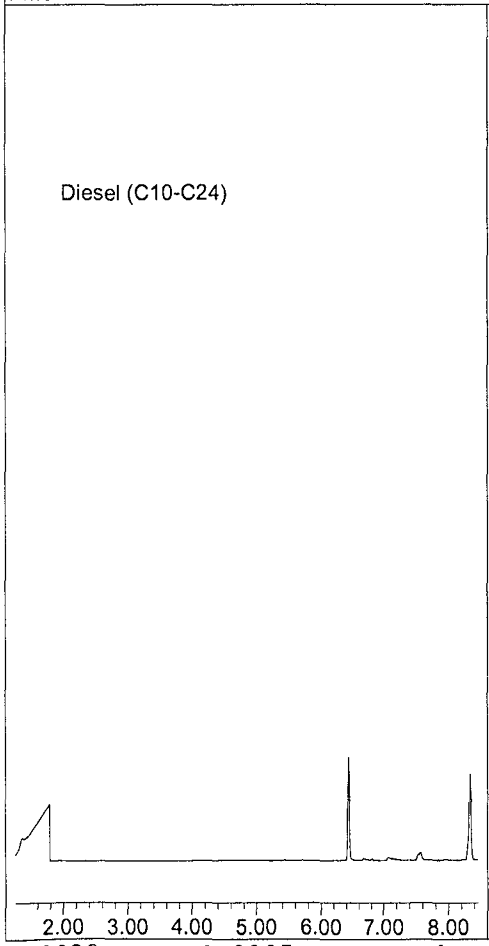


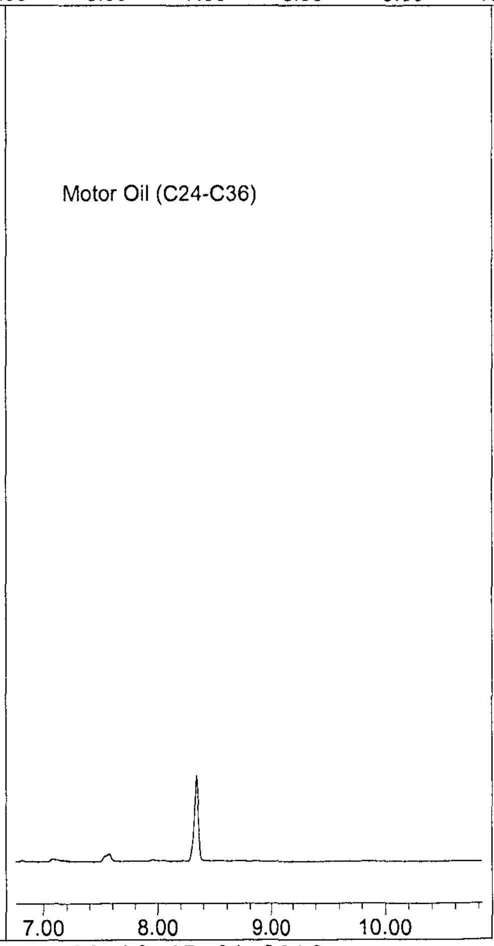
Quantitation Report (QT Reviewed)

```
Data File : G:\APOLLO\DATA\180910\910033.D              Vial: 33
Acq On    : 9-10-18 21:02:33                        Operator: DP
Sample    : 180907A BLK 5/50.75G DF5                Inst    : Apollo
Misc      : soil                                    Multiplr: 492.61
IntFile   : events.e
Quant Time: Sep 11 11:33 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A

    Compound                         R.T.      Response    Conc Units
-----------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)           6.43      22153914 2818.040 ppb
Surrogate Spike 2955.665                   Recovery      =   95.34%
 4) SA  Octacosane(S)                8.34      24900837 3797.804 ppb
Surrogate Spike 2955.665                   Recovery      =  128.49%

  Target Compounds
```

Data File: G:\APOLLO\DATA\180910\910033.D
Sample : 180907A BLK 5/50.75G DF5







Quantitation Report (QT Reviewed)

Data File : G:\APOLLO\DATA\180910\910061.D   Vial: 61
Acq On : 9-11-18 6:21:04   Operator: DP
Sample : 180907A BLK 5/1000   Inst : Apollo
Misc : water   Multiplr: 5.00
IntFile : events.e
Quant Time: Sep 11 14:16 2018 Quant Results File: DROB0905.RES

Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

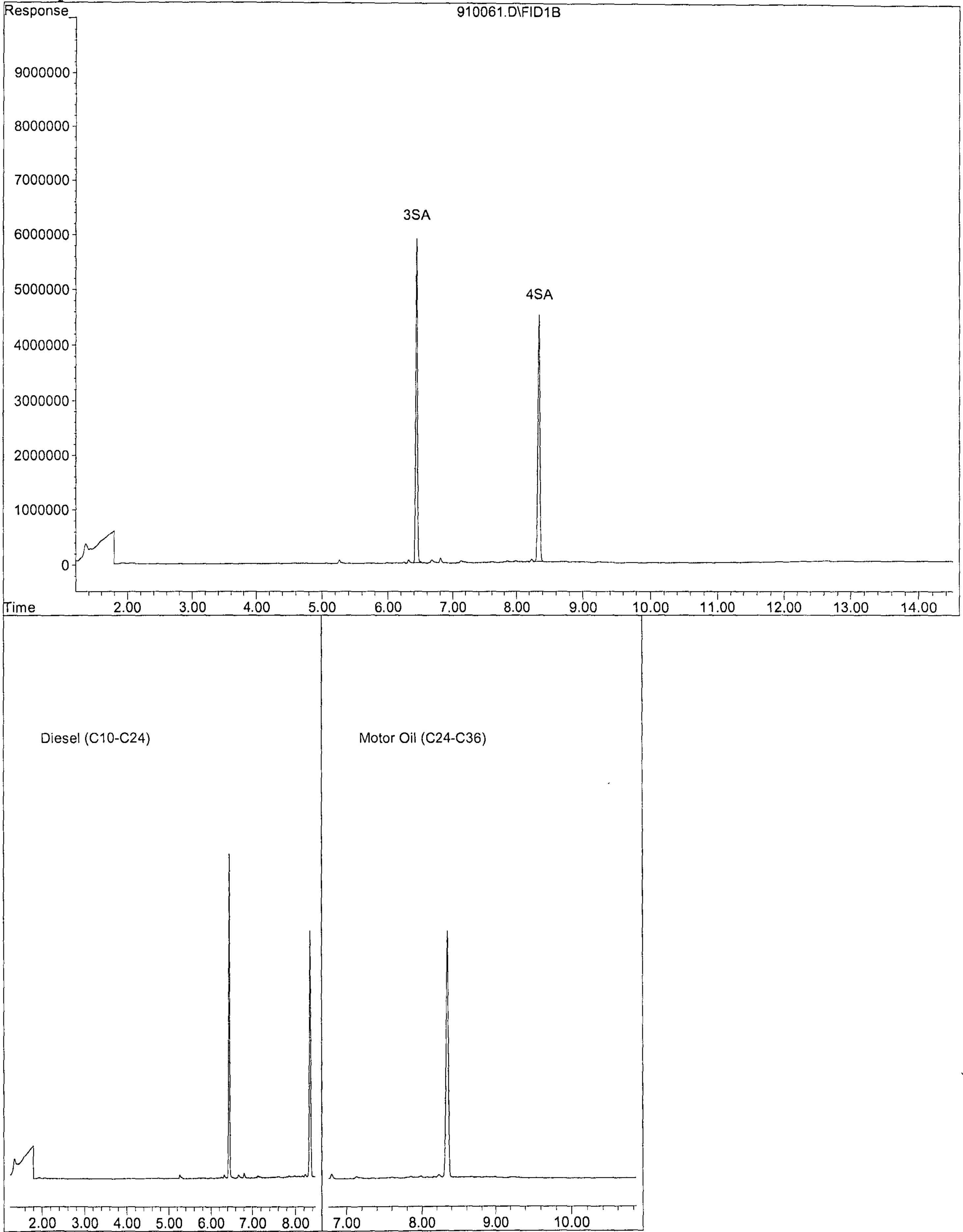
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	99255616	128.150 ppb
Surrogate Spike 150.000		Recovery =	85.43%
4) SA Octacosane(S)	8.34	94529437	146.336 ppb
Surrogate Spike 150.000		Recovery =	97.56%

Target Compounds

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910061.D
Sample   : 180907A BLK 5/1000

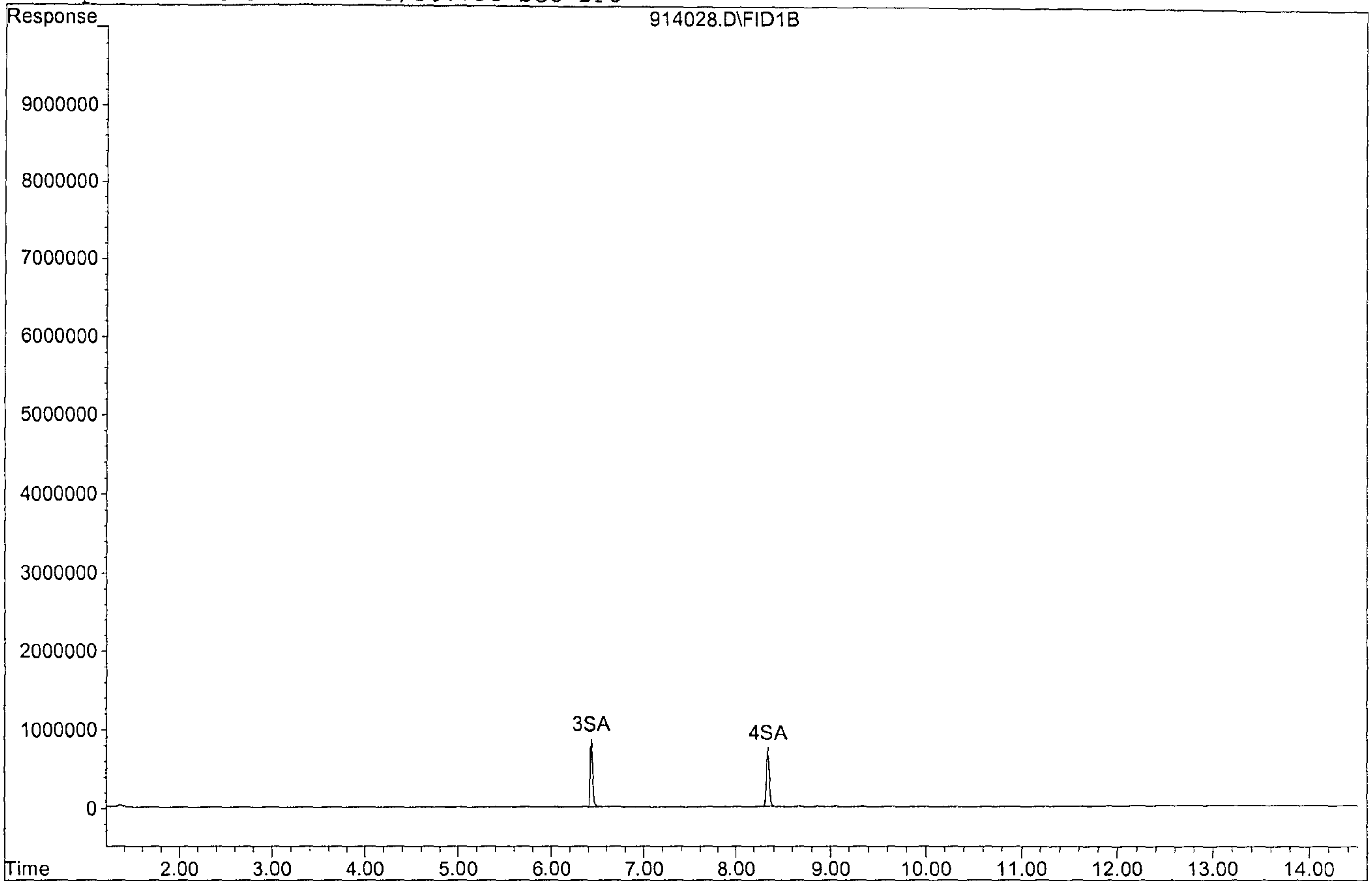


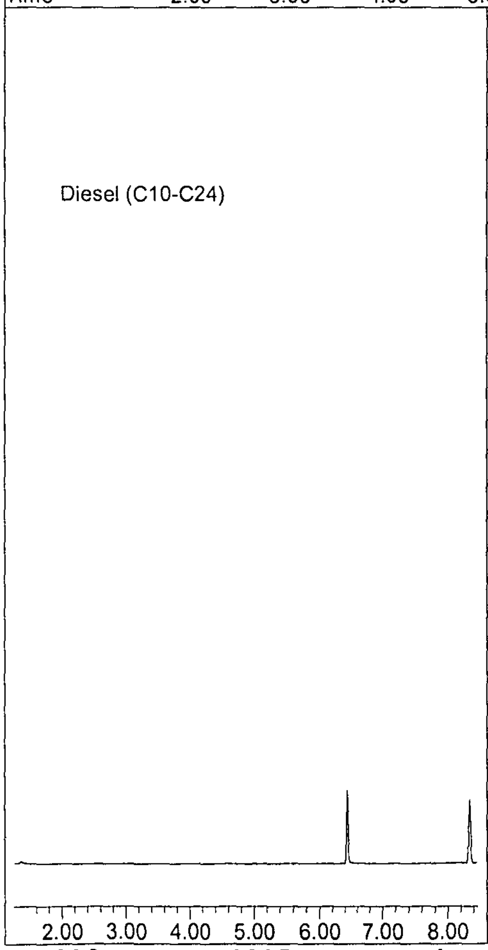
Quantitation Report (QT Reviewed)

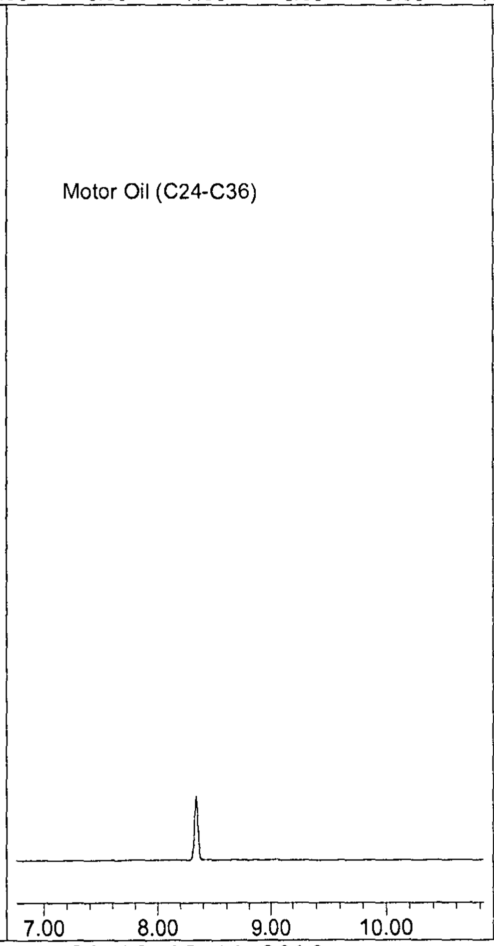
```
Data File : G:\APOLLO\DATA\180914\914028.D                Vial: 28
Acq On    : 9-14-18 17:37:54                          Operator: DP
Sample    : 180907A BLK 5/50.75G SGC DF5              Inst     : Apollo
Misc      : soil                                      Multiplr: 492.61
IntFile   : events.e
Quant Time: Sep 17  8:56 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A

    Compound                          R.T.       Response    Conc Units
-----------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)            6.43       15533389 1975.890 ppb
Surrogate Spike 2955.665                     Recovery      =   66.85%
 4) SA  Octacosane(S)                 8.34       15739846 2400.596 ppb
Surrogate Spike 2955.665                     Recovery      =   81.22%

  Target Compounds
```

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914028.D
Sample : 180907A BLK 5/50.75G SGC DF5







Quantitation Report (QT Reviewed)

Data File : G:\APOLLO\DATA\180910\910034.D Vial: 34
Acq On : 9-10-18 21:22:31 Operator: DP
Sample : 180907A LCS-1 5/50.73G DF5 Inst : Apollo
Misc : soil Multiplr: 492.81
IntFile : events.e
Quant Time: Sep 11 11:34 2018 Quant Results File: DROB0905.RES

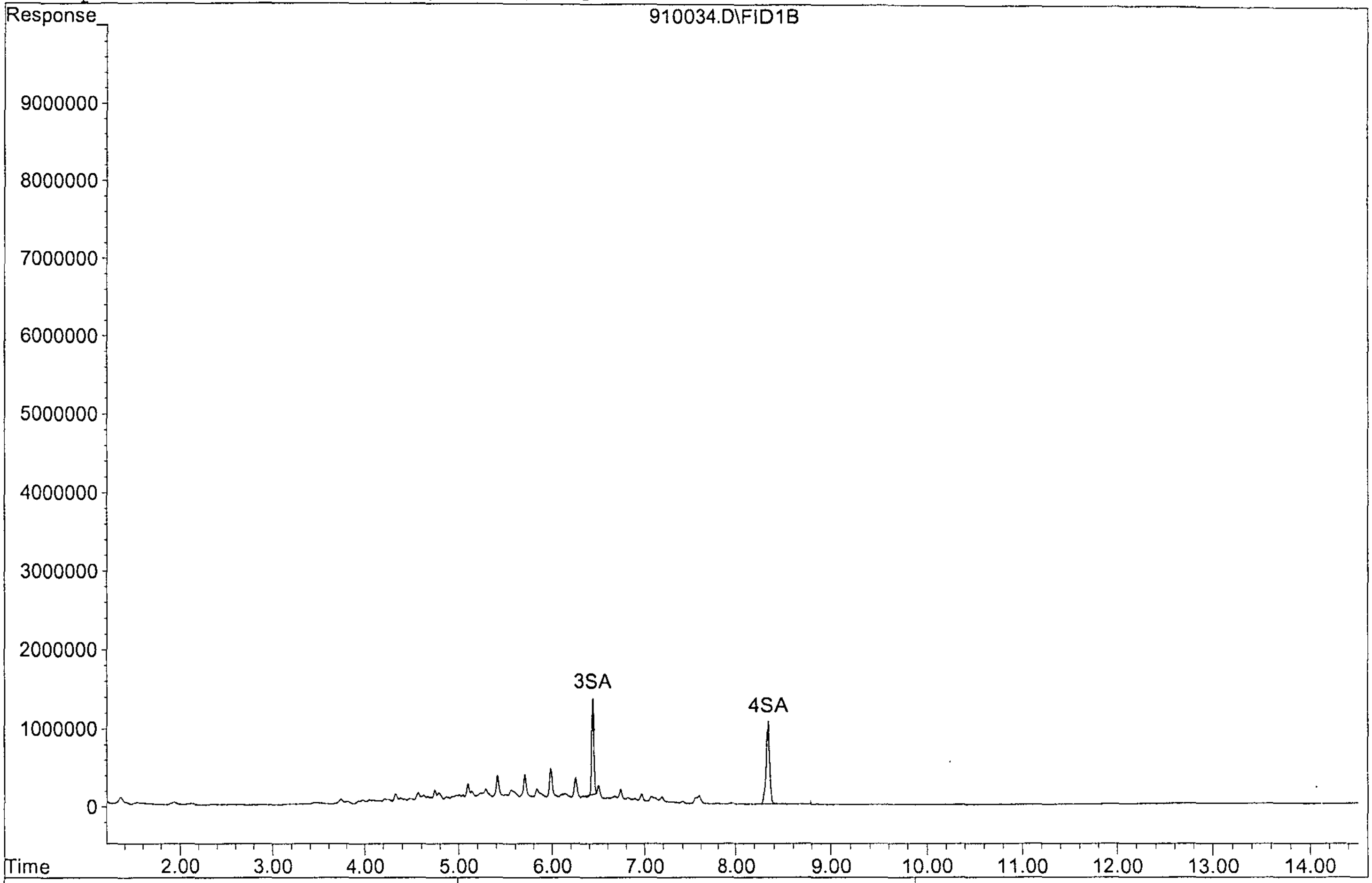
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

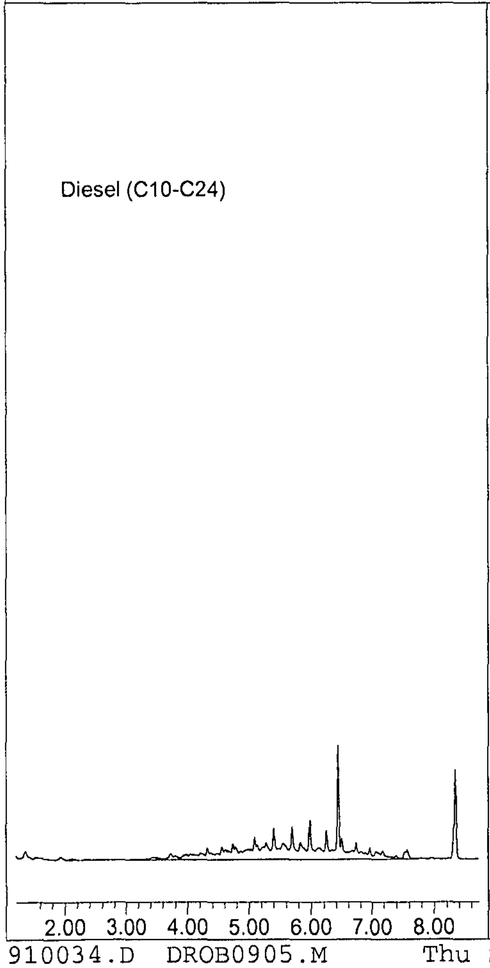
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

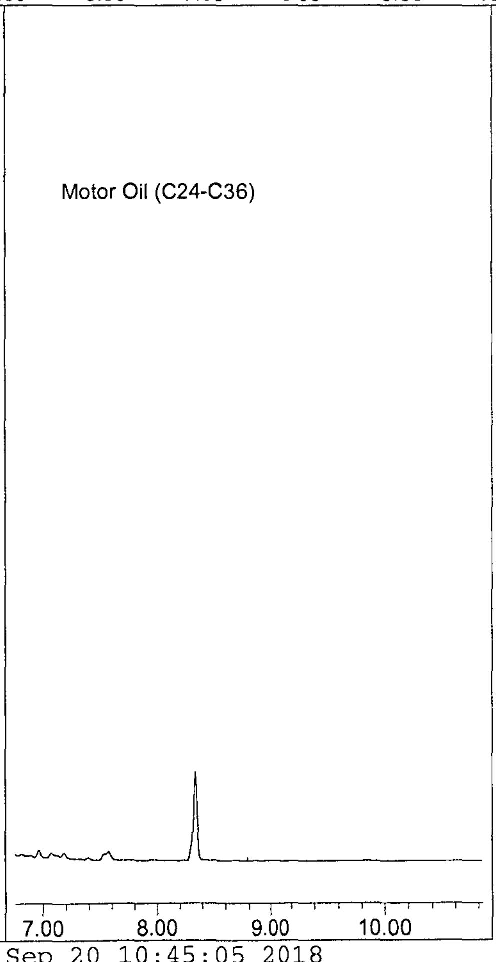
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	20222164	2573.329 ppb
Surrogate Spike 2956.830		Recovery	= 87.03%
4) SA Octacosane(S)	8.34	25312440	3862.100 ppb
Surrogate Spike 2956.830		Recovery	= 130.62%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	251664422	37566.936 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910034.D
Sample : 180907A LCS-1 5/50.73G DF5



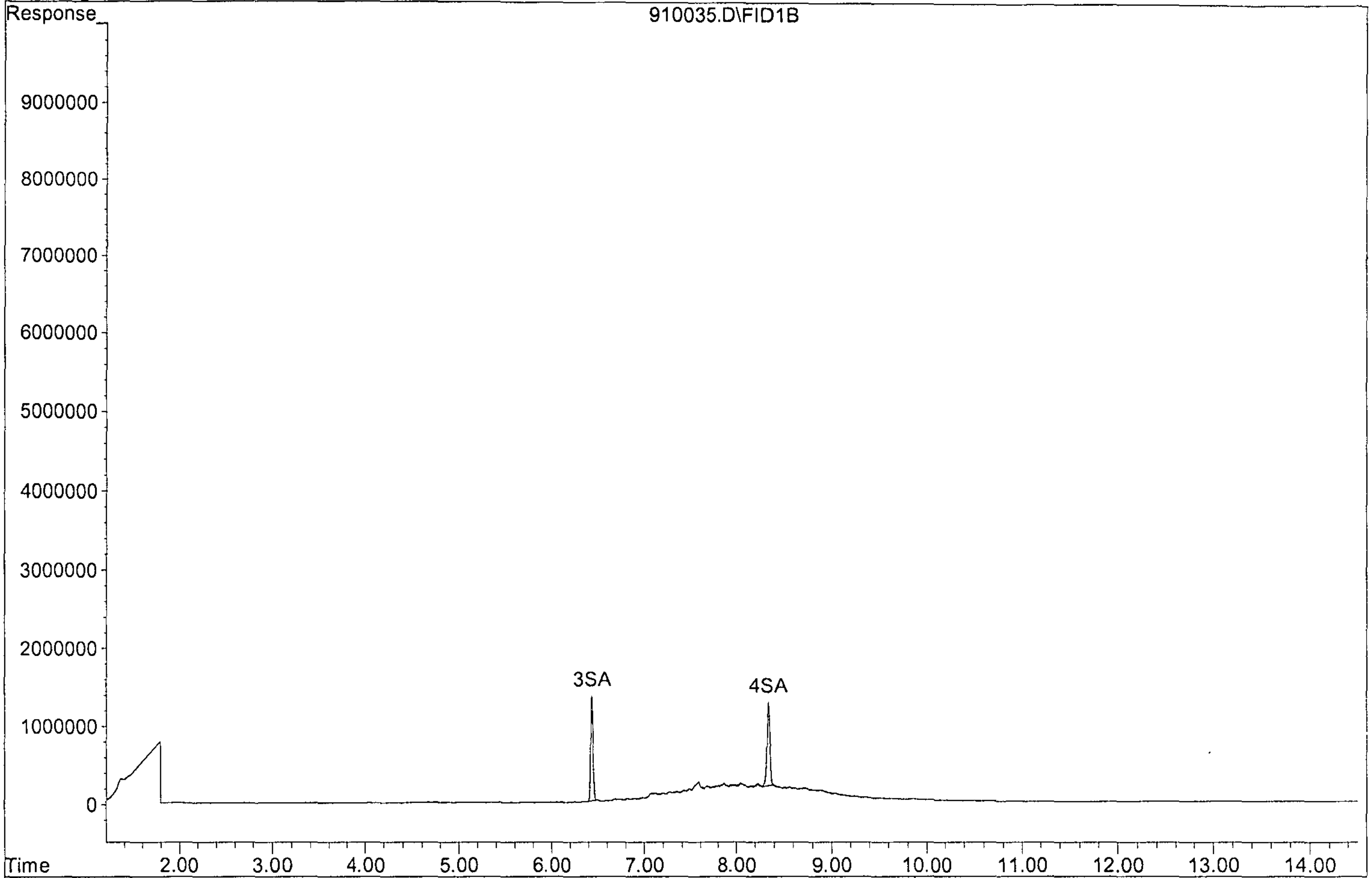


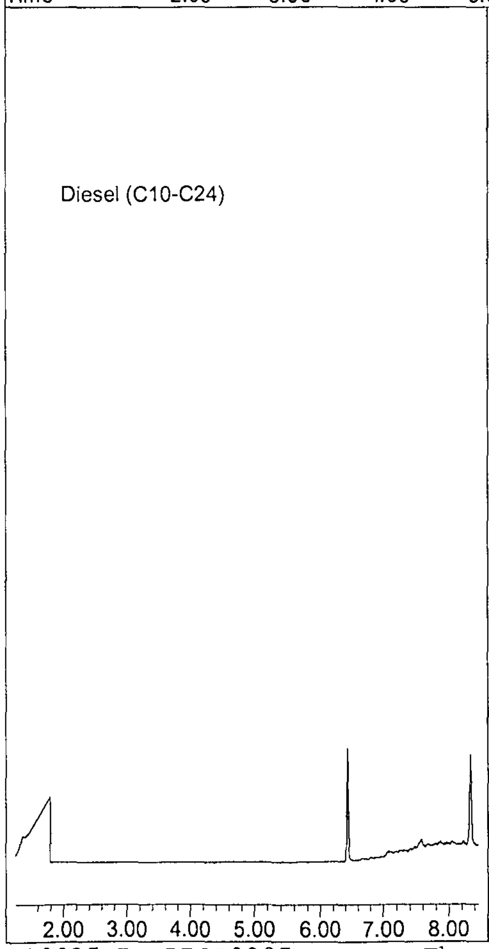


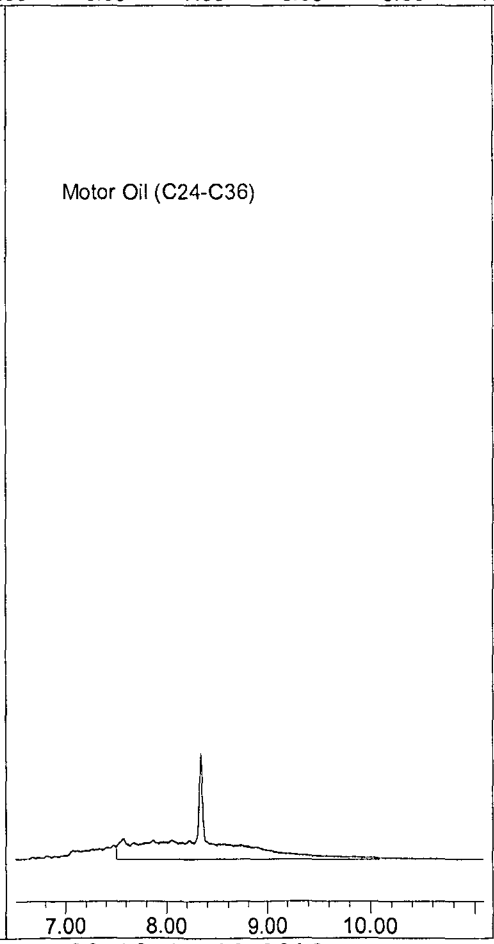
Quantitation Report (QT Reviewed)

```
Data File : G:\APOLLO\DATA\180910\910035.D              Vial: 35
Acq On    : 9-10-18 21:42:32                         Operator: DP
Sample    : 180907A LCS-2 5/50.27G DF5               Inst    : Apollo
Misc      : soil                                     Multiplr: 497.32
IntFile   : events.e
Quant Time: Sep 11 11:34 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A

      Compound                        R.T.      Response    Conc Units
---------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)            6.44       22529337 2893.160 ppb
Surrogate Spike 2983.887                    Recovery       =   96.96%
 4) SA  Octacosane(S)                 8.34       22675287 3491.393 ppb
Surrogate Spike 2983.887                    Recovery       =  117.01%

  Target Compounds
 2) HBTM Motor Oil (C24-C36)           8.80      193035143 39322.022 ppb
```

Data File: G:\APOLLO\DATA\180910\910035.D
Sample : 180907A LCS-2 5/50.27G DF5







Quantitation Report (QT Reviewed)

Data File : G:\APOLLO\DATA\180910\910063.D   Vial: 63
Acq On : 9-11-18 7:00:54   Operator: DP
Sample : 180907A LCS-2 5/1000   Inst : Apollo
Misc : water   Multiplr: 5.00
IntFile : events.e
Quant Time: Sep 11 14:16 2018 Quant Results File: DROB0905.RES

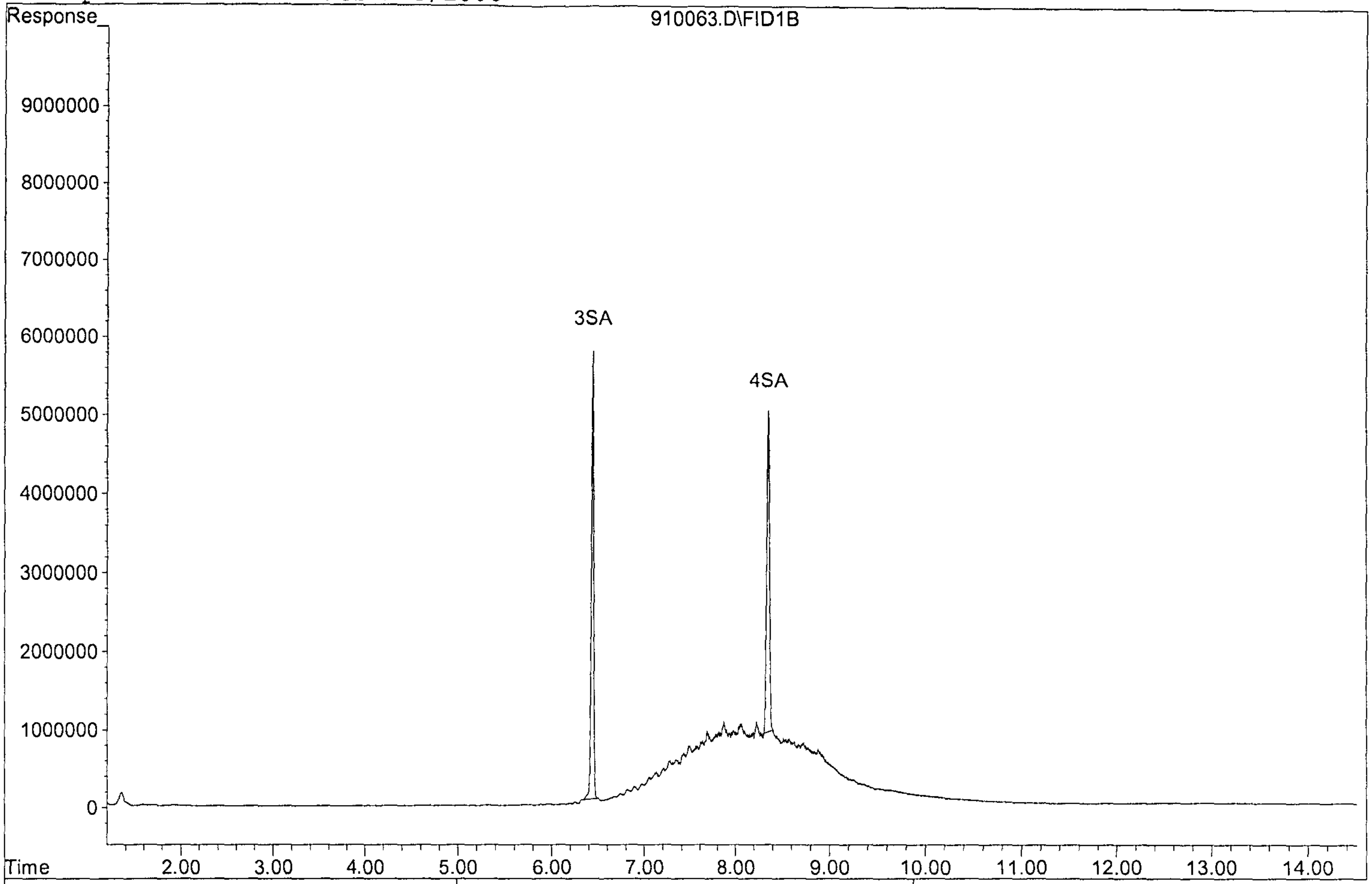
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

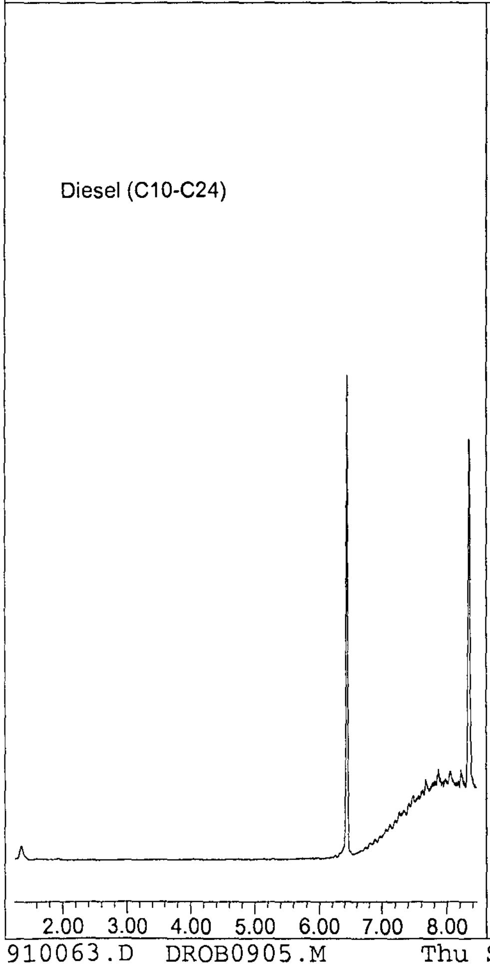
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

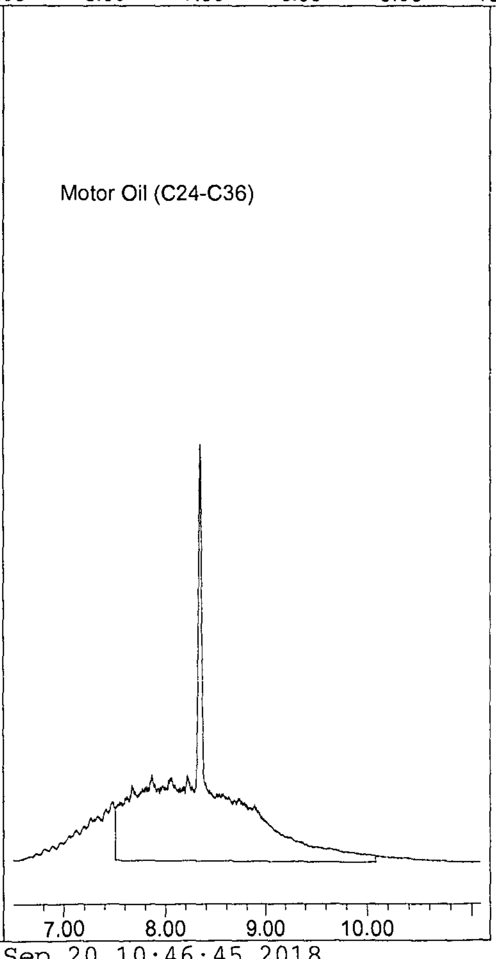
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	97557682	125.957 ppb
Surrogate Spike 150.000		Recovery =	83.97%
4) SA Octacosane(S)	8.35	85690946	132.654 ppb
Surrogate Spike 150.000		Recovery =	88.44%
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	833738322	1707.527 ppb

(f)=RT Delta > 1/2 Window   (m)=manual int.

Data File: G:\APOLLO\DATA\180910\910063.D
Sample : 180907A LCS-2 5/1000







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180912\912004.D Vial: 4
Acq On : 9-12-18 16:56:43 Operator: DP
Sample : 180907A LCS-1 5/1000 Inst : Apollo
Misc : water Multiplr: 5.00
IntFile : events.e
Quant Time: Sep 13 8:39 2018 Quant Results File: DROB0905.RES

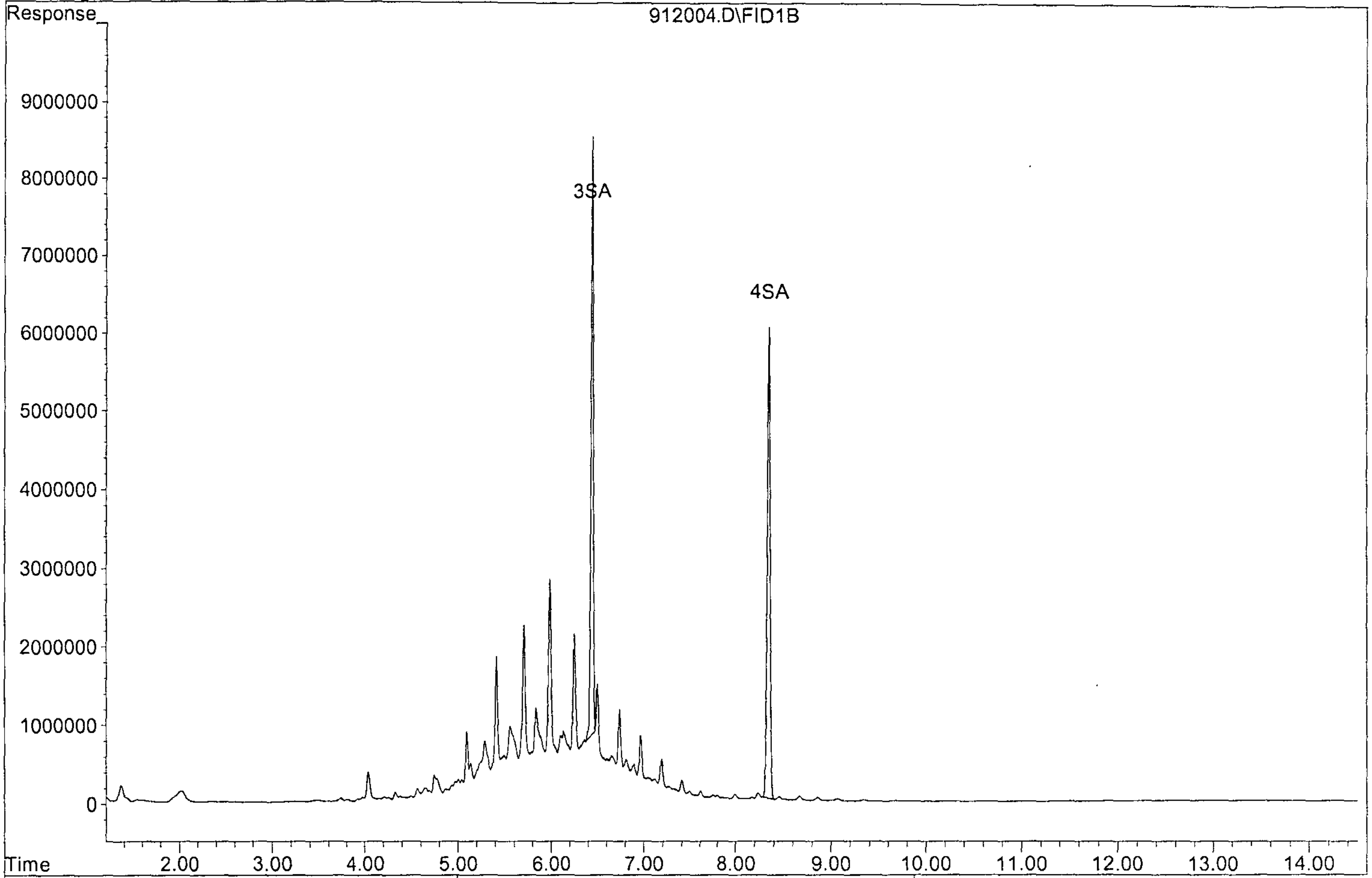
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

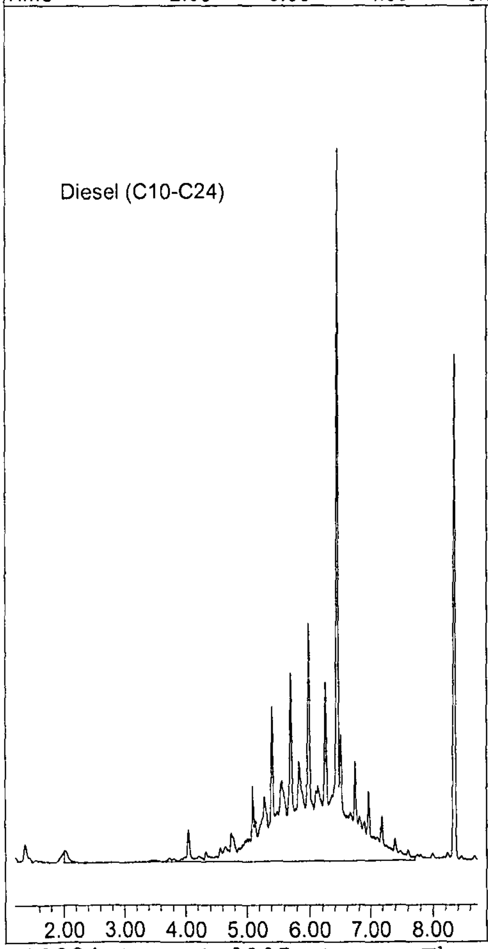
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

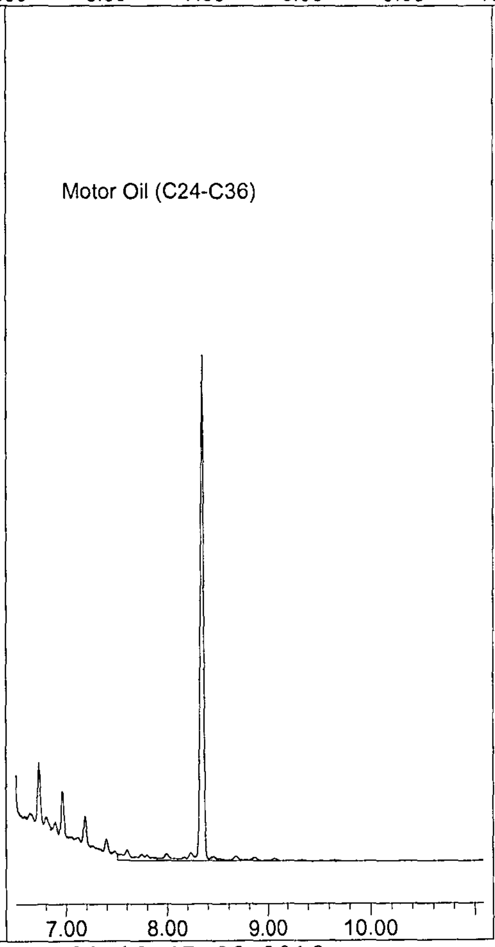
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.44	129720659	167.483 ppb
Surrogate Spike 150.000		Recovery =	111.66%
4) SA Octacosane(S)	8.35	127640571	197.594 ppb
Surrogate Spike 150.000		Recovery =	131.73%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	1031915386	1562.870 ppb
2) HBTM Motor Oil (C24-C36)	8.80	34606455	70.875 ppb

Quantitation Report

Data File: G:\APOLLO\DATA\180912\912004.D
Sample : 180907A LCS-1 5/1000







Quantitation Report (Not Reviewed)

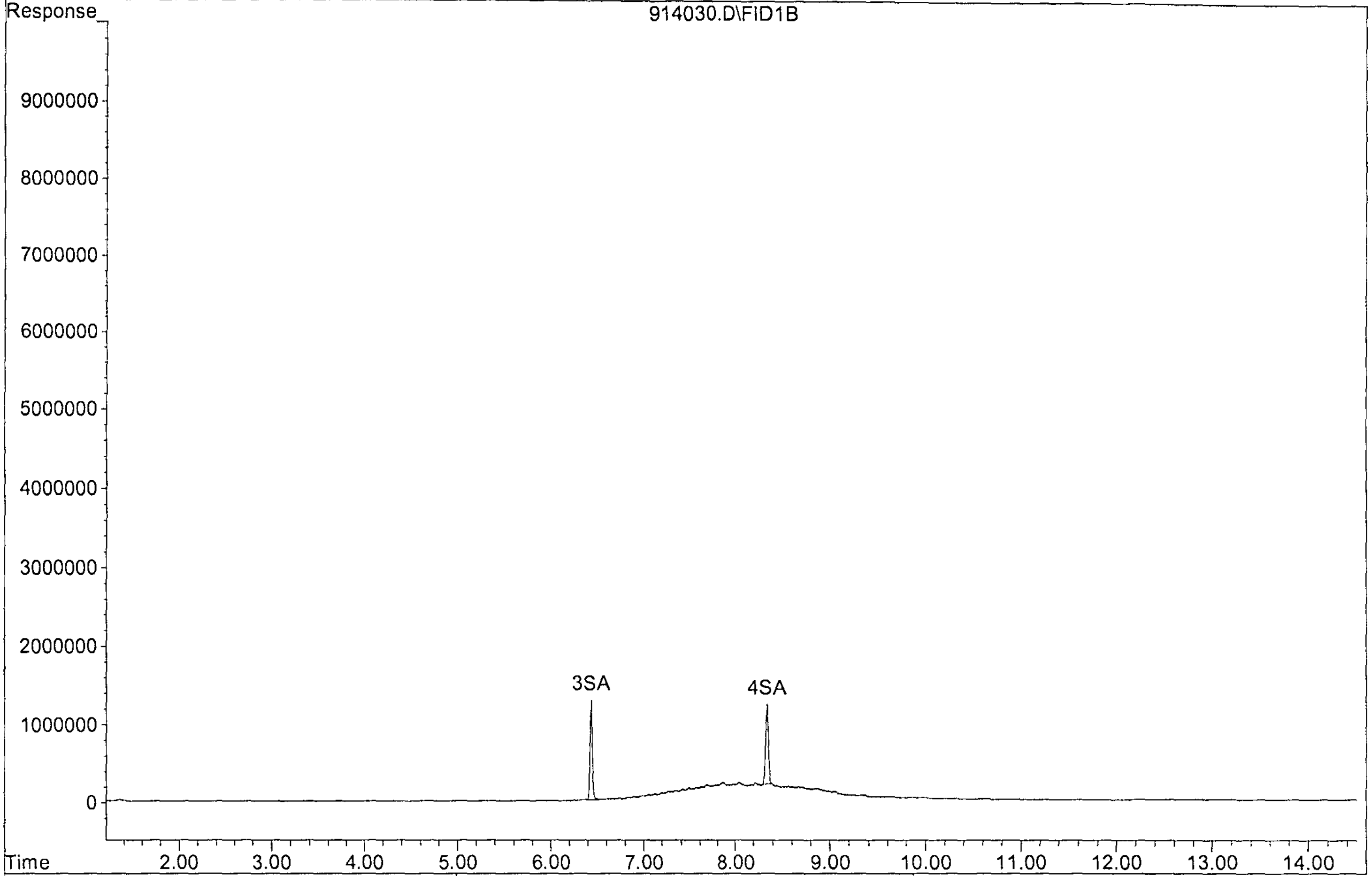
Data File : G:\APOLLO\DATA\180914\914030.D Vial: 30
Acq On : 9-14-18 18:18:17 Operator: DP
Sample : 180907A LCS-2 5/50.27G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 497.32
IntFile : events.e
Quant Time: Sep 17 8:57 2018 Quant Results File: DROB0905.RES

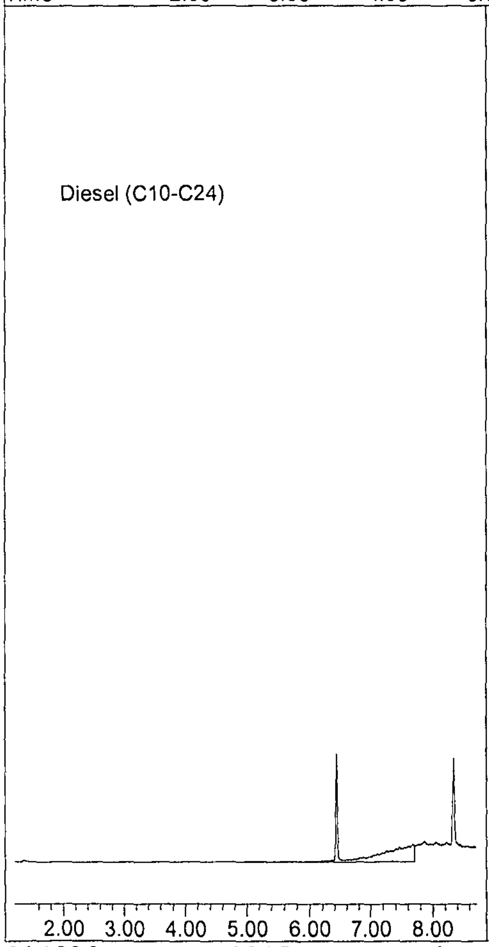
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

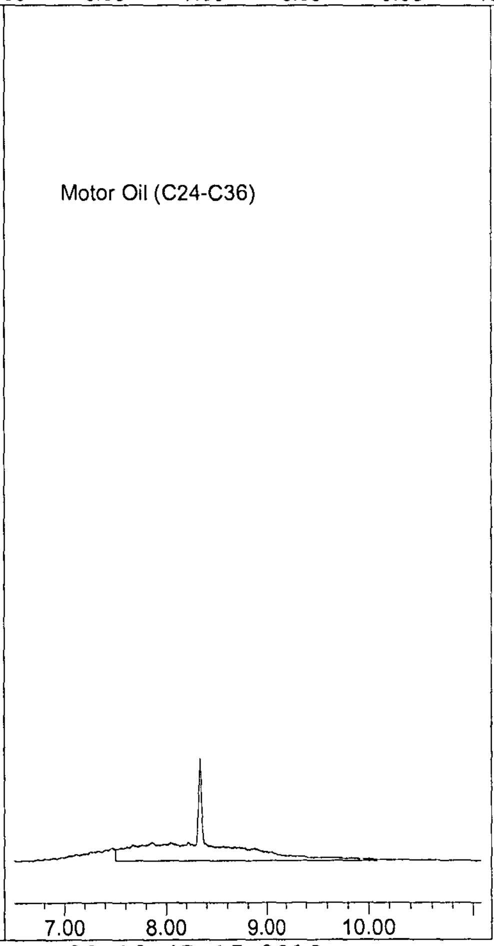
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	22356758	2870.998 ppb
Surrogate Spike 2983.887		Recovery =	96.22%
4) SA Octacosane(S)	8.34	19946192	3071.185 ppb
Surrogate Spike 2983.887		Recovery =	102.93%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	76231378	11483.497 ppb
2) HBTM Motor Oil (C24-C36)	8.80	183630201	37406.198 ppb

Data File: G:\APOLLO\DATA\180914\914030.D
Sample : 180907A LCS-2 5/50.27G SGC DF5





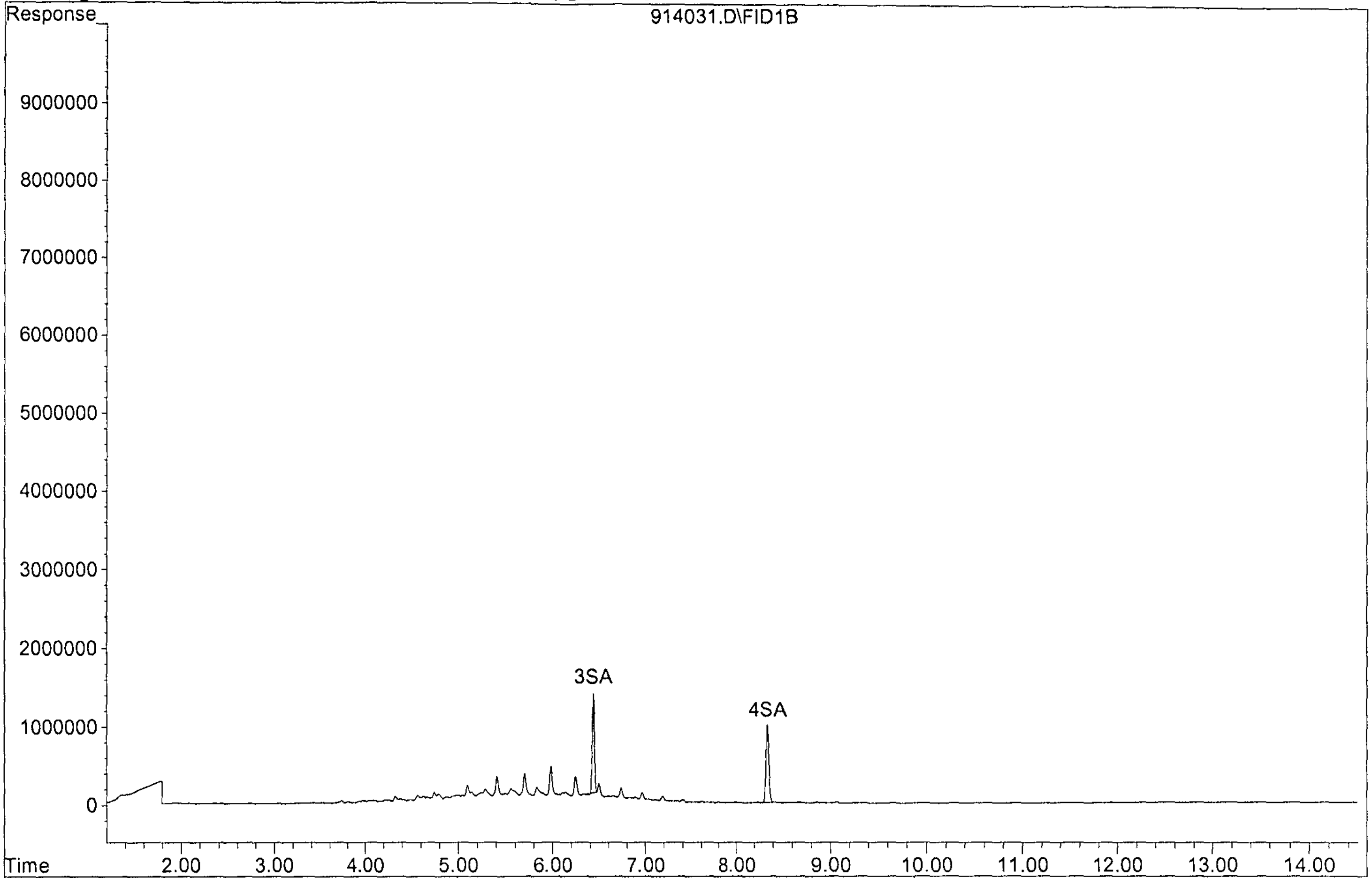


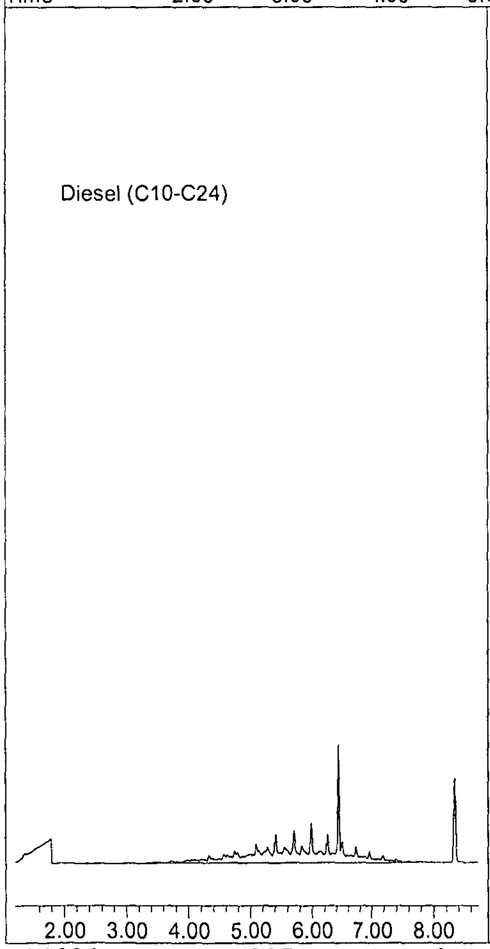
Quantitation Report (Not Reviewed)

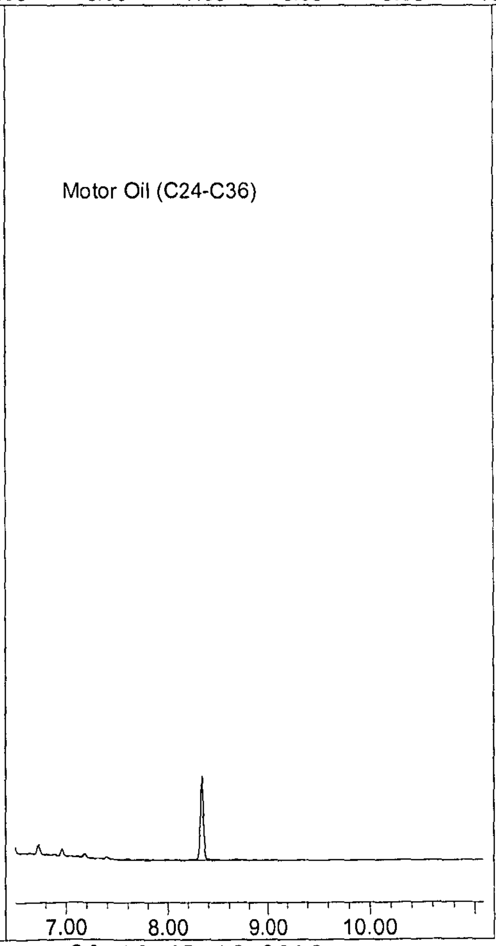
```
Data File : G:\APOLLO\DATA\180914\914031.D              Vial: 31
Acq On    : 9-14-18 18:38:36                        Operator: DP
Sample    : 180907A LCS-1 5/50.57G SGC DF5          Inst    : Apollo
Misc      : soil                                    Multiplr: 494.36
IntFile   : events.e
Quant Time: Sep 17  8:57 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A

    Compound                        R.T.      Response    Conc Units
  -------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)          6.43      20268940 2587.441 ppb
Surrogate Spike 2966.185                  Recovery      =   87.23%
 4) SA  Octacosane(S)               8.34      21061894 3223.730 ppb
Surrogate Spike 2966.185                  Recovery      =  108.68%

  Target Compounds
 1) HATM Diesel (C10-C24)            4.86     211370378 31651.902 ppb
 2) HBTM Motor Oil (C24-C36)         8.80       6105389 1236.312 ppb
```

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914031.D
Sample : 180907A LCS-1 5/50.57G SGC DF5







Quantitation Report (QT Reviewed)

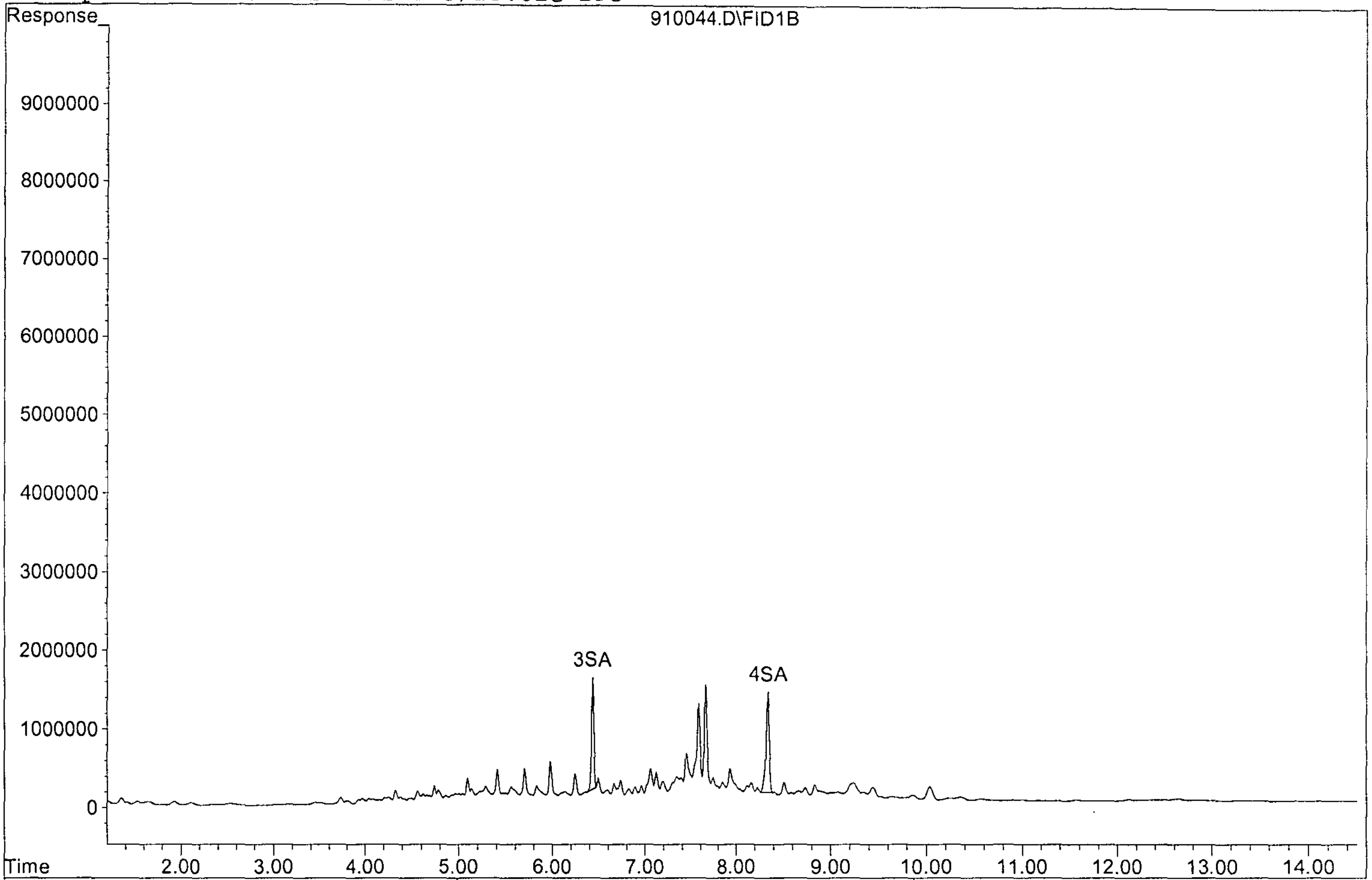
Data File : G:\APOLLO\DATA\180910\910044.D Vial: 44
Acq On : 9-11-18 0:41:54 Operator: DP
Sample : AZ79151S01 MS-1 5/25.61G DF5 Inst : Apollo
Misc : soil Multiplr: 976.18
IntFile : events.e
Quant Time: Sep 11 14:06 2018 Quant Results File: DROB0905.RES

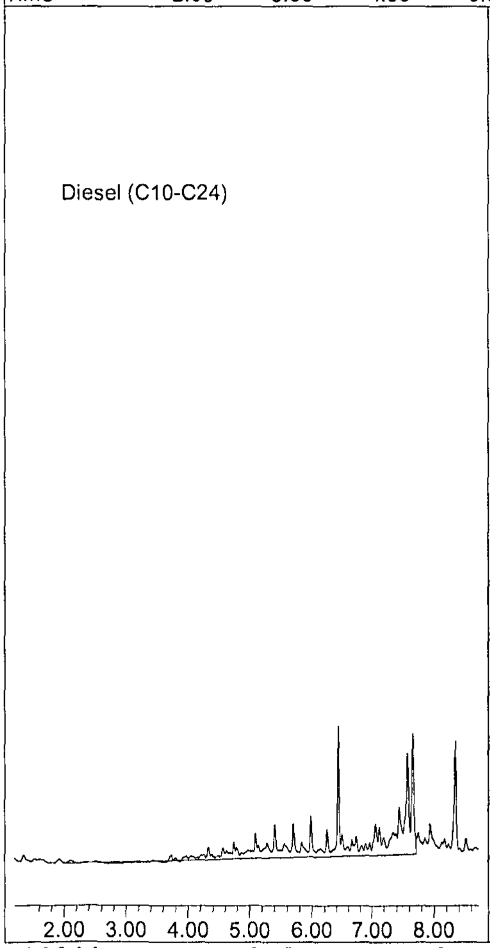
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

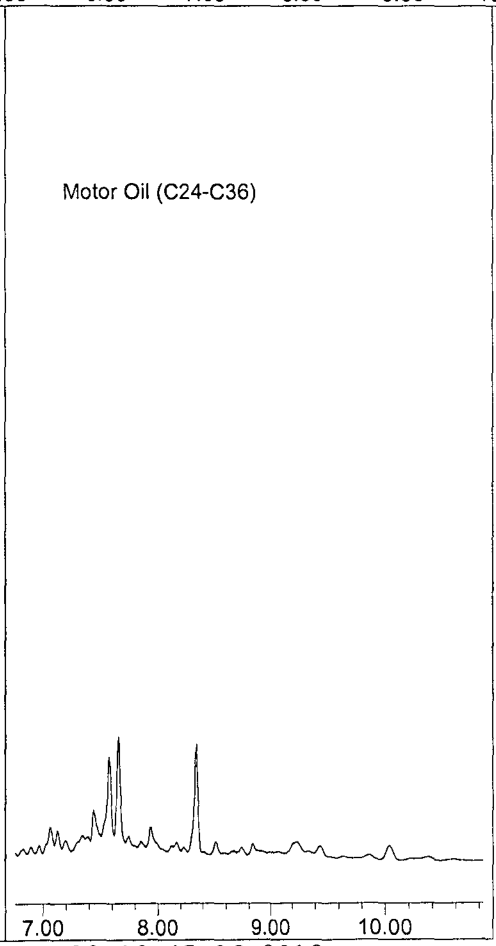
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	24321137	6130.653 ppb
Surrogate Spike 5857.087		Recovery	= 104.67%
4) SA Octacosane(S)	8.34	29882137	9031.428 ppb
Surrogate Spike 5857.087		Recovery	= 154.20%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	341031849	100840.301 ppb

Data File: G:\APOLLO\DATA\180910\910044.D
Sample : AZ79151S01 MS-1 5/25.61G DF5





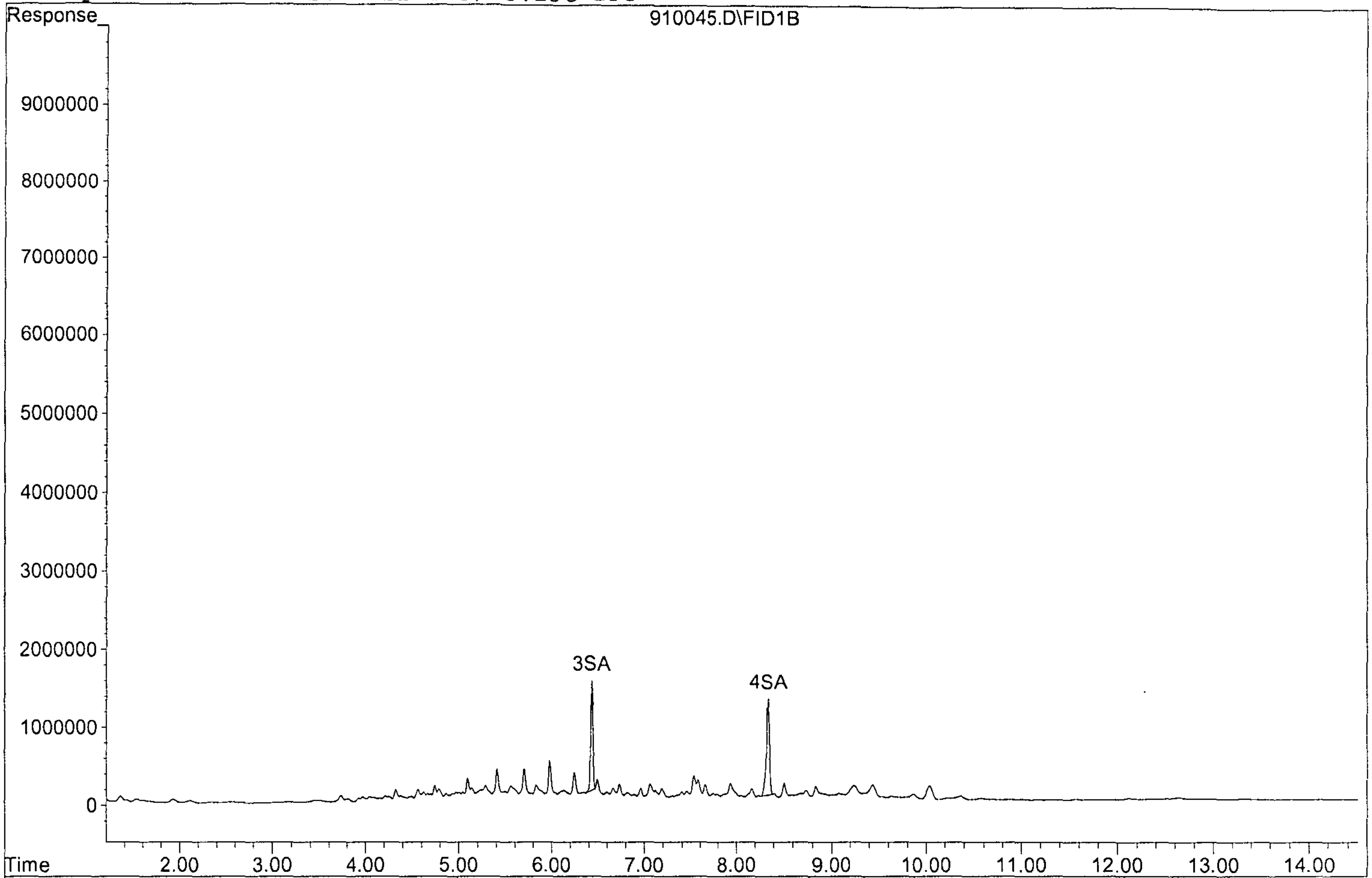


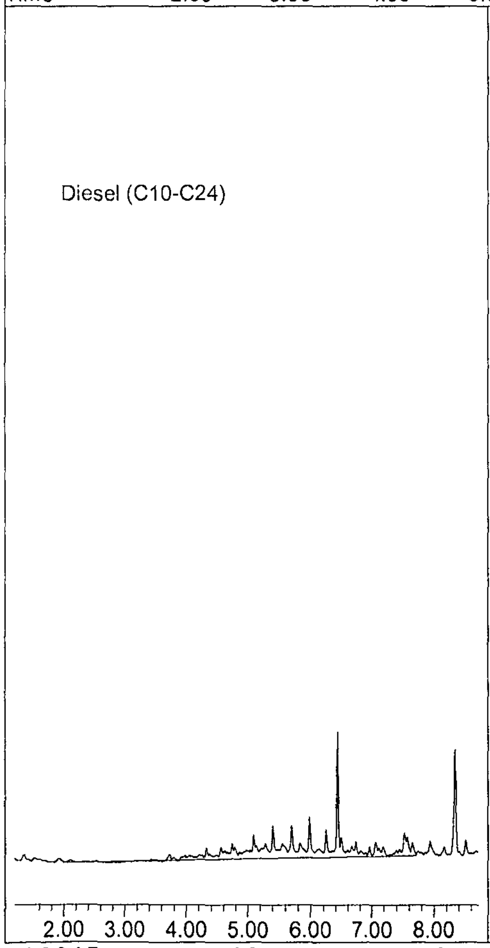
Quantitation Report (QT Reviewed)

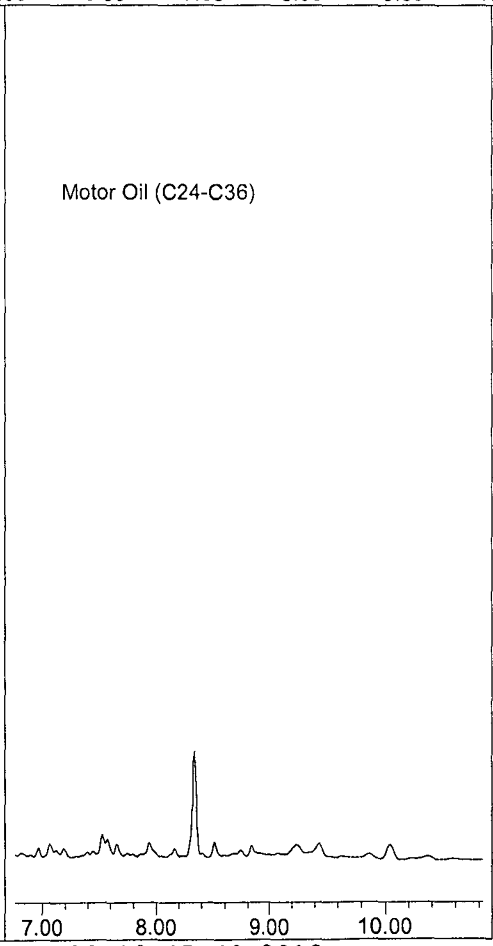
```
Data File : G:\APOLLO\DATA\180910\910045.D                  Vial: 45
Acq On    : 9-11-18 1:01:57                             Operator: DP
Sample    : AZ79151S01 MSD-1 5/25.13G DF5               Inst    : Apollo
Misc      : soil                                        Multiplr: 994.83
IntFile   : events.e
Quant Time: Sep 11 14:07 2018  Quant Results File: DROB0905.RES

Method        : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title         : 8015 B&C
Last Update   : Tue Sep 11 10:13:20 2018
Response via  : Multiple Level Calibration

Volume Inj.   : 2UL
Signal Phase  : DB-5
Signal Info   : FID02A

     Compound                          R.T.      Response    Conc Units
------------------------------------------------------------------------

  System Monitoring Compounds
 3) SA  Ortho-Terphenyl(S)             6.43       24426598 6274.846 ppb
Surrogate Spike 5968.961                     Recovery     =  105.12%
 4) SA  Octacosane(S)                  8.34       29017391 8937.589 ppb
Surrogate Spike 5968.961                     Recovery     =  149.73%

  Target Compounds
 1) HATM Diesel (C10-C24)               4.86      218385089 65808.106 ppb
```

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910045.D
Sample : AZ79151S01 MSD-1 5/25.13G DF5







Quantitation Report (QT Reviewed)

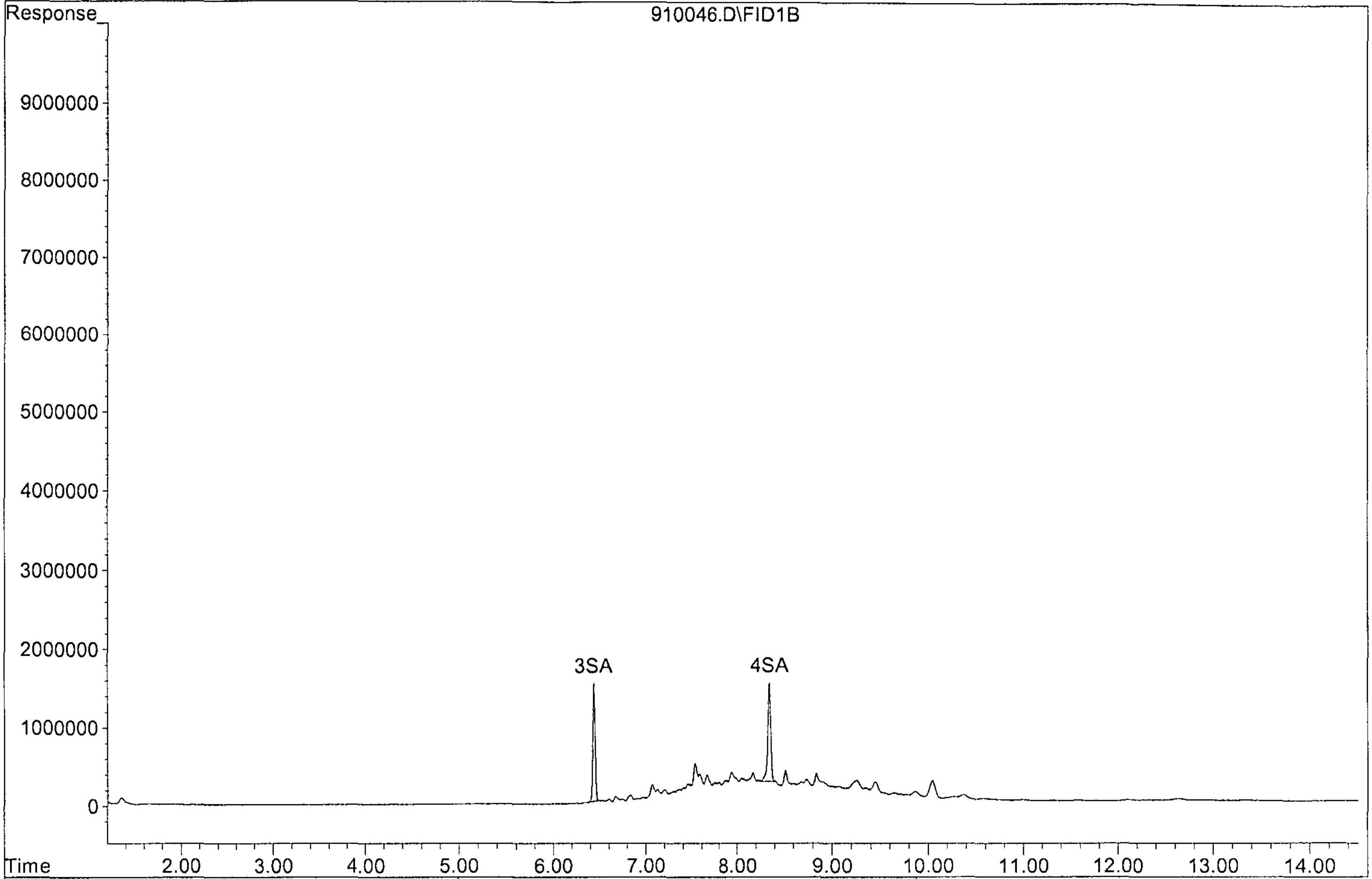
```
Data File : G:\APOLLO\DATA\180910\910046.D            Vial: 46
Acq On    : 9-11-18 1:22:00                           Operator: DP
Sample    : AZ79151S01 MS-2 5/25.18G DF5              Inst    : Apollo
Misc      : soil                                      Multiplr: 992.85
IntFile   : events.e
Quant Time: Sep 11 14:07 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

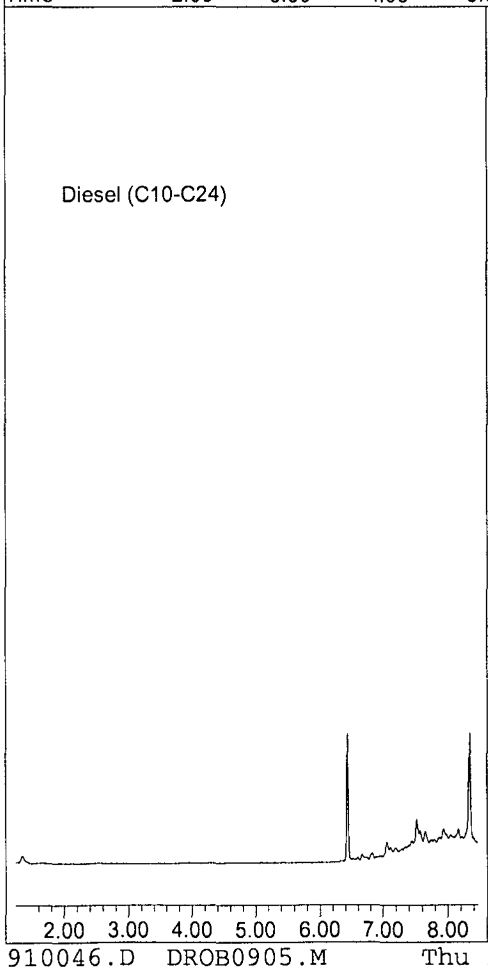
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	25371187	6504.552 ppb
Surrogate Spike 5957.109		Recovery	= 109.19%
4) SA Octacosane(S)	8.34	27908464	8578.956 ppb
Surrogate Spike 5957.109		Recovery	= 144.01%
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	324089598	131800.505 ppb

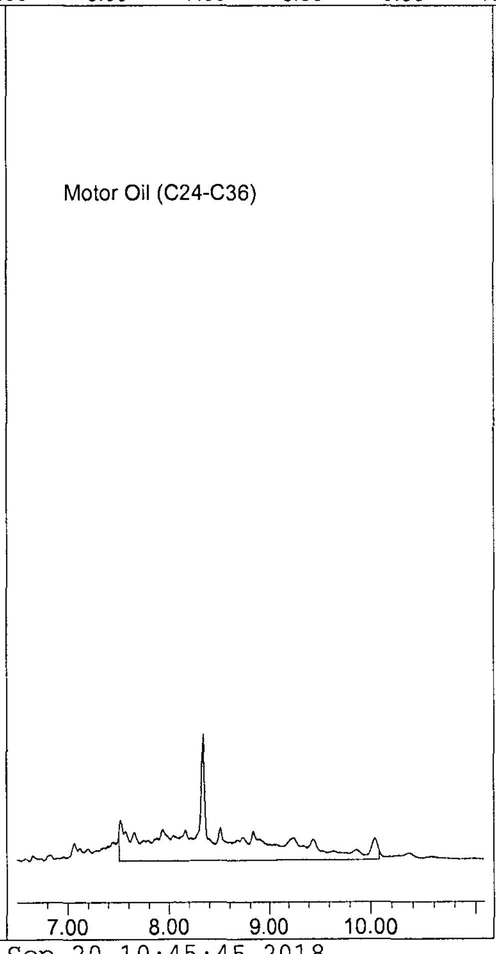
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180910\910046.D
Sample : AZ79151S01 MS-2 5/25.18G DF5







Quantitation Report (QT Reviewed)

Data File : G:\APOLLO\DATA\180910\910047.D Vial: 47
Acq On : 9-11-18 1:42:03 Operator: DP
Sample : AZ79151S01 MSD-2 5/25.33G DF5 Inst : Apollo
Misc : soil Multiplr: 986.97
IntFile : events.e
Quant Time: Sep 11 14:07 2018 Quant Results File: DROB0905.RES

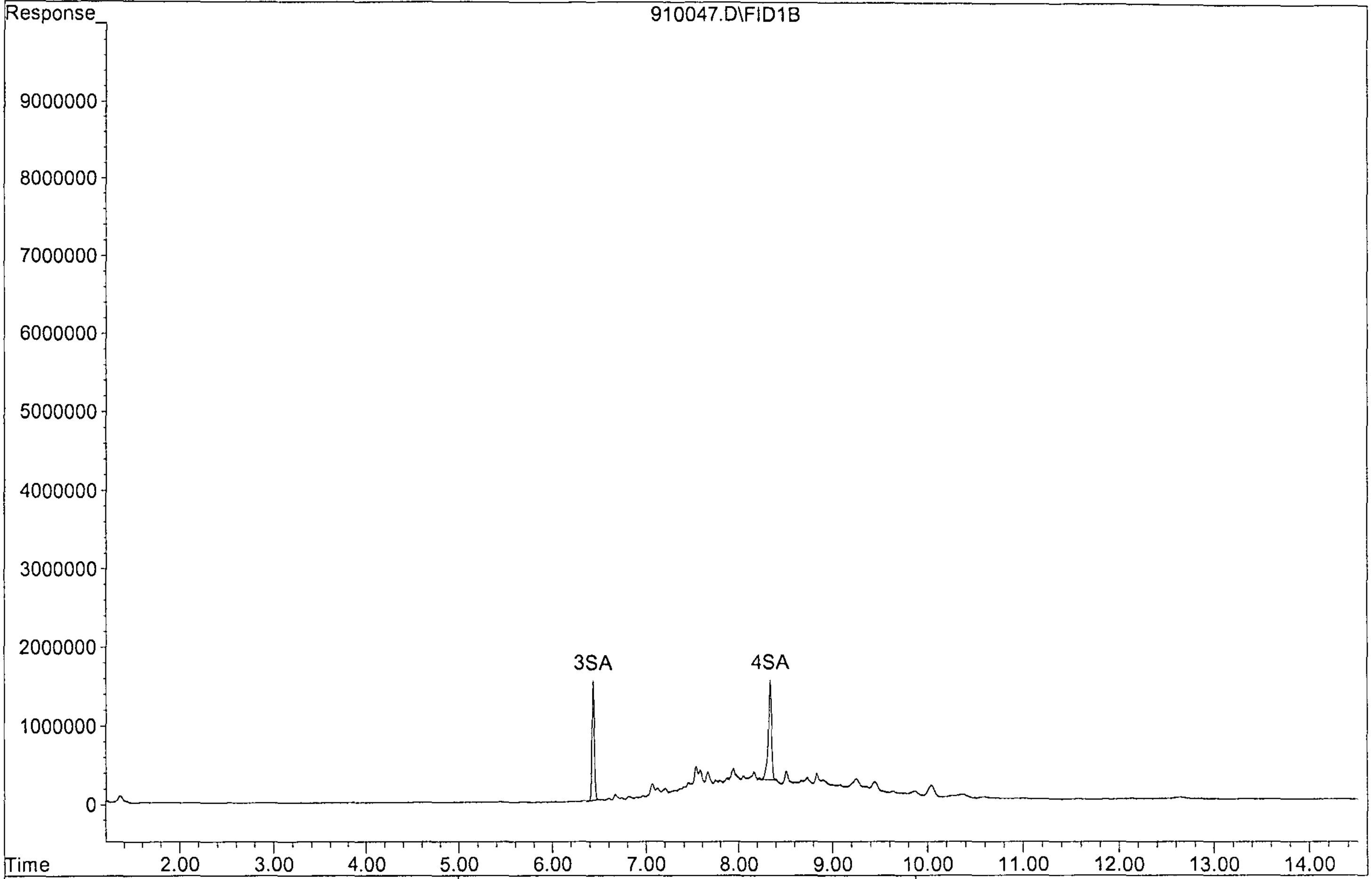
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

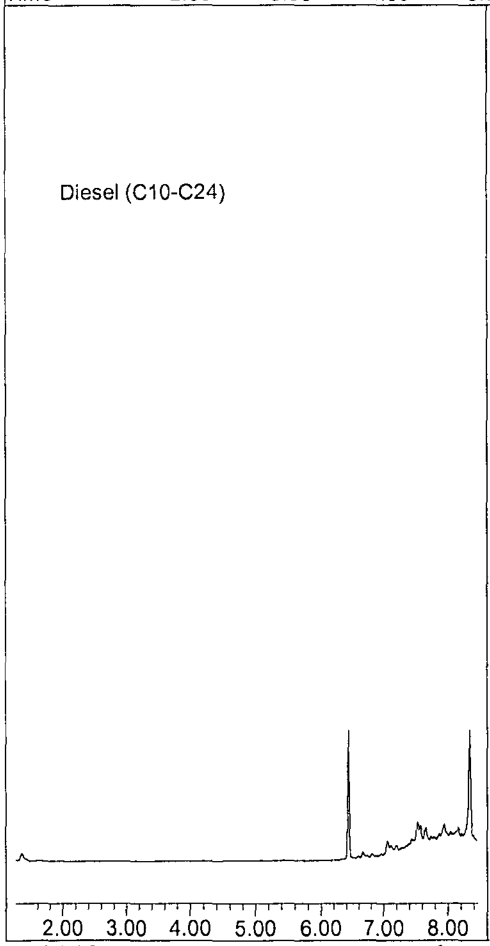
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

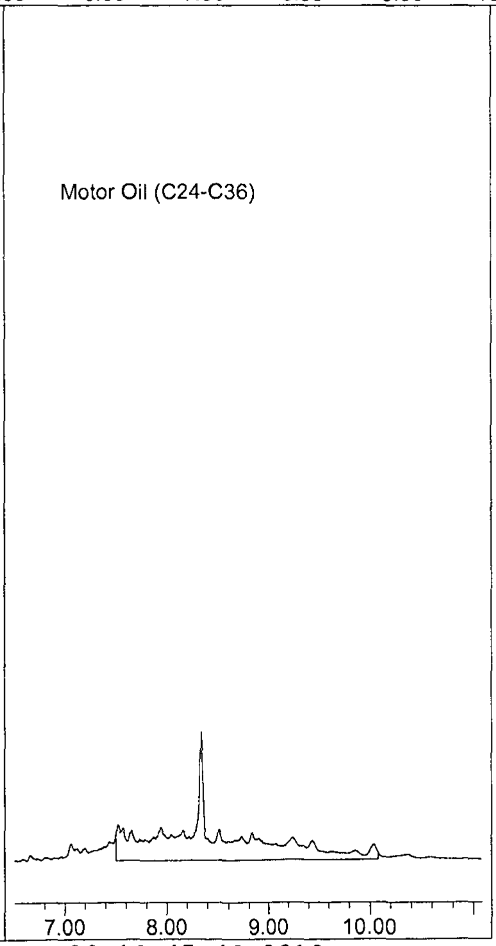
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	25872094	6593.696 ppb
Surrogate Spike 5921.832		Recovery	= 111.35%
4) SA Octacosane(S)	8.34	30301886	9259.530 ppb
Surrogate Spike 5921.832		Recovery	= 156.36%
Target Compounds			
2) HBTM Motor Oil (C24-C36)	8.80	320637798	129624.608 ppb

(f)=RT Delta > 1/2 Window (m)=manual int.

Data File: G:\APOLLO\DATA\180910\910047.D
Sample : AZ79151S01 MSD-2 5/25.33G DF5



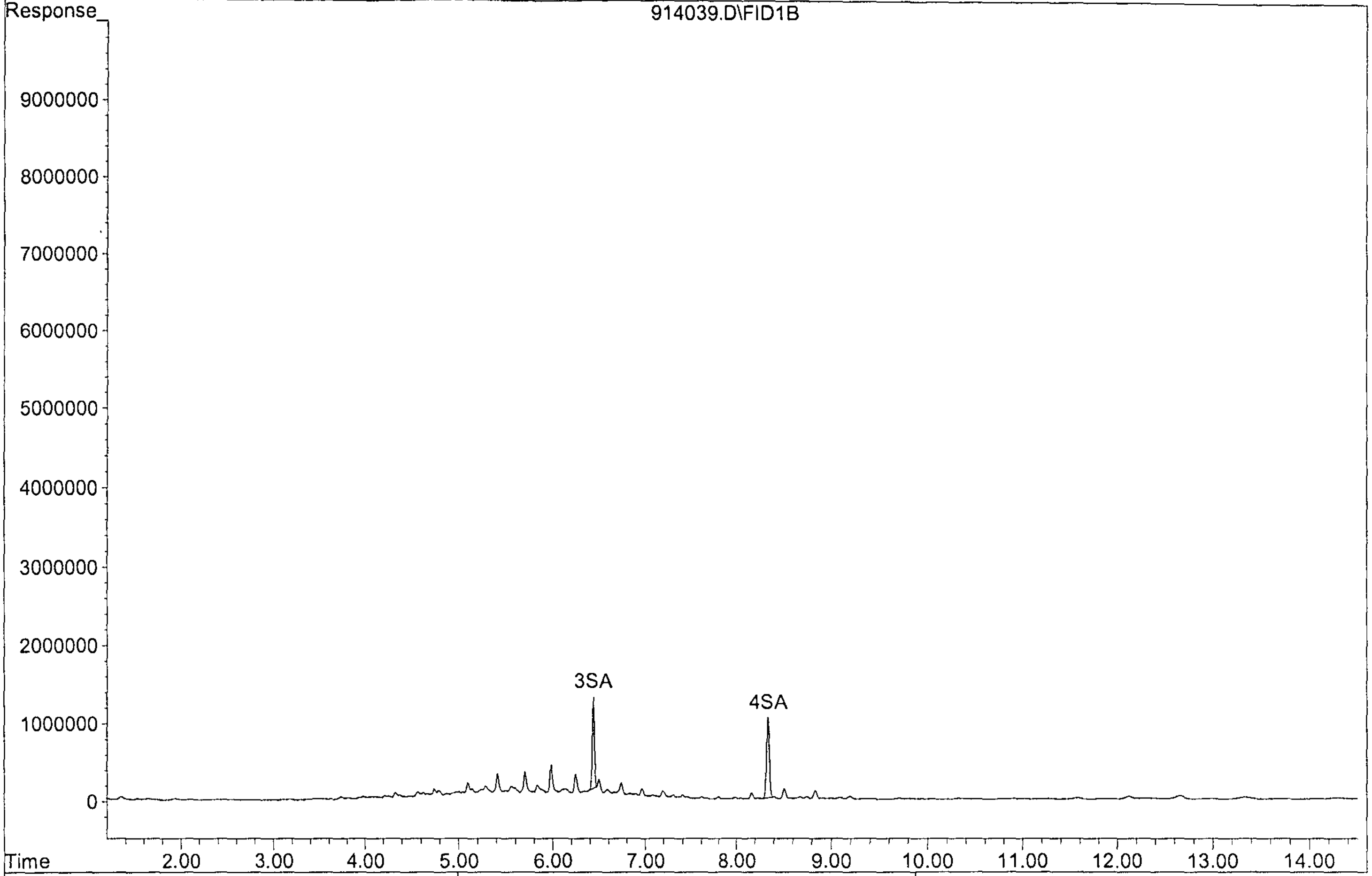


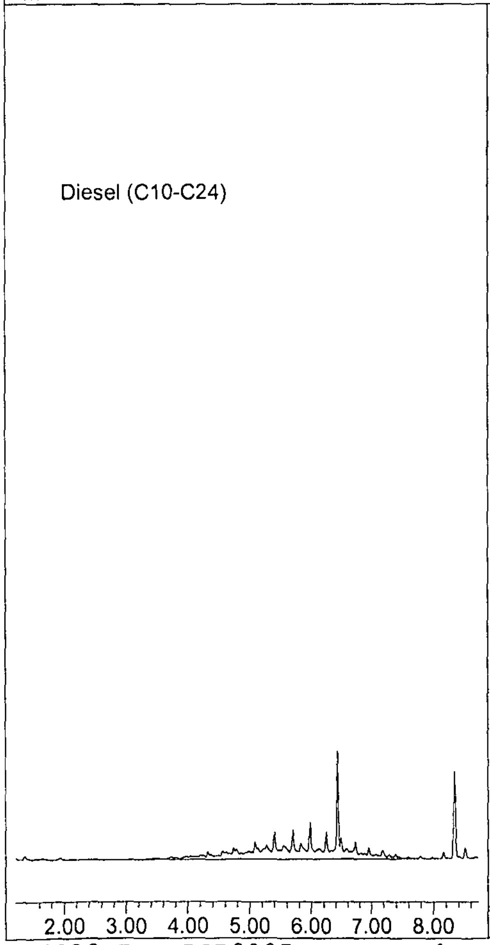


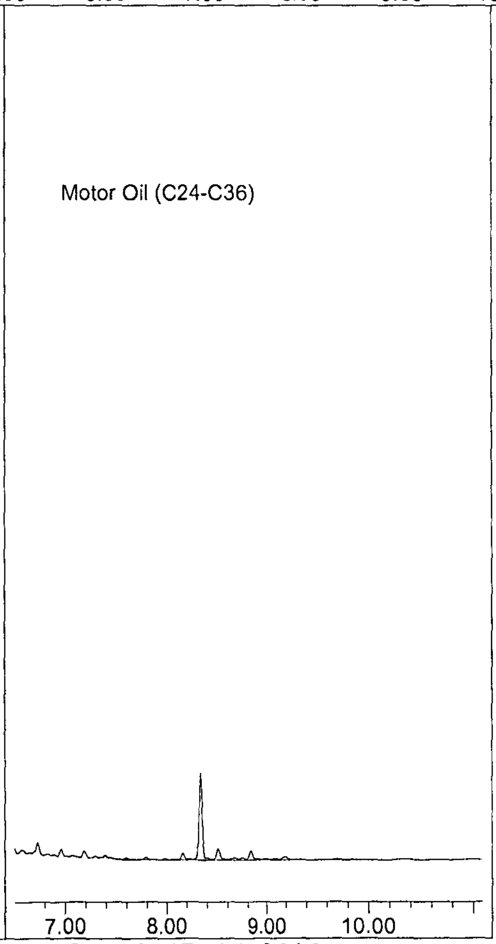
```
Data File : G:\APOLLO\DATA\180914\914039.D              Vial: 39
Acq On    : 9-14-18 21:19:24                         Operator: DP
Sample    : AZ79151S01 MS-1 5/25.61G SGC DF5         Inst    : Apollo
Misc      : soil                                     Multiplr: 976.18
IntFile   : events.e
Quant Time: Sep 17  8:59 2018  Quant Results File: DROB0905.RES

Method       : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title        : 8015 B&C
Last Update  : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

Volume Inj.  : 2UL
Signal Phase : DB-5
Signal Info  : FID02A
```

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	19149817	4827.113 ppb
Surrogate Spike 5857.087		Recovery =	82.41%
4) SA Octacosane(S)	8.34	21632610	6538.132 ppb
Surrogate Spike 5857.087		Recovery =	111.63%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	209443739	61930.784 ppb
2) HBTM Motor Oil (C24-C36)	8.80	19626676	7847.747 ppb

Data File: G:\APOLLO\DATA\180914\914039.D
Sample : AZ79151S01 MS-1 5/25.61G SGC DF5







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180914\914040.D Vial: 40
Acq On : 9-14-18 21:38:35 Operator: DP
Sample : AZ79151S01 MS-2 5/25.18G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 992.85
IntFile : events.e
Quant Time: Sep 17 9:00 2018 Quant Results File: DROB0905.RES

Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

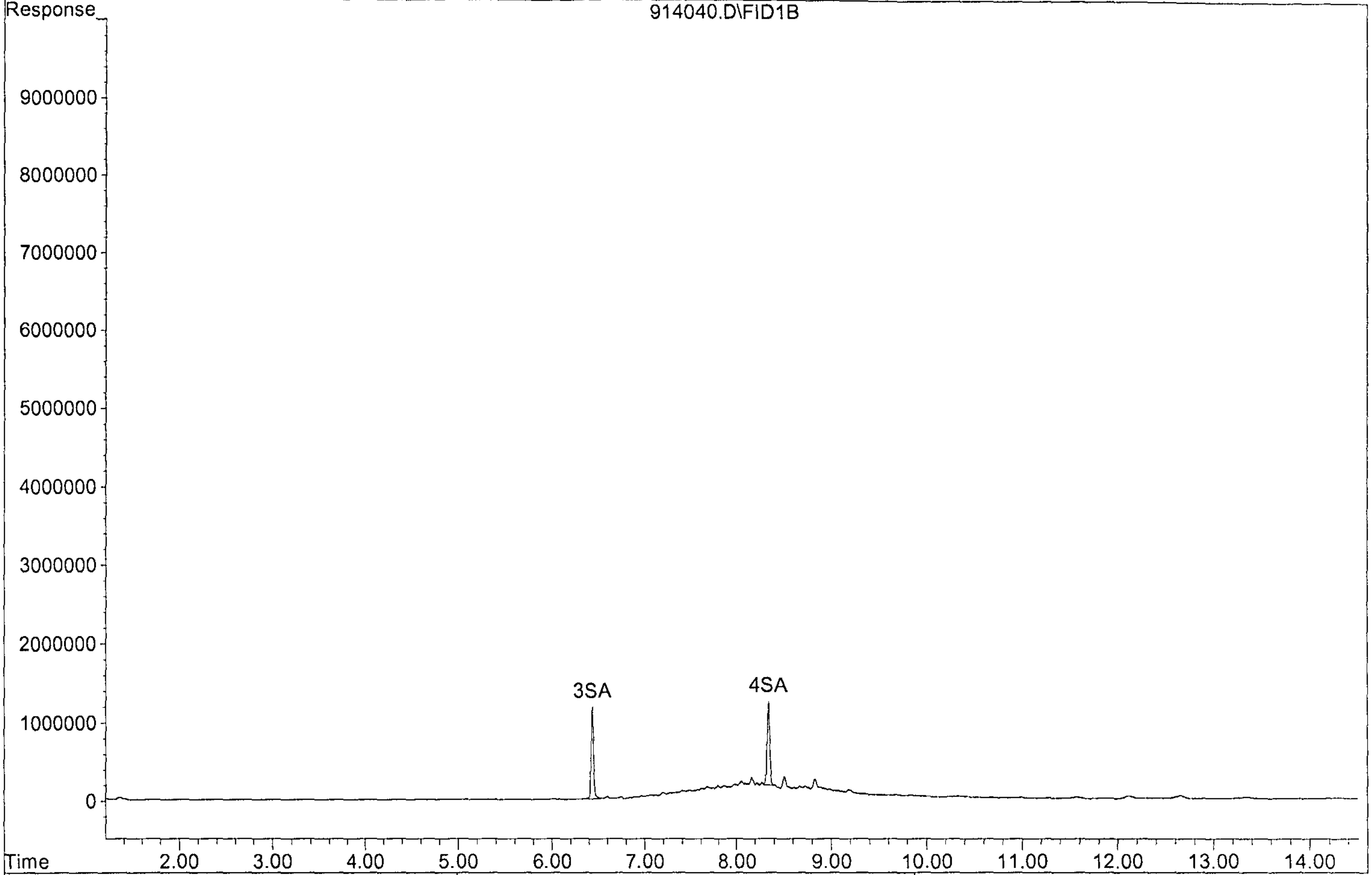
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

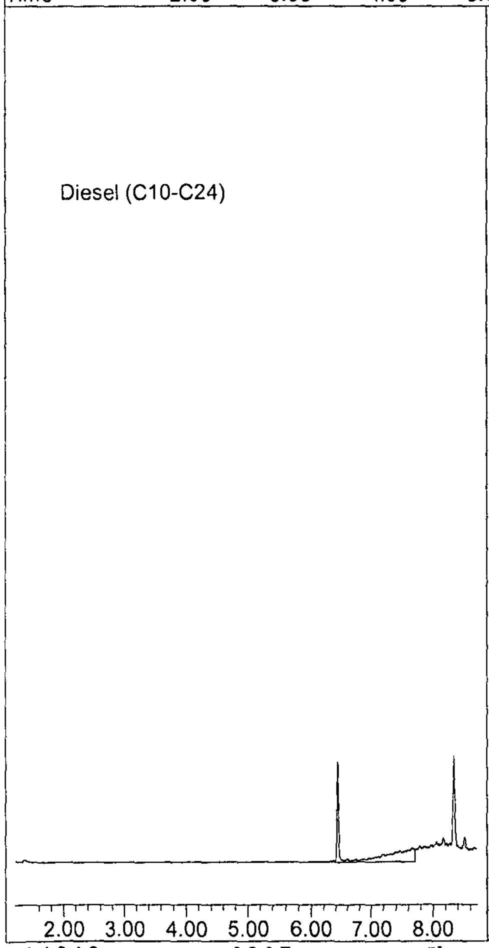
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	21690683	5560.961 ppb
Surrogate Spike 5957.109		Recovery =	93.35%
4) SA Octacosane(S)	8.34	20928441	6433.324 ppb
Surrogate Spike 5957.109		Recovery =	107.99%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	55670717	16742.478 ppb
2) HBTM Motor Oil (C24-C36)	8.80	174022182	70771.205 ppb

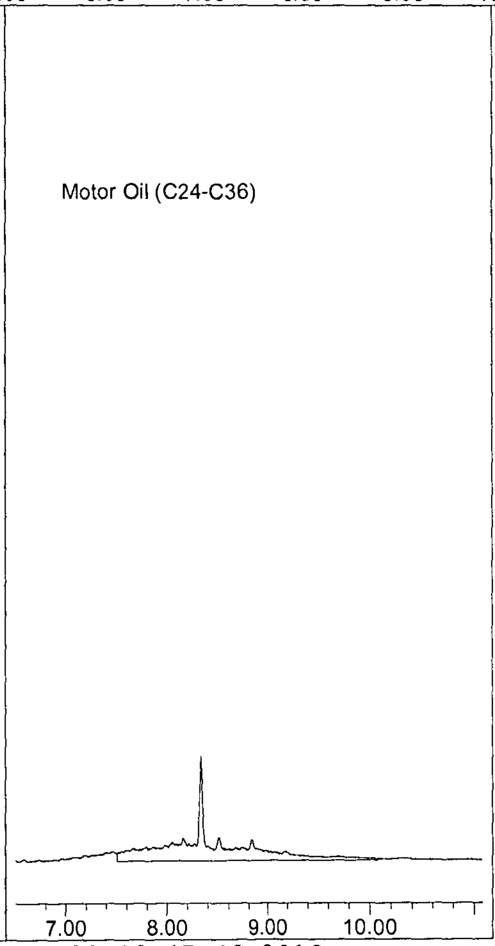
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914040.D
Sample : AZ79151S01 MS-2 5/25.18G SGC DF5







Quantitation Report (Not Reviewed)

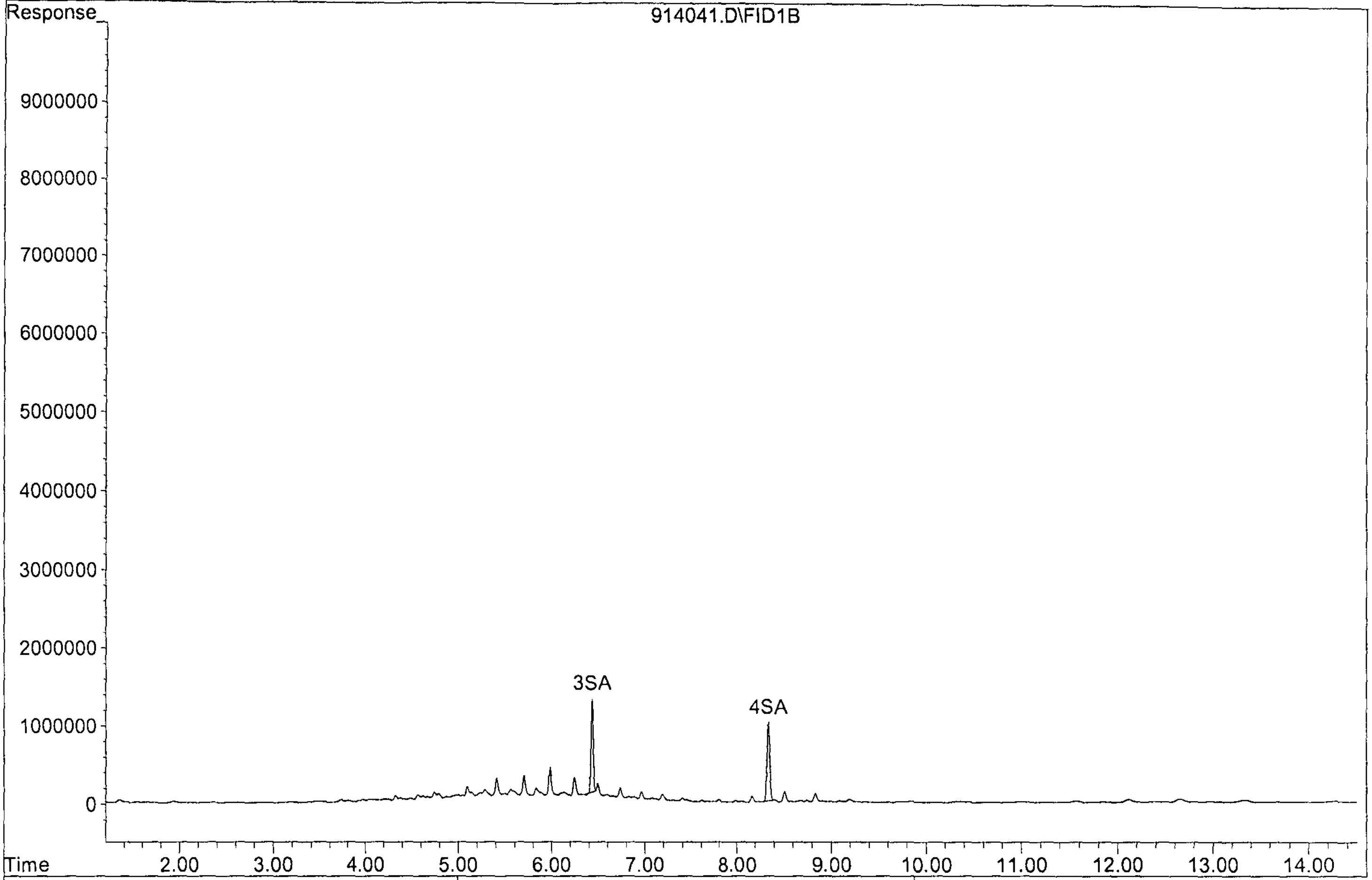
Data File : G:\APOLLO\DATA\180914\914041.D Vial: 41
Acq On : 9-14-18 21:57:55 Operator: DP
Sample : AZ79151S01 MSD-1 5/25.13G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 994.83
IntFile : events.e
Quant Time: Sep 17 9:01 2018 Quant Results File: DROB0905.RES

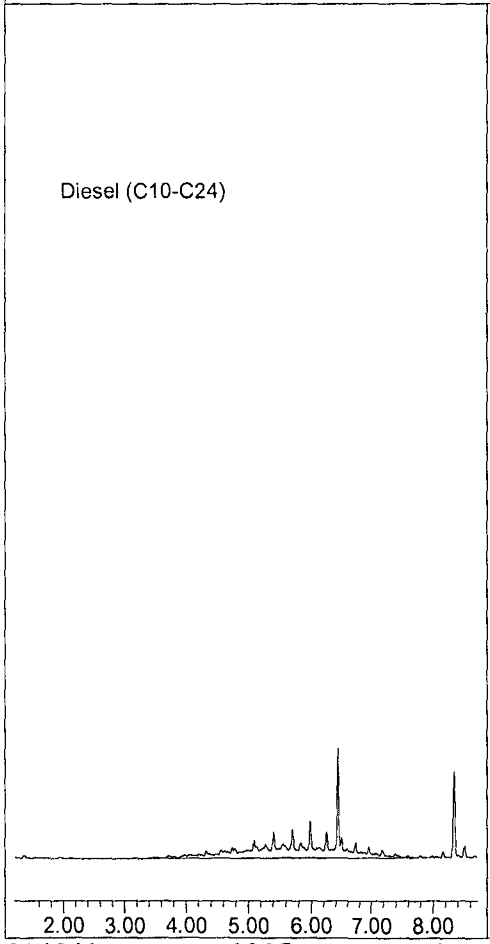
Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

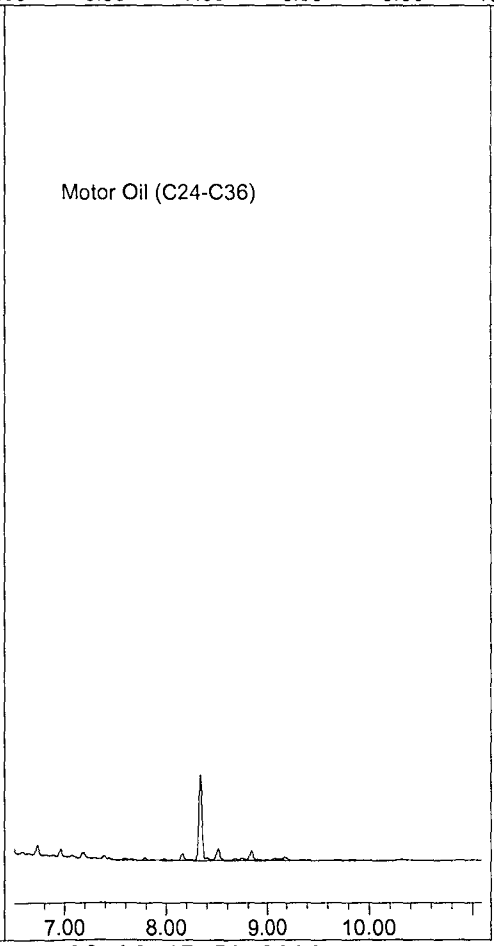
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	19492537	5007.356 ppb
Surrogate Spike 5968.961		Recovery	= 83.89%
4) SA Octacosane(S)	8.34	20909273	6440.223 ppb
Surrogate Spike 5968.961		Recovery	= 107.90%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	202212374	60934.624 ppb
2) HBTM Motor Oil (C24-C36)	8.80	20419791	8320.832 ppb

Data File: G:\APOLLO\DATA\180914\914041.D
Sample : AZ79151S01 MSD-1 5/25.13G SGC DF5







Quantitation Report (Not Reviewed)

Data File : G:\APOLLO\DATA\180914\914042.D Vial: 42
Acq On : 9-14-18 22:17:49 Operator: DP
Sample : AZ79151S01 MSD-2 5/25.33G SGC DF5 Inst : Apollo
Misc : soil Multiplr: 986.97
IntFile : events.e
Quant Time: Sep 17 9:01 2018 Quant Results File: DROB0905.RES

Method : G:\APOLLO\DATA\180905\DROB0905.M (Chemstation Integrator)
Title : 8015 B&C
Last Update : Tue Sep 11 10:13:20 2018
Response via : Multiple Level Calibration

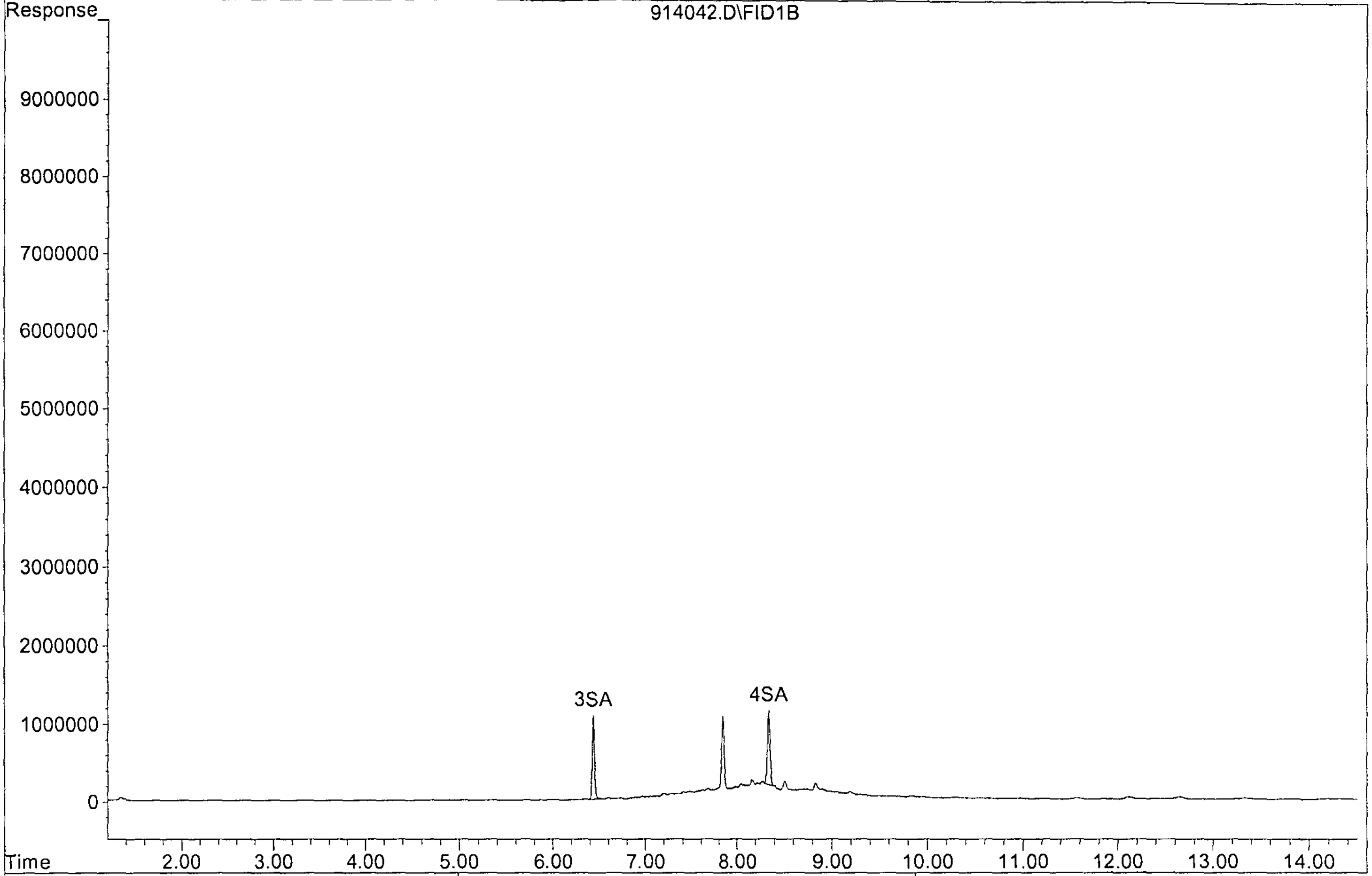
Volume Inj. : 2UL
Signal Phase : DB-5
Signal Info : FID02A

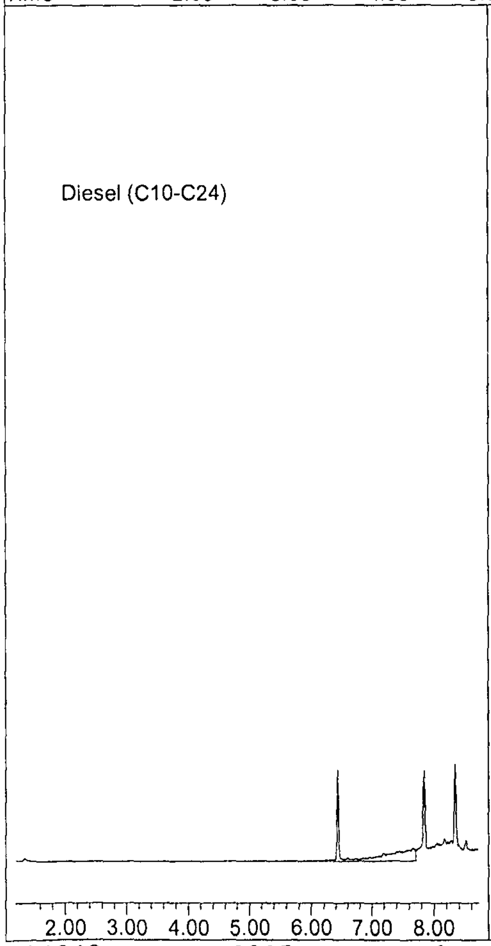
Compound	R.T.	Response	Conc Units
System Monitoring Compounds			
3) SA Ortho-Terphenyl(S)	6.43	19180291	4888.240 ppb
Surrogate Spike 5921.832		Recovery	= 82.55%
4) SA Octacosane(S)	8.34	18392886	5620.425 ppb
Surrogate Spike 5921.832		Recovery	= 94.91%
Target Compounds			
1) HATM Diesel (C10-C24)	4.86	55562770	16611.068 ppb
2) HBTM Motor Oil (C24-C36)	8.80	177071867	71585.045 ppb

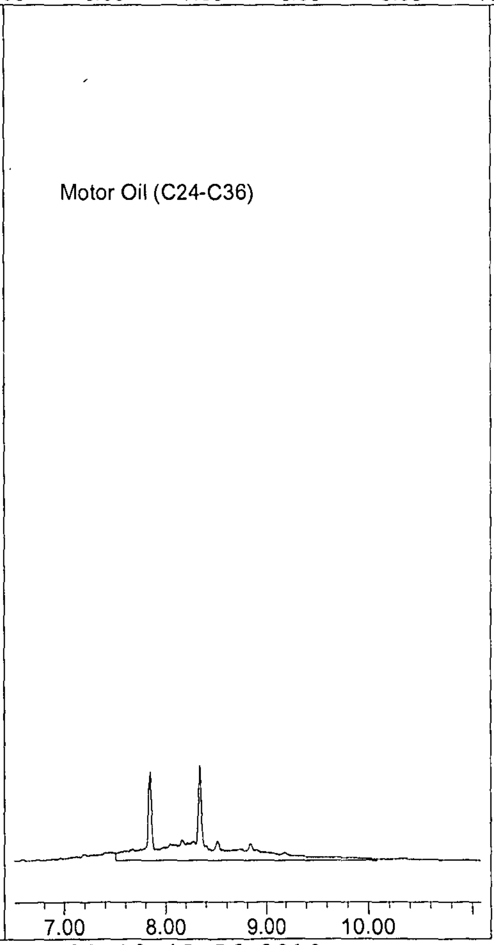
(f)=RT Delta > 1/2 Window (m)=manual int.

Quantitation Report

Data File: G:\APOLLO\DATA\180914\914042.D
Sample : AZ79151S01 MSD-2 5/25.33G SGC DF5







8015 Standard Prep

THC Surrogate

Prepared: 09/07/18
Expires: 09/07/19
Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
O-terphenyl / Octacosane Mix	Phenova	ALO-130161	600	CL12572-39252	09/07/19	06/30/23	N/A	N/A	N/A	600

Diesel Calibration Standard

Prepared: 08/13/19
Expires: 08/13/19
Methylene Chloride Lot No. 56278
Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Diesel Fuel #2	Restek	31258	50,000	A0121108	08/13/19		1000uL	25mL	MC	2000
THC Surrogate	Phenova	ALO-130161	600	CL12238-39244	08/13/19		4165			100

Diesel Calibration Curve

Prepared: 09/05/18
Expires: 03/06/19
Methylene Chloride Lot No. 56278
Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Diesel Calibration STD	Restek	Diesel STD (Level 1)	2,000	Prepared 08/13/19	08/13/19	N/A	5uL	1000uL	MC	10
Diesel Calibration STD	Restek	Diesel STD (Level 2)	2,000	Prepared 08/13/19	08/13/19	N/A	25uL	1000uL	MC	50
Diesel Calibration STD	Restek	Diesel STD (Level 3)	2,000	Prepared 08/13/19	08/13/19	N/A	125uL	1000uL	MC	250
Diesel Calibration STD	Restek	Diesel STD (Level 4)	2,000	Prepared 08/13/19	08/13/19	N/A	50uL	100uL	MC	1000
Diesel Calibration STD	Restek	Diesel STD (Level 5)	2,000	Prepared 08/13/19	08/13/19	N/A	75uL	100uL	MC	1500
Diesel Calibration STD	Restek	Diesel STD (Level 6)	2,000	Prepared 08/13/19	08/13/19	N/A	100uL	100uL	N/A	2,000

Diesel Second Source (SS)

Prepared: 08/02/18
Expires: 08/02/19
Methylene Chloride Lot No. 56278
Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Diesel Fuel #2	O2SI	G34-011598-03	50,000	G34-319187-38958	08/02/19		100uL	5mL	MC	1,000

Diesel CCV

Prepared: 08/13/18
Expires: 11/11/18
Methylene Chloride Lot No. 56278
Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Diesel Calibration STD	Restek	Diesel CCV	2,000	Prepared 08/13/19	08/13/19	N/A	1250uL	10mL	MC	250

Diesel Spike

Prepared: 07/09/18
Expires: 07/09/19
Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Diesel Fuel Composite #2	O2SI	011598-03	50,000	335595-39013	07/09/19		N/A	N/A	N/A	50,000

Motor Oil Standard

Prepared: 03/02/18
Expires: 03/02/19
Prepared By (Initials): DP
Methylene Chloride Lot No. 56258

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Motor Oil	O2SI	116390-01	50,000	334223-38795	03/02/19		1mL	25mL	MC	2,000

Motor Oil Calibration Curve

Prepared: 09/05/18
Expires: 03/02/19
Prepared By (Initials): DP
Methylene Chloride Lot No. 56278

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Motor Oil STD	O2SI	Motor Oil (Level 1)	2,000	Prepared 03/02/18	03/02/19	N/A	5uL	1000uL	MC	10
Motor Oil STD	O2SI	Motor Oil (Level 2)	2,000	Prepared 03/02/18	03/02/19	N/A	25uL	1000uL	MC	50
Motor Oil STD	O2SI	Motor Oil (Level 3)	2,000	Prepared 03/02/18	03/02/19	N/A	125uL	1000uL	MC	250
Motor Oil STD	O2SI	Motor Oil (Level 4)	2,000	Prepared 03/02/18	03/02/19	N/A	50uL	100uL	MC	1,000
Motor Oil STD	O2SI	Motor Oil (Level 5)	2,000	Prepared 03/02/18	03/02/19	N/A	75uL	100uL	MC	1,500
Motor Oil STD	O2SI	Motor Oil (Level 6)	2,000	Prepared 03/02/18	03/02/19	N/A	100uL	100uL	N/A	2,000

Motor Oil Second Source (SS)

Prepared: 07/13/18
Expires: 03/02/19
Prepared By (Initials): DP
Methylene Chloride Lot No. 56278

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Motor Oil Second Source	O2SI	116390-02-SS	50,000	301142-37652	03/02/19		100uL	5mL	MC	1,000

Motor Oil CCV

Prepared: 08/15/18
Expires: 11/13/18
Prepared By (Initials): DP
Methylene Chloride Lot No. 56278

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Motor Oil STD	O2SI	Motor Oil CCV	2,000	Prepared 03/02/18	03/02/19	N/A	1250uL	10mL	MC	400

Motor Oil Spike

Prepared: 07/09/18
Expires: 07/09/19
Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	From Stock	Final Volume	Solvent	Standard Conc.
Motor Oil Composite	O2SI	G34116390-01	50,000	G34-334223-38794	07/09/19		N/A	N/A	N/A	50,000

Organic Extraction Worksheet

Method	THC Sonication Extraction 3550B Wet MIS	Extraction Set	180907A	Extraction Method	SON004WETIS	Units	mL

Spiked ID 1	Diesel Ampule 7-12-18 EXP 7-12-19		Surrogate ID 1	THC Surrogate 8-27-18 EXP 8-27-19	
Spiked ID 2	Motor Oil Ampule 8-21-18 EXP 8-21-19		Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	YES	
Spiked ID 7			Ext. Start Time:	09/07/18 13:10	
Spiked ID 8			Ext. End Time:	09/10/18 10:50	
			GC Requires Extract By:	**09/19/18 0:00**	

pH1			Water Bath Temp Criteria	73,75 °C
pH2				
pH3				

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
17	AZ79153	AZ79153S01			0.250	1	50.19g	5	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB5				
18	AZ79154	AZ79154S01			0.250	1	50.26g	5	NA	09/07/18 13:10	86766
						equip	E-S1.2 E-WB6				
19	AZ79155	AZ79155S01			0.250	1	50.74g	5	NA	09/07/18 13:10	86766
						equip	E-S2 E-WB6				
20	AZ79156	AZ79156S01			0.250	1	50.19g	5	NA	09/07/18 13:10	86766
						equip	E-S6 E-WB6				
21	AZ79157	AZ79157S01			0.250	1	50.25g	5	NA	09/07/18 13:10	86766
						equip	E-S7 E-WB6				
22	AZ79158	AZ79158S01			0.250	1	50.78g	5	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB6				
23	AZ79159	AZ79159S01			0.250	1	50.41g	5	NA	09/07/18 13:10	86766
						equip	E-S1.2 E-WB6				
24	AZ79160	AZ79160S01			0.250	1	50.88g	5	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB6				

KY 9/11/18

Solvent and Lot#	
Scale Balance #	EB1
B.Na2SO4	18D105205
Dichloromethane (DCM)	58059
Filter Paper	15751144

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/11/18 11:57:57 AM

Reviewed By: KY **Date** 9/11/18

Organic Extraction Worksheet

Method	THC Son Extraction 3550B (SILICA GEL)MIS	Extraction Set	180907A	Extraction Method	SON004SGCMIS	Units	mL

Spiked ID 1	Diesel Spike 7-12-18 EXP 7-12-19	Surrogate ID 1	THC Surrogate 8-27-18 EXP 8-27-19	
Spiked ID 2	Motor Oil Spike 8-21-18 EXP 8-21-19	Surrogate ID 2		
Spiked ID 3		Surrogate ID 3		
Spiked ID 4		Surrogate ID 4		
Spiked ID 5		Surrogate ID 5		
Spiked ID 6		Sufficient Vol for Matrix QC:	NO	
Spiked ID 7		Ext. Start Time:	09/07/18 13:10	
Spiked ID 8		Ext. End Time:	09/10/18 10:50	
		GC Requires Extract By:	**09/19/18 0:00**	

pH1			Water Bath Temp Criteria	73,75,35,3
pH2				
pH3				

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

#	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907A Blk				0.250	1	50.75g	5	NA	09/07/18 13:10	*
						equip	E-S1.1 E-WB5 E-WB1				
2	180907A LCS-1		0.040	1	0.250	1	50.73g	5	NA	09/07/18 13:10	*
						equip	E-S1.2 E-WB5 E-WB2				
3	180907A LCS-2		0.040	2	0.250	1	50.27g	5	NA	09/07/18 13:10	*
						equip	E-S2 E-WB5 E-WB3				
4	180907A LCSD-1		0.040	1	0.250	1	50.57g	5	NA	09/07/18 13:10	*
						equip	E-S6 E-WB5 E-WB1				
5	180907A LCSD-2		0.040	2	0.250	1	50.33g	5	NA	09/07/18 13:10	*
						equip	E-S7 E-WB5 E-WB2				
6	AZ79146	AZ79146S01			0.250	1	50.17g	5	NA	09/07/18 13:10	86766 *
						equip	e-s8 E-WB5 E-WB3				
7	AZ79147	AZ79147S01			0.250	1	50.14g	5	NA	09/07/18 13:10	86766 *
						equip	E-S1.1 E-WB5 E-WB1				
8	AZ79148	AZ79148S01			0.250	1	50.13g	5	NA	09/07/18 13:10	86766 *
						equip	E-S1.2 E-WB5 E-WB2				
9	AZ79149	AZ79149S01			0.250	1	50.23g	5	NA	09/07/18 13:10	86766 *
						equip	E-S2 E-WB5 E-WB3				
10	AZ79150	AZ79150S01			0.250	1	50.53g	5	NA	09/07/18 13:10	86766 *
						equip	E-S6 E-WB5 E-WB1				
11	AZ79151 MS-1	AZ79151S01	0.040	1	0.250	1	25.61g	5	NA	09/07/18 15:00	86766 *
						equip	E-S1.2 E-WB6 E-WB1				
12	AZ79151 MSD-1	AZ79151S01	0.040	1	0.250	1	25.13g	5	NA	09/07/18 15:00	86766 *
						equip	E-S6 E-WB6 E-WB3				
13	AZ79151 MS-2	AZ79151S01	0.040	2	0.250	1	25.18g	5	NA	09/07/18 15:00	86766 *
						equip	E-S2 E-WB6 E-WB2				
14	AZ79151 MSD-2	AZ79151S01	0.040	2	0.250	1	25.33g	5	NA	09/07/18 15:00	86766 *
						equip	e-s8 E-WB6 E-WB1				
15	AZ79151	AZ79151S01			0.250	1	50.02g	5	NA	09/07/18 13:10	86766 *
						equip	E-S7 E-WB6 E-WB2				
16	AZ79152	AZ79152S01			0.250	1	50.09g	5	NA	09/07/18 13:10	86766 *
						equip	E-S1.1 E-WB6 E-WB2				

Solvent and Lot#	
MC	58059
Na2SO4	18D105205
Silica Gel (*)	021111Q
Filter Paper	15751144
BALANCE ID	EB1

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	DP
Date	9/13/18
Time	5:00
Refrigerator	Hobart1

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/13/18 1:50:10 PM

Reviewed By: KY 499 Date 9/13/18

Organic Extraction Worksheet

Method	THC Son Extraction 3550B (SILICA GEL)MIS	Extraction Set	180907A	Extraction Method	SON004SGCMIS	Units	mL

Spiked ID 1	Diesel Spike 7-12-18 EXP 7-12-19		Surrogate ID 1	THC Surrogate 8-27-18 EXP 8-27-19
Spiked ID 2	Motor Oil Spike 8-21-18 EXP 8-21-19		Surrogate ID 2	
Spiked ID 3			Surrogate ID 3	
Spiked ID 4			Surrogate ID 4	
Spiked ID 5			Surrogate ID 5	
Spiked ID 6			Sufficient Vol for Matrix QC:	NO
Spiked ID 7			Ext. Start Time:	09/07/18 13:10
Spiked ID 8			Ext. End Time:	09/10/18 10:50
			GC Requires Extract By:	**09/19/18 0:00**

pH1			Water Bath Temp Criteria	73,75,35,3
pH2				
pH3				

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
17	AZ79153	AZ79153S01			0.250	1	50.19g	5	NA	09/07/18 13:10	86766 *
						equip	E-S1.2 E-WB6 E-WB3				
18	AZ79154	AZ79154S01			0.250	1	50.26g	5	NA	09/07/18 13:10	86766 *
						equip	E-S2 E-WB6 E-WB1				
19	AZ79155	AZ79155S01			0.250	1	50.74g	5	NA	09/07/18 13:10	86766 *
						equip	E-S6 E-WB6 E-WB2				
20	AZ79156	AZ79156S01			0.250	1	50.19g	5	NA	09/07/18 13:10	86766 *
						equip	E-S7 E-WB6 E-WB3				
21	AZ79157	AZ79157S01			0.250	1	50.25g	5	NA	09/07/18 13:10	86766 *
						equip	e-s8 E-WB6 E-WB1				
22	AZ79158	AZ79158S01			0.250	1	50.28g	5	NA	09/07/18 13:10	86766 *
						equip	E-S1.1 E-WB6 E-WB2				
23	AZ79159	AZ79159S01			0.250	1	50.41g	5	NA	09/07/18 13:10	86766 *
						equip	E-S1.2 E-WB6 E-WB3				
24	AZ79160	AZ79160S01			0.250	1	50.88g	5	NA	09/07/18 13:10	86766 *
						equip	E-WB3 E-WB6 E-WB1				

Ky 9/13/18

Solvent and Lot#	
MC	58059
Na2SO4	18D105205
Silica Gel (*)	021111Q
Filter Paper	15751144
BALANCE ID	EB1

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/13/18 1:50:10 PM

Reviewed By: Ky 500 **Date** 9/13/18

_SEP011

Organic Extraction Worksheet

Method	THC Separatory Funnel Extraction 3510C	Extraction Set	180907A	Extraction Method	SEP011	Units	mL

Spiked ID 1	Diesel Spike Ampule 7-12-18 EXP 7-12-19		Surrogate ID 1	THC Surrogate 8-27-18 EXP 8-27-19
Spiked ID 2	Motor Oil Spike Ampule 8-21-18 EXP 8-21-19		Surrogate ID 2	
Spiked ID 3	Motor Oil Spike Ampule 9-7-18 exp 9-7-19		Surrogate ID 3	
Spiked ID 4			Surrogate ID 4	
Spiked ID 5			Surrogate ID 5	
Spiked ID 6			Sufficient Vol for Matrix QC:	NO
Spiked ID 7			Ext. Start Time:	09/07/18 14:23
Spiked ID 8			Ext. End Time:	09/10/18 13:10
			GC Requires Extract By:	**09/19/18 0:00**

pH1			Water Bath Temp Criteria
pH2			
pH3			

Spiked By: SS **Date** 09/07/18 **Witnessed By:** EL **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907A Blk				0.250	1	1000	5	7	09/07/18 14:23	
						equip	DV-1				
2	180907A LCS-1		0.040	1	0.250	1	1000	5	7	09/07/18 14:23	
						equip	dv-2				
3	180907A LCS-2		0.040	2	0.250	1	1000	5	7	09/07/18 14:23	
						equip	dv-3				
4	180907A LCSD-1		0.040	1	0.250	1	1000	5	7	09/07/18 14:23	
						equip	dv-4				
5	180907A LCSD-2		0.040	3	0.250	1	1000	5	7	09/07/18 14:23	
						equip	dv-5				
6	AZ79179	AZ79179W01			0.250	1	1050	5	7	09/07/18 14:23	86766
						equip	dv-6				

Ky 9/11/18

Solvent and Lot#	
Ph Strip	hc 727135
Dichloromethane	58059
Filter Paper	400138
B.Na2SO4	18d105205

Extraction COC Transfer	
Extraction lab employee Initials	
GC analyst's initials	DP
Date	9/10/18
Time	2:00
Refrigerator	Hobart 1

	Technician's Initials
Scanned By	FM
Sample Preparation	FM,EL,SS
Extraction	FM,EL,SS
Concentration	FM

Modified	09/11/18 11:53:37 AM

Reviewed By: Ky **Date** 9/11/18

Organic Extraction Worksheet

Method	THC Sonication Extraction 3550B Wet MIS	Extraction Set	180907A	Extraction Method	SON004WETIS	Units	mL

Spiked ID 1	Diesel Ampule 7-12-18 EXP 7-12-19		Surrogate ID 1	THC Surrogate 8-27-18 EXP 8-27-19
Spiked ID 2	Motor Oil Ampule 8-21-18 EXP 8-21-19		Surrogate ID 2	
Spiked ID 3			Surrogate ID 3	
Spiked ID 4			Surrogate ID 4	
Spiked ID 5			Surrogate ID 5	
Spiked ID 6			Sufficient Vol for Matrix QC:	YES
Spiked ID 7			Ext. Start Time:	09/07/18 13:10
Spiked ID 8			Ext. End Time:	09/10/18 10:50
			GC Requires Extract By:	**09/19/18 0:00**
			pH1	Water Bath Temp Criteria 73,75 °C
			pH2	
			pH3	

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907A Blk				0.250	1	50.75g	5	NA	09/07/18 13:10	
						equip	E-S1.1 E-WB5				
2	180907A LCS-1		0.040	1	0.250	1	50.73g	5	NA	09/07/18 13:10	
						equip	E-S1.2 E-WB5				
3	180907A LCS-2		0.040	2	0.250	1	50.27g	5	NA	09/07/18 13:10	
						equip	E-S2 E-WB5				
4	180907A LCSD-1		0.040	1	0.250	1	50.57g	5	NA	09/07/18 13:10	
						equip	E-S6 E-WB5				
5	180907A LCSD-2		0.040	2	0.250	1	50.33g	5	NA	09/07/18 13:10	
						equip	E-S7 E-WB5				
6	AZ79146	AZ79146S01			0.250	1	50.17g	5	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB5				
7	AZ79147	AZ79147S01			0.250	1	50.14g	5	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB5				
8	AZ79148	AZ79148S01			0.250	1	50.13g	5	NA	09/07/18 13:10	86766
						equip	E-S1.2 E-WB5				
9	AZ79149	AZ79149S01			0.250	1	50.23g	5	NA	09/07/18 13:10	86766
						equip	E-S2 E-WB5				
10	AZ79150	AZ79150S01			0.250	1	50.53g	5	NA	09/07/18 13:10	86766
						equip	E-S6 E-WB5				
11	AZ79151 MS-1	AZ79151S01	0.040	1	0.250	1	25.61g	5	NA	09/07/18 15:00	86766
						equip	E-S1.2 E-WB6				
12	AZ79151 MSD-1	AZ79151S01	0.040	1	0.250	1	25.13g	5	NA	09/07/18 15:00	86766
						equip	E-S2 E-WB6				
13	AZ79151 MS-2	AZ79151S01	0.040	2	0.250	1	25.18g	5	NA	09/07/18 15:00	86766
						equip	E-S6 E-WB6				
14	AZ79151 MSD-2	AZ79151S01	0.040	2	0.250	1	25.33g	5	NA	09/07/18 15:00	86766
						equip	E-S7 E-WB6				
15	AZ79151	AZ79151S01			0.250	1	50.02g	5	NA	09/07/18 13:10	86766
						equip	E-S7 E-WB5				
16	AZ79152	AZ79152S01			0.250	1	50.09g	5	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB5				

Solvent and Lot#	
Scale Balance #	EB1
B.Na2SO4	18D105205
Dichloromethane (DCM)	58059
Filter Paper	15751144

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	DP
Date	9/10/18
Time	2:00
Refrigerator	Hobart 1

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/11/18 11:57:57 AM

Reviewed By: Ky **Date** 9/11/18

Injection Log

Directory: G:\APOLLO\DATA\180905\

Vial	FileName	Multiplier	SampleName	Misc Info	Injected
3	905003.D	1	Diesel - 1 9/5/18	Mix(A)	9-5-18 13:32:12
4	905004.D	1	Diesel - 2 9/5/18	Mix(A)	9-5-18 13:51:56
5	905005.D	1	Diesel - 3 9/5/18	Mix(A)	9-5-18 14:11:55
6	905006.D	1	Diesel - 4 9/5/18	Mix(A)	9-5-18 14:31:55
7	905007.D	1	Diesel - 5 9/5/18	Mix(A)	9-5-18 14:51:56
8	905008.D	1	Diesel - 6 9/5/18	Mix(A)	9-5-18 15:11:58
9	905009.D	1	Diesel - SS 8/2/18	Mix(A)	9-5-18 15:32:03
10	905010.D	1	Motor Oil - 1 9/5/18	Mix(B)	9-5-18 15:52:08
11	905011.D	1	Motor Oil - 2 9/5/18	Mix(B)	9-5-18 16:12:11
12	905012.D	1	Motor Oil - 3 9/5/18	Mix(B)	9-5-18 16:32:11
13	905013.D	1	Motor Oil - 4 9/5/18	Mix(B)	9-5-18 16:52:14
14	905014.D	1	Motor Oil - 5 9/5/18	Mix(B)	9-5-18 17:12:14
15	905015.D	1	Motor Oil - 6 9/5/18	Mix(B)	9-5-18 17:31:25
16	905016.D	1	Motor Oil - SS 7/13/18	Mix(B)	9-5-18 17:51:24
31	910031.D	1	Diesel - 3 8/13/18	Mix(A)	9-10-18 20:22:33
32	910032.D	1	Motor Oil - 3 8/15/18	Mix(B)	9-10-18 20:42:34
33	910033.D	492.611	180907A BLK 5/50.75G DF5	soil	9-10-18 21:02:33
34	910034.D	492.805	180907A LCS-1 5/50.73G DF5	soil	9-10-18 21:22:31
35	910035.D	497.315	180907A LCS-2 5/50.27G DF5	soil	9-10-18 21:42:32
38	910038.D	498.306	AZ79146S01 5/50.17G DF5	soil	9-10-18 22:42:24
39	910039.D	498.604	AZ79147S01 5/50.14G DF5	soil	9-10-18 23:02:28
40	910040.D	498.703	AZ79148S01 5/50.13G DF5	soil	9-10-18 23:22:38
41	910041.D	497.711	AZ79149S01 5/50.23G DF5	soil	9-10-18 23:42:40
42	910042.D	494.756	AZ79150S01 5/50.53G DF5	soil	9-11-18 0:02:44
43	910043.D	499.8	AZ79151S01 5/50.02G DF5	soil	9-11-18 0:22:01
44	910044.D	976.181	AZ79151S01 MS-1 5/25.61G DF5	soil	9-11-18 0:41:54
45	910045.D	994.827	AZ79151S01 MSD-1 5/25.13G DF5	soil	9-11-18 1:01:57
46	910046.D	992.851	AZ79151S01 MS-2 5/25.18G DF5	soil	9-11-18 1:22:00
47	910047.D	986.972	AZ79151S01 MSD-2 5/25.33G DF5	soil	9-11-18 1:42:03
48	910048.D	1	Diesel - 3 8/13/18	Mix(A)	9-11-18 2:02:02
49	910049.D	1	Motor Oil - 3 8/15/18	Mix(B)	9-11-18 2:21:58
50	910050.D	499.102	AZ79152S01 5/50.09G DF5	soil	9-11-18 2:41:53
51	910051.D	498.107	AZ79153S01 5/50.19G DF5	soil	9-11-18 3:01:54
52	910052.D	497.413	AZ79154S01 5/50.26G DF5	soil	9-11-18 3:21:53
53	910053.D	492.708	AZ79155S01 5/50.74G DF5	soil	9-11-18 3:41:56
54	910054.D	498.107	AZ79156S01 5/50.19G DF5	soil	9-11-18 4:01:55
55	910055.D	497.512	AZ79157S01 5/50.25G DF5	soil	9-11-18 4:21:55
56	910056.D	492.32	AZ79158S01 5/50.78G DF5	soil	9-11-18 4:41:57
57	910057.D	495.933	AZ79159S01 5/50.41G DF5	soil	9-11-18 5:01:08
58	910058.D	491.352	AZ79160S01 5/50.88G DF5	soil	9-11-18 5:21:04
59	910059.D	1	Diesel - 3 8/13/18	Mix(A)	9-11-18 5:41:05
60	910060.D	1	Motor Oil - 3 8/15/18	Mix(B)	9-11-18 6:01:01
61	910061.D	5	180907A BLK 5/1000	water	9-11-18 6:21:04
63	910063.D	5	180907A LCS-2 5/1000	water	9-11-18 7:00:54
66	910066.D	4.7619	AZ79179W01 5/1050	water	9-11-18 8:00:11
67	910067.D	1	Diesel - 3 8/13/18	Mix(A)	9-11-18 8:20:31
68	910068.D	1	Motor Oil - 3 8/15/18	Mix(B)	9-11-18 8:40:11
2	912002.D	1	Diesel - 3 8/13/18	Mix(A)	9-12-18 16:17:19
4	912004.D	5	180907A LCS-1 5/1000	water	9-12-18 16:56:43
20	912020.D	1	Diesel - 3 8/13/18	Mix(A)	9-12-18 22:20:25
26	914026.D	1	Diesel - 3 8/13/18	Mix(A)	9-14-18 16:57:35

27	914027.D	1	Motor Oil - 3 8/15/18	Mix(B)	9-14-18 17:17:47
28	914028.D	492.611	180907A BLK 5/50.75G SGC DF5	soil	9-14-18 17:37:54
30	914030.D	497.315	180907A LCS-2 5/50.27G SGC DF5	soil	9-14-18 18:18:17
31	914031.D	494.364	180907A LCS-1 5/50.57G SGC DF5	soil	9-14-18 18:38:36
33	914033.D	498.306	AZ79146S01 5/50.17G SGC DF5	soil	9-14-18 19:19:08
34	914034.D	498.604	AZ79147S01 5/50.14G SGC DF5	soil	9-14-18 19:39:29
35	914035.D	498.703	AZ79148S01 5/50.13G SGC DF5	soil	9-14-18 19:59:38
36	914036.D	497.711	AZ79149S01 5/50.23G SGC DF5	soil	9-14-18 20:19:37
37	914037.D	494.756	AZ79150S01 5/50.53G SGC DF5	soil	9-14-18 20:39:33
38	914038.D	499.8	AZ79151S01 5/50.02G SGC DF5	soil	9-14-18 20:59:31
39	914039.D	976.181	AZ79151S01 MS-1 5/25.61G SGC DF5	soil	9-14-18 21:19:24
40	914040.D	992.851	AZ79151S01 MS-2 5/25.18G SGC DF5	soil	9-14-18 21:38:35
41	914041.D	994.827	AZ79151S01 MSD-1 5/25.13G SGC DF5	soil	9-14-18 21:57:55
42	914042.D	986.972	AZ79151S01 MSD-2 5/25.33G SGC DF5	soil	9-14-18 22:17:49
43	914043.D	1	Diesel - 3 8/13/18	Mix(A)	9-14-18 22:37:09
44	914044.D	1	Motor Oil - 3 8/15/18	Mix(B)	9-14-18 22:57:09
45	914045.D	500	AZ79152S01 5/50.09G SGC DF5	soil	9-14-18 23:17:15
46	914046.D	499.102	AZ79153S01 5/50.19G SGC DF5	soil	9-14-18 23:37:26
47	914047.D	497.413	AZ79154S01 5/50.26G SGC DF5	soil	9-14-18 23:57:18
48	914048.D	492.708	AZ79155S01 5/50.74G SGC DF5	soil	9-15-18 0:17:25
49	914049.D	498.107	AZ79156S01 5/50.19G SGC DF5	soil	9-15-18 0:37:24
50	914050.D	497.512	AZ79157S01 5/50.25G SGC DF5	soil	9-15-18 0:56:36
51	914051.D	497.216	AZ79158S01 5/50.28G SGC DF5	soil	9-15-18 1:16:40
52	914052.D	495.933	AZ79159S01 5/50.41G SGC DF5	soil	9-15-18 1:36:42
53	914053.D	491.352	AZ79160S01 5/50.88G SGC DF5	soil	9-15-18 1:56:38
54	914054.D	1	Diesel - 3 8/13/18	Mix(A)	9-15-18 2:16:36
55	914055.D	1	Motor Oil - 3 8/15/18	Mix(B)	9-15-18 2:36:32

ORGANICS
Calibration Data

APPL, INC.

Data File Name:	**0911002.D**
Data File Path:	**G:\ETHEL\DATA\180911**
Operator:	**MA**
Date Acquired:	**11 Sep 2018 13:36**
Method File:	**OCL0911.M**
Sample Name:	**OCL Deg Check 1/15/18**
Vial Number:	**2**
Instrument Name:	**Ethel**

#	Name	Ret Time	Target Response
1)	P,P-DDT	8.94	44837400
2)	P,P-DDD	8.50	152096
3)	P,P-DDE	7.66	155057

Breakdown **0.68**

#	Name	Ret Time	Target Response
1)	P,P-DDT #2	9.87	51077500
2)	P,P-DDD #2	9.35	365663
3)	P,P-DDE #2	8.50	675158

Breakdown **2.0**

#	Name	Ret Time	Target Response
1)	ENDRIN	8.36	43153300
2)	ENDRIN ALDEHYDE	9.13	483435
3)	ENDRIN KETONE	10.59	1063680

Breakdown **3.5**

#	Name	Ret Time	Target Response
1)	ENDRIN #2	9.14	56992400
2)	ENDRIN ALDEHYDE #2	9.80	698292
3)	ENDRIN KETONE #2	11.16	2491660

Breakdown **5.3**

Quantitation Report (Not Reviewed)

```
Signal #1 : G:\ETHEL\DATA\180911\0911002.D\ECD1A.CH      Vial: 2
Signal #2 : G:\ETHEL\DATA\180911\0911002.D\ECD2B.CH
Acq On    : 9-11-18 13:36:46                          Operator: MA
Sample    : OCL Deg Check 1/15/18                     Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:44 2018  Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:21:20 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2ul
Signal #1 Phase : DB-35MS          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

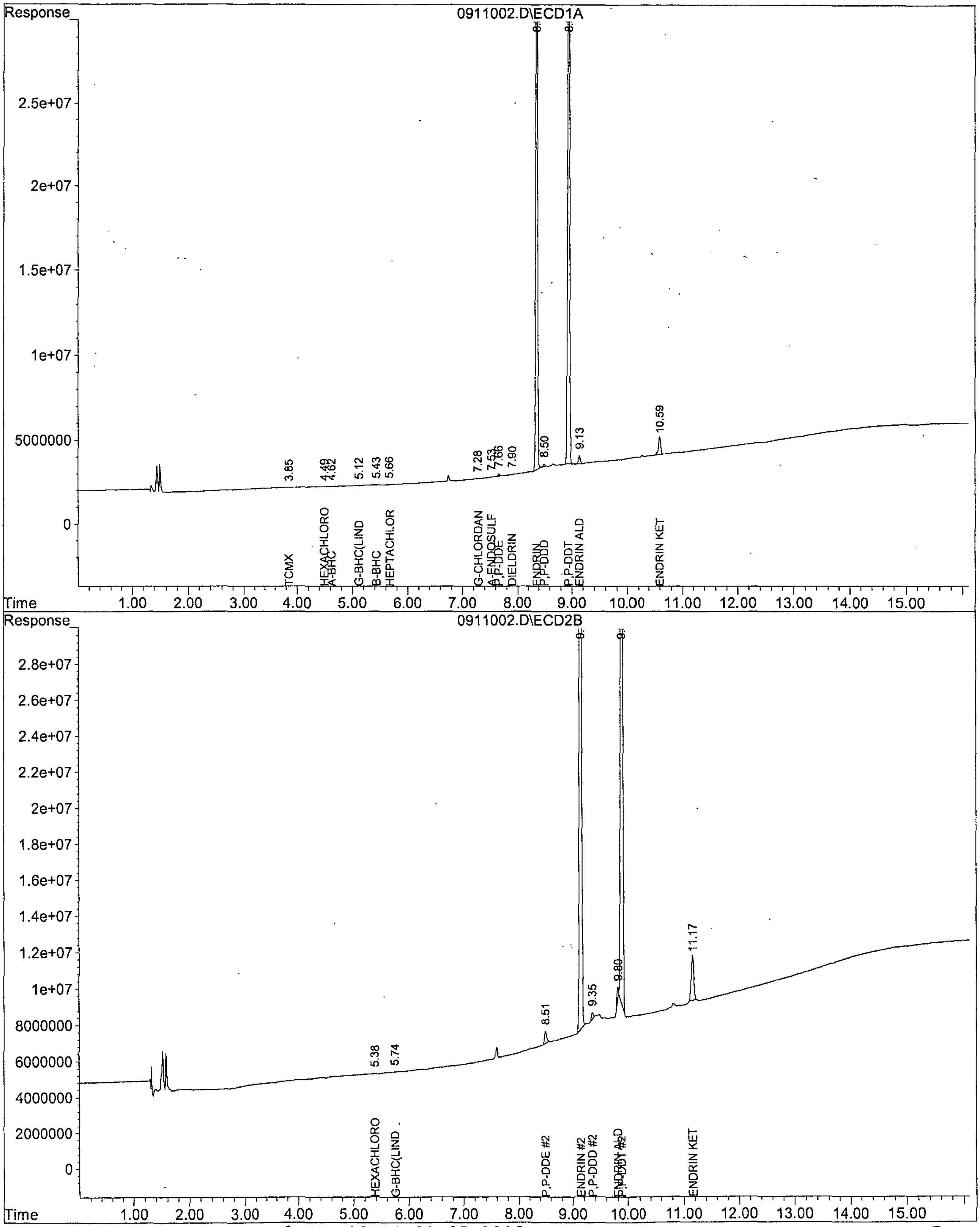
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1)	S TCMX	3.85f	0.00	3121	0	0.0000	N.D. #
	Surrogate Spike 0.150 Range 25 - 150			Recovery	=	0.00%#	0.00%#
23)	S DBC	0.00	0.00	0	0	N.D.	N.D.
	Surrogate Spike 0.150			Recovery	=	0.00%	0.00%
24)	S DECA	0.00	0.00	0	0	N.D.	N.D.
	Surrogate Spike 0.150 Range 25 - 150			Recovery	=	0.00%#	0.00%#
	Target Compounds						
2)	TM HEXACHLOROBENZEN	4.49	5.38	4561	12763	0.0000	0.0001 #
3)	TM A-BHC	4.62	0.00	3397	0	0.0000	N.D. #
4)	TM B-BHC	5.43f	0.00	4759	0	0.0001	N.D. #
5)	M G-BHC(LINDANE)	5.12f	5.74	5047	6519	0.0000	0.0000 #
7)	M HEPTACHLOR	5.66	0.00	2032	0	0.0000	N.D. #
10)	TM G-CHLORDANE	7.28	0.00	2123	0	0.0000	N.D. #
11)	TM A-ENDOSULFAN	7.53f	0.00	22285	0	0.0002	N.D. #
13)	TM P,P-DDE	7.66	8.51	155057	675158	0.0015	0.0048 #
14)	M DIELDRIN	7.90	0.00	14825	0	0.0002	N.D. #
15)	M ENDRIN	8.36	9.14	43153293	56992442	0.5061	0.5334
17)	TM P,P-DDD	8.50	9.35	152096	365663	0.0018	0.0035 #
18)	TM ENDRIN ALDEHYDE	9.13	9.80	483435	698292	0.0077	0.0097 #
19)	M P,P-DDT	8.94	9.87	44837374	51077474	0.5401	0.5847
21)	TM ENDRIN KETONE	10.59	11.17	1063684	2491659	0.0145	0.0227 #
	Target Compounds						
6)	TM D-BHC	0.00	0.00	0	0	N.D.	N.D.
8)	M ALDRIN	0.00	0.00	0	0	N.D.	N.D.
9)	TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D.	N.D.
12)	TM A-CHLORDANE	0.00	0.00	0	0	N.D.	N.D.
16)	TM B-ENDOSULFAN	0.00	0.00	0	0	N.D.	N.D.
20)	TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D.	N.D.
22)	TM METHOXYCHLOR	0.00	0.00	0	0	N.D.	N.D.

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911002.D
Acq On : 9-11-18 13:36:46
Sample : OCL Deg Check 1/15/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 2
Operator: MA
Inst : Ethel
Multiplr: 1.00



Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 6
Initial Calibration

Lab Name: APPL, Inc.   SDG No:
Case No: Initial Cal. Date: 09/11/18
Matrix: Water   Instrument: Ethel   Initials:

			0911005.D	0911007.D	0911008.D	0911009.D	0911010.D	0911004.D	0911003.D								
		Compound	1	3	4	5	6	1A	1B				Avg	%RSD	Type	r^2	Q
1	S	TCMX	54281600	49817255	47876383	49350408	48387972	51306833	52898500				50559850	4.7	S		
2	TM	HEXACHLOROBENZENE	66959900	56200085	54200923	54666405	52738912	64349167	69683500				59828413	12	TM		
3	TM	A-BHC	54552700	63028140	60591993	62699868	61494734	50893667	45870000				57018729	12	TM		
4	TM	B-BHC	28354300	25821740	24428503	24921825	24841804	26273000	27234500				25982239	5.5	TM		
5	M	G-BHC(LINDANE)	57137700	57457405	54719337	57948403	54701574	52572667	51113000				55092869	4.7	M		
6	TM	D-BHC	57704800	59426330	58009763	59285293	56978888	54581333	58553500				57791415	2.9	TM		
7	M	HEPTACHLOR	52895800	49649675	48745133	52467895	49170488	49381500	47764500				50010713	3.8	M		
8	M	ALDRIN	50538800	50424540	49717167	51997858	48519620	47288667	40316500				48400450	8.0	M		
9	TM	HEPTACHLOR EPOXIDE	50086000	46800255	45874567	48748440	44589770	47086333	47145000				47190052	3.8	TM		
10	TM	G-CHLORDANE	51889700	50103520	50836290	53699110	50904000	49533833	48223500				50741422	3.4	TM		
11	TM	A-ENDOSULFAN	47823800	46519935	45730817	46740628	44077854	43990167	40882500				45109386	5.2	TM		
12	TM	A-CHLORDANE	52549500	48864125	49900400	52923310	48600082	49627667	50480500				50420798	3.4	TM		
13	TM	P,P-DDE	51954100	53316130	52895617	56521123	50747306	51179667	44792000				51629420	6.9	TM		
14	M	DIELDRIN	47845600	47618975	45756307	48966350	45729694	46486500	41561000				46280632	5.2	M		
15	M	ENDRIN	44107200	42221955	40648110	43402365	40323320	41364333	46351000				42631183	5.0	M		
16	TM	B-ENDOSULFAN	41966100	41698720	41092610	42021848	41366028	40733000	32695000				40224758	8.3	TM		
17	TM	P,P-DDD	42368000	42991290	41769123	44094938	41793892	41733500	36785500				41648035	5.5	TM		
18	TM	ENDRIN ALDEHYDE	33711600	31372140	31435773	33617253	29672856	34814833	25512500				31448136	10	TM		
19	M	P,P-DDT	42986700	42434410	42124837	47064643	42670582	40364167	32906000				41507334	10	M		
20	TM	ENDOSULFAN SULFATE	41236300	35909960	35845497	39144300	36423154	39460000	38597000				38088030	5.4	TM		
21	TM	ENDRIN KETONE	38584900	37796360	37357473	39077568	35604800	37885333	30159500				36637991	8.4	TM		
22	TM	METHOXYCHLOR	19712300	20047250	18678783	19941315	18353916	19986000	16152000				18981652	7.5	TM		
23	S	DBC	109802700	85187675	83945503	90781733	82542532	104081000					92723524	12	S		
24	S	DECA	98046900	95905580	92889890	99065368	89964188	93002333					94812376	3.7	S		
25		Signal #2															
26																	
27																	
28																	
29																	
30																	
31																	
32																	
33																	
34																	
35																	

4.49939

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 6
Initial Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Initial Cal. Date: 09/11/18
Instrument: Ethel

Initials:

		Compound	1	3	4	5	6	1A	1B				Avg	%RSD	Type	r^2	Q
			0911005.D	0911007.D	0911008.D	0911009 D	0911010.D	0911004.D	0911003.D								
36	S	TCMX #2	111379800	102679685	99335730	103397915	97802182	117754167	116291000				106948640	7.6	S		
37	TM	HEXACHLOROBENZENE #2	107274500	96871915	92943903	96784625	88266978	107025167	103922500				99012798	7.4	TM		
38	TM	A-BHC #2	119424000	129979455	125275110	133287490	125023018	116282833	102631000				121700415	8.4	TM		
39	TM	B-BHC #2	53602700	51289605	49600150	52552498	48463160	54891833	48474500				51267778	5.0	TM		
40	M	G-BHC(LINDANE) #2	213799600	240090170	233199100	248935938	234917130	207648333	175596000				222026610	11	M		
41	TM	D-BHC #2	100359000	107150700	102466593	109318718	101039204	97428333	94632500				101770721	5.1	TM		
42	M	HEPTACHLOR #2	84926400	82026875	80532840	85877100	79538448	84032167	82403500				82762476	2.8	M		
43	M	ALDRIN #2	82874700	86307865	83581810	93817893	83071568	78309000	74338500				83185905	7.4	M		
44	TM	HEPTACHLOR EPOXIDE #2	79196200	80859815	76476877	81052835	75085990	77704500	69558500				77133531	5.2	TM		
45	TM	G-CHLORDANE #2	70950200	70025825	70522623	75237310	69628344	72014333	64666000				70434948	4.5	TM		
46	TM	A-ENDOSULFAN #2	64576100	62519275	60725780	66957053	60181208	66536500	54342000				62262559	7.0	TM		
47	TML	A-CHLORDANE #2	67726800	65715160	65067233	69944618	63942392	68767833	66818500				66854648	3.2	TM	0.997	
48	TM	P,P-DDE #2	68927900	70491545	70076373	78810040	69439434	70078167	60440000				69751923	7.6	TM		
49	M	DIELDRIN #2	66735300	66464740	64538480	72732875	64509150	62953833	57586000				65074340	7.0	M		
50	ML	ENDRIN #2	52197700	54994255	51068990	57553123	51528320	50067667	25406000				48973722	22	M	0.994	
51	TML	B-ENDOSULFAN #2	59902600	60032495	56981210	61177708	56820488	55657500	9019500				51370214	37	TM	0.998	
52	TM	P,P-DDD #2	49809000	56785775	54962150	58849133	53105942	48905833	41041500				51922762	12	TM		
53	TM	ENDRIN ALDEHYDE #2	37042000	37752195	35813183	39321363	35782418	33162167	34129000				36143189	5.8	TM		
54	M	P,P-DDT #2	42063200	47135905	46239493	49715013	45096504	37690500	37829000				43681374	11	M		
55	TM	ENDOSULFAN SULFATE #2	50189800	48823580	47417847	51498773	47544544	47914500	34219500				46801220	12	TM		
56	TML	ENDRIN KETONE #2	53136600	55800015	52766550	58366528	53666622	50186667	27062500				50140783	21	TM	0.997	
57	TM	METHOXYCHLOR #2	23465800	24108405	23351673	25647140	22867428	19549000	24703000				23384635	8.3	TM		
58	S	DBC #2	31948400	37548025	37003933	40962483	36647056	27673167					35297177	13	S		
59	S	DECA #2	29244200	27195325	27538387	28479375	26008838	26574167					27506715	4.4	S		
60																	
61																	
62																	
63																	
64																	
65																	
66																	
67																	
68																	
69																	
70																	

6.711424

Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On : 9-11-18 13:55:43 Operator: MA
Sample : OCLHX - 1B 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 9:20 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Tue Sep 11 15:15:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.67	105797	232582	0.0012	0.0012
Surrogate Spike 0.150 Range 25 - 150 Recovery =					0.80%#	0.80%#
23) S DBC	0.00	0.00	0	0	N.D. d	N.D.
Surrogate Spike 0.150 Recovery =					0.00%	0.00%
24) S DECA	0.00	0.00	0	0	N.D.	N.D.
Surrogate Spike 0.150 Range 25 - 150 Recovery =					0.00%#	0.00%#
Target Compounds						
2) TM HEXACHLOROBENZEN	4.51	5.39	139367	207845	0.0014	0.0011
3) TM A-BHC	4.63	5.27	91740	205262	0.0008	0.0009
4) TM B-BHC	5.50	6.17	54469	96949	0.0011	0.0009
5) M G-BHC(LINDANE)	5.17	5.76	102226	351192	0.0009	0.0008
6) TM D-BHC	5.92	6.56	117107	189265	0.0010	0.0009
7) M HEPTACHLOR	5.68	6.62	95529	164807	0.0010	0.0009
8) M ALDRIN	6.14	7.10	80633	148677	0.0008	0.0008
9) TM HEPTACHLOR EPOXI	6.92	7.75	94290	139117	0.0009	0.0008
10) TM G-CHLORDANE	7.25	8.22	96447	129332	0.0009	0.0007
11) TM A-ENDOSULFAN	7.48	8.36	81765	108684	0.0009	0.0007
12) TM A-CHLORDANE	7.39	8.29	100961	133637	0.0010	0.0008
13) TM P,P-DDE	7.66	8.50	89584	120880	0.0009	0.0007
14) M DIELDRIN	7.89	8.76	83122	115172	0.0009	0.0007
15) M ENDRIN	8.36	9.15	92702	50812	0.0013	0.0004 #
16) TM B-ENDOSULFAN	8.77	9.60	65390	18039	0.0008	0.0001 #
17) TM P,P-DDD	8.50	9.34	73571	82083	0.0010	0.0006m#
18) TM ENDRIN ALDEHYDE	9.14	9.80	51025	68258	0.0008	0.0007m
19) M P,P-DDT	8.94	9.88	65812	75658	0.0009	0.0006m#
20) TM ENDOSULFAN SULFA	9.47	10.32	77194	68439	0.0010	0.0005 #
21) TM ENDRIN KETONE	10.59	11.18	60319	54125	0.0008m	0.0004m#
22) TM METHOXYCHLOR	10.10	10.69	32304	49406	0.0005m	0.0008m#

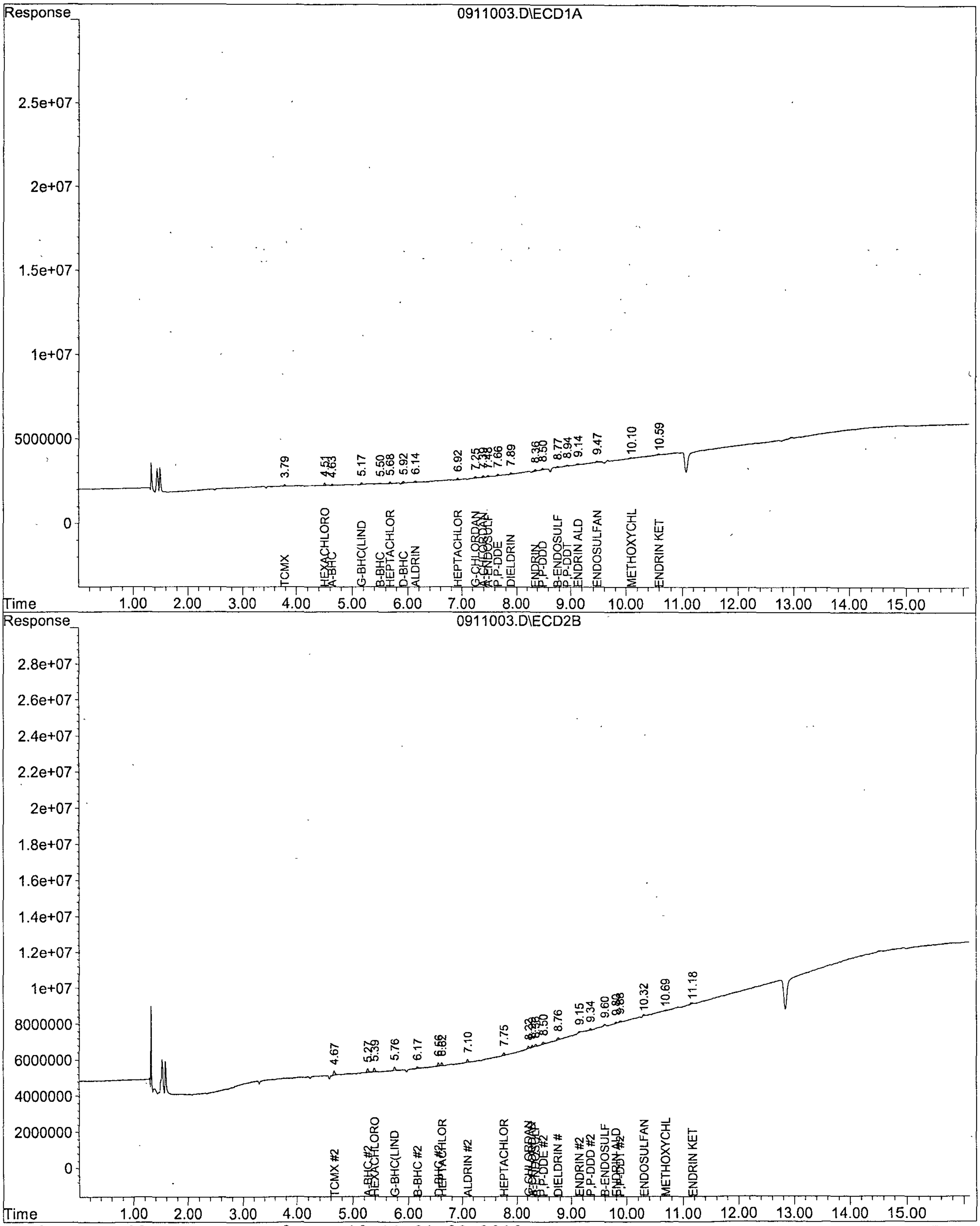
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

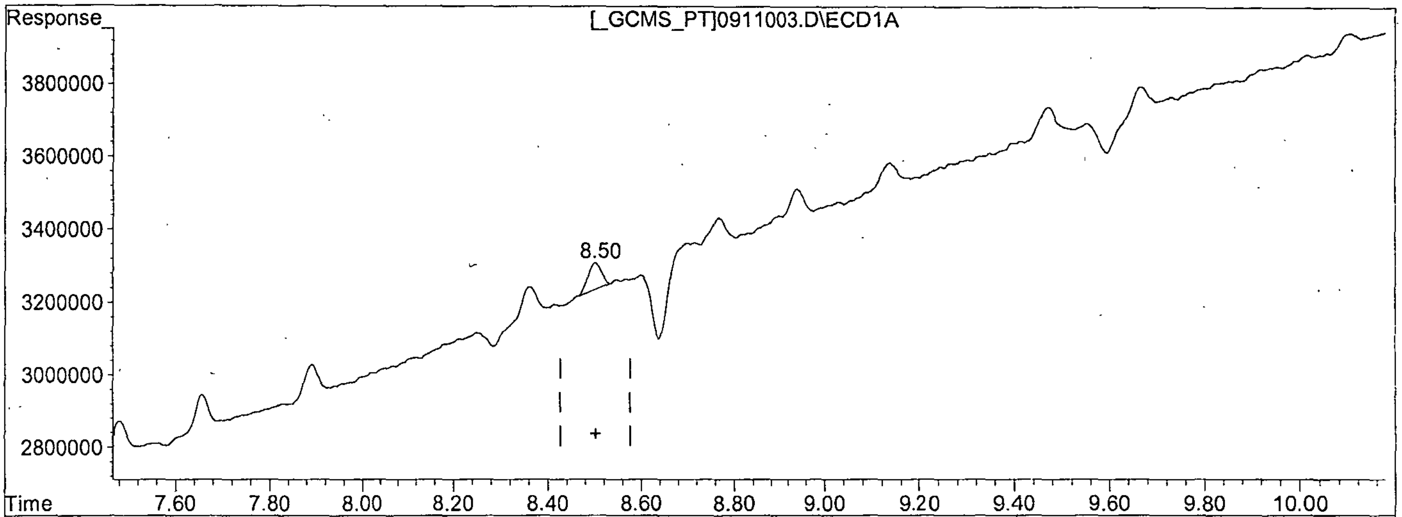
Data File : G:\ETHEL\DATA\180911\0911003.D
Acq On : 9-11-18 13:55:43
Sample : OCLHX - 1B 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

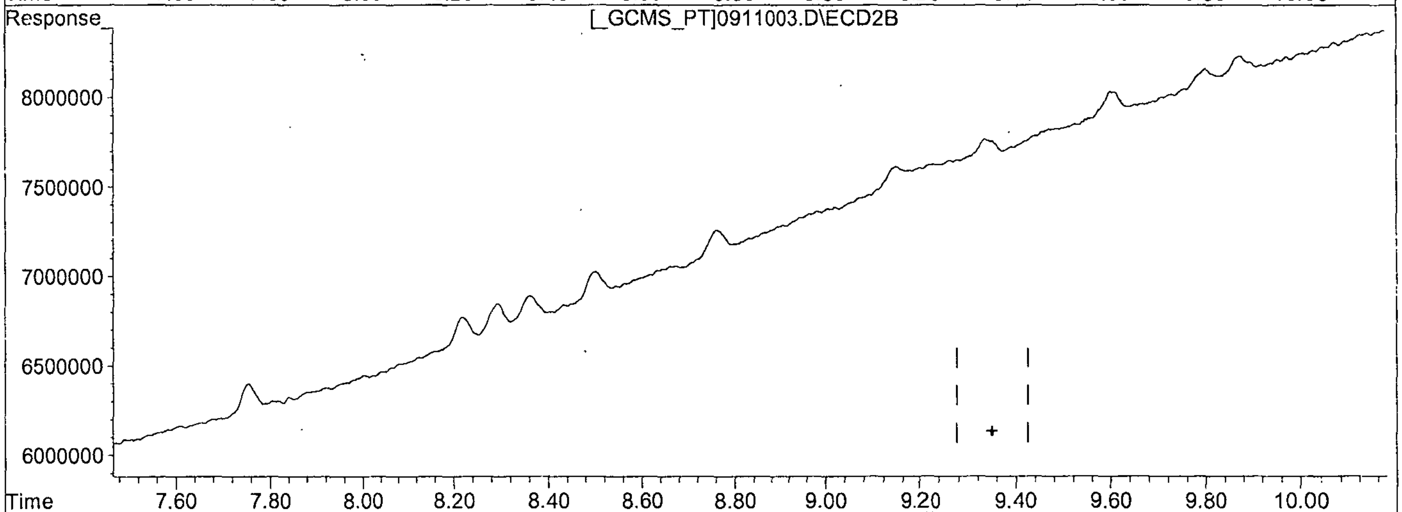
Vial: 3
Operator: MA
Inst : Ethel
Multiplr: 1.00



Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH      Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                          Operator: MA
Sample    : OCLHX - 1B 4/13/18                        Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: rteint.p    IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:12 2018  Quant Results File: OCL0911.RES

Method          : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title           : 508/608/8081
Last Update     : Wed Sep 12 09:18:56 2018
Response via    : Multiple Level Calibration
```





QEdit

(17) P,P-DDD (TM)

8.50min 0.001ppb

response 73571

(17) P,P-DDD #2 (TM)

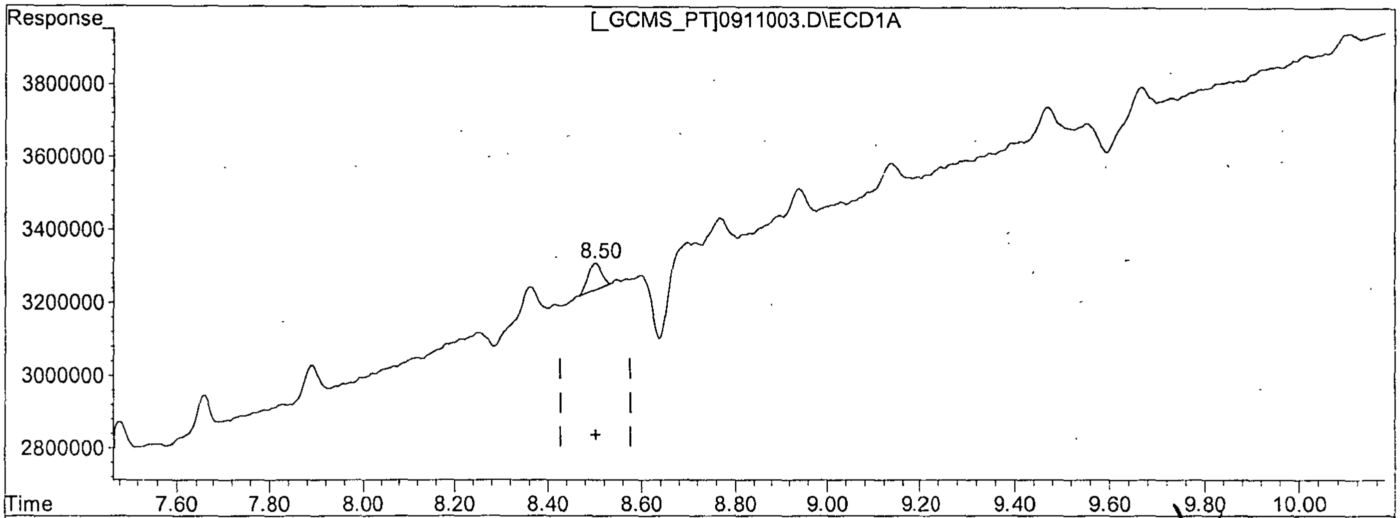
0.00min 0.000ppb

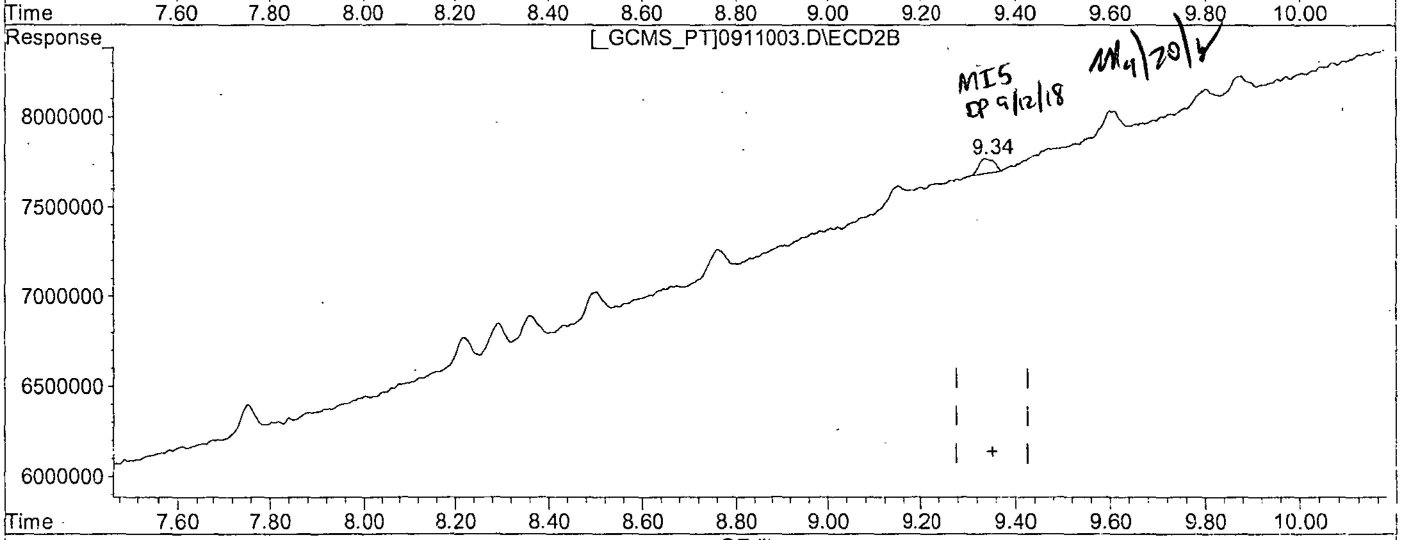
response 0

(+) = Expected Retention Time

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH      Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                          Operator: MA
Sample    : OCLHX - 1B 4/13/18                        Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:12 2018  Quant Results File: OCL0911.RES

Method         : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title          : 508/608/8081
Last Update    : Wed Sep 12 09:18:56 2018
Response via   : Multiple Level Calibration
```





QEdit

(17) P,P-DDD (TM)

8.50min 0.001ppb

response 73571

(17) P,P-DDD #2 (TM)

9.34min 0.001ppb m

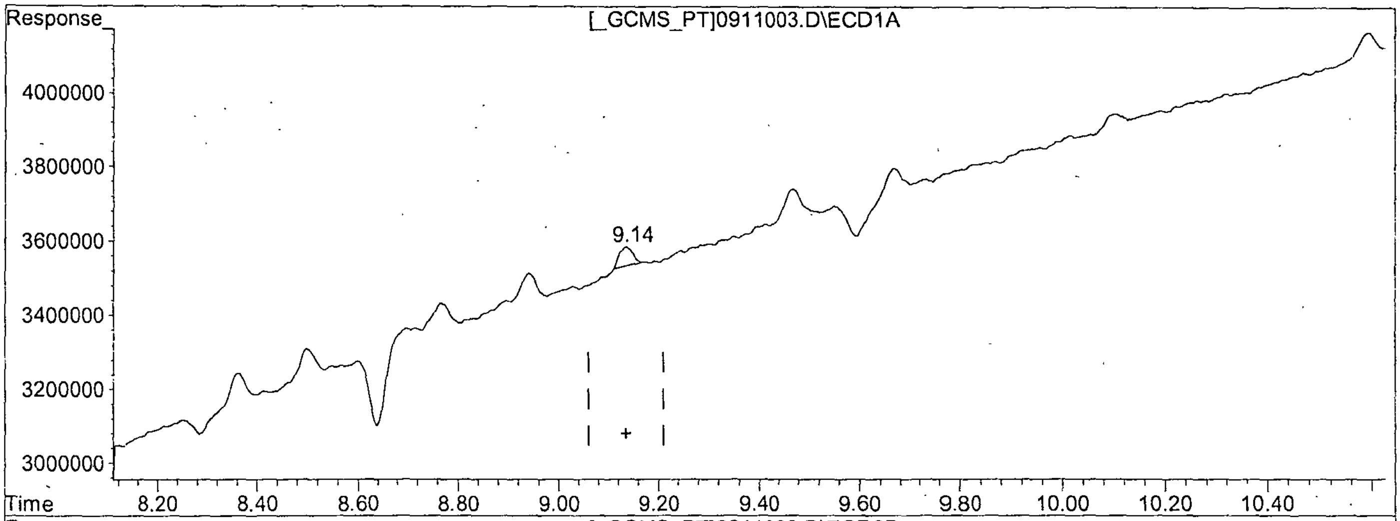
response 82083

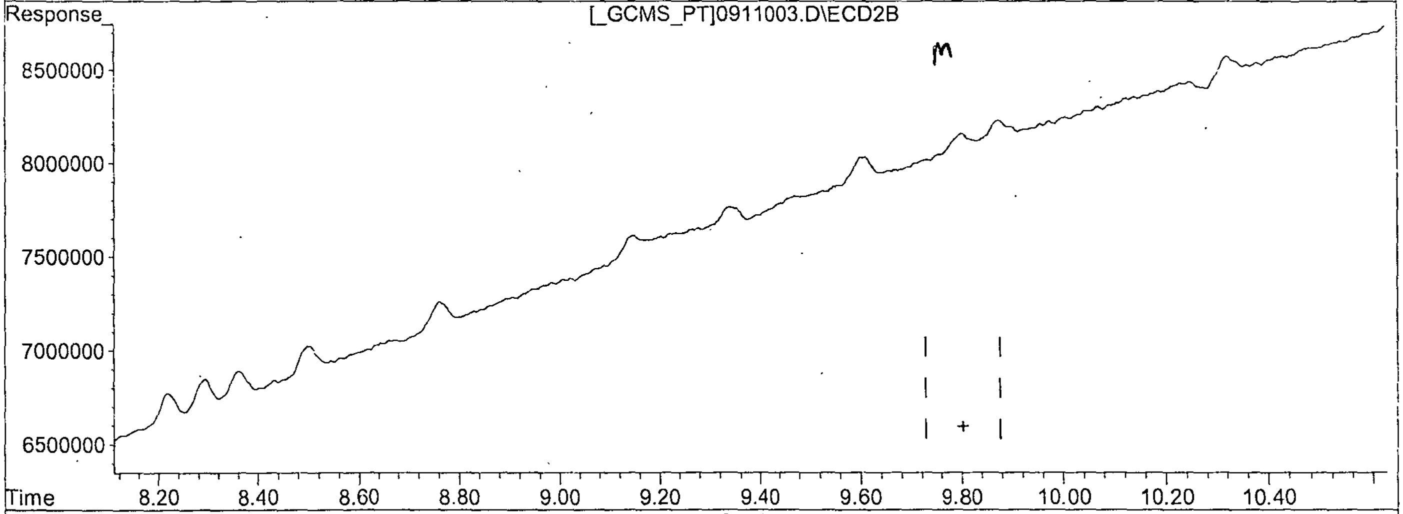
(+) = Expected Retention Time

```
0911003.D   OCL0911.M       Wed Sep 12 09:20:16 2018
```

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH      Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                          Operator: MA
Sample    : OCLHX - 1B 4/13/18                        Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:12 2018  Quant Results File: OCL0911.RES

Method        : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title         : 508/608/8081
Last Update   : Wed Sep 12 09:18:56 2018
Response via  : Multiple Level Calibration
```





QEdit

(18) ENDRIN ALDEHYDE (TM)

9.14min 0.001ppb

response 51025

(18) ENDRIN ALDEHYDE #2 (TM)

0.00min 0.000ppb

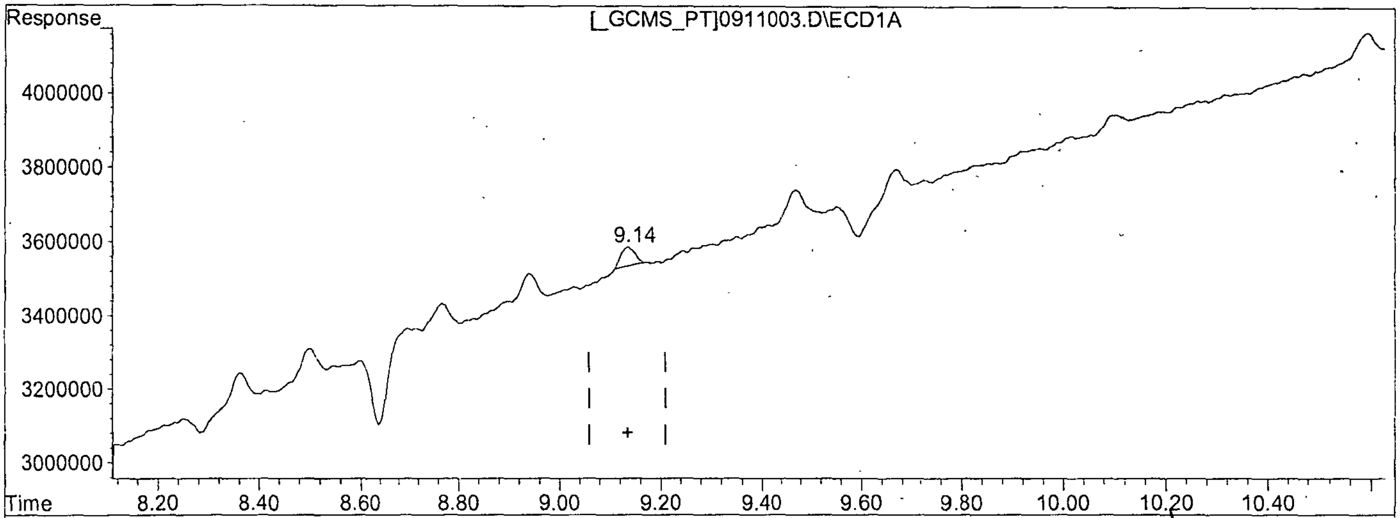
response 0

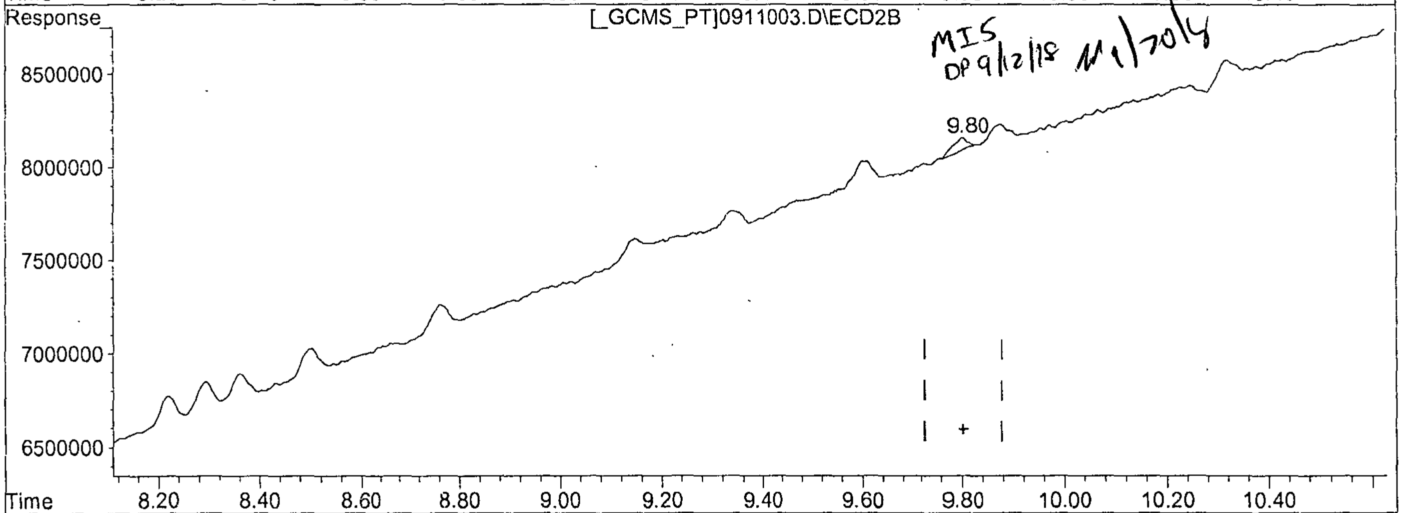
(+) = Expected Retention Time

0911003.D OCL0911.M   Wed Sep 12 09:20:19 2018

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH      Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                           Operator: MA
Sample    : OCLHX - 1B 4/13/18                         Inst    : Ethel
Misc      : water                                      Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:12 2018  Quant Results File: OCL0911.RES

Method        : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title         : 508/608/8081
Last Update   : Wed Sep 12 09:18:56 2018
Response via  : Multiple Level Calibration
```





[redacted]

QEdit

(18) ENDRIN ALDEHYDE (TM)

9.14min 0.001ppb

response 51025

(18) ENDRIN ALDEHYDE #2 (TM)

9.80min 0.001ppb m

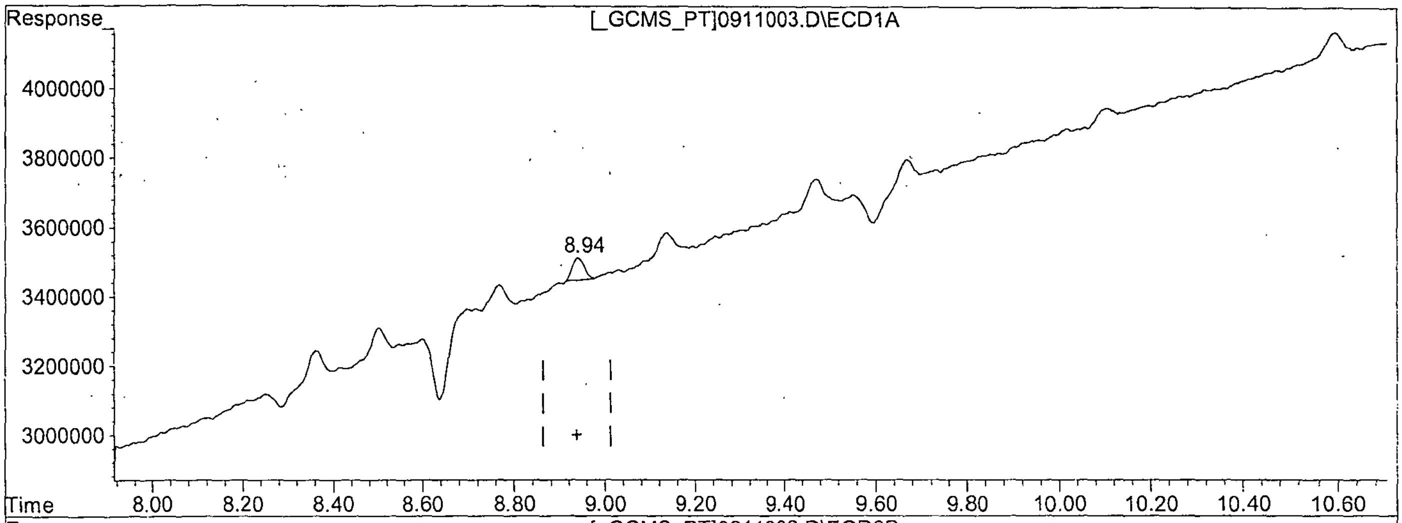
response 68258

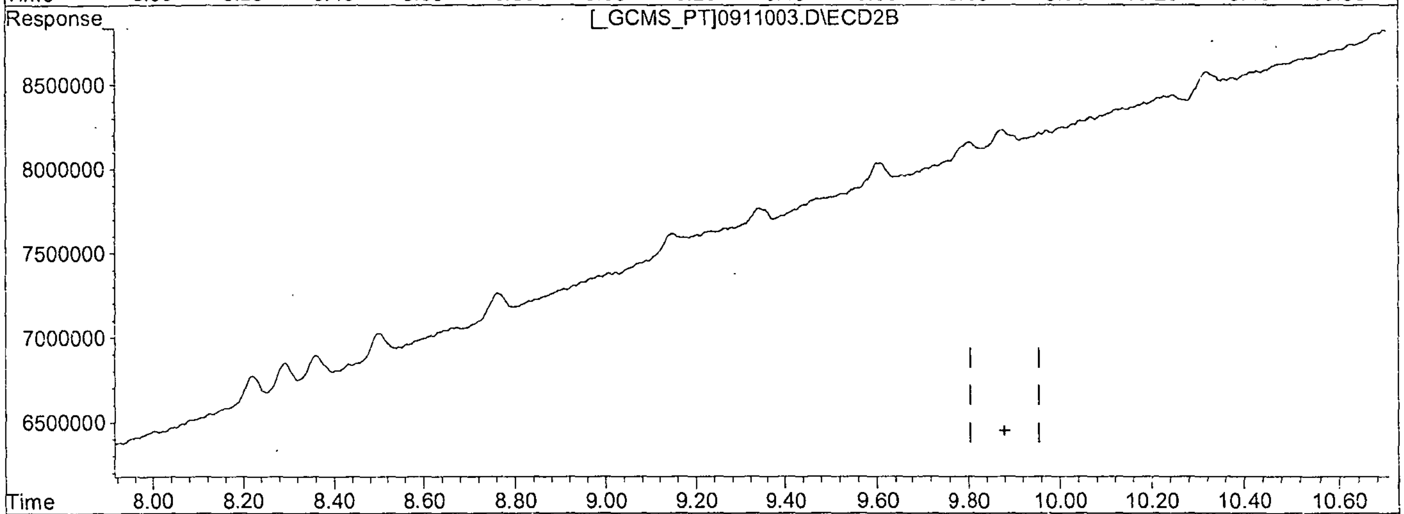
(+) = Expected Retention Time

0911003.D OCL0911.M Wed Sep 12 09:20:24 2018

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH        Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                          Operator: MA
Sample    : OCLHX - 1B 4/13/18                         Inst    : Ethel
Misc      : water                                      Multiplr: 1.00
IntFile Signal #1: rteint.p      IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:12 2018   Quant Results File: OCL0911.RES

Method         : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title          : 508/608/8081
Last Update    : Wed Sep 12 09:18:56 2018
Response via   : Multiple Level Calibration
```





QEdit

(19) P,P-DDT (M)

8.94min 0.001ppb

response 65812

(19) P,P-DDT #2 (M)

0.00min 0.000ppb

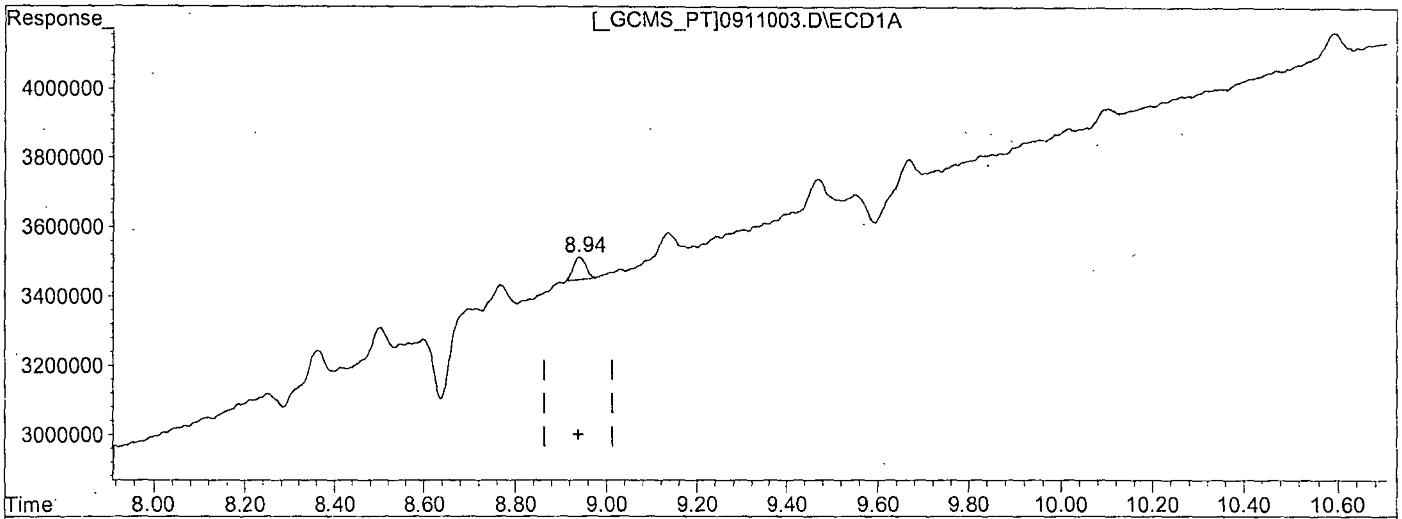
response 0

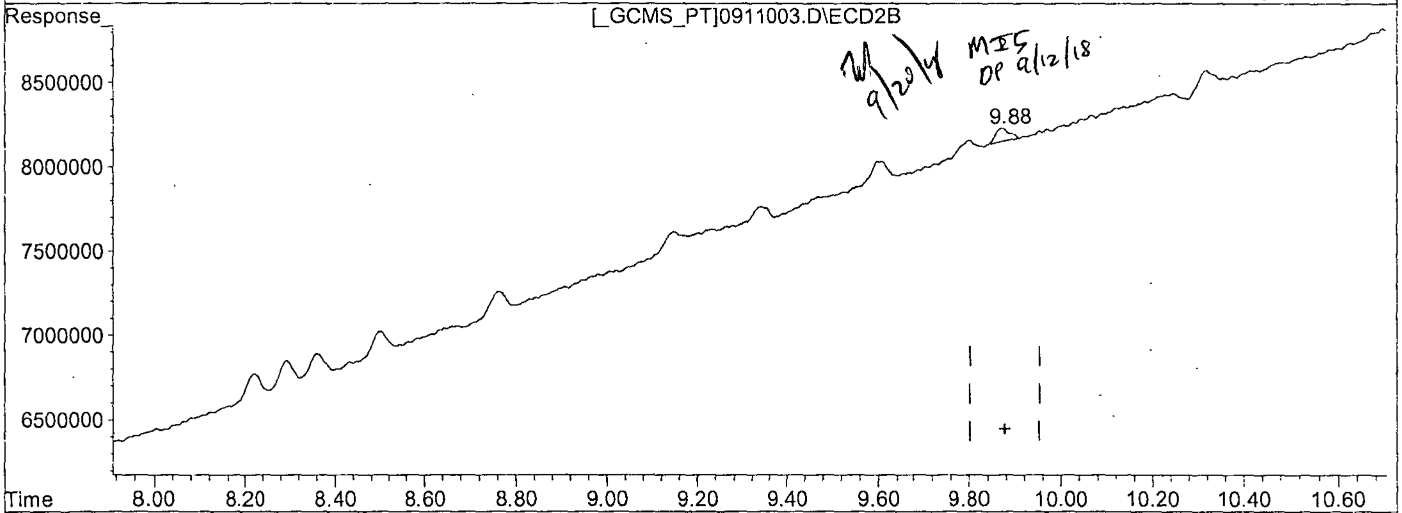
(+) = Expected Retention Time

Quantitation Report

Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On : 9-11-18 13:55:43 Operator: MA
Sample : OCLHX - 1B 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 9:12 2018 Quant Results File: OCL0911.RES

Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:18:56 2018
Response via : Multiple Level Calibration





QEdit

(19) P,P-DDT (M)

8.94min 0.001ppb

response 65812

(19) P,P-DDT #2 (M)

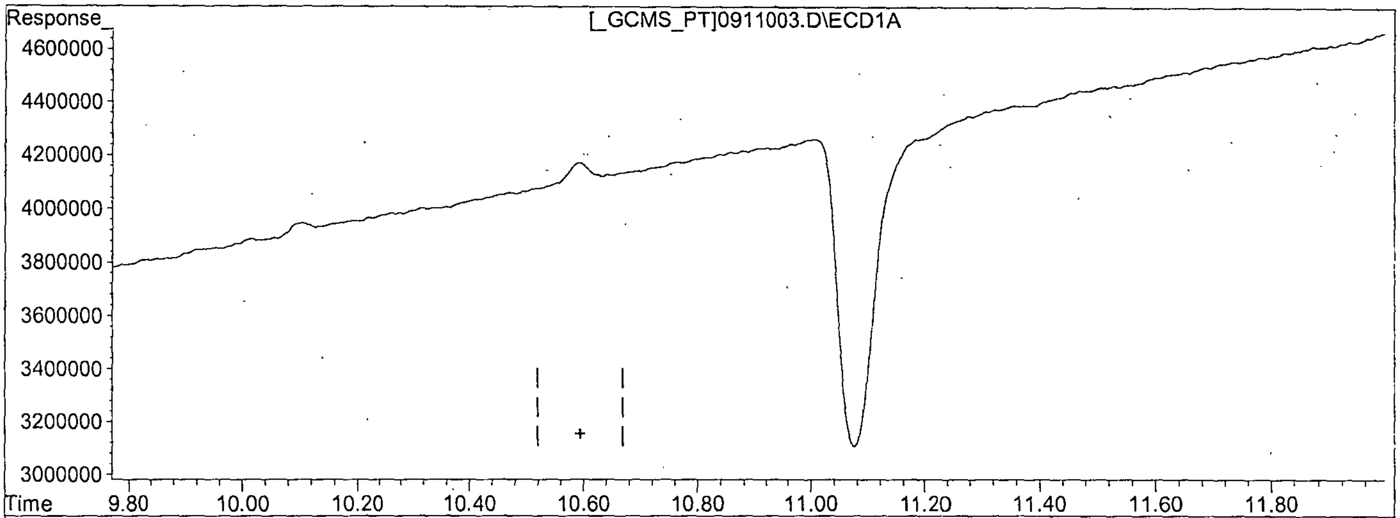
9.88min 0.001ppb m

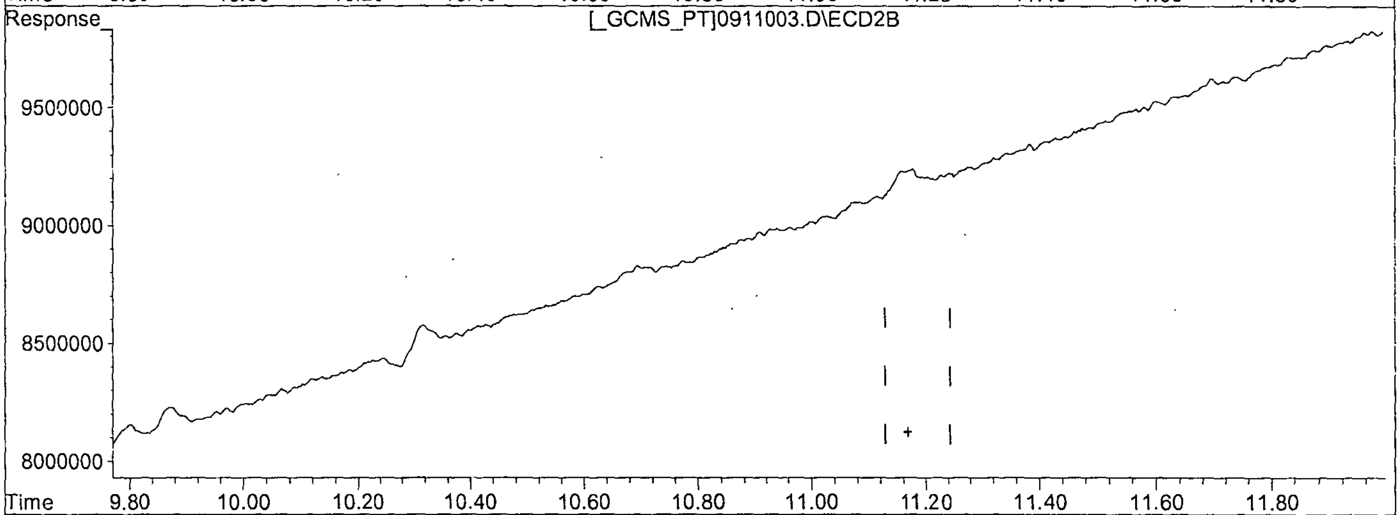
response 75658

(+) = Expected Retention Time

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH       Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                           Operator: MA
Sample    : OCLHX - 1B 4/13/18                         Inst    : Ethel
Misc      : water                                      Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:10 2018  Quant Results File: OCL0911.RES

Method        : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title         : 508/608/8081
Last Update   : Tue Sep 11 15:15:06 2018
Response via  : Multiple Level Calibration
```





QEdit

(21) ENDRIN KETONE (TM)

0.00min 0.000ppb

response 0

(21) ENDRIN KETONE #2 (TM)

0.00min 0.000ppb

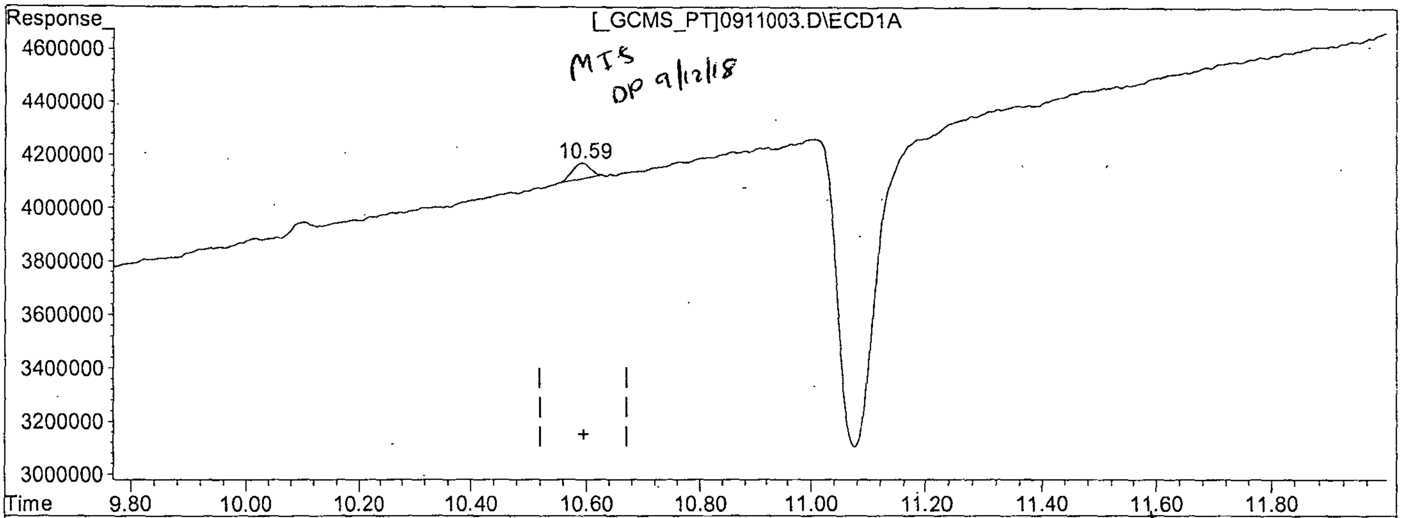
response 0

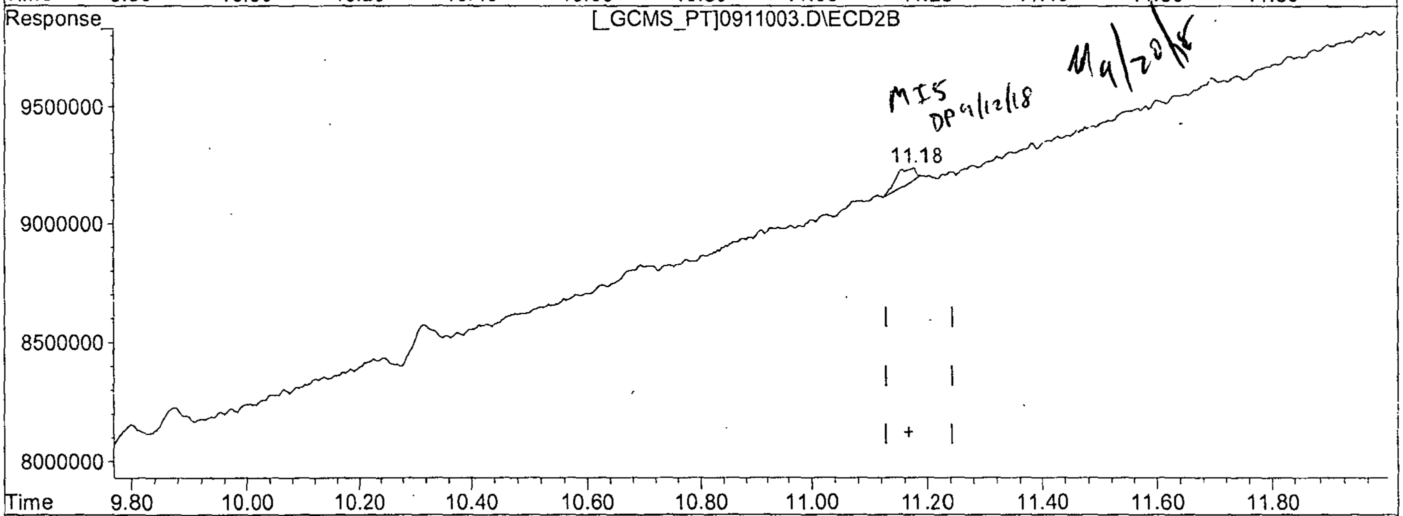
(+) = Expected Retention Time

0911003.D OCL0911.M Wed Sep 12 09:12:28 2018

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH      Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                          Operator: MA
Sample    : OCLHX - 1B 4/13/18                        Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:10 2018  Quant Results File: OCL0911.RES

Method        : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title         : 508/608/8081
Last Update   : Tue Sep 11 15:15:06 2018
Response via  : Multiple Level Calibration
```





QEdit

(21) ENDRIN KETONE (TM)

10.59min 0.001ppb m

response 60319

(21) ENDRIN KETONE #2 (TM)

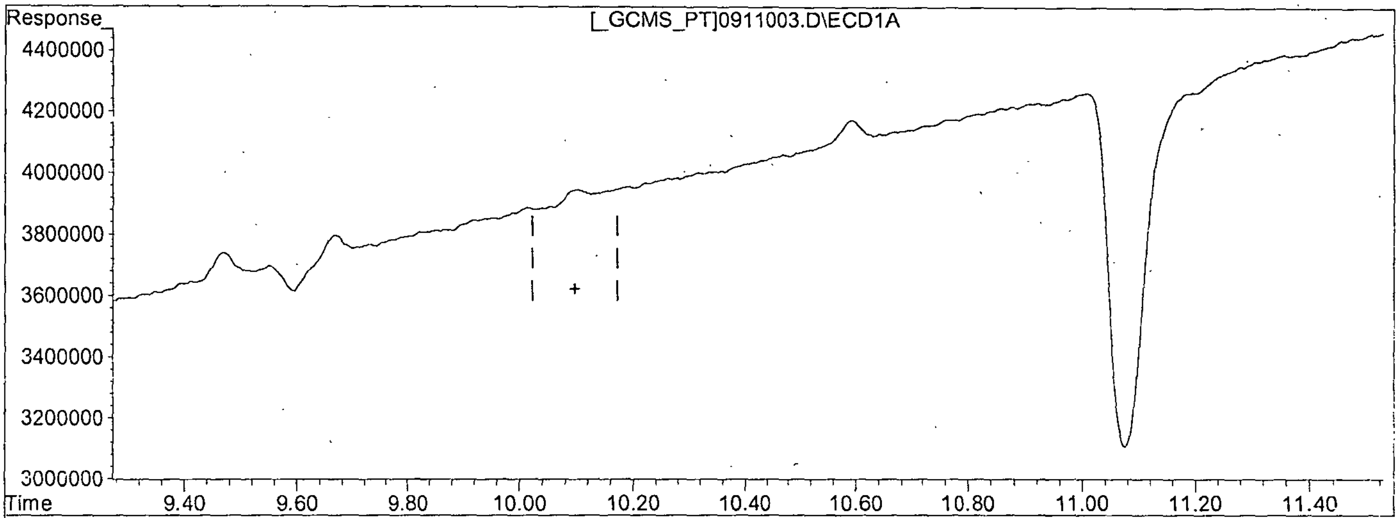
11.18min 0.000ppb m

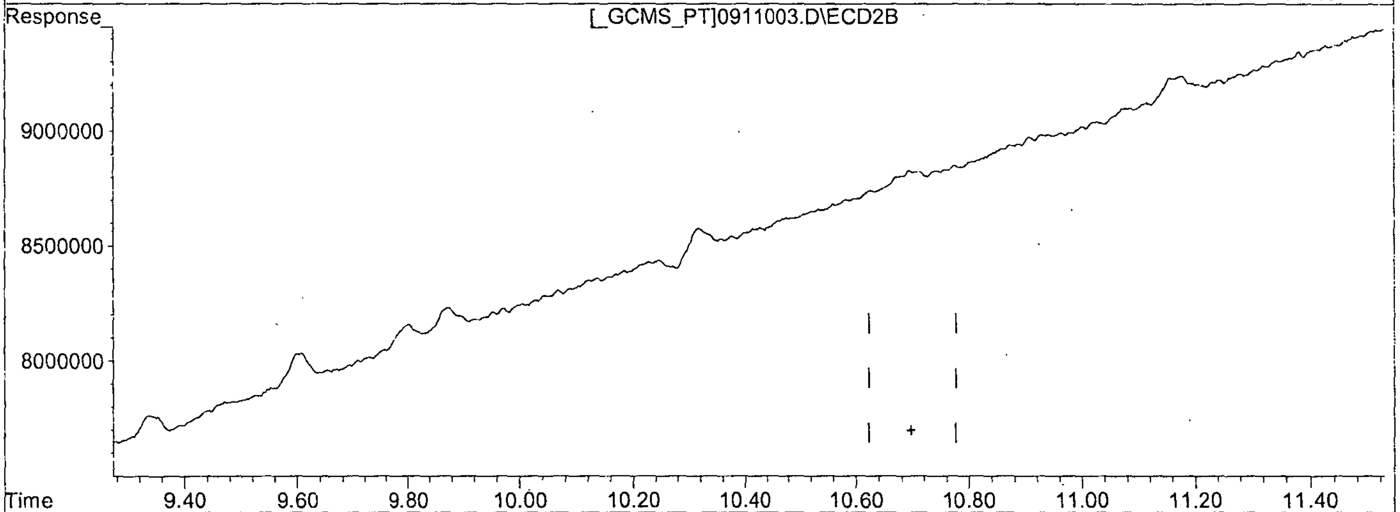
response 54125

(+) = Expected Retention Time

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH       Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                            Operator: MA
Sample    : OCLHX - 1B 4/13/18                          Inst    : Ethel
Misc      : water                                       Multiplr: 1.00
IntFile Signal #1: rteint.p      IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:10 2018  Quant Results File: OCL0911.RES

Method        : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title         : 508/608/8081
Last Update   : Tue Sep 11 15:15:06 2018
Response via  : Multiple Level Calibration
```





QEdit

(22) METHOXYCHLOR (TM)

0.00min 0.000ppb

response 0

(22) METHOXYCHLOR #2 (TM)

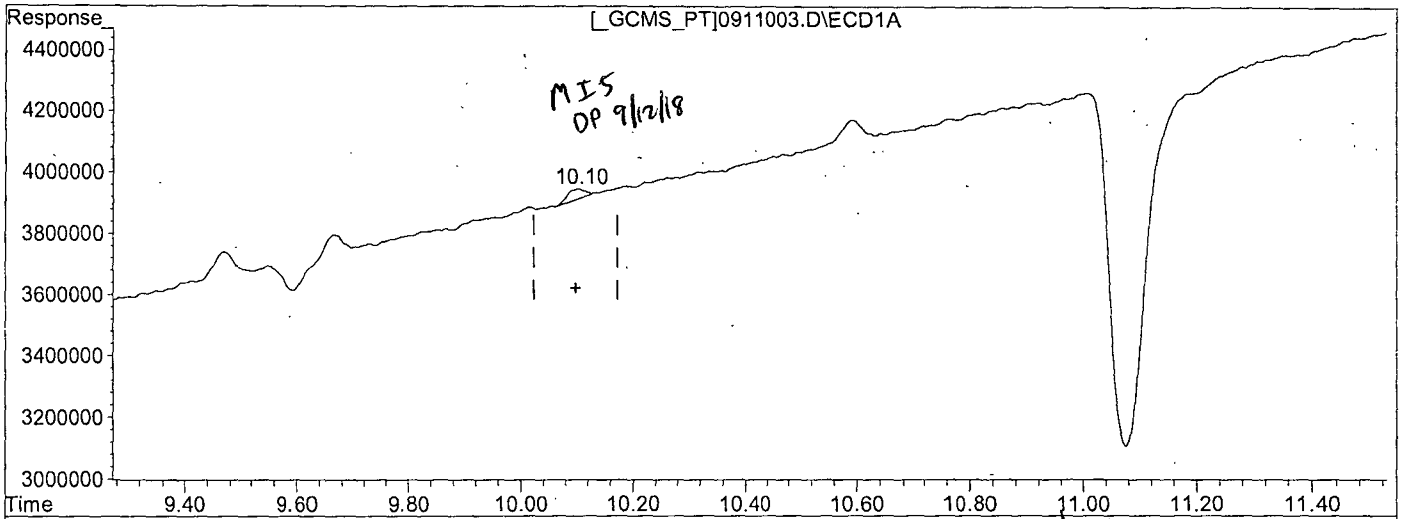
0.00min 0.000ppb

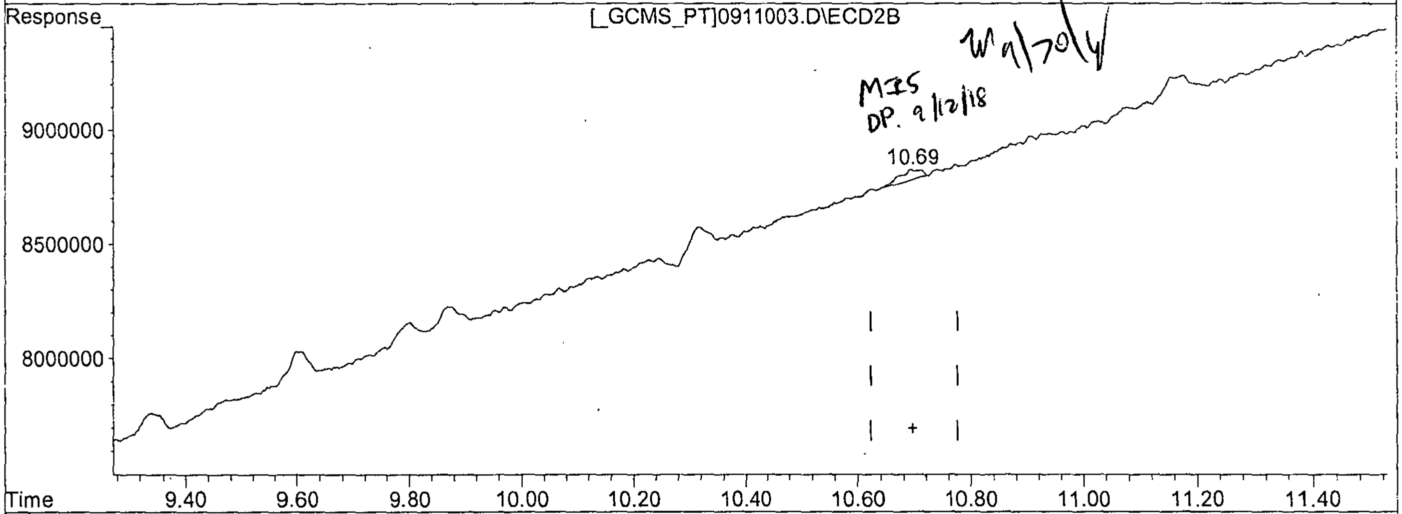
response 0

(+) = Expected Retention Time

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911003.D\ECD1A.CH        Vial: 3
Signal #2 : G:\ETHEL\DATA\180911\0911003.D\ECD2B.CH
Acq On    : 9-11-18 13:55:43                             Operator: MA
Sample    : OCLHX - 1B 4/13/18                           Inst    : Ethel
Misc      : water                                        Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:10 2018   Quant Results File: OCL0911.RES

Method       : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Tue Sep 11 15:15:06 2018
Response via : Multiple Level Calibration
```





QEdit

(22) METHOXYCHLOR (TM)

10.10min 0.000ppb m

response 32304

(22) METHOXYCHLOR #2 (TM)

10.69min 0.001ppb m

response 49406

(+) = Expected Retention Time

0911003.D OCL0911.M Wed Sep 12 09:12:24 2018

Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911004.D\ECD1A.CH Vial: 4
Signal #2 : G:\ETHEL\DATA\180911\0911004.D\ECD2B.CH
Acq On : 9-11-18 14:14:41 Operator: MA
Sample : OCLHX - 1A 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 9:13 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Tue Sep 11 15:15:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.67	307841	706525	0.0036	0.0038
Surrogate Spike 0.150 Range 25 - 150			Recovery =		2.40%#	2.53%#
23) S DBC	9.67	10.99	624486	166039	0.0036	0.0017m#
Surrogate Spike 0.150			Recovery =		2.40%	1.13%
24) S DECA	12.96	14.54	558014	159445	0.0032	0.0021m#
Surrogate Spike 0.150 Range 25 - 150			Recovery =		2.13%#	1.40%#
Target Compounds						
2) TM HEXACHLOROBENZEN	4.51	5.39	386095	642151	0.0038	0.0034
3) TM A-BHC	4.63	5.27	305362	697697	0.0027	0.0030
4) TM B-BHC	5.50	6.17	157638	329351	0.0030	0.0032
5) M G-BHC(LINDANE)	5.17	5.76	315436	1245890	0.0028	0.0029
6) TM D-BHC	5.92	6.56	327488	584570	0.0028	0.0027
7) M HEPTACHLOR	5.69	6.62	296289	504193	0.0030	0.0027
8) M ALDRIN	6.14	7.11	283732	469854	0.0028	0.0025
9) TM HEPTACHLOR EPOXI	6.92	7.75	282518	466227	0.0028	0.0026
10) TM G-CHLORDANE	7.25	8.22	297203	432086	0.0028	0.0025
11) TM A-ENDOSULFAN	7.48	8.36	263941	399219	0.0028	0.0026
12) TM A-CHLORDANE	7.39	8.29	297766	412607	0.0028	0.0025
13) TM P,P-DDE	7.66	8.50	307078	420469	0.0031	0.0024
14) M DIELDRIN	7.89	8.76	278919	377723	0.0029	0.0024
15) M ENDRIN	8.36	9.15	248186	300406	0.0034	0.0024 #
16) TM B-ENDOSULFAN	8.77	9.60	244398	333945	0.0029	0.0023
17) TM P,P-DDD	8.50	9.35	250401	293435	0.0032	0.0023 #
18) TM ENDRIN ALDEHYDE	9.13	9.80	208889	198973	0.0033	0.0019 #
19) M P,P-DDT	8.94	9.88	242185	226143	0.0034	0.0019 #
20) TM ENDOSULFAN SULFA	9.47	10.32	236760	287487	0.0032	0.0022 #
21) TM ENDRIN KETONE	10.59	11.17	227312	301120	0.0029	0.0022 #
22) TM METHOXYCHLOR	10.10	10.69	119916	117294	0.0033	0.0019 #

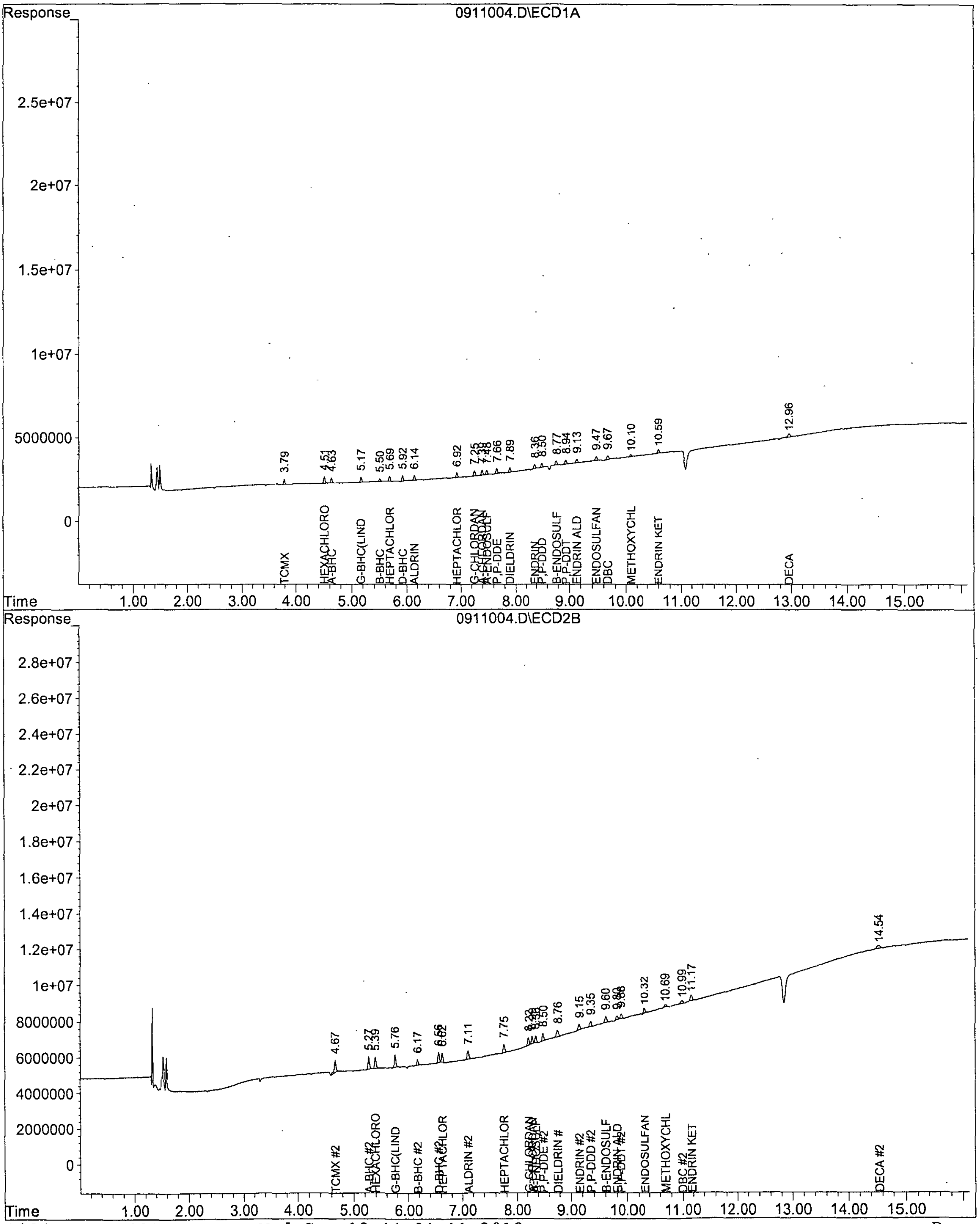
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

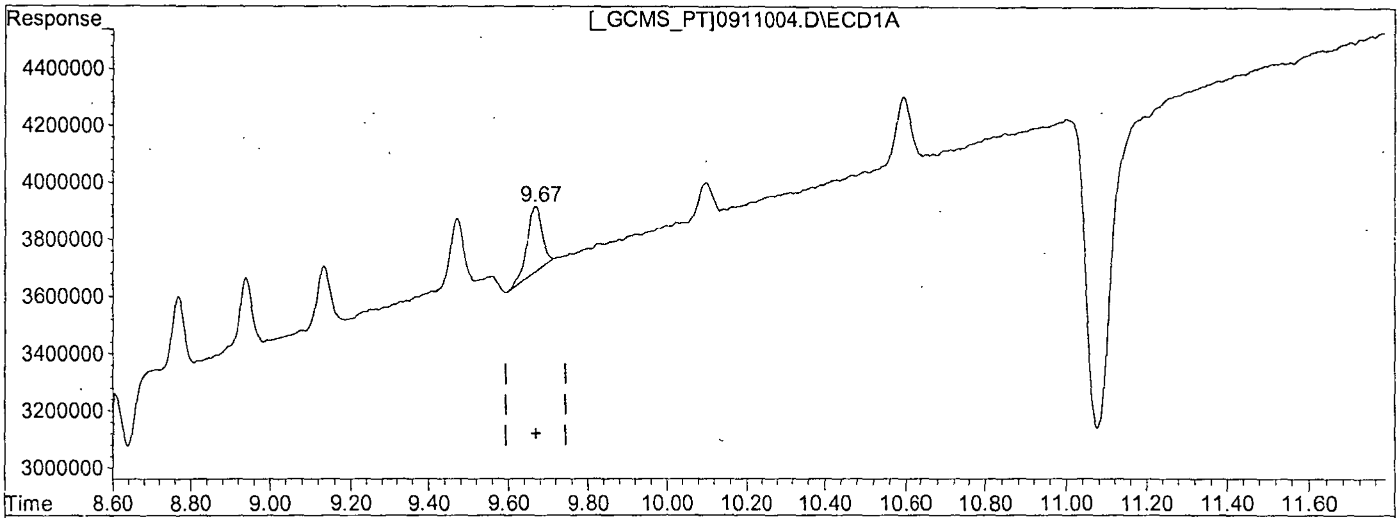
Data File : G:\ETHEL\DATA\180911\0911004.D
Acq On : 9-11-18 14:14:41
Sample : OCLHX - 1A 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

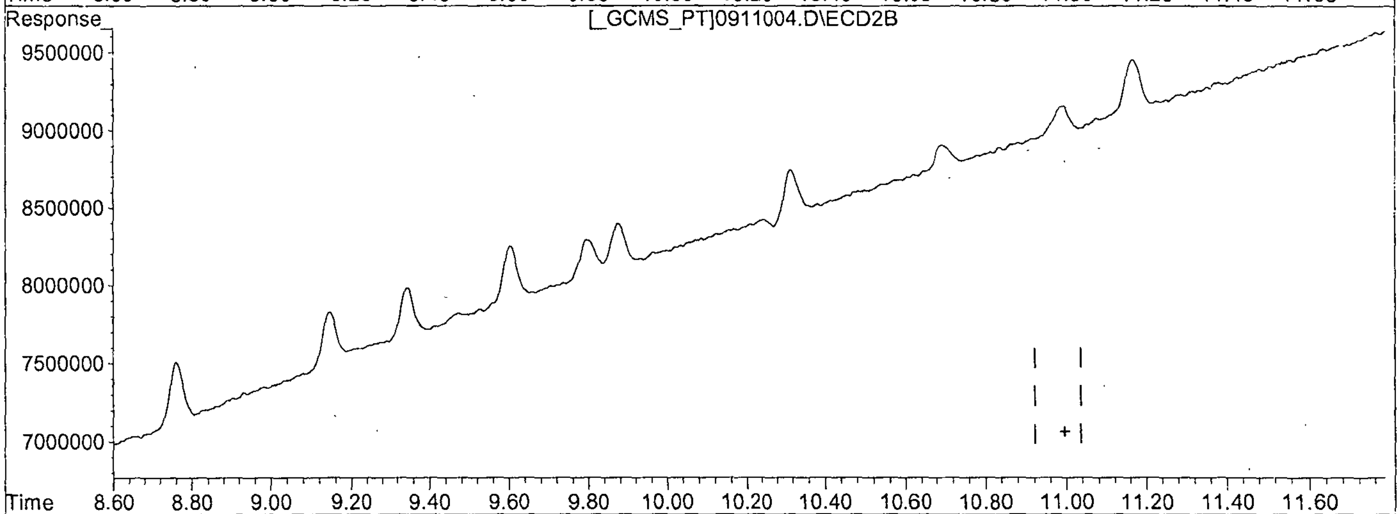
Vial: 4
Operator: MA
Inst : Ethel
Multiplr: 1.00



Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911004.D\ECD1A.CH      Vial: 4
Signal #2 : G:\ETHEL\DATA\180911\0911004.D\ECD2B.CH
Acq On    : 9-11-18 14:14:41                          Operator: MA
Sample    : OCLHX - 1A 4/13/18                        Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:10 2018  Quant Results File: OCL0911.RES

Method       : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Tue Sep 11 15:15:06 2018
Response via : Multiple Level Calibration
```





QEdit

(23) DBC (S)

9.67min 0.004ppb

response 624486

(23) DBC #2 (S)

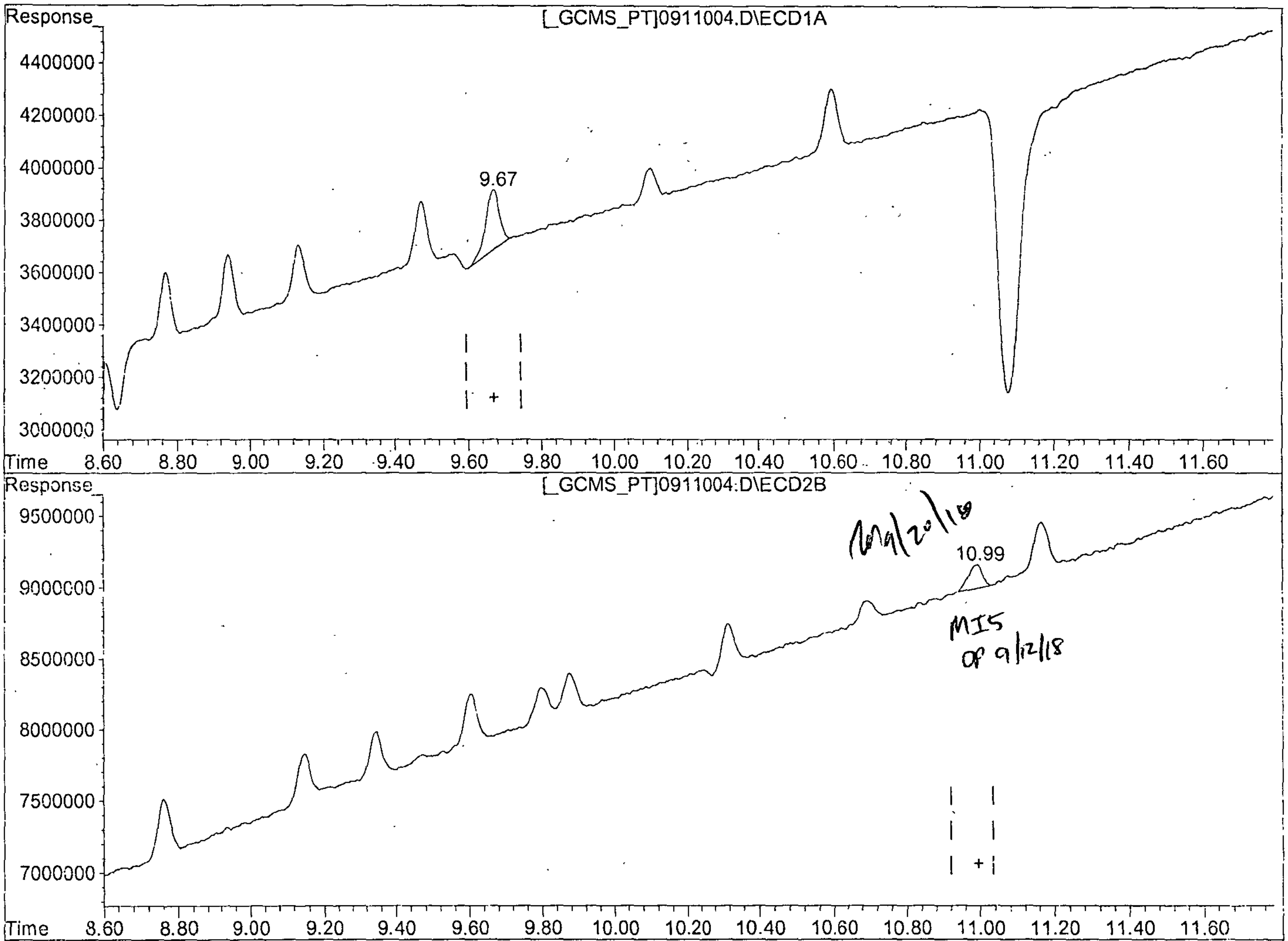
0.00min 0.000ppb

response 0

(+) = Expected Retention Time

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911004.D\ECD1A.CH      Vial: 4
Signal #2 : G:\ETHEL\DATA\180911\0911004.D\ECD2B.CH
Acq On    : 9-11-18 14:14:41                            Operator: MA
Sample    : OCLHX - 1A 4/13/18                          Inst    : Ethel
Misc      : water                                       Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:10 2018  Quant Results File: OCL0911.RES

Method        : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title         : 508/608/8081
Last Update   : Tue Sep 11 15:15:06 2018
Response via  : Multiple Level Calibration
```



[redacted]

QEdit

(23) DBC (S)

9.67min 0.004ppb

response 624486

(23) DBC #2 (S)

10.99min 0.002ppb m

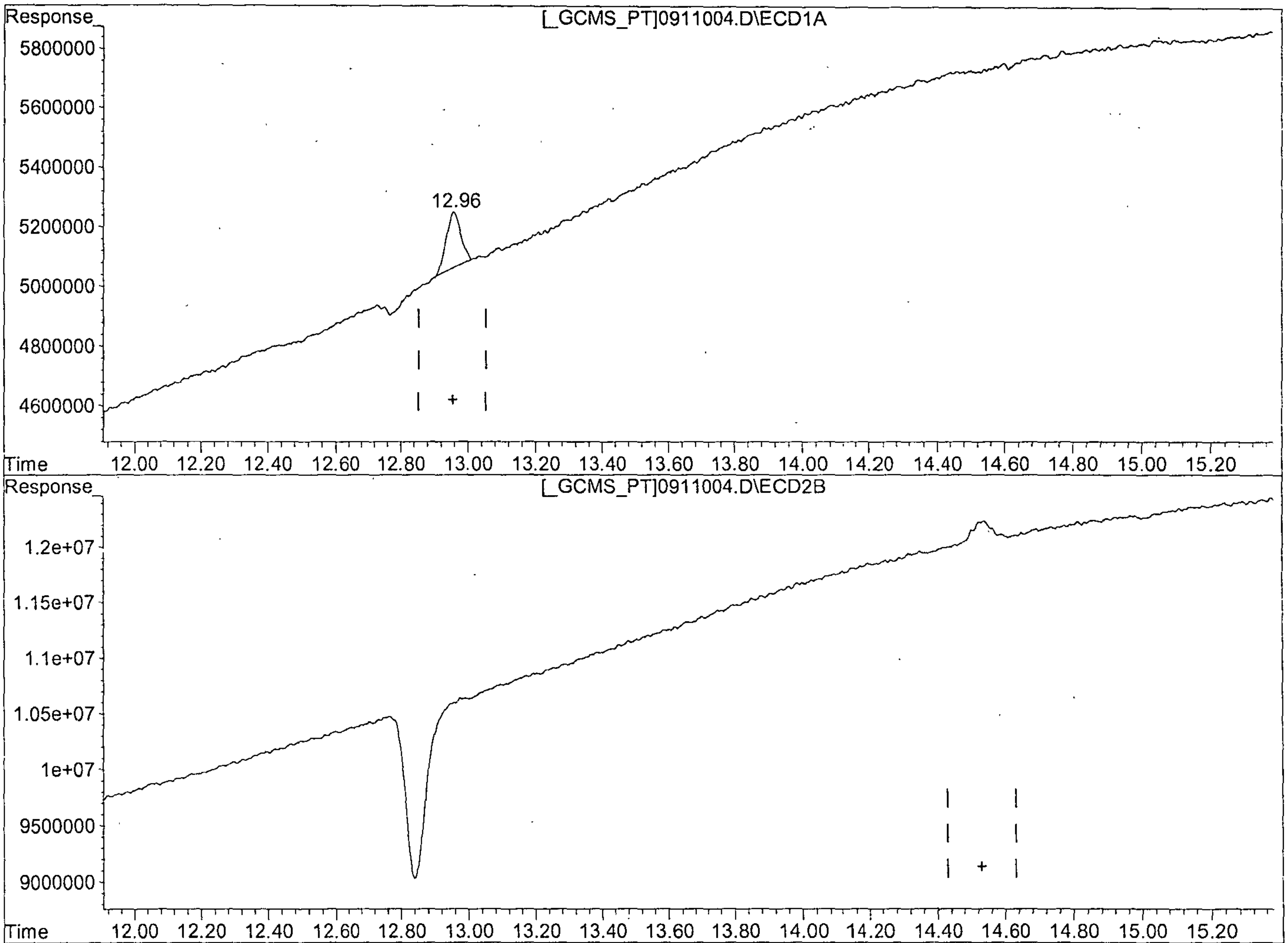
response 166039

(+) = Expected Retention Time

0911004.D OCL0911.M Wed Sep 12 09:13:26 2018

Quantitation Report

```
Signal #1 : G:\ETHEL\DATA\180911\0911004.D\ECD1A.CH      Vial: 4
Signal #2 : G:\ETHEL\DATA\180911\0911004.D\ECD2B.CH
Acq On    : 9-11-18 14:14:41                          Operator: MA
Sample    : OCLHX - 1A 4/13/18                        Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12  9:10 2018  Quant Results File: OCL0911.RES

Method        : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title         : 508/608/8081
Last Update   : Tue Sep 11 15:15:06 2018
Response via  : Multiple Level Calibration
```



QEdit

(24) DECA (S)

12.96min 0.003ppb

response 558014

(24) DECA #2 (S)

0.00min 0.000ppb

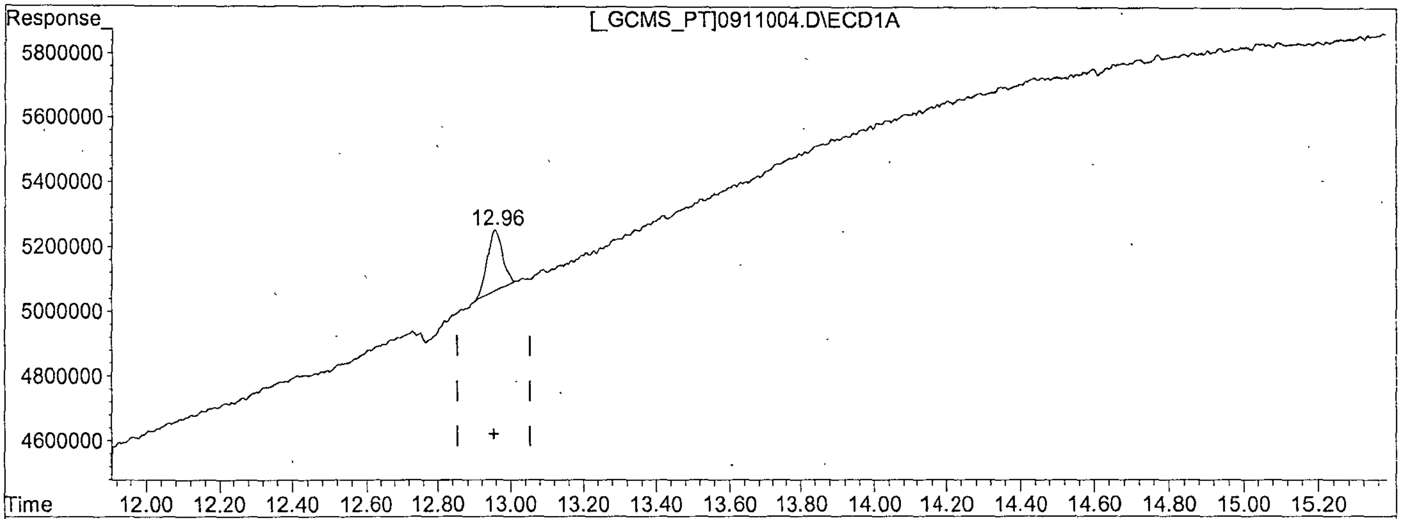
response 0

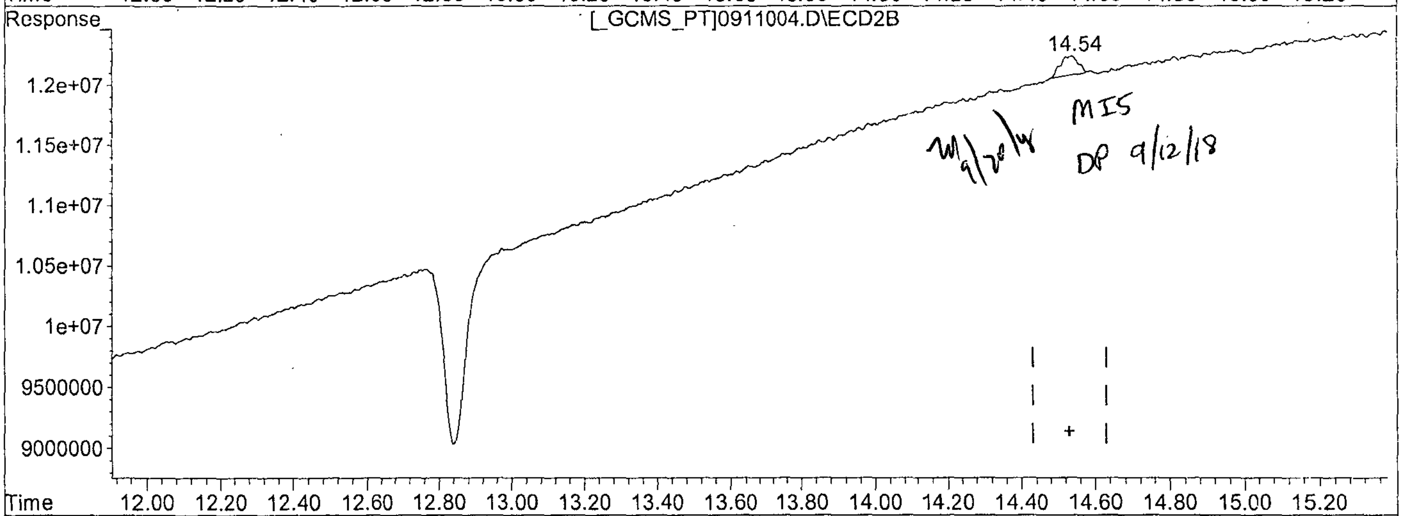
(+) = Expected Retention Time

Quantitation Report

Signal #1 : G:\ETHEL\DATA\180911\0911004.D\ECD1A.CH Vial: 4
Signal #2 : G:\ETHEL\DATA\180911\0911004.D\ECD2B.CH
Acq On : 9-11-18 14:14:41 Operator: MA
Sample : OCLHX - 1A 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 9:10 2018 Quant Results File: OCL0911.RES

Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Tue Sep 11 15:15:06 2018
Response via : Multiple Level Calibration





[redacted]

QEdit

(24) DECA (S)

12.96min 0.003ppb

response 558014

(24) DECA #2 (S)

14.54min 0.002ppb m

response 159445

(+) = Expected Retention Time
0911004.D OCL0911.M Wed Sep 12 09:13:36 2018

Quantitation Report (Not Reviewed)

```
Signal #1 : G:\ETHEL\DATA\180911\0911005.D\ECD1A.CH      Vial: 5
Signal #2 : G:\ETHEL\DATA\180911\0911005.D\ECD2B.CH
Acq On    : 9-11-18 14:33:41                           Operator: MA
Sample    : OCLHX - 1 4/13/18                          Inst    : Ethel
Misc      : water                                      Multiplr: 1.00
IntFile Signal #1: rteint.p    IntFile Signal #2: rteint2.p
Quant Time: Sep 12 11:20 2018  Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2ul
Signal #1 Phase : DB-35MS          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

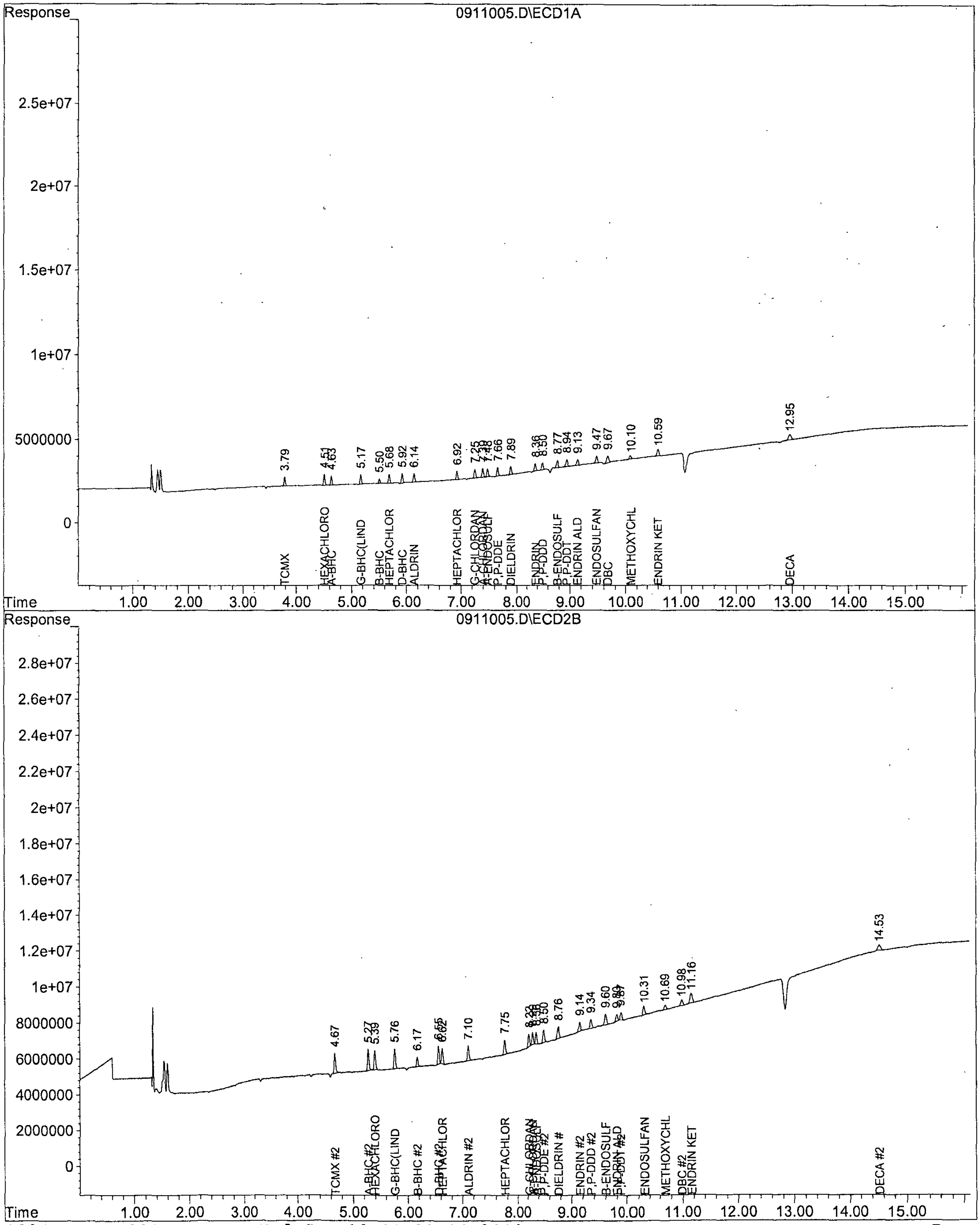
		Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
		System Monitoring Compounds						
1)	S	TCMX	3.79	4.67	542816	1113798	0.0054	0.0052
		Surrogate Spike 0.150 Range 25 - 150			Recovery =		3.60%#	3.47%#
23)	S	DBC	9.67	10.98	1098027	319484	0.0059	0.0045
		Surrogate Spike 0.150			Recovery =		3.93%	3.00%
24)	S	DECA	12.95	14.53	980469	292442	0.0052	0.0053
		Surrogate Spike 0.150 Range 25 - 150			Recovery =		3.47%#	3.53%#
		Target Compounds						
2)	TM	HEXACHLOROBENZEN	4.51	5.39	669599	1072745	0.0056	0.0054
3)	TM	A-BHC	4.63	5.27	545527	1194240	0.0048	0.0049
4)	TM	B-BHC	5.50	6.17	283543	536027	0.0055	0.0052
5)	M	G-BHC(LINDANE)	5.17	5.76	571377	2137996	0.0052	0.0048
6)	TM	D-BHC	5.92	6.55	577048	1003590	0.0050	0.0049
7)	M	HEPTACHLOR	5.68	6.62	528958	849264	0.0053	0.0051
8)	M	ALDRIN	6.14	7.10	505388	828747	0.0052	0.0050
9)	TM	HEPTACHLOR EPOXI	6.92	7.75	500860	791962	0.0053	0.0051
10)	TM	G-CHLORDANE	7.25	8.22	518897	709502	0.0051	0.0050
11)	TM	A-ENDOSULFAN	7.48	8.36	478238	645761	0.0053	0.0052
12)	TM	A-CHLORDANE	7.39	8.29	525495	677268	0.0052	0.0047
13)	TM	P,P-DDE	7.66	8.50	519541	689279	0.0050	0.0049
14)	M	DIELDRIN	7.89	8.76	478456	667353	0.0052	0.0051
15)	M	ENDRIN	8.36	9.14	441072	521977	0.0052	0.0045
16)	TM	B-ENDOSULFAN	8.77	9.60	419661	599026	0.0052	0.0047
17)	TM	P,P-DDD	8.50	9.34	423680	498090	0.0051	0.0048
18)	TM	ENDRIN ALDEHYDE	9.13	9.80	337116	370420	0.0054	0.0051
19)	M	P,P-DDT	8.94	9.87	429867	420632	0.0052	0.0048
20)	TM	ENDOSULFAN SULFA	9.47	10.31	412363	501898	0.0054	0.0054
21)	TM	ENDRIN KETONE	10.59	11.16	385849	531366	0.0053	0.0049
22)	TM	METHOXYCHLOR	10.10	10.69	197123	234658	0.0052	0.0050

Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911005.D
Acq On : 9-11-18 14:33:41
Sample : OCLHX - 1 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 5
Operator: MA
Inst : Ethel
Multiplr: 1.00



Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911007.D\ECD1A.CH Vial: 7
Signal #2 : G:\ETHEL\DATA\180911\0911007.D\ECD2B.CH
Acq On : 9-11-18 15:11:45 Operator: MA
Sample : OCLHX - 3 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 11:20 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

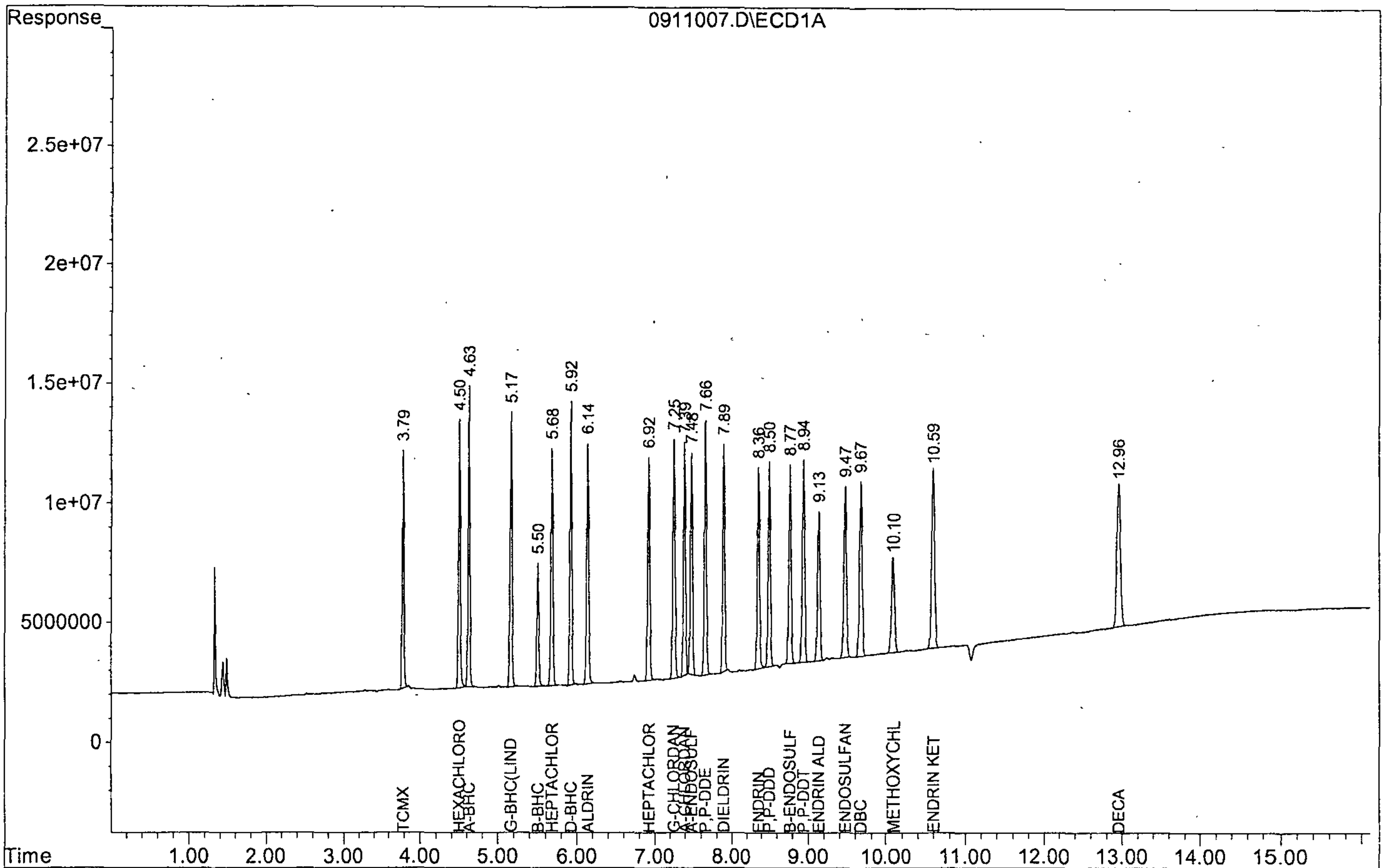
Compound			RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds								
1)	S	TCMX	3.79	4.67	9963451	20535937	0.0985	0.0960
Surrogate Spike 0.150 Range 25 - 150 Recovery =							65.67%	64.00%
23)	S	DBC	9.67	10.99	17037535	7509605	0.0919	0.1064
Surrogate Spike 0.150 Recovery =							61.27%	70.93%
24)	S	DECA	12.96	14.53	19181116	5439065	0.1012	0.0989
Surrogate Spike 0.150 Range 25 - 150 Recovery =							67.47%	65.93%
Target Compounds								
2)	TM	HEXACHLOROBENZEN	4.50	5.39	11240017	19374383	0.0939	0.0978
3)	TM	A-BHC	4.63	5.27	12605628	25995891	0.1105	0.1068
4)	TM	B-BHC	5.50	6.17	5164348	10257921	0.0994	0.1000
5)	M	G-BHC(LINDANE)	5.17	5.76	11491481	48018034	0.1043	0.1081
6)	TM	D-BHC	5.92	6.55	11885266	21430140	0.1028	0.1053
7)	M	HEPTACHLOR	5.68	6.62	9929935	16405375	0.0993	0.0991
8)	M	ALDRIN	6.14	7.10	10084908	17261573	0.1042	0.1038
9)	TM	HEPTACHLOR EPOXI	6.92	7.75	9360051	16171963	0.0992	0.1048
10)	TM	G-CHLORDANE	7.25	8.22	10020704	14005165	0.0987	0.0994
11)	TM	A-ENDOSULFAN	7.48	8.36	9303987	12503855	0.1031	0.1004
12)	TM	A-CHLORDANE	7.39	8.29	9772825	13143032	0.0969	0.0993
13)	TM	P,P-DDE	7.66	8.50	10663226	14098309	0.1033	0.1011
14)	M	DIELDRIN	7.89	8.76	9523795	13292948	0.1029	0.1021
15)	M	ENDRIN	8.36	9.15	8444391	10998851	0.0990	0.1026
16)	TM	B-ENDOSULFAN	8.77	9.60	8339744	12006499	0.1037	0.1026
17)	TM	P,P-DDD	8.50	9.35	8598258	11357155	0.1032	0.1094
18)	TM	ENDRIN ALDEHYDE	9.13	9.80	6274428	7550439	0.0998	0.1045
19)	M	P,P-DDT	8.94	9.88	8486882	9427181	0.1022	0.1079
20)	TM	ENDOSULFAN SULFA	9.47	10.32	7181992	9764716	0.0943	0.1043
21)	TM	ENDRIN KETONE	10.59	11.16	7559272	11160003	0.1032	0.1014
22)	TM	METHOXYCHLOR	10.10	10.69	4009450	4821681	0.1056	0.1031

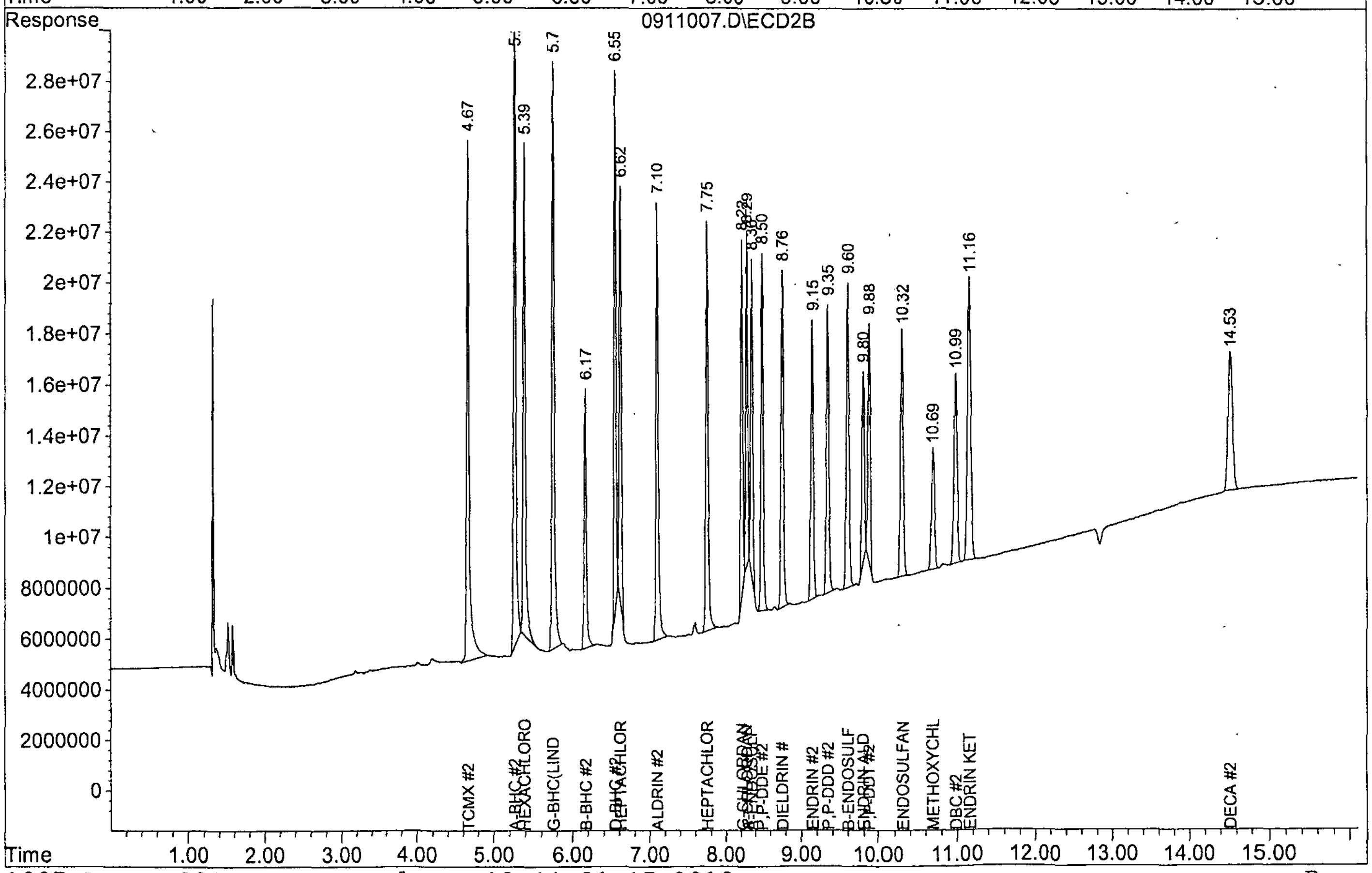
Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911007.D
Acq On : 9-11-18 15:11:45
Sample : OCLHX - 3 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 7
Operator: MA
Inst : Ethel
Multiplr: 1.00





Quantitation Report   (Not Reviewed)

```
Signal #1 : G:\ETHEL\DATA\180911\0911008.D\ECD1A.CH      Vial: 8
Signal #2 : G:\ETHEL\DATA\180911\0911008.D\ECD2B.CH
Acq On    : 9-11-18 15:30:42                          Operator: MA
Sample    : OCLHX - 4 4/13/18                         Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12 11:20 2018  Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2ul
Signal #1 Phase : DB-35MS          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

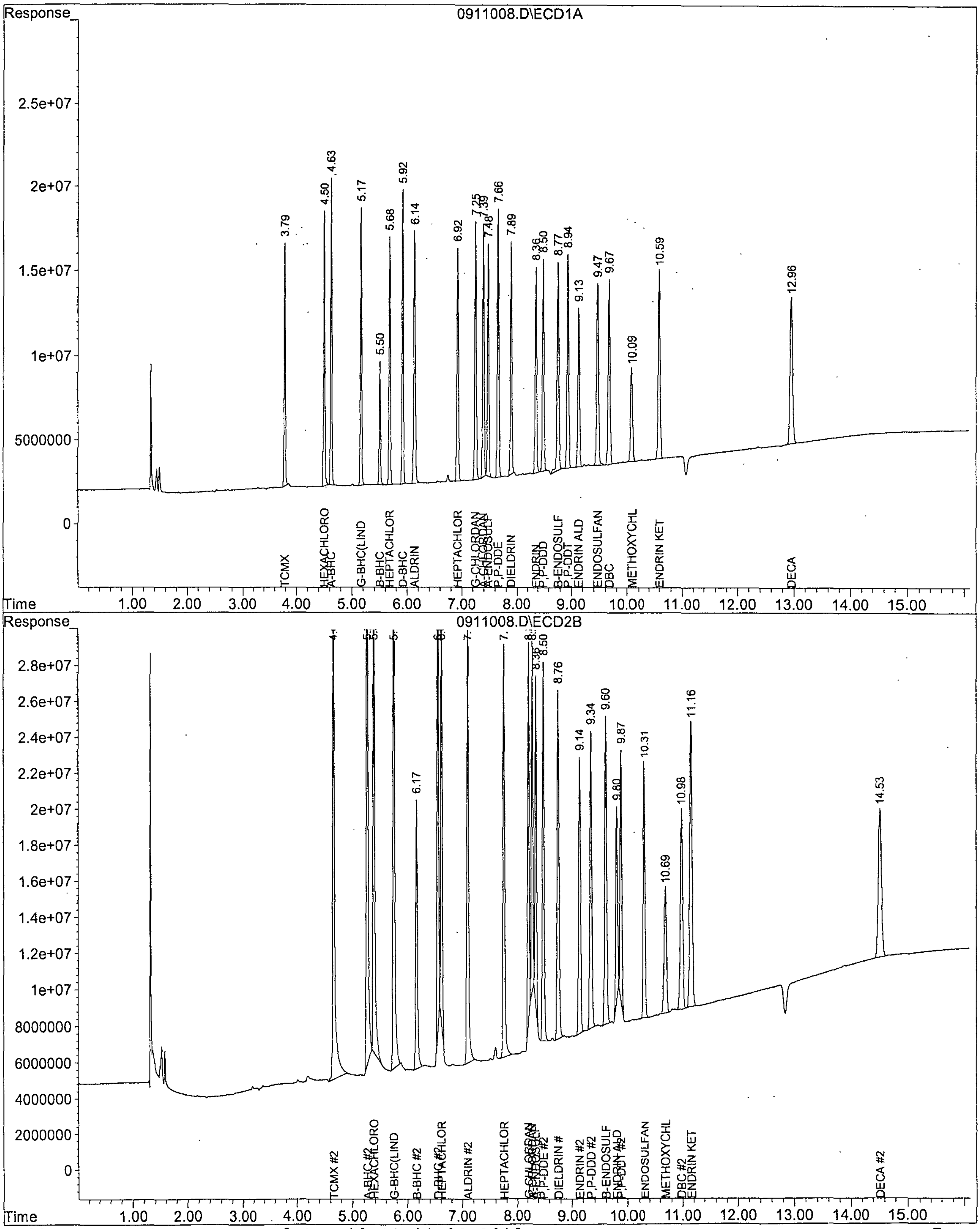
Compound			RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds								
1)	S	TCMX	3.79	4.66	14362915	29800719	0.1420	0.1393
Surrogate Spike 0.150 Range 25 - 150					Recovery =		94.67%	92.87%
23)	S	DBC	9.67	10.98	25183651	11101180	0.1358	0.1573
Surrogate Spike 0.150					Recovery =		90.53%	104.87%
24)	S	DECA	12.96	14.53	27866967	8261516	0.1470	0.1502
Surrogate Spike 0.150 Range 25 - 150					Recovery =		98.00%	100.13%
Target Compounds								
2)	TM	HEXACHLOROBENZEN	4.50	5.39	16260277	27883171	0.1359	0.1408
3)	TM	A-BHC	4.63	5.27	18177598	37582533	0.1594	0.1544
4)	TM	B-BHC	5.50	6.17	7328551	14880045	0.1410	0.1451
5)	M	G-BHC(LINDANE)	5.17	5.75	16415801	69959730	0.1490	0.1575
6)	TM	D-BHC	5.92	6.55	17402929	30739978	0.1506	0.1510
7)	M	HEPTACHLOR	5.68	6.62	14623540	24159852	0.1462	0.1460
8)	M	ALDRIN	6.14	7.10	14915150	25074543	0.1541	0.1507
9)	TM	HEPTACHLOR EPOXI	6.92	7.75	13762370	22943063	0.1458	0.1487
10)	TM	G-CHLORDANE	7.25	8.22	15250887	21156787	0.1503	0.1502
11)	TM	A-ENDOSULFAN	7.48	8.36	13719245	18217734	0.1521	0.1463
12)	TM	A-CHLORDANE	7.39	8.29	14970120	19520170	0.1485	0.1477
13)	TM	P,P-DDE	7.66	8.50	15868685	21022912	0.1537	0.1507
14)	M	DIELDRIN	7.89	8.76	13726892	19361544	0.1483	0.1488
15)	M	ENDRIN	8.36	9.14	12194433	15320697	0.1430	0.1431
16)	TM	B-ENDOSULFAN	8.77	9.60	12327783	17094363	0.1532	0.1463
17)	TM	P,P-DDD	8.50	9.34	12530737	16488645	0.1504	0.1588
18)	TM	ENDRIN ALDEHYDE	9.13	9.80	9430732	10743955	0.1499	0.1486
19)	M	P,P-DDT	8.94	9.87	12637451	13871848	0.1522	0.1588
20)	TM	ENDOSULFAN SULFA	9.47	10.31	10753649	14225354	0.1412	0.1520
21)	TM	ENDRIN KETONE	10.59	11.16	11207242	15829965	0.1529	0.1438
22)	TM	METHOXYCHLOR	10.09	10.69	5603635	7005502	0.1476	0.1498

Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911008.D
Acq On : 9-11-18 15:30:42
Sample : OCLHX - 4 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 8
Operator: MA
Inst : Ethel
Multiplr: 1.00



Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911009.D\ECD1A.CH Vial: 9
Signal #2 : G:\ETHEL\DATA\180911\0911009.D\ECD2B.CH
Acq On : 9-11-18 15:49:41 Operator: MA
Sample : OCLHX - 5 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 11:20 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.67	19740163	41359166	0.1952	0.1934
Surrogate Spike 0.150 Range 25 - 150 Recovery =					130.13%	128.93%
23) S DBC	9.67	10.99	36312693	16384993	0.1958	0.2321
Surrogate Spike 0.150 Recovery =					130.53%	154.73%
24) S DECA	12.95	14.53	39626147	11391750	0.2090	0.2071
Surrogate Spike 0.150 Range 25 - 150 Recovery =					139.33%	138.07%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.50	5.39	21866562	38713850	0.1827	0.1955
3) TM A-BHC	4.63	5.27	25079947	53314996	0.2199	0.2190
4) TM B-BHC	5.50	6.17	9968730	21020999	0.1918	0.2050
5) M G-BHC(LINDANE)	5.17	5.76	23179361	99574375	0.2104	0.2242
6) TM D-BHC	5.92	6.56	23714117	43727487	0.2052	0.2148
7) M HEPTACHLOR	5.68	6.62	20987158	34350840	0.2098	0.2075
8) M ALDRIN	6.14	7.10	20799143	37527157	0.2149	0.2256
9) TM HEPTACHLOR EPOXI	6.92	7.75	19499376	32421134	0.2066	0.2102
10) TM G-CHLORDANE	7.25	8.22	21479644	30094924	0.2117	0.2136
11) TM A-ENDOSULFAN	7.48	8.36	18696251	26782821	0.2072	0.2151
12) TM A-CHLORDANE	7.39	8.29	21169324	27977847	0.2099	0.2119
13) TM P,P-DDE	7.66	8.50	22608449	31524016	0.2189	0.2260
14) M DIELDRIN	7.89	8.76	19586540	29093150	0.2116	0.2235
15) M ENDRIN	8.36	9.14	17360946	23021249	0.2036	0.2152
16) TM B-ENDOSULFAN	8.77	9.60	16808739	24471083	0.2089	0.2096
17) TM P,P-DDD	8.50	9.35	17637975	23539653	0.2118	0.2267
18) TM ENDRIN ALDEHYDE	9.13	9.80	13446901	15728545	0.2138	0.2176
19) M P,P-DDT	8.94	9.88	18825857	19886005	0.2268	0.2276
20) TM ENDOSULFAN SULFA	9.47	10.31	15657720	20599509	0.2055	0.2201
21) TM ENDRIN KETONE	10.59	11.16	15631027	23346611	0.2133	0.2120
22) TM METHOXYCHLOR	10.10	10.69	7976526	10258856	0.2101	0.2194

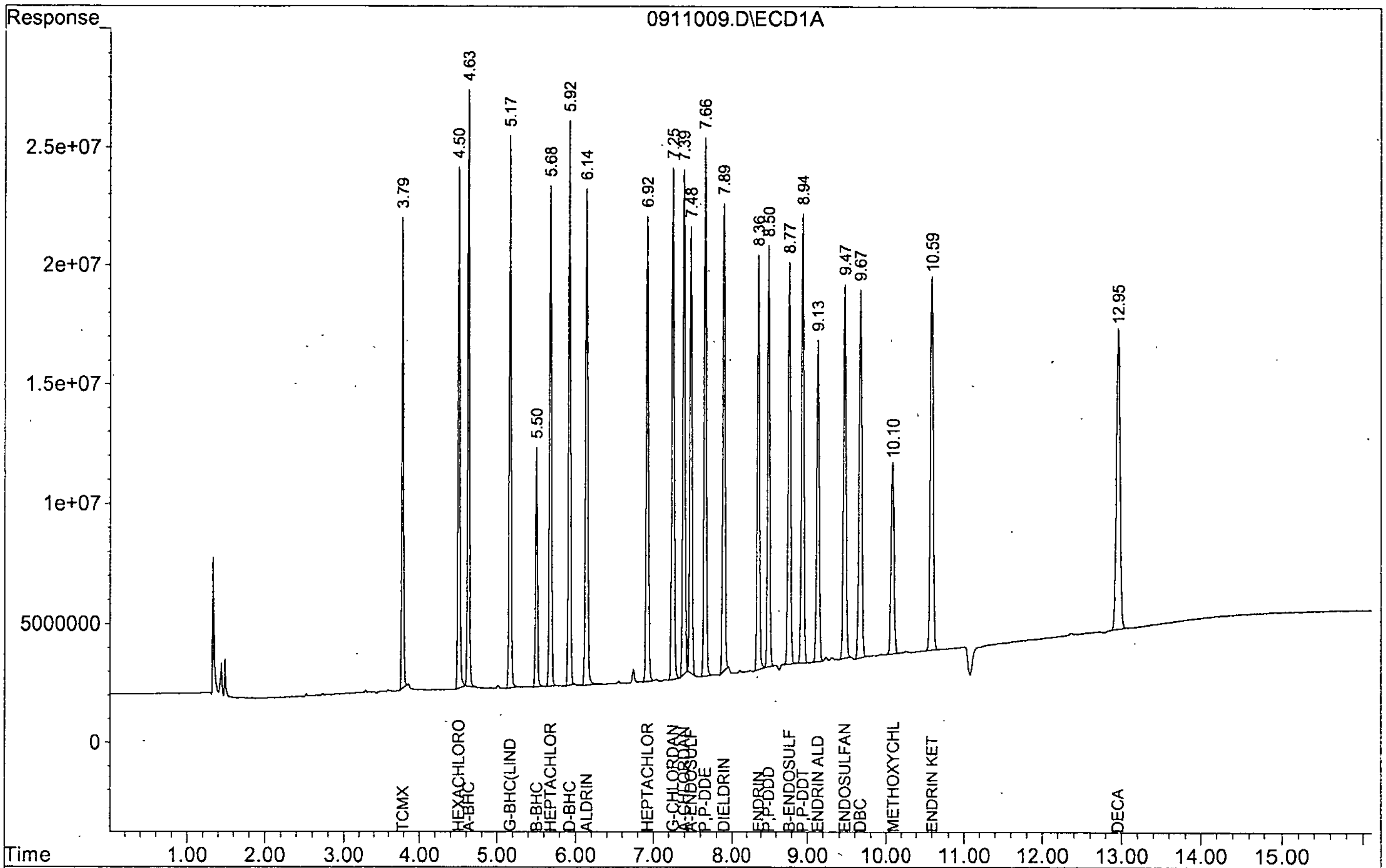
Target Compounds

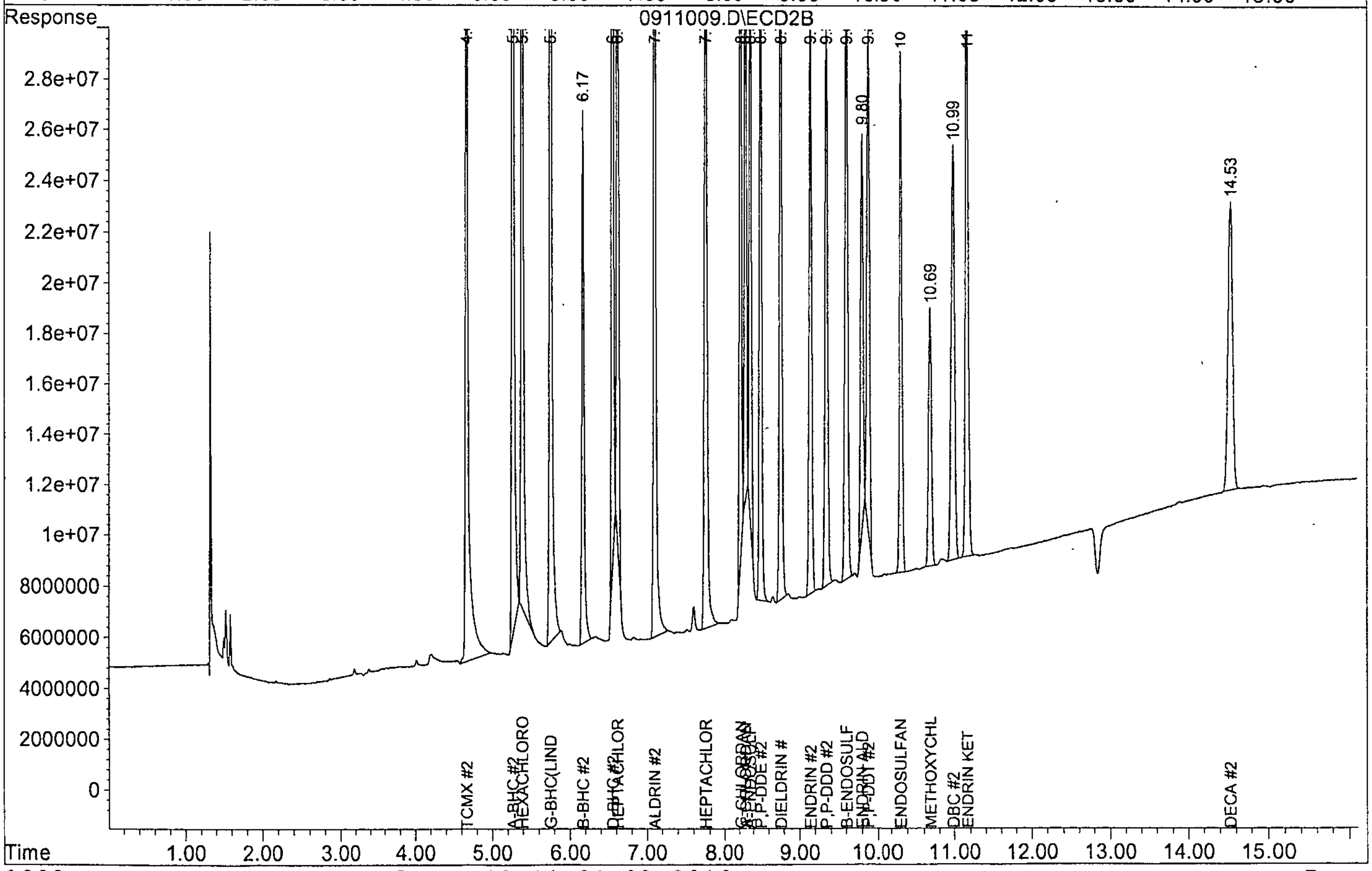
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911009.D
Acq On : 9-11-18 15:49:41
Sample : OCLHX - 5 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 9
Operator: MA
Inst : Ethel
Multiplr: 1.00



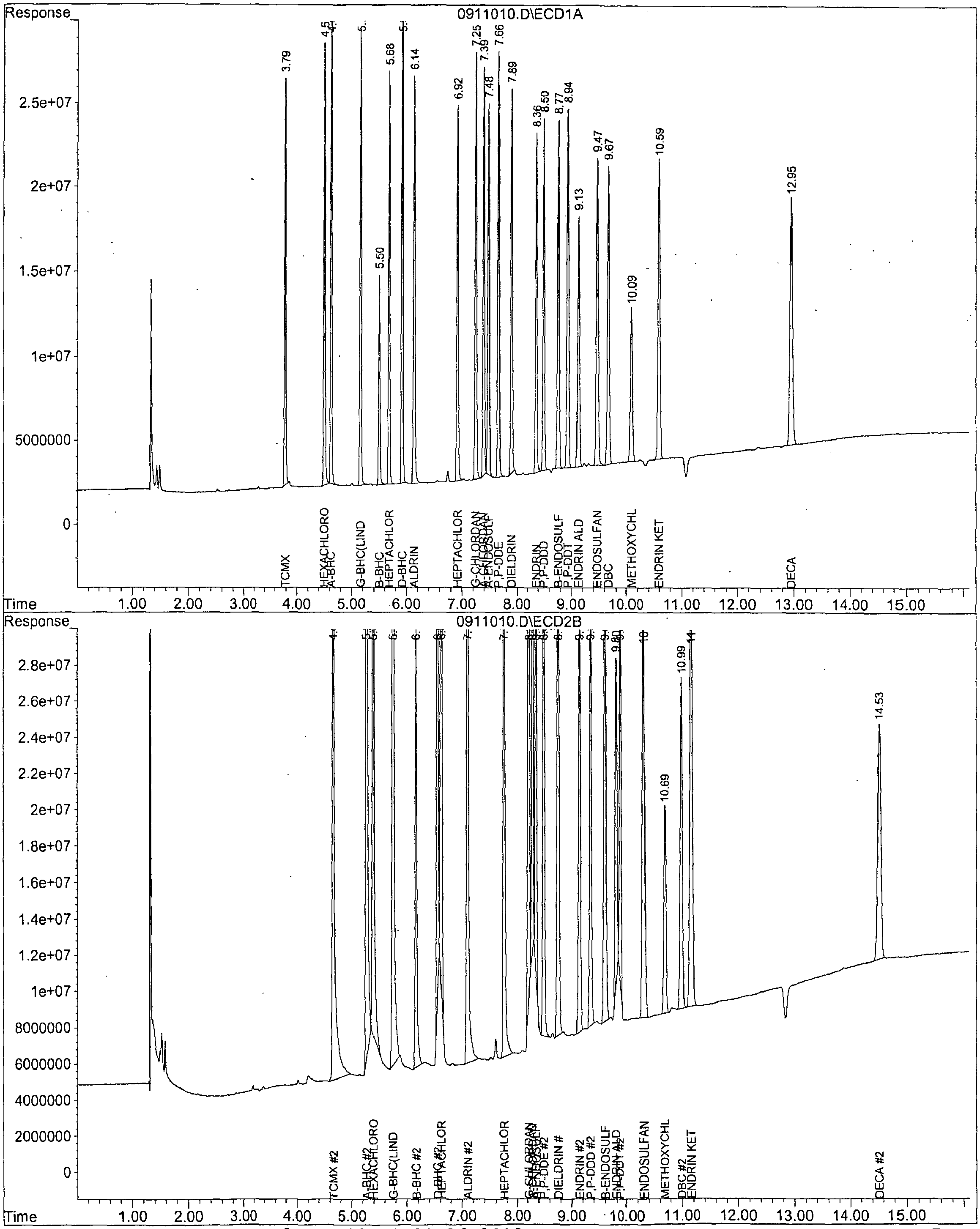


Quantitation Report (Not Reviewed)

```
Signal #1 : G:\ETHEL\DATA\180911\0911010.D\ECD1A.CH      Vial: 10
Signal #2 : G:\ETHEL\DATA\180911\0911010.D\ECD2B.CH
Acq On    : 9-11-18 16:08:46                         Operator: MA
Sample    : OCLHX - 6 4/13/18                        Inst    : Ethel
Misc      : water                                    Multiplr: 1.00
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 12 11:20 2018  Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35MS           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32

    Compound              RT#1   RT#2    Resp#1   Resp#2       ppb        ppb
-------------------------------------------------------------------------------

   System Monitoring Compounds
 1)  S  TCMX               3.79   4.66  24193986 48901091    0.2393     0.2286
 Surrogate Spike    0.150 Range  25 - 150  Recovery   =  159.53%#  152.40%#
23) S   DBC                9.67  10.99  41271266 18323528    0.2226     0.2596
 Surrogate Spike 0.150                    Recovery    =  148.40%   173.07%
24) S   DECA              12.95  14.53  44982094 13004419    0.2372     0.2364
 Surrogate Spike    0.150 Range  25 - 150  Recovery   =  158.13%#  157.60%#

   Target Compounds
 2) TM  HEXACHLOROBENZEN   4.50   5.39  26369456 44133489    0.2204     0.2229
 3) TM  A-BHC              4.63   5.27  30747367 62511509    0.2696     0.2568
 4) TM  B-BHC              5.50   6.17  12420902 24231580    0.2390     0.2363
 5) M   G-BHC(LINDANE)     5.17   5.75  27350787  117.5E6    0.2482     0.2645
 6) TM  D-BHC              5.92   6.55  28489444 50519602    0.2465     0.2482
 7) M   HEPTACHLOR         5.68   6.62  24585244 39769224    0.2458     0.2403
 8) M   ALDRIN             6.14   7.10  24259810 41535784    0.2506     0.2497
 9) TM  HEPTACHLOR EPOXI   6.92   7.75  22294885 37542995    0.2362     0.2434
10) TM  G-CHLORDANE        7.25   8.22  25452000 34814172    0.2508     0.2471
11) TM  A-ENDOSULFAN       7.48   8.36  22038927 30090604    0.2443     0.2416
12) TM  A-CHLORDANE        7.39   8.29  24300041 31971196    0.2410     0.2422
13) TM  P,P-DDE            7.66   8.50  25373653 34719717    0.2457     0.2489
14) M   DIELDRIN           7.89   8.76  22864847 32254575    0.2470     0.2478
15) M   ENDRIN             8.36   9.14  20161660 25764160    0.2365     0.2409
16) TM  B-ENDOSULFAN       8.77   9.60  20683014 28410244    0.2571     0.2435
17) TM  P,P-DDD            8.50   9.34  20896946 26552971    0.2509     0.2557
18) TM  ENDRIN ALDEHYDE    9.13   9.80  14836428 17891209    0.2359     0.2475
19) M   P,P-DDT            8.94   9.87  21335291 22548252    0.2570     0.2581
20) TM  ENDOSULFAN SULFA   9.47  10.31  18211577 23772272    0.2391     0.2540
21) TM  ENDRIN KETONE     10.59  11.16  17802400 26833311    0.2430     0.2436
22) TM  METHOXYCHLOR      10.09  10.69   9176958 11433714    0.2417     0.2445

   Target Compounds
```

Data File : G:\ETHEL\DATA\180911\0911010.D
Acq On : 9-11-18 16:08:46
Sample : OCLHX - 6 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 10
Operator: MA
Inst : Ethel
Multiplr: 1.00



Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/11/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911011.D

		Compound	MEAN	CCRF	%D		%Drift
1	TM	HEXACHLOROBENZENE	59828400	54397300	9.1	TM	
2	TM	A-BHC	57018700	59099900	3.7	TM	
3	TM	B-BHC	25982200	25317600	2.6	TM	
4	M	G-BHC(LINDANE)	55092900	54441200	1.2	M	
5	TM	D-BHC	57791400	53430700	7.5	TM	
6	M	HEPTACHLOR	50010700	46482400	7.1	M	
7	M	ALDRIN	48400500	46808200	3.3	M	
8	TM	HEPTACHLOR EPOXIDE	47190100	44214100	6.3	TM	
9	TM	G-CHLORDANE	50741400	45616400	10	TM	
10	TM	A-ENDOSULFAN	45109400	40174800	11	TM	
11	TM	A-CHLORDANE	50420800	42035300	17	TM	
12	TM	P,P-DDE	51629400	48684000	5.7	TM	
13	M	DIELDRIN	46280600	42336800	8.5	M	
14	M	ENDRIN	42631200	38514900	9.7	M	
15	TM	B-ENDOSULFAN	40224800	37204300	7.5	TM	
16	TM	P,P-DDD	41648000	39445900	5.3	TM	
17	TM	ENDRIN ALDEHYDE	31448100	27156400	14	TM	
18	M	P,P-DDT	41507300	40285900	2.9	M	
19	TM	ENDOSULFAN SULFATE	38088000	32034000	16	TM	
20	TM	ENDRIN KETONE	36638000	33488300	8.6	TM	
21	TM	METHOXYCHLOR	18981700	18113800	4.6	TM	
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			7.7		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/11/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911011.D

		Compound	MEAN	CCRF	%D		%Drift
41	TM	HEXACHLOROBENZENE	99012800	90627100	8.5	TM	
42	TM	A-BHC	121700000	120896000	0.66	TM	
43	TM	B-BHC	51267800	49167700	4.1	TM	
44	M	G-BHC(LINDANE)	222027000	226511000	2.0	M	
45	TM	D-BHC	101771000	94158000	7.5	TM	
46	M	HEPTACHLOR	82762500	75515000	8.8	M	
47	M	ALDRIN	83185900	78494100	5.6	M	
48	TM	HEPTACHLOR EPOXIDE	77133500	70505900	8.6	TM	
49	TM	G-CHLORDANE	70434900	61505600	13	TM	
50	TM	A-ENDOSULFAN	62262600	52829200	15	TM	
51	TML	A-CHLORDANE	66854600	53048000	21	TML	20
52	TM	P,P-DDE	69751900	66025300	5.3	TM	
53	M	DIELDRIN	65074300	58305500	10	M	
54	ML	ENDRIN	48973700	50963800	4.1	ML	4.9
55	TML	B-ENDOSULFAN	51370200	50281300	2.1	TML	14
56	TM	P,P-DDD	51922800	49855000	4.0	TM	
57	TM	ENDRIN ALDEHYDE	36143200	31615700	13	TM	
58	M	P,P-DDT	43681400	41535500	4.9	M	
59	TM	ENDOSULFAN SULFATE	46801200	41889700	10	TM	
60	TML	ENDRIN KETONE	50140800	49311500	1.7	TML	10
61	TM	METHOXYCHLOR	23384600	22296800	4.7	TM	
62							
63							
64							
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
		Average			7.4		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911011.D\ECD1A.CH Vial: 11
Signal #2 : G:\ETHEL\DATA\180911\0911011.D\ECD2B.CH
Acq On : 9-11-18 16:27:44 Operator: MA
Sample : OCLHX - SS 3/30/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 11:20 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

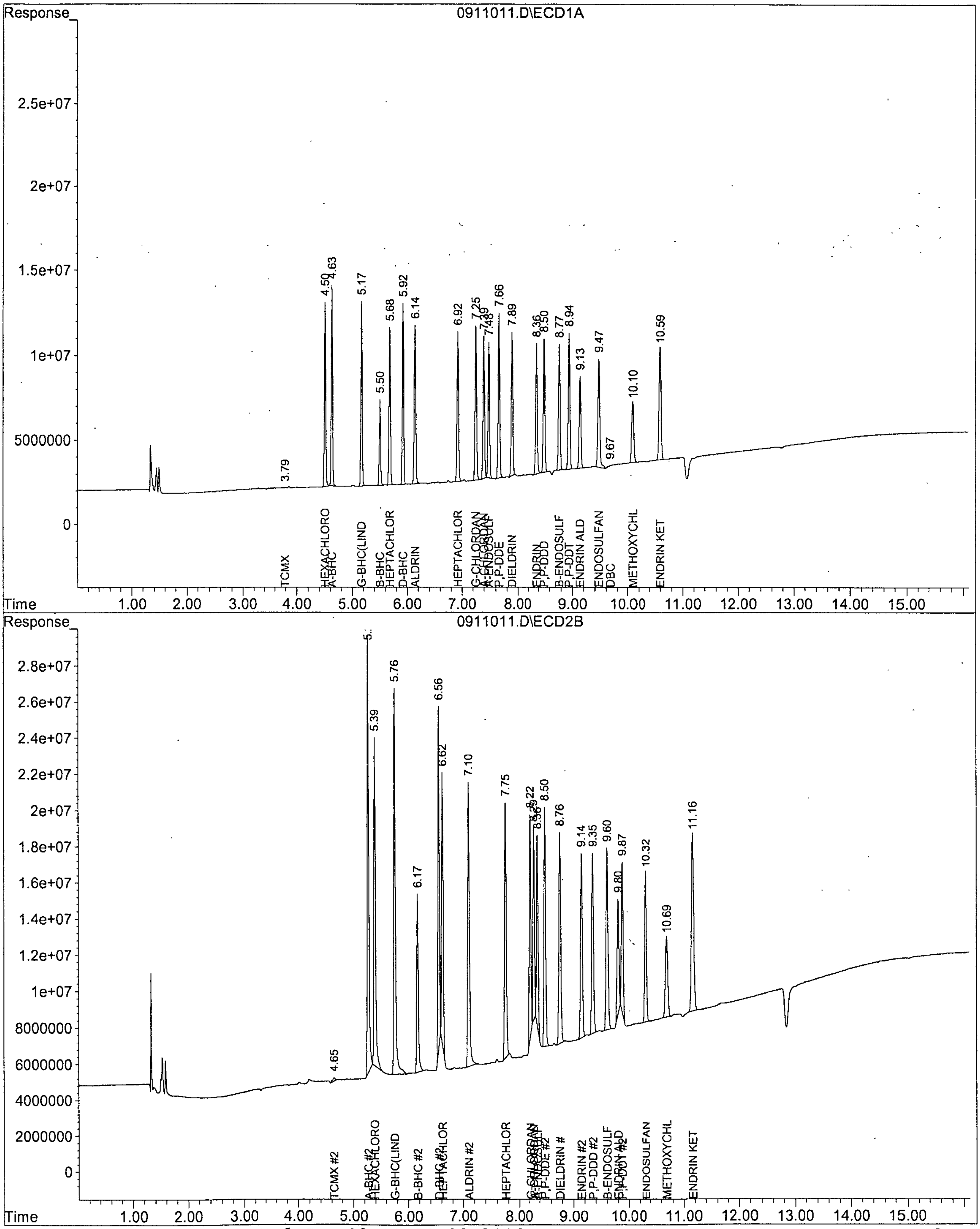
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.65	4910	189155	0.0000	0.0009 #
	Surrogate Spike 0.150 Range 25 - 150			Recovery	=	0.00%#	0.60%#
23) S	DBC	9.67	0.00	170319	0	0.0009	N.D. #
	Surrogate Spike 0.150			Recovery	=	0.60%	0.00%
24) S	DECA	0.00	0.00	0	0	N.D.	N.D.
	Surrogate Spike 0.150 Range 25 - 150			Recovery	=	0.00%#	0.00%#
	Target Compounds						
2) TM	HEXACHLOROBENZEN	4.50	5.39	10879450	18125422	0.0909	0.0915
3) TM	A-BHC	4.63	5.27	11819986	24179134	0.1037	0.0993
4) TM	B-BHC	5.50	6.17	5063514	9833538	0.0974	0.0959
5) M	G-BHC(LINDANE)	5.17	5.76	10888246	45302298	0.0988	0.1020
6) TM	D-BHC	5.92	6.56	10686132	18831598	0.0925	0.0925
7) M	HEPTACHLOR	5.68	6.62	9296483	15102998	0.0929	0.0912
8) M	ALDRIN	6.14	7.10	9361647	15698817	0.0967	0.0944
9) TM	HEPTACHLOR EPOXI	6.92	7.75	8842827	14101185	0.0937	0.0914
10) TM	G-CHLORDANE	7.25	8.22	9123279	12301121	0.0899	0.0873
11) TM	A-ENDOSULFAN	7.48	8.36	8034957	10565843	0.0891	0.0848
12) TM	A-CHLORDANE	7.39	8.29	8407056	10609608	0.0834	0.0801
13) TM	P,P-DDE	7.66	8.50	9736808	13205065	0.0943	0.0947
14) M	DIELDRIN	7.89	8.76	8467361	11661104	0.0915	0.0896
15) M	ENDRIN	8.36	9.14	7702983	10192761	0.0903	0.0951
16) TM	B-ENDOSULFAN	8.77	9.60	7440855	10056264	0.0925	0.0859
17) TM	P,P-DDD	8.50	9.35	7889173	9971000	0.0947	0.0960
18) TM	ENDRIN ALDEHYDE	9.13	9.80	5431278	6323138	0.0864	0.0875
19) M	P,P-DDT	8.94	9.87	8057187	8307093	0.0971	0.0951
20) TM	ENDOSULFAN SULFA	9.47	10.32	6406801	8377943	0.0841	0.0895
21) TM	ENDRIN KETONE	10.59	11.16	6697667	9862295	0.0914	0.0896
22) TM	METHOXYCHLOR	10.10	10.69	3622766	4459369	0.0954	0.0953

Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Data File : G:\ETHEL\DATA\180911\0911011.D
Acq On : 9-11-18 16:27:44
Sample : OCLHX - SS 3/30/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 11
Operator: MA
Inst : Ethel
Multiplr: 1.00



TOXAPHENE
METHOD 608/8081 TOX0911

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 09/11/18
Matrix: Water Instrument: Ethel Initials:

		Compound	1	2	3	4	5	6	1A	1B			Avg	%RSD	Type	r^2	Q
			0911014.D	0911015.D	0911016.D	0911017.D	0911018.D	0911019.D	0911013.D	0911012.D							
1	ANM	Toxaphene Total	1761302	1843268	1871750	1976525	1865254	2019617	1847532	1658449			1855462	6.1	ANM		
2	L2AK	Toxaphene	161154	173941	177378	186588	180443	198306	120115	170956			171110	14	L2AK		
3	L2AK	Toxaphene {2}	541090	523242	555348	592095	560362	605136	462930	498255			542307	8.7	L2AK		
4	L2AK	Toxaphene {3}	396019	409832	405202	422659	394533	429314	448519	273545			397453	13	L2AK		
5	L2AK	Toxaphene {4}	205750	227910	224353	234782	221509	229550	219394	154269			214690	12	L2AK		
6	L2AK	Toxaphene {5}	457289	508342	509470	540401	508408	557311	596573	561423			529902	8.1	L2AK		
7		Signal #2															
8	ANM	Toxaphene Total #2	1361348	1636287	1734420	1817241	1886510	1909138	1536543	1924212			1725712	12	ANM		
9	L2AK	Toxaphene #2	109870	84222	114529	127640	119081	121255	175268	181029			129112	26	L2AK		
10	L2AK	Toxaphene {2} #2	293578	349497	345673	351815	364147	375991	298067	297629			334549	9.9	L2AK		
11	L2AK	Toxaphene {3} #2	357358	375857	391263	400684	417213	416210	144167	387932			361335	25	L2AK		
12	L2AK	Toxaphene {4} #2	488628	630562	652513	710252	732297	752673	616873	697363			660145	13	L2AK		
13	L2AK	Toxaphene {5} #2	111915	196149	230443	226851	253773	243009	302168	360259			240571	30	L2AK		
14																	
15																	
16																	
17																	
18																	
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34																	
35																	

5.056456

Quantitation Report (QT Reviewed)

```
Signal #1 : G:\ETHEL\DATA\180911\0911012.D\ECD1A.CH       Vial: 12
Signal #2 : G:\ETHEL\DATA\180911\0911012.D\ECD2B.CH
Acq On    : 9-11-18 16:46:39                            Operator: MA
Sample    : TOX - 1B 8/3/18                             Inst     : Ethel
Misc      : water                                       Multiplr: 1.00
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 12  9:38 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2ul
Signal #1 Phase : DB-35ms             Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32                Signal #2 Info : 0.32
```

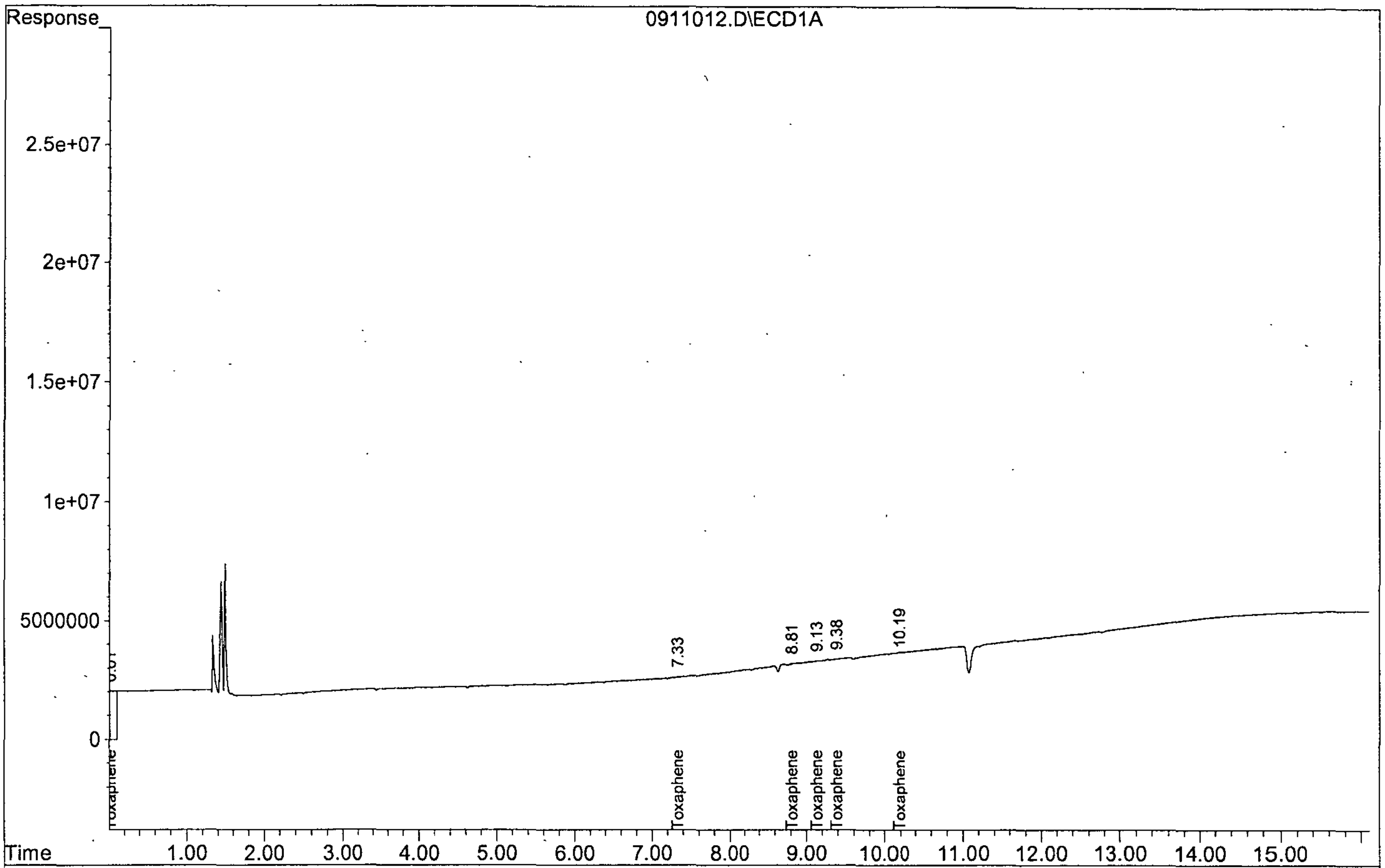
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	Target Compounds						
1)	ANM Toxaphene Total	0.00	0.00	82922	96211	0.0215m	0.0279m#
2)	L2AK Toxaphene	7.33	7.62	8548	9051	0.0250	0.0351 #
3)	L2AK Toxaphene {2}	8.81	9.52	24913	14881	0.0230	0.0222
4)	L2AK Toxaphene {3}	9.13	9.99	13677	19397	0.0172	0.0268 #
5)	L2AK Toxaphene {4}	9.38	10.15	7713	34868	0.0118	0.0264 #
6)	L2AK Toxaphene {5}	10.20	11.07	28071	18013	0.0265	0.0374 #
	Sum Toxaphene			82922	96211	0.1034	0.1480
	Average Toxaphene					0.021	0.030

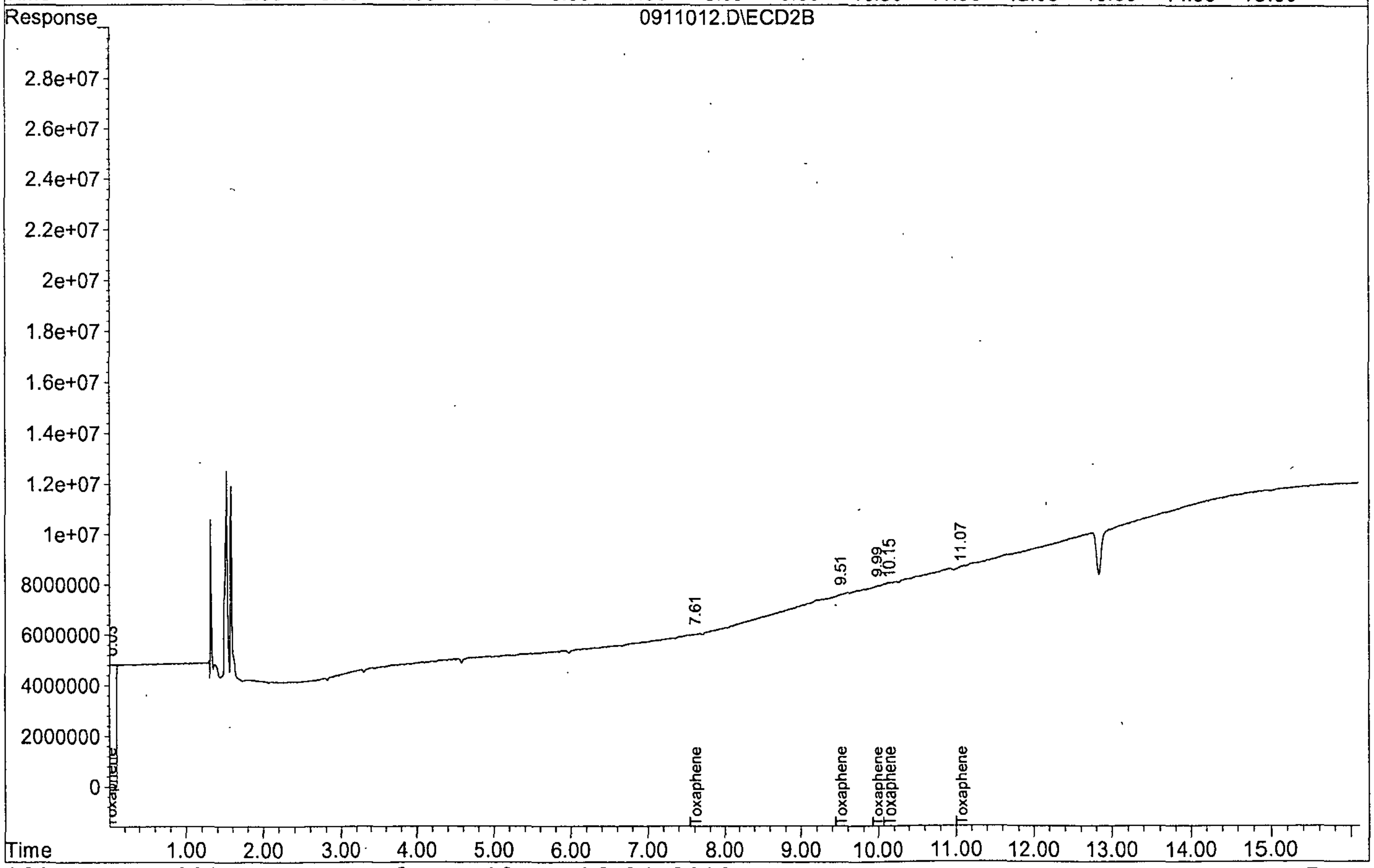
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911012.D
Acq On : 9-11-18 16:46:39
Sample : TOX - 1B 8/3/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 12
Operator: MA
Inst : Ethel
Multiplr: 1.00





Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911013.D\ECD1A.CH Vial: 13
Signal #2 : G:\ETHEL\DATA\180911\0911013.D\ECD2B.CH
Acq On : 9-11-18 17:05:35 Operator: MA
Sample : TOX - 1A 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 9:38 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

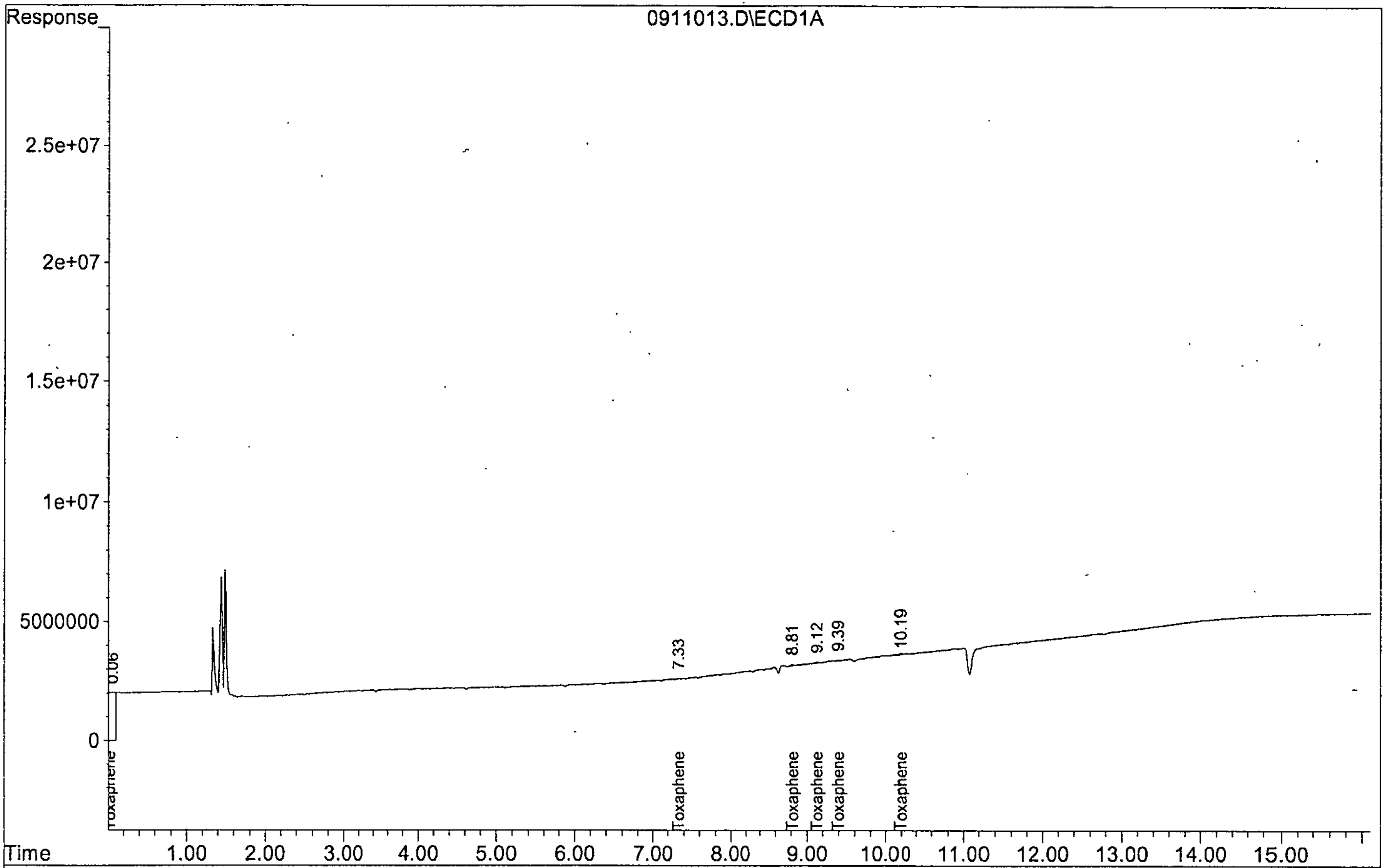
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

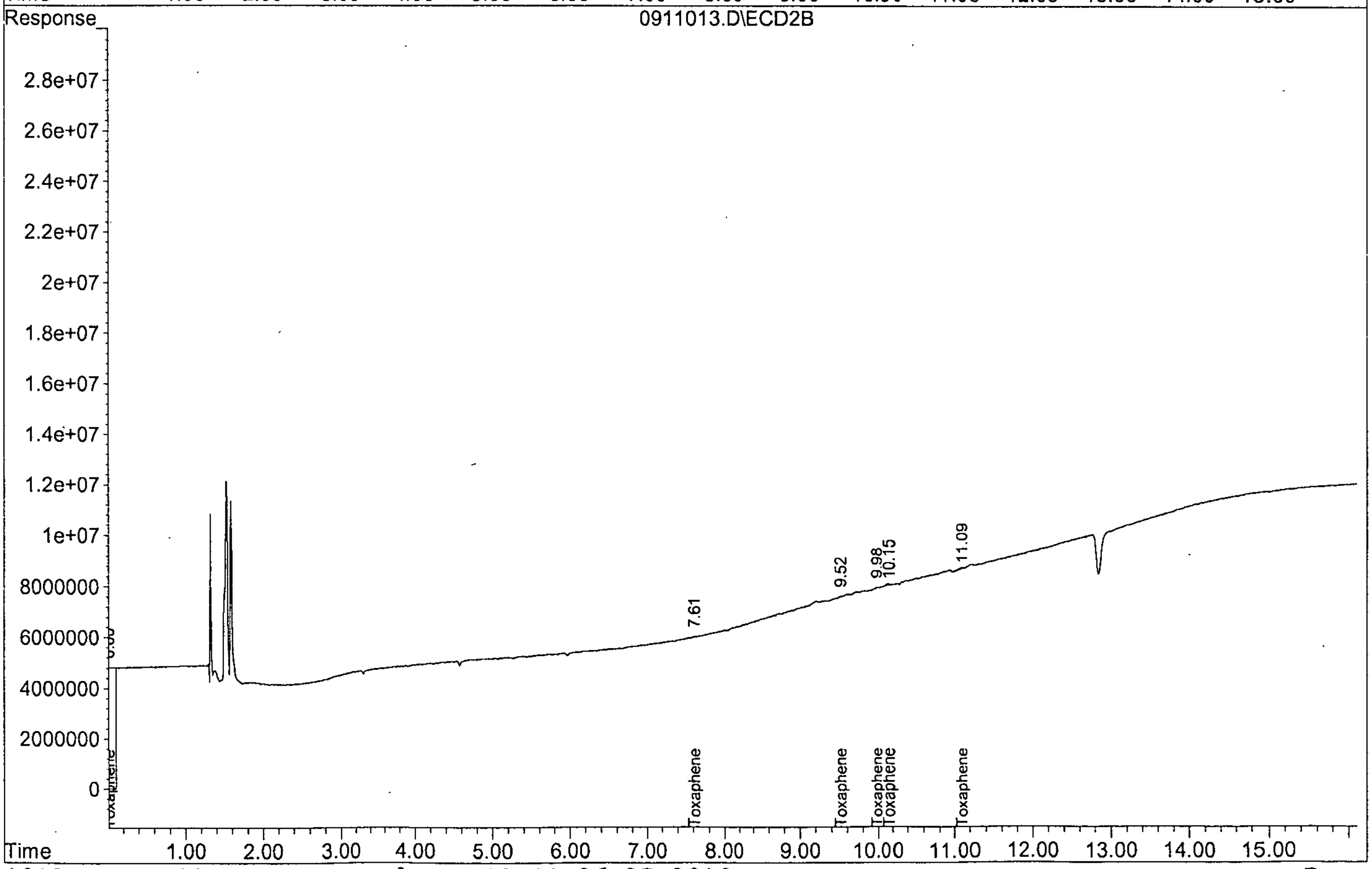
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) ANM Toxaphene Total	0.00	0.00	184753	153654	0.0479m	0.0445m
2) L2AK Toxaphene	7.33	7.61	12011	17527	0.0351	0.0679 #
3) L2AK Toxaphene {2}	8.81	9.52	46293	29807	0.0427	0.0445
4) L2AK Toxaphene {3}	9.13	9.98	44852	14417	0.0564	0.0199 #
5) L2AK Toxaphene {4}	9.39	10.15	21939	61687	0.0335	0.0467 #
6) L2AK Toxaphene {5}	10.20	11.09	59657	30217	0.0563	0.0628
Sum Toxaphene			184753	153654	0.2240	0.2419
Average Toxaphene					0.045	0.048

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Data File : G:\ETHEL\DATA\180911\0911013.D
Acq On : 9-11-18 17:05:35
Sample : TOX - 1A 8/3/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 13
Operator: MA
Inst : Ethel
Multiplr: 1.00





Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911014.D\ECD1A.CH Vial: 14
Signal #2 : G:\ETHEL\DATA\180911\0911014.D\ECD2B.CH
Acq On : 9-11-18 17:24:39 Operator: MA
Sample : TOX - 1 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 9:38 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

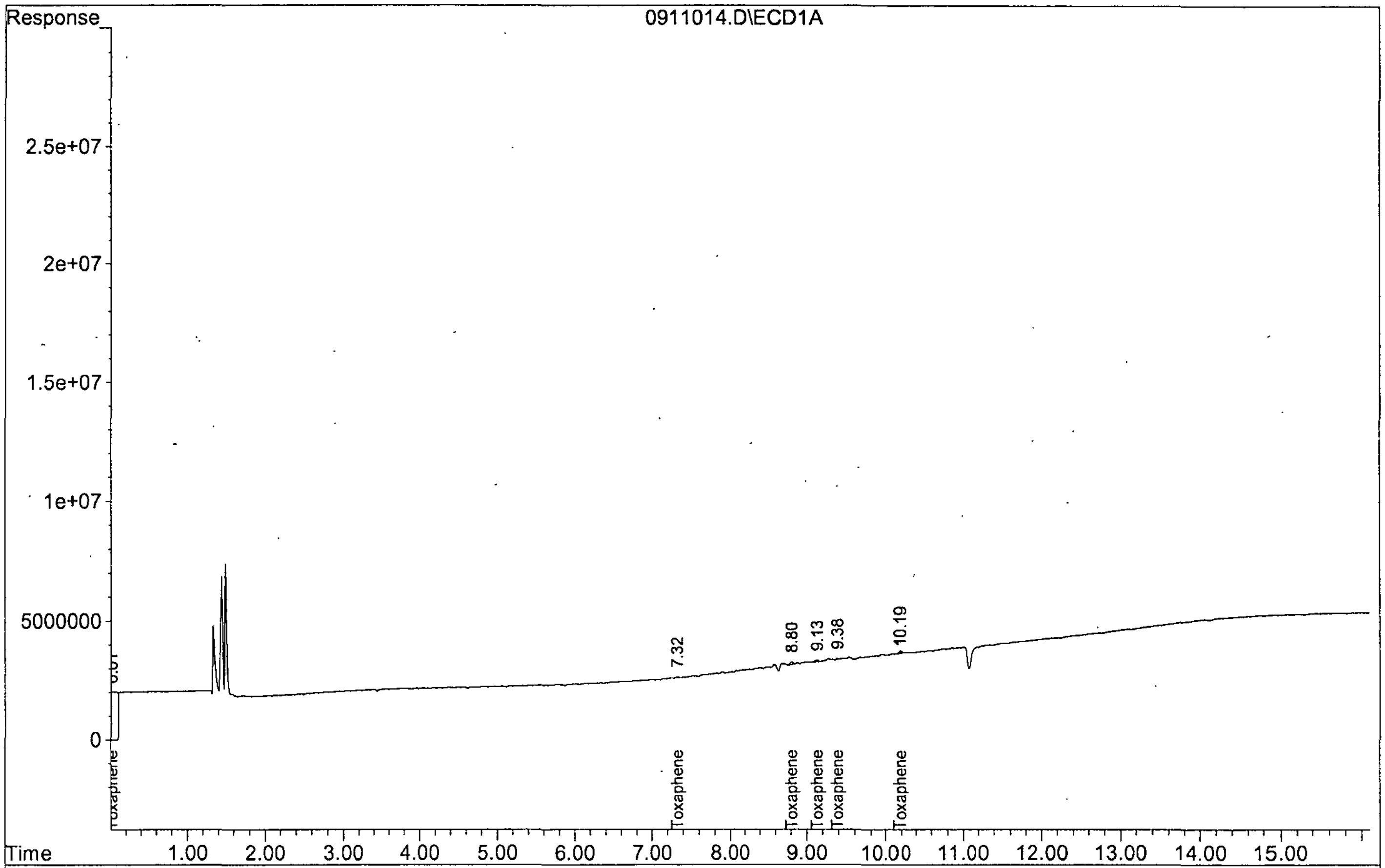
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

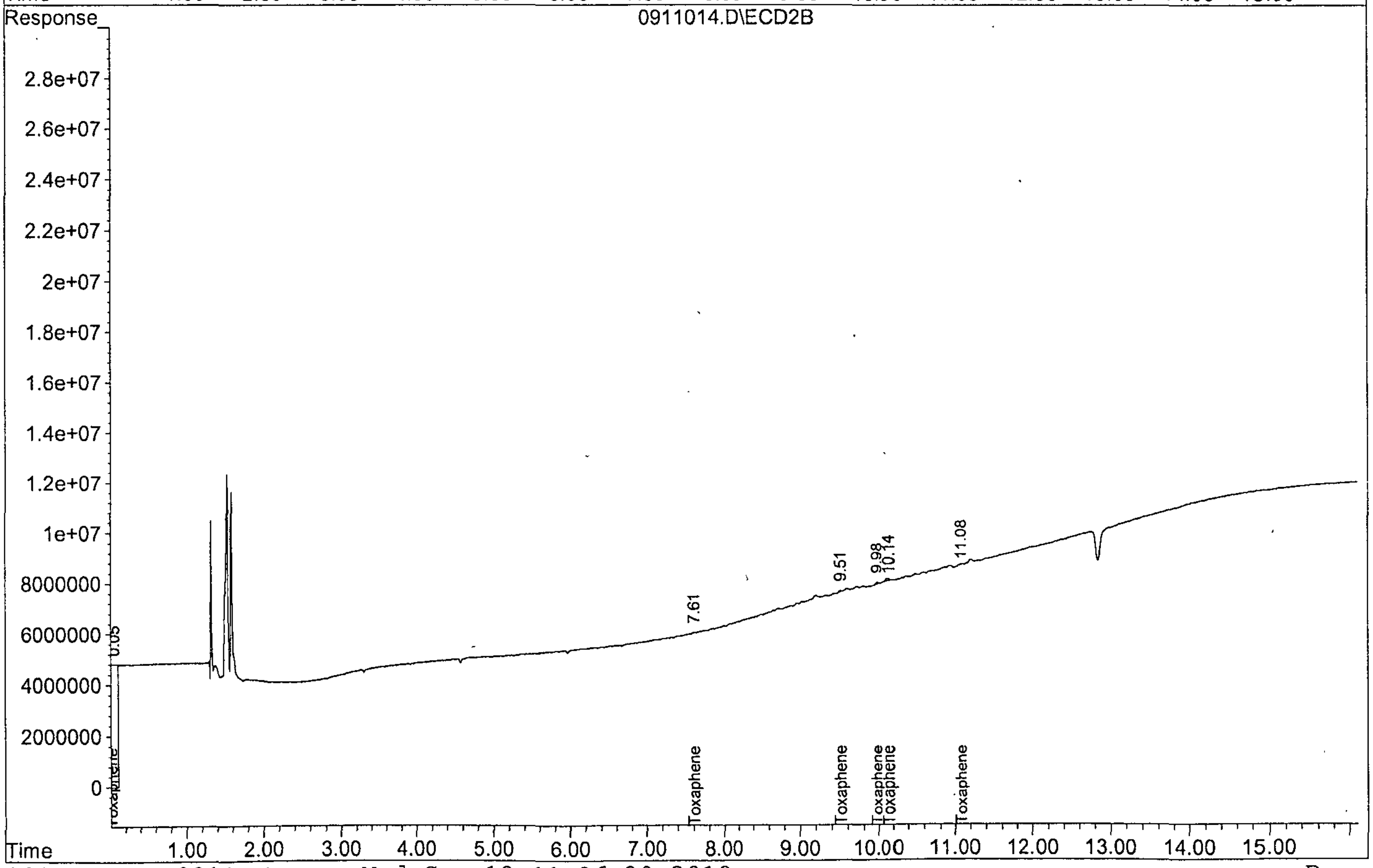
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	352260	272270	0.0914m	0.0789m	
2) L2AK Toxaphene	7.32	7.61	32231	21974	0.0942	0.0851	
3) L2AK Toxaphene {2}	8.81	9.51	108218	58716	0.0998	0.0878	
4) L2AK Toxaphene {3}	9.13	9.98	79204	71472	0.0996	0.0989	
5) L2AK Toxaphene {4}	9.38	10.14	41150	97726	0.0628	0.0740	
6) L2AK Toxaphene {5}	10.19	11.08	91458	22383	0.0863	0.0465	#
Sum Toxaphene			352260	272270	0.4427	0.3923	
Average Toxaphene					0.089	0.078	

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911014.D Vial: 14
Acq On : 9-11-18 17:24:39 Operator: MA
Sample : TOX - 1 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M





Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911015.D\ECD1A.CH Vial: 15
Signal #2 : G:\ETHEL\DATA\180911\0911015.D\ECD2B.CH
Acq On : 9-11-18 17:43:37 Operator: MA
Sample : TOX - 2 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 9:38 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

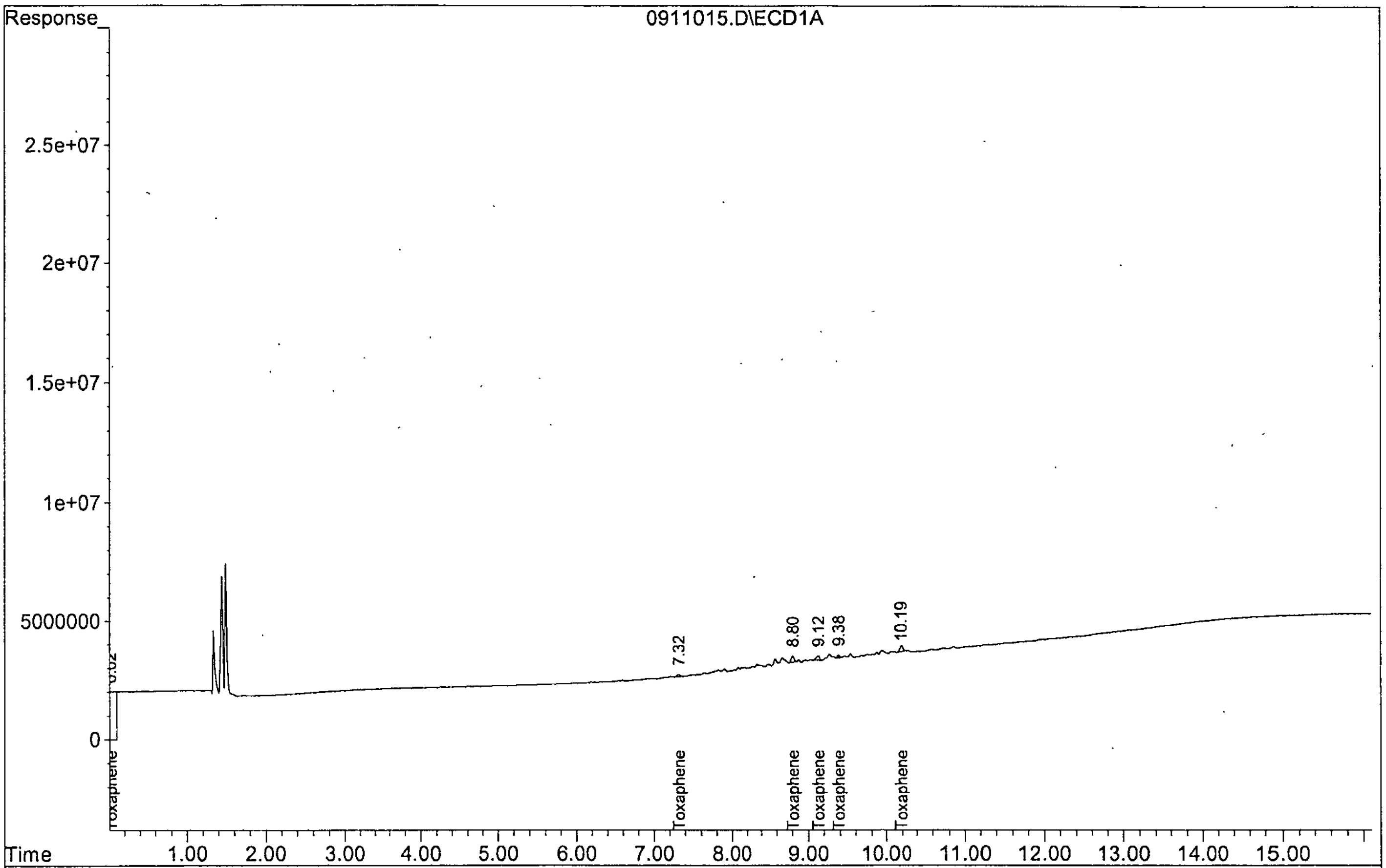
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

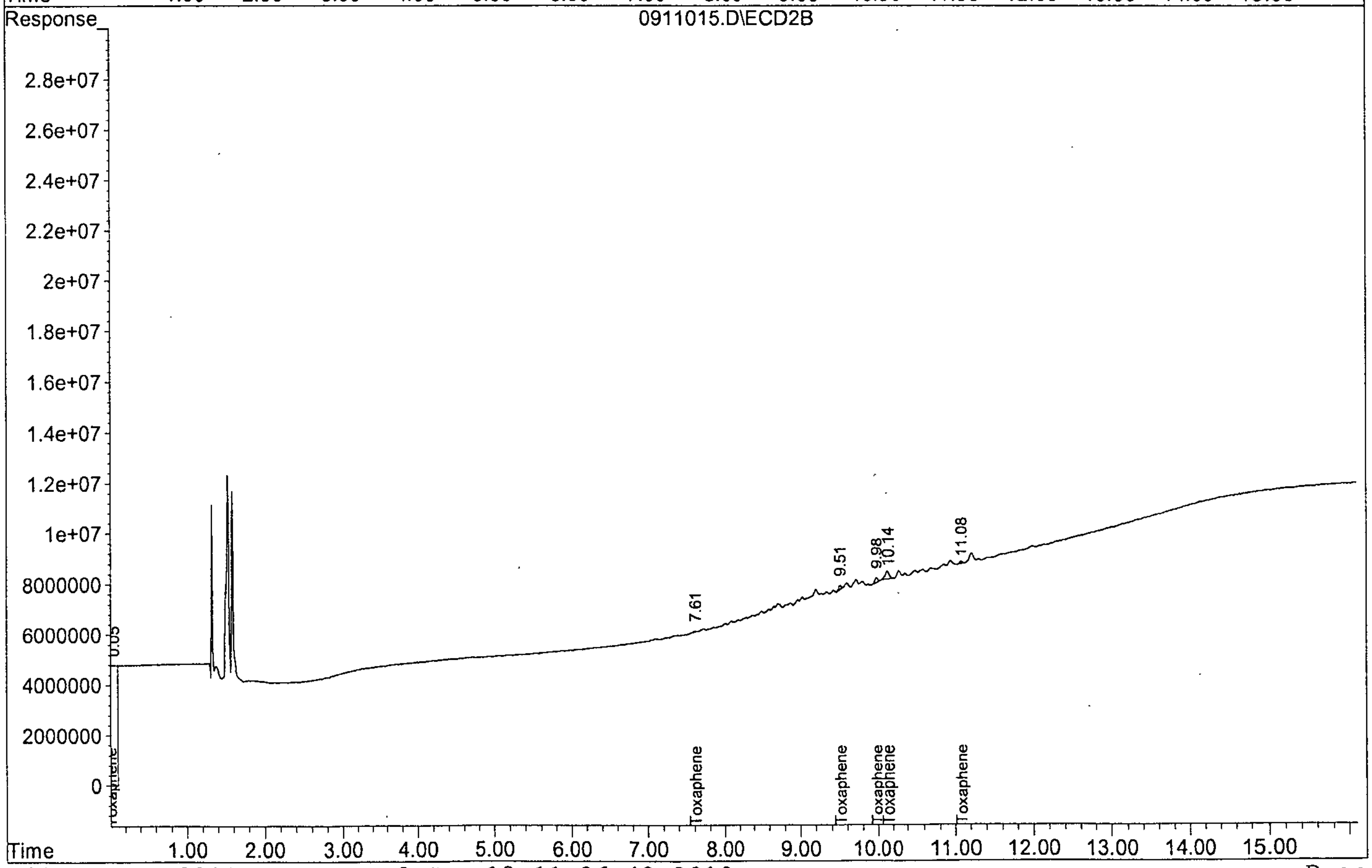
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) ANM Toxaphene Total	0.00	0.00	921634	818143	0.2391m	0.2370m
2) L2AK Toxaphene	7.32	7.61	86971	42111	0.2541	0.1631 #
3) L2AK Toxaphene {2}	8.80	9.51	261621	174748	0.2412	0.2612
4) L2AK Toxaphene {3}	9.13	9.98	204916	187928	0.2578	0.2600
5) L2AK Toxaphene {4}	9.38	10.14	113955	315281	0.1739	0.2388 #
6) L2AK Toxaphene {5}	10.19	11.08	254171	98075	0.2398	0.2038
Sum Toxaphene			921634	818143	1.1668	1.1269
Average Toxaphene					0.233	0.225

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911015.D Vial: 15
Acq On : 9-11-18 17:43:37 Operator: MA
Sample : TOX - 2 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M





Quantitation Report (Not Reviewed)

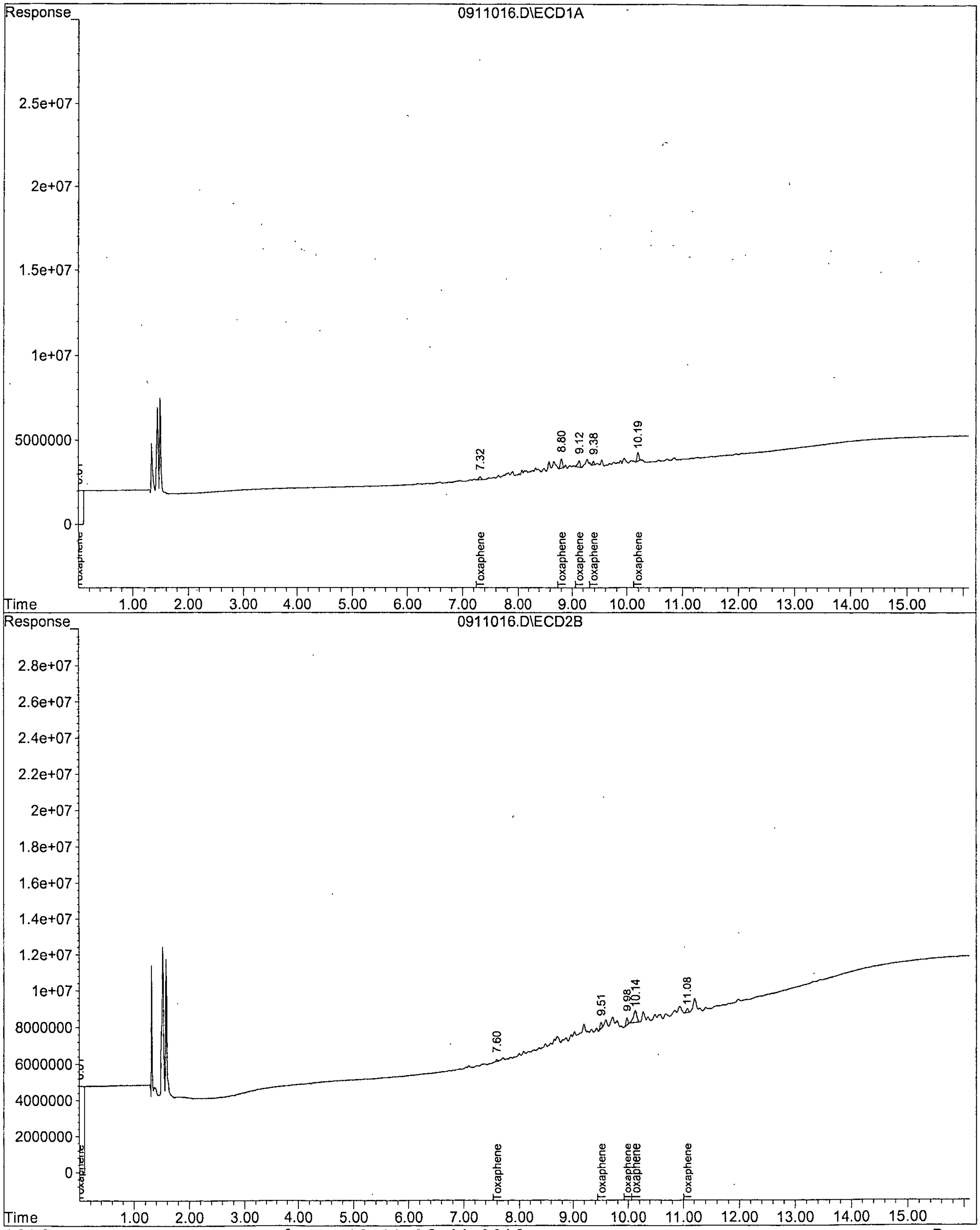
Signal #1 : G:\ETHEL\DATA\180911\0911016.D\ECD1A.CH Vial: 16
Signal #2 : G:\ETHEL\DATA\180911\0911016.D\ECD2B.CH
Acq On : 9-11-18 18:02:35 Operator: MA
Sample : TOX - 3 1/4/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 9:38 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	1871750	1734420	0.4855m	0.5025m	
2) L2AK Toxaphene	7.32	7.60	177378	114529	0.5183	0.4435	
3) L2AK Toxaphene {2}	8.81	9.51	555348	345673	0.5120	0.5166	
4) L2AK Toxaphene {3}	9.13	9.98	405202	391263	0.5097	0.5414	
5) L2AK Toxaphene {4}	9.38	10.14	224353	652513	0.3423	0.4942	#
6) L2AK Toxaphene {5}	10.19	11.08	509470	230443	0.4807	0.4790	
Sum Toxaphene			1871750	1734420	2.3631	2.4747	
Average Toxaphene					0.473	0.495	

Data File : G:\ETHEL\DATA\180911\0911016.D   Vial: 16
Acq On   : 9-11-18 18:02:35   Operator: MA
Sample   : TOX - 3 1/4/18   Inst   : Ethel
Misc   : water   Multiplr: 1.00
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M



Quantitation Report   (Not Reviewed)

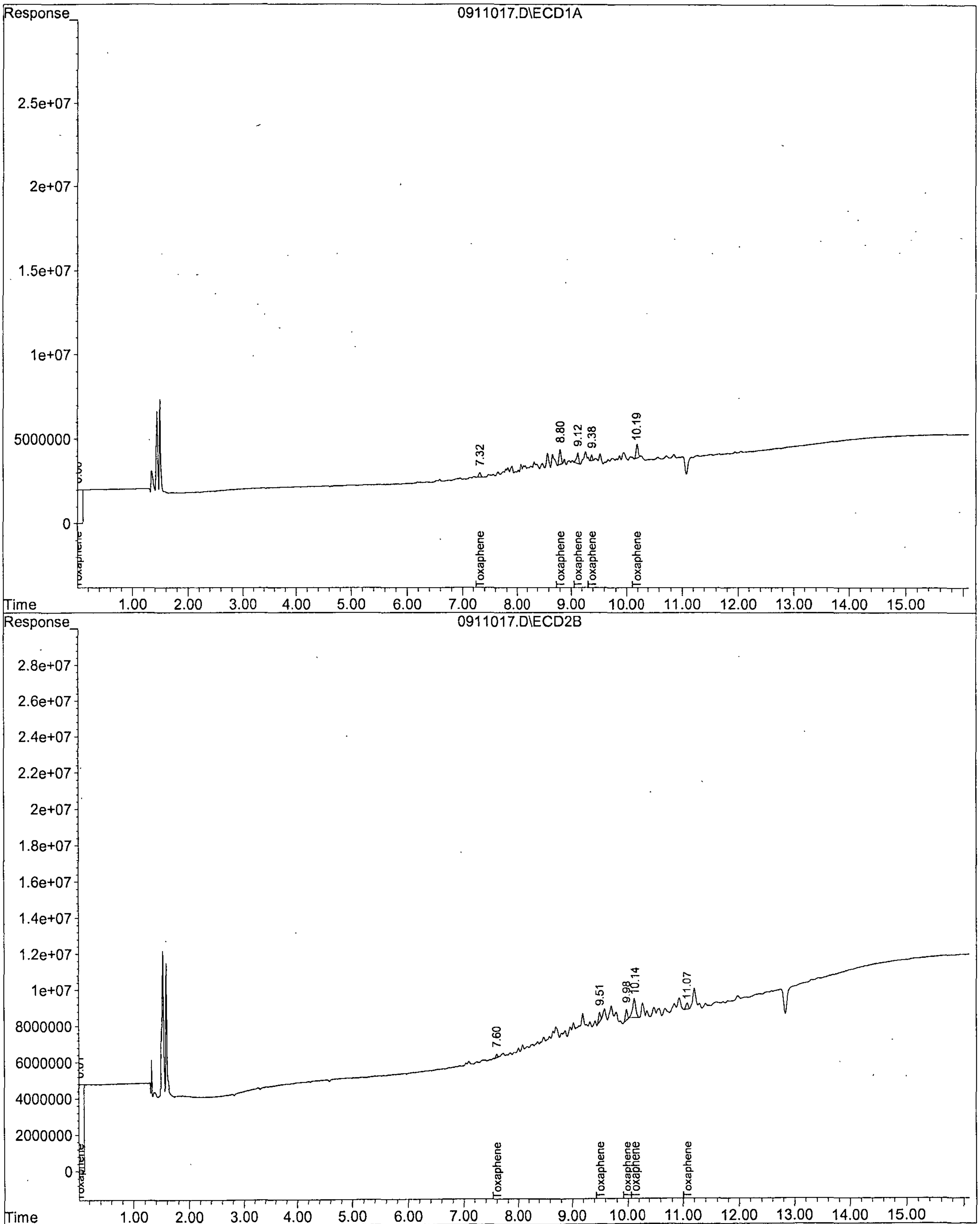
Signal #1 : G:\ETHEL\DATA\180911\0911017.D\ECD1A.CH   Vial: 17
Signal #2 : G:\ETHEL\DATA\180911\0911017.D\ECD2B.CH
Acq On   : 9-11-18 18:21:32   Operator: MA
Sample   : TOX - 4 8/3/18   Inst   : Ethel
Misc   : water   Multiplr: 1.00
IntFile Signal #1: events.e   IntFile Signal #2: events2.e
Quant Time: Sep 12 9:38 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title   : 508/608/8081
Last Update : Wed Sep 12 09:38:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.   : 2ul
Signal #1 Phase : DB-35ms   Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32   Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	2964787	2725862	0.7691m	0.7898m	
2) L2AK Toxaphene	7.32	7.60	279881	191460	0.8178	0.7415	
3) L2AK Toxaphene {2}	8.80	9.51	888142	527722	0.8189	0.7887	
4) L2AK Toxaphene {3}	9.13	9.98	633989	601026	0.7976	0.8317	
5) L2AK Toxaphene {4}	9.38	10.14	352173	1065378	0.5374	0.8069	#
6) L2AK Toxaphene {5}	10.19	11.08	810602	340276	0.7649	0.7072	
Sum Toxaphene			2964787	2725862	3.7365	3.8760	
Average Toxaphene					0.747	0.775	

Data File : G:\ETHEL\DATA\180911\0911017.D Vial: 17
Acq On : 9-11-18 18:21:32 Operator: MA
Sample : TOX - 4 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M



Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911018.D\ECD1A.CH Vial: 18
Signal #2 : G:\ETHEL\DATA\180911\0911018.D\ECD2B.CH
Acq On : 9-11-18 18:40:34 Operator: MA
Sample : TOX - 5 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 9:38 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

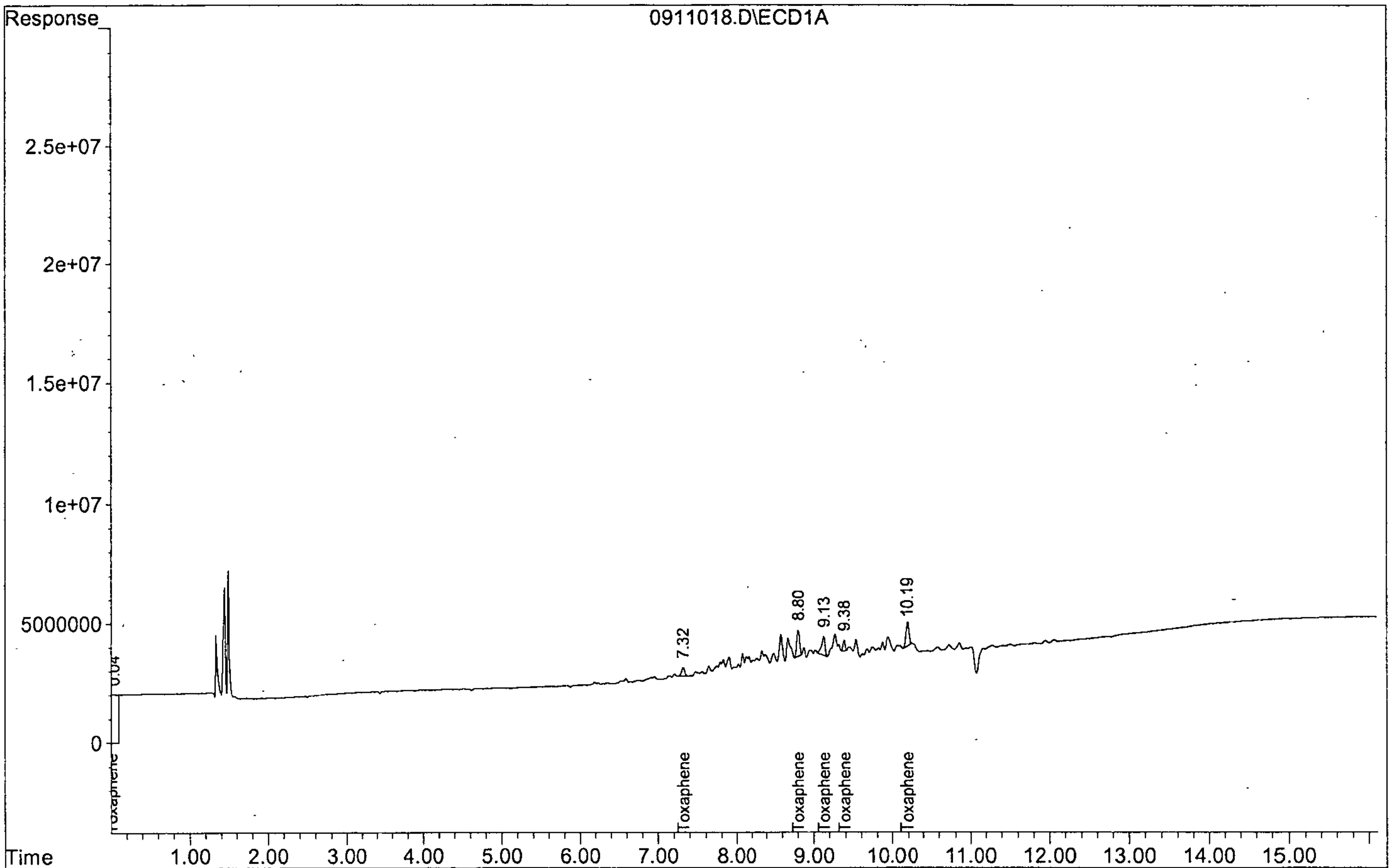
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	3730509	3773020	0.9677m	1.0932m	
2) L2AK Toxaphene	7.32	7.60	360885	238162	1.0545	0.9223	
3) L2AK Toxaphene {2}	8.80	9.51	1120725	728293	1.0333	1.0885	
4) L2AK Toxaphene {3}	9.13	9.98	789065	834425	0.9927	1.1546	
5) L2AK Toxaphene {4}	9.38	10.14	443017	1464593	0.6760	1.1093	#
6) L2AK Toxaphene {5}	10.19	11.08	1016816	507545	0.9594	1.0549	
Sum Toxaphene			3730509	3773020	4.7159	5.3296	
Average Toxaphene					0.943	1.066	

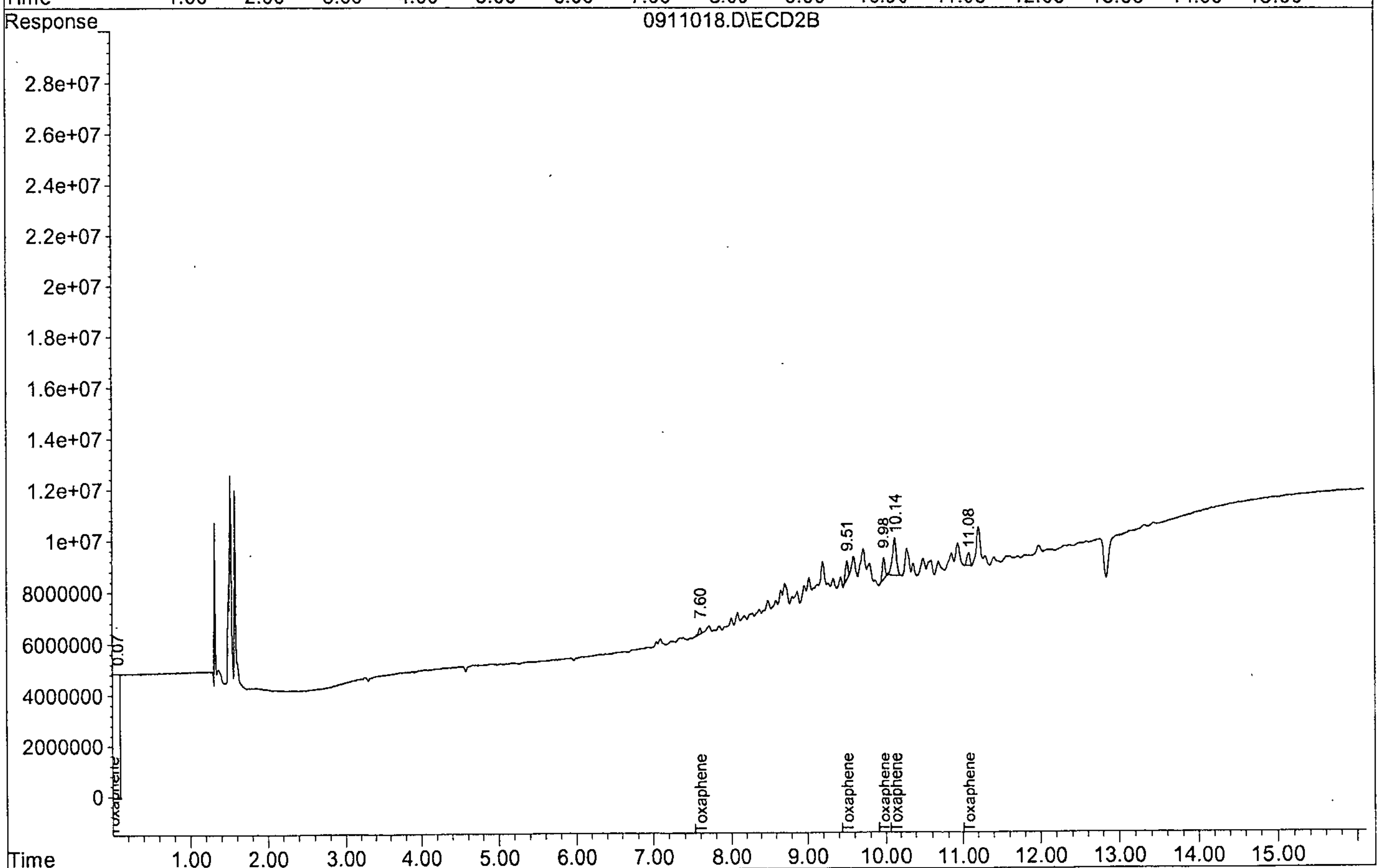
(f)=RT Delta > 1/2 Window (#)=Amounts differ by ≥ 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911018.D
Acq On : 9-11-18 18:40:34
Sample : TOX - 5 8/3/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 18
Operator: MA
Inst : Ethel
Multiplr: 1.00





Quantitation Report (Not Reviewed)

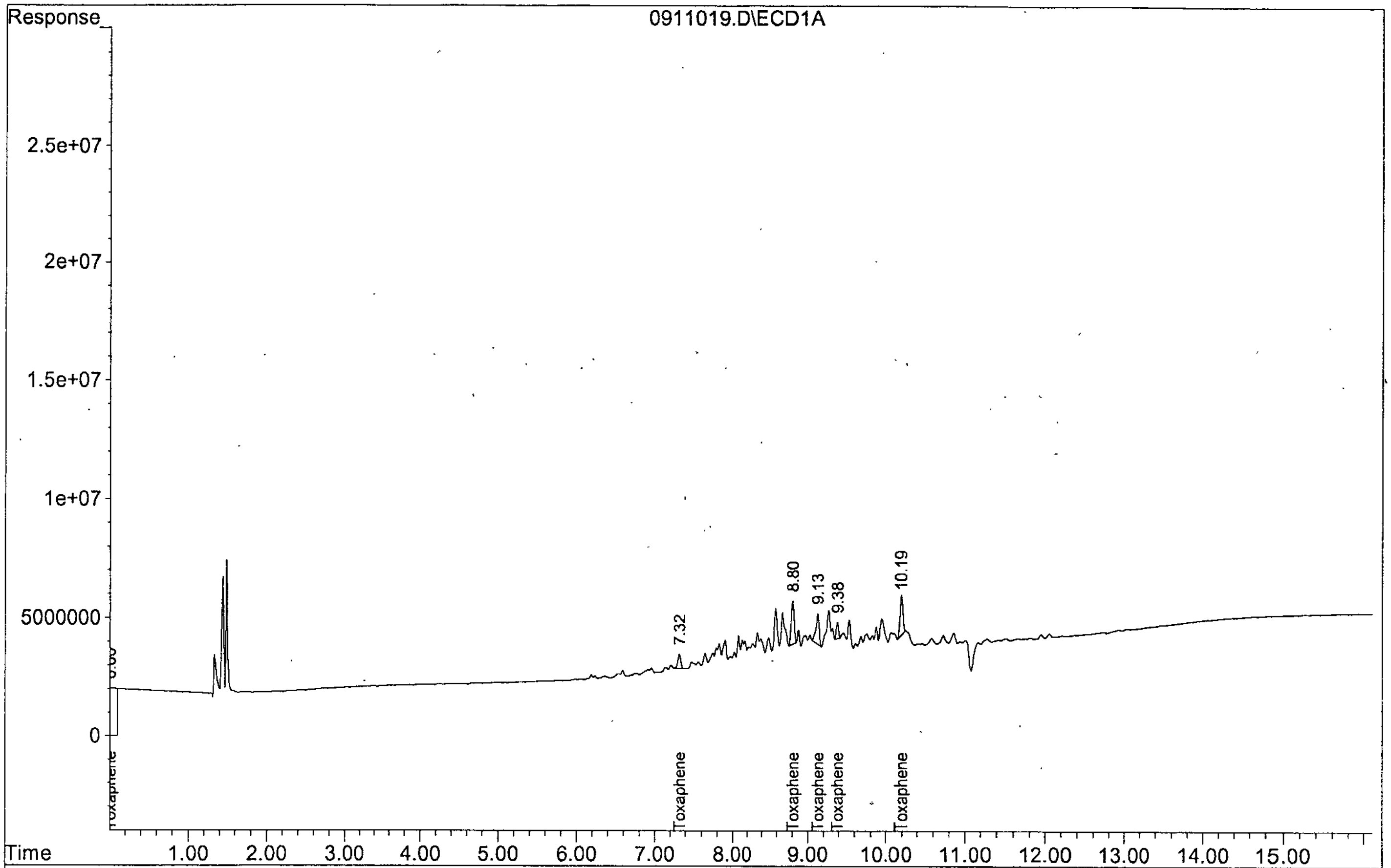
```
Signal #1 : G:\ETHEL\DATA\180911\0911019.D\ECD1A.CH      Vial: 19
Signal #2 : G:\ETHEL\DATA\180911\0911019.D\ECD2B.CH
Acq On    : 9-11-18 18:59:35                          Operator: MA
Sample    : TOX - 6 8/3/18                            Inst    : Ethel
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: events.e    IntFile Signal #2: events2.e
Quant Time: Sep 12  9:38 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:06 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

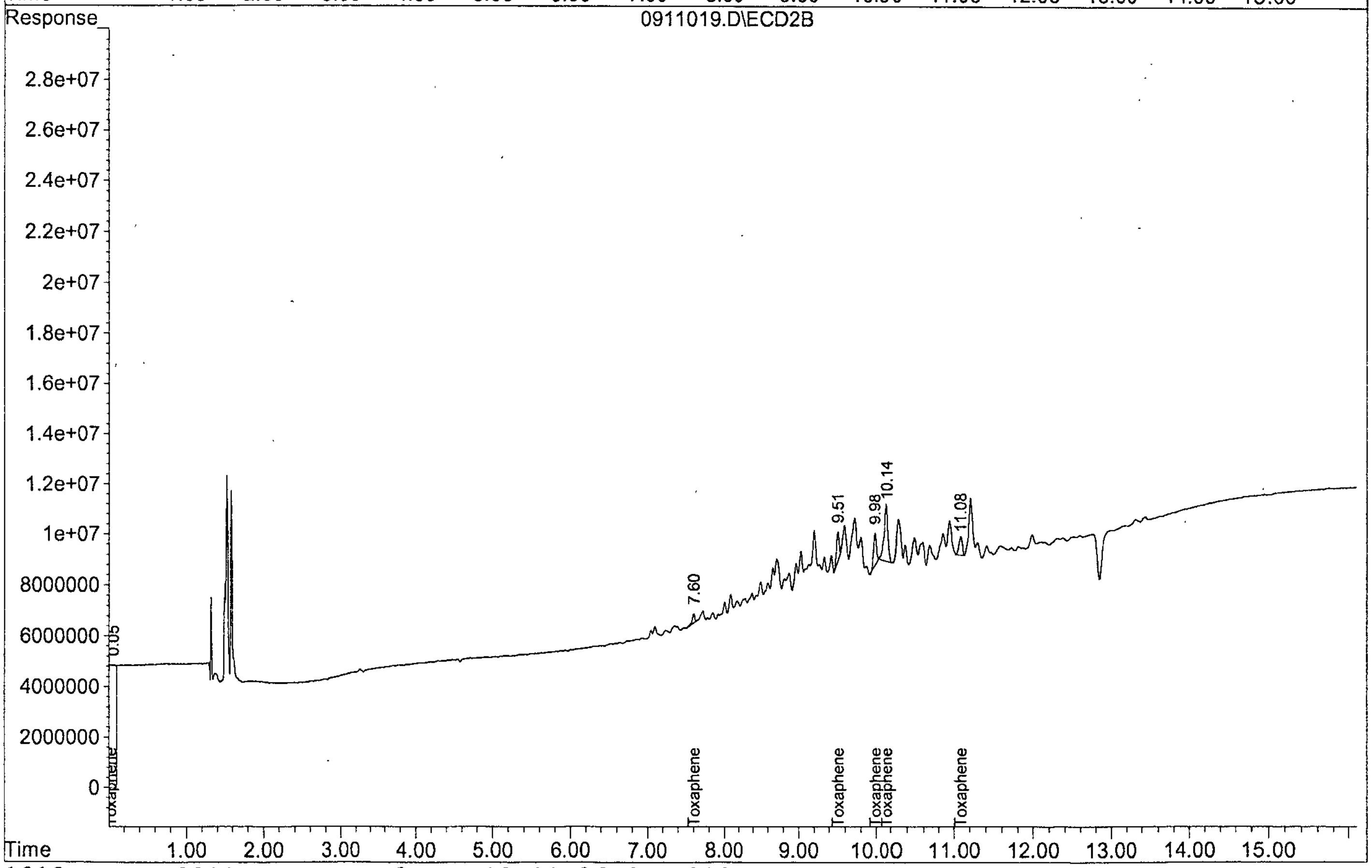
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	6058850	5727413	1.5717m	1.6594m	
2) L2AK Toxaphene	7.32	7.60	594917	363764	1.7384	1.4087	
3) L2AK Toxaphene {2}	8.81	9.51	1815409	1127973	1.6738	1.6858	
4) L2AK Toxaphene {3}	9.13	9.98	1287941	1248630	1.6202	1.7278	
5) L2AK Toxaphene {4}	9.38	10.14	688651	2258019	1.0508	1.7102	#
6) L2AK Toxaphene {5}	10.19	11.08	1671932	729027	1.5776	1.5152	
Sum Toxaphene			6058850	5727413	7.6608	8.0478	
Average Toxaphene					1.532	1.610	

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Data File : G:\ETHEL\DATA\180911\0911019.D
Acq On : 9-11-18 18:59:35
Sample : TOX - 6 8/3/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 19
Operator: MA
Inst : Ethel
Multiplr: 1.00





TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/11/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911020.D

		Compound	MEAN	CCRF	%D		%Drift
1	ANM	Toxaphene Total	1855460	2118250	14	ANM	
2	L2AK	Toxaphene	171110	203440	19	L2AK	
3	L2AK	Toxaphene {2}	542307	630384	16	L2AK	
4	L2AK	Toxaphene {3}	397453	446991	12	L2AK	
5	L2AK	Toxaphene {4}	214690	260146	21	L2AK	
6	L2AK	Toxaphene {5}	529902	577288	8.9	L2AK	
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
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28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			16.5		

TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/11/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911020.D

		Compound	MEAN	CCRF	%D		%Drift
41	ANM	Toxaphene Total	1725710	1914150	11	ANM	
42	L2AK	Toxaphene	129112	131246	1.7	L2AK	
43	L2AK	Toxaphene {2}	334549	363028	8.5	L2AK	
44	L2AK	Toxaphene {3}	361335	435712	21	L2AK	
45	L2AK	Toxaphene {4}	660145	728952	10	L2AK	
46	L2AK	Toxaphene {5}	240571	255207	6.1	L2AK	
47							
48							
49							
50							
51							
52							
53							
54							
55							
56							
57							
58							
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71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
		Average			9.7		

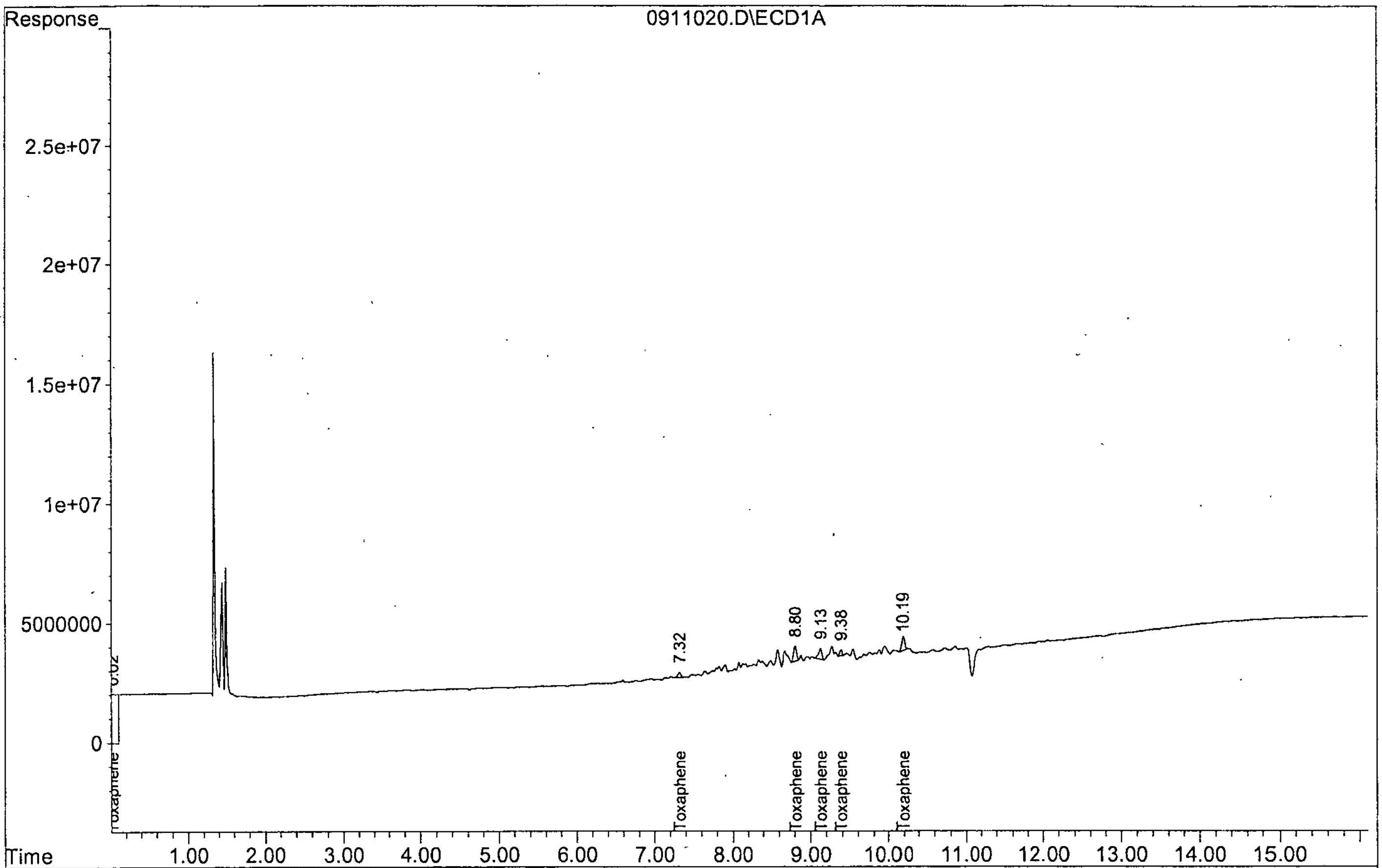
Quantitation Report (Not Reviewed)

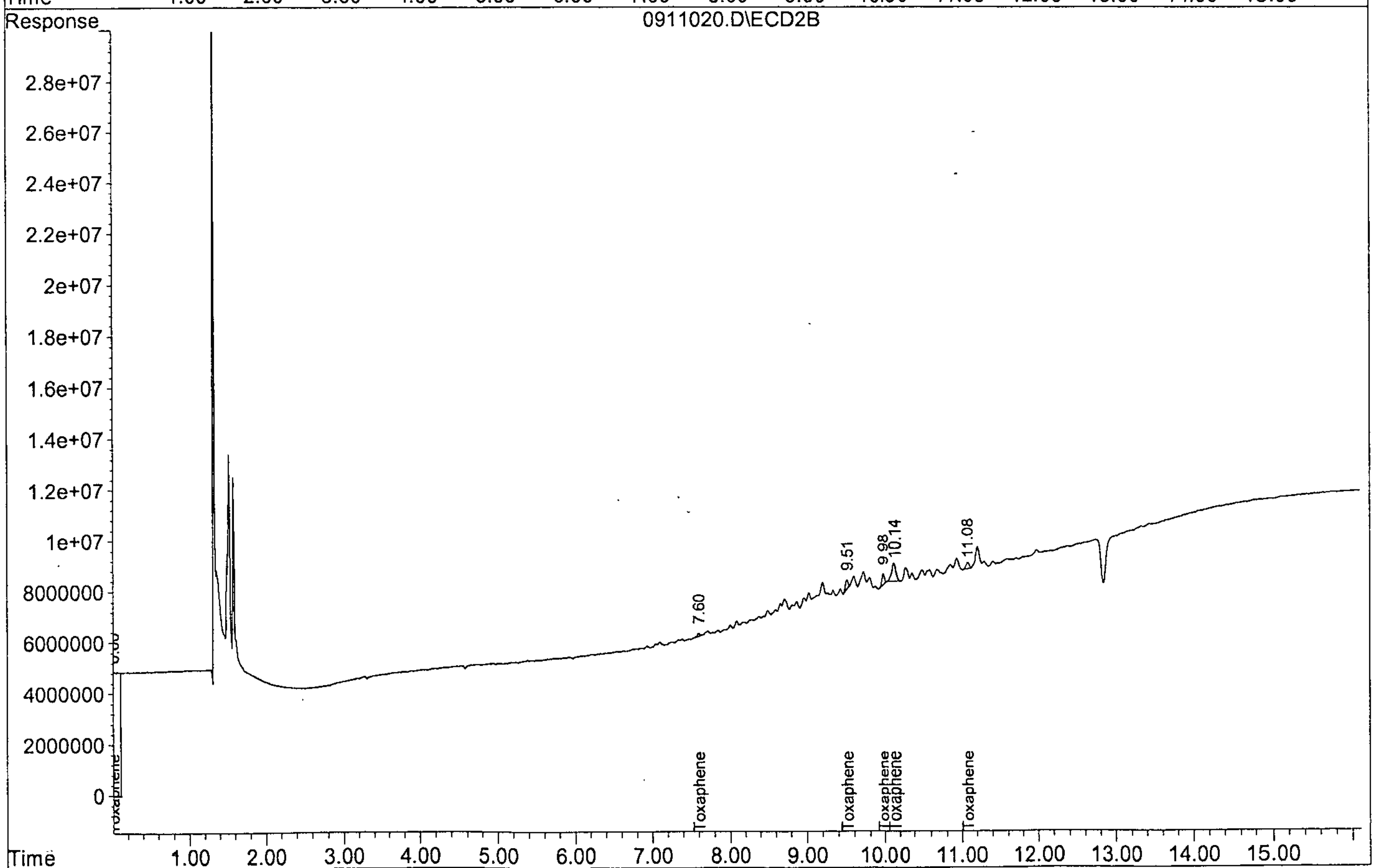
```
Signal #1 : G:\ETHEL\DATA\180911\0911020.D\ECD1A.CH      Vial: 20
Signal #2 : G:\ETHEL\DATA\180911\0911020.D\ECD2B.CH
Acq On    : 9-11-18 19:18:31                         Operator: MA
Sample    : TOX - SS 7/23/18                         Inst    : Ethel
Misc      : water                                    Multiplr: 1.00
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 12  9:40 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	Target Compounds						
1)	ANM Toxaphene Total	0.00	0.00	2118248	1914145	0.5708m	0.5546m
2)	L2AK Toxaphene	7.32	7.60	203440	131246	0.5945	0.5083
3)	L2AK Toxaphene {2}	8.80	9.51	630384	363028	0.5812	0.5426
4)	L2AK Toxaphene {3}	9.13	9.98	446991	435712	0.5623	0.6029
5)	L2AK Toxaphene {4}	9.38	10.14	260146	728952	0.6059	0.5521
6)	L2AK Toxaphene {5}	10.19	11.08	577288	255207	0.5447	0.5304
	Sum Toxaphene			2118248	1914145	2.8886	2.7363
	Average Toxaphene					0.578	0.547

Data File : G:\ETHEL\DATA\180911\0911020.D
Acq On : 9-11-18 19:18:31
Sample : TOX - SS 7/23/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 20
Operator: MA
Inst : Ethel
Multiplr: 1.00





Data File Name:	**0911029.D**
Data File Path:	**G:\ETHEL\DATA\180911**
Operator:	**MA**
Date Acquired:	**12 Sep 2018 10:11**
Method File:	**OCL0911.M**
Sample Name:	**OCL Deg Check 1/15/18**
Vial Number:	**29**
Instrument Name:	**Ethel**

#	Name	Ret Time	Target Response
1)	P,P-DDT	8.94	43570700
2)	P,P-DDD	8.50	145283
3)	P,P-DDE	7.66	148154

Breakdown **0.67**

#	Name	Ret Time	Target Response
1)	P,P-DDT #2	9.87	50829500
2)	P,P-DDD #2	9.35	294857
3)	P,P-DDE #2	8.50	650375

Breakdown **1.8**

#	Name	Ret Time	Target Response
1)	ENDRIN	8.36	43412500
2)	ENDRIN ALDEHYDE	9.13	534033
3)	ENDRIN KETONE	10.59	1104980

Breakdown **3.6**

#	Name	Ret Time	Target Response
1)	ENDRIN #2	9.14	54659600
2)	ENDRIN ALDEHYDE #2	9.80	673909
3)	ENDRIN KETONE #2	11.16	2349020

Breakdown **5.2**

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911029.D\ECD1A.CH Vial: 29
Signal #2 : G:\ETHEL\DATA\180911\0911029.D\ECD2B.CH
Acq On : 9-12-18 10:11:12 Operator: MA
Sample : OCL Deg Check 1/15/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 10:43 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

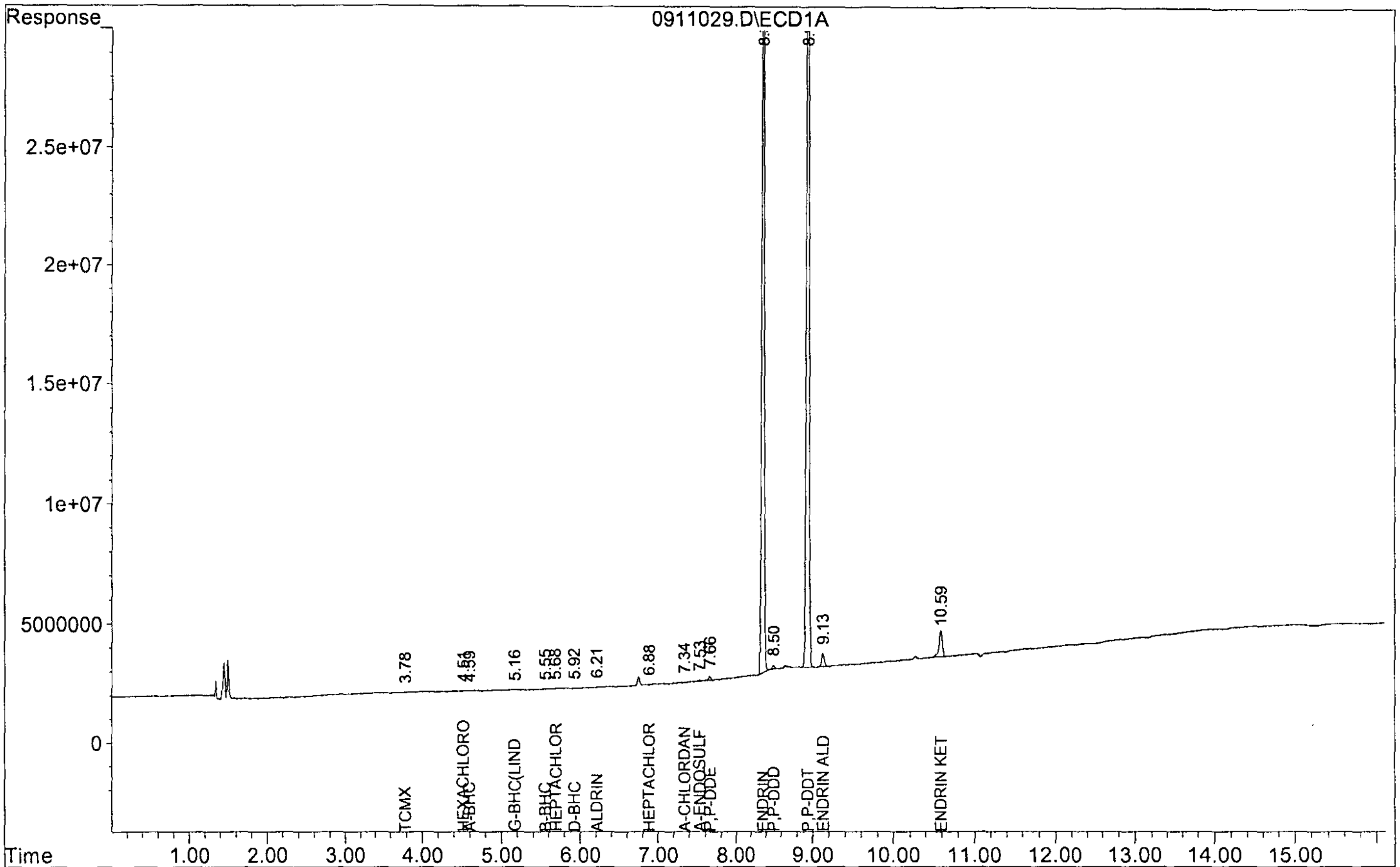
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.78	4.66	2734	11828	0.0000	0.0001 #
Surrogate Spike 0.150 Range 25 - 150			Recovery	=	0.00%#	0.07%#
23) S DBC	0.00	0.00	0	0	N.D.	N.D.
Surrogate Spike 0.150			Recovery	=	0.00%	0.00%
24) S DECA	0.00	0.00	0	0	N.D.	N.D.
Surrogate Spike 0.150 Range 25 - 150			Recovery	=	0.00%#	0.00%#
Target Compounds						
2) TM HEXACHLOROBENZEN	4.51	5.40	3121	13003	0.0000	0.0001 #
3) TM A-BHC	4.59f	5.23f	3563	8375	0.0000	0.0000
4) TM B-BHC	5.55f	6.12f	7326	6469	0.0001	0.0001 #
5) M G-BHC(LINDANE)	5.16	5.70f	3882	5799	0.0000	0.0000 #
6) TM D-BHC	5.92	0.00	5223	0	0.0000	N.D. #
7) M HEPTACHLOR	5.68	0.00	1610	0	0.0000	N.D. #
8) M ALDRIN	6.21f	0.00	3233	0	0.0000	N.D. #
9) TM HEPTACHLOR EPOXI	6.88f	7.83f	4676	15337	0.0000	0.0001 #
10) TM G-CHLORDANE	0.00	8.21	0	29663	N.D.	0.0002 #
11) TM A-ENDOSULFAN	7.53f	8.34	29275	13718	0.0003	0.0001 #
13) TM P,P-DDE	7.66	8.50	148154	650375	0.0014	0.0047 #
15) M ENDRIN	8.36	9.14	43412498	54659639	0.5092	0.5115
17) TM P,P-DDD	8.50	9.35	145283	294857	0.0017	0.0028 #
18) TM ENDRIN ALDEHYDE	9.13	9.80	534033	673909	0.0085	0.0093
19) M P,P-DDT	8.94	9.87	43570723	50829507	0.5249	0.5818
21) TM ENDRIN KETONE	10.59	11.16	1104980	2349024	0.0151	0.0214 #
Target Compounds						
12) TM A-CHLORDANE	7.34f	8.34f	8295	13718	0.0001	N.D. #
14) M DIELDRIN	0.00	0.00	0	0	N.D.	N.D.
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D.	N.D.
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D.	N.D.
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D.	N.D.

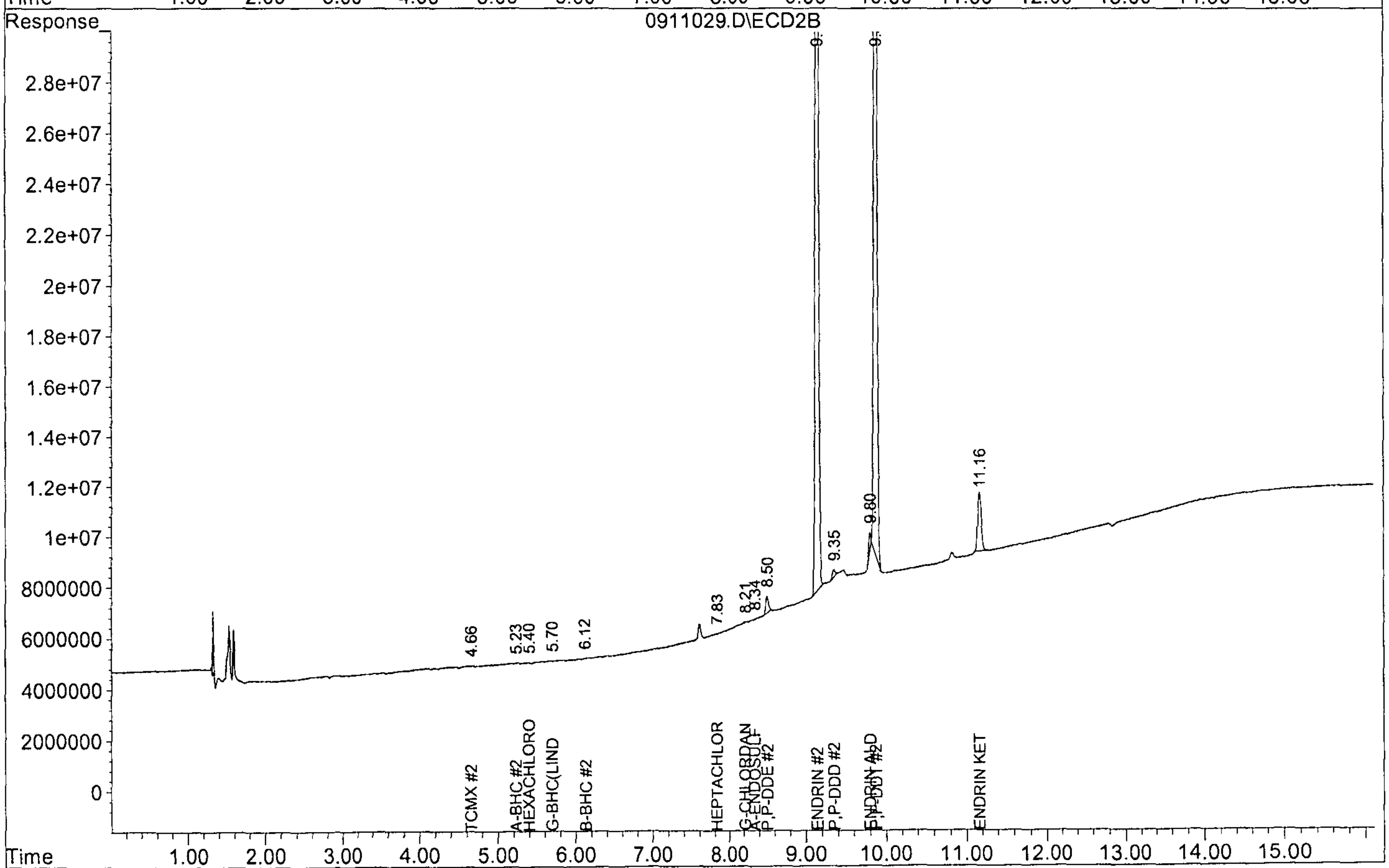
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911029.D
Acq On : 9-12-18 10:11:12
Sample : OCL Deg Check 1/15/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 29
Operator: MA
Inst : Ethel
Multiplr: 1.00





Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/12/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911030.D

		Compound	MEAN	CCRF	%D		%Drift
1	S	TCMX	50559900	45875300	9.3	S	
2	TM	HEXACHLOROBENZENE	59828400	52811000	12	TM	
3	TM	A-BHC	57018700	57212800	0.34	TM	
4	TM	B-BHC	25982200	23790000	8.4	TM	
5	M	G-BHC(LINDANE)	55092900	54465900	1.1	M	
6	TM	D-BHC	57791400	55116800	4.6	TM	
7	M	HEPTACHLOR	50010700	49814600	0.39	M	
8	M	ALDRIN	48400500	48644200	0.50	M	
9	TM	HEPTACHLOR EPOXIDE	47190100	46405800	1.7	TM	
10	TM	G-CHLORDANE	50741400	50275700	0.92	TM	
11	TM	A-ENDOSULFAN	45109400	45689600	1.3	TM	
12	TM	A-CHLORDANE	50420800	50250600	0.34	TM	
13	TM	P,P-DDE	51629400	51807500	0.34	TM	
14	M	DIELDRIN	46280600	45055500	2.6	M	
15	M	ENDRIN	42631200	41385300	2.9	M	
16	TM	B-ENDOSULFAN	40224800	41973100	4.3	TM	
17	TM	P,P-DDD	41648000	42249100	1.4	TM	
18	TM	ENDRIN ALDEHYDE	31448100	33021600	5.0	TM	
19	M	P,P-DDT	41507300	43883100	5.7	M	
20	TM	ENDOSULFAN SULFATE	38088000	37684900	1.1	TM	
21	TM	ENDRIN KETONE	36638000	39337000	7.4	TM	
22	TM	METHOXYCHLOR	18981700	20001200	5.4	TM	
23	S	DBC	92723500	86090500	7.2	S	
24	S	DECA	94812400	96795900	2.1	S	
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			3.6		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/12/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911030.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	106949000	102711000	4.0	S	
42	TM	HEXACHLOROBENZENE	99012800	94784000	4.3	TM	
43	TM	A-BHC	121700000	125000000	2.7	TM	
44	TM	B-BHC	51267800	50206700	2.1	TM	
45	M	G-BHC(LINDANE)	222027000	234061000	5.4	M	
46	TM	D-BHC	101771000	99691400	2.0	TM	
47	M	HEPTACHLOR	82762500	81387900	1.7	M	
48	M	ALDRIN	83185900	84627000	1.7	M	
49	TM	HEPTACHLOR EPOXIDE	77133500	76202300	1.2	TM	
50	TM	G-CHLORDANE	70434900	68410500	2.9	TM	
51	TM	A-ENDOSULFAN	62262600	62007300	0.41	TM	
52	TML	A-CHLORDANE	66854600	65913700	1.4	TML	0.40
53	TM	P,P-DDE	69751900	67305700	3.5	TM	
54	M	DIELDRIN	65074300	64310700	1.2	M	
55	ML	ENDRIN	48973700	53501700	9.2	ML	0.15
56	TML	B-ENDOSULFAN	51370200	56518200	10	TML	3.4
57	TM	P,P-DDD	51922800	53165400	2.4	TM	
58	TM	ENDRIN ALDEHYDE	36143200	36934400	2.2	TM	
59	M	P,P-DDT	43681400	43551300	0.30	M	
60	TM	ENDOSULFAN SULFATE	46801200	49059400	4.8	TM	
61	TML	ENDRIN KETONE	50140800	54080300	7.9	TML	1.8
62	TM	METHOXYCHLOR	23384600	23715900	1.4	TM	
63	S	DBC	35297200	36566900	3.6	S	
64	S	DECA	27506700	27349400	0.57	S	
65							
66							
67							
68							
69							
70							
71							
72							
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74							
75							
76							
77							
78							
79							
80							
		Average			3.2		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911030.D\ECD1A.CH Vial: 30
Signal #2 : G:\ETHEL\DATA\180911\0911030.D\ECD2B.CH
Acq On : 9-12-18 10:30:11 Operator: MA
Sample : OCLHX - 3 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 10:57 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

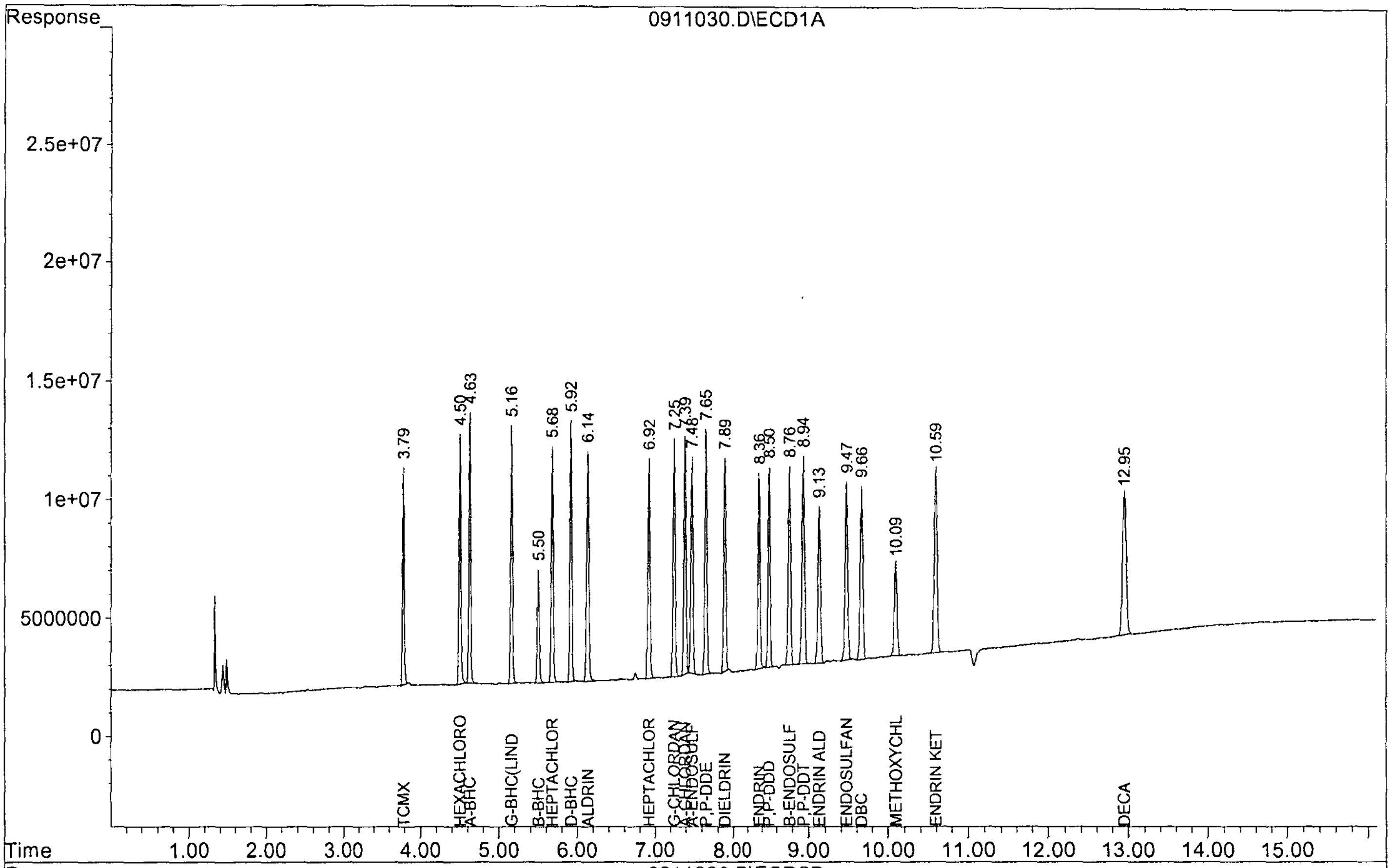
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	9175055	20542220	0.0907	0.0960
Surrogate Spike 0.150 Range 25 - 150 Recovery =					60.47%	64.00%
23) S DBC	9.66	10.98	17218097	7313371	0.0928	0.1036
Surrogate Spike 0.150 Recovery =					61.87%	69.07%
24) S DECA	12.95	14.52	19359171	5469889	0.1021	0.0994
Surrogate Spike 0.150 Range 25 - 150 Recovery =					68.07%	66.27%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.50	5.39	10562202	18956799	0.0883	0.0957
3) TM A-BHC	4.63	5.27	11442567	24999985	0.1003	0.1027
4) TM B-BHC	5.50	6.17	4758007	10041345	0.0916	0.0979
5) M G-BHC(LINDANE)	5.16	5.75	10893180	46812239	0.0989	0.1054
6) TM D-BHC	5.92	6.55	11023354	19938287	0.0954	0.0980
7) M HEPTACHLOR	5.68	6.62	9962912	16277589	0.0996	0.0983
8) M ALDRIN	6.14	7.10	9728836	16925406	0.1005	0.1017
9) TM HEPTACHLOR EPOXI	6.92	7.75	9281155	15240453	0.0983	0.0988
10) TM G-CHLORDANE	7.25	8.22	10055135	13682107	0.0991	0.0971
11) TM A-ENDOSULFAN	7.48	8.36	9137910	12401460	0.1013	0.0996
12) TM A-CHLORDANE	7.39	8.29	10050124	13182734	0.0997	0.0996
13) TM P,P-DDE	7.65	8.50	10361504	13461135	0.1003	0.0965
14) M DIELDRIN	7.89	8.76	9011101	12862147	0.0974	0.0988
15) M ENDRIN	8.36	9.14	8277068	10700332	0.0971	0.0998
16) TM B-ENDOSULFAN	8.76	9.60	8394629	11303644	0.1043	0.0966
17) TM P,P-DDD	8.50	9.34	8449825	10633085	0.1014	0.1024
18) TM ENDRIN ALDEHYDE	9.13	9.79	6604314	7386873	0.1050	0.1022
19) M P,P-DDT	8.94	9.87	8776614	8710263	0.1057	0.0997
20) TM ENDOSULFAN SULFA	9.47	10.31	7536973	9811885	0.0989	0.1048
21) TM ENDRIN KETONE	10.59	11.16	7867394	10816050	0.1074	0.0982
22) TM METHOXYCHLOR	10.09	10.69	4000245	4743189	0.1054	0.1014

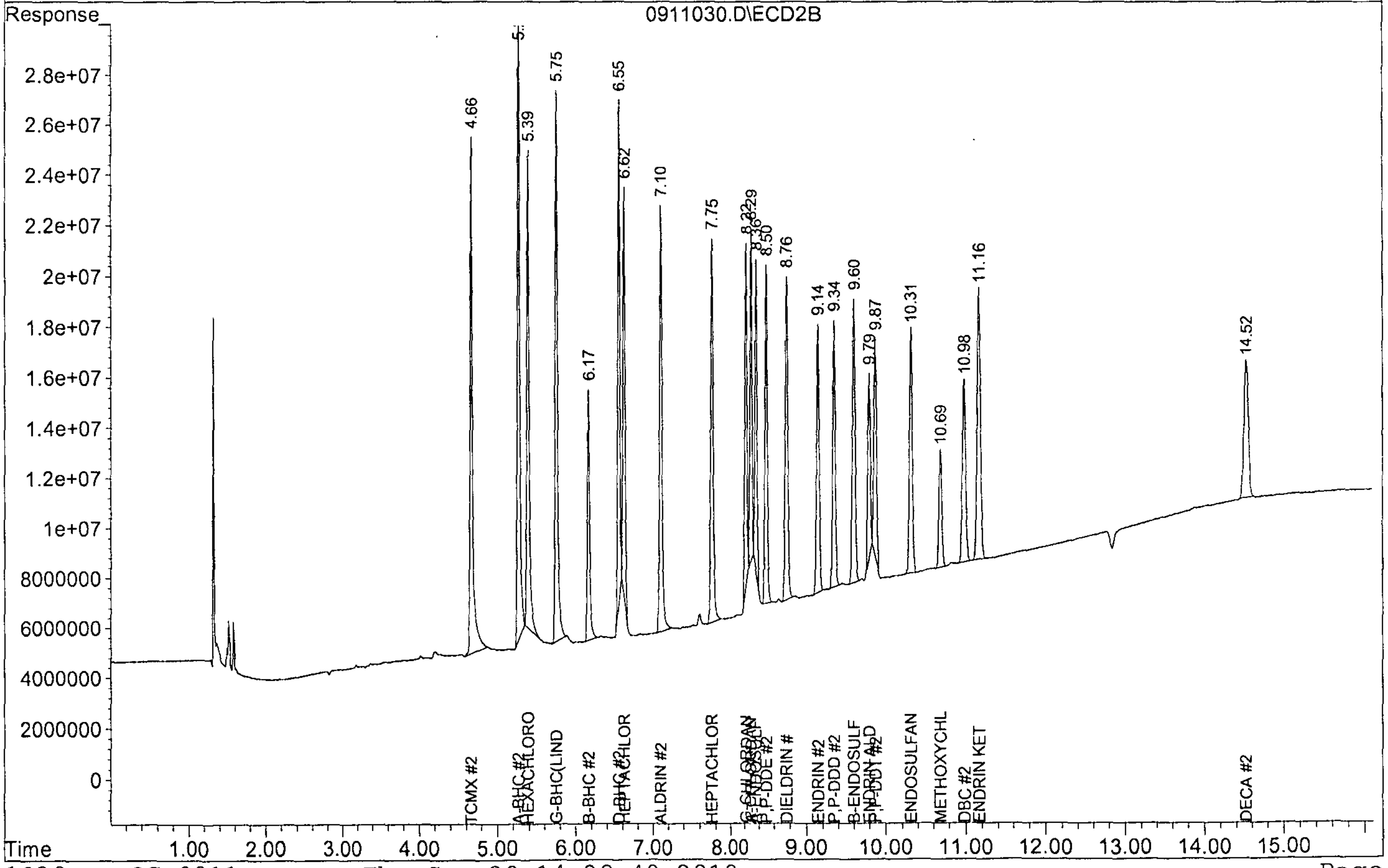
Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911030.D
Acq On : 9-12-18 10:30:11
Sample : OCLHX - 3 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 30
Operator: MA
Inst : Ethel
Multiplr: 1.00





TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/12/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911031.D

		Compound	MEAN	CCRF	%D		%Drift
1	ANM	Toxaphene Total	1855460	1966290	6.0	ANM	
2	L2AK	Toxaphene	171110	161082	5.9	L2AK	
3	L2AK	Toxaphene {2}	542307	558224	2.9	L2AK	
4	L2AK	Toxaphene {3}	397453	509006	28	L2AK	
5	L2AK	Toxaphene {4}	214690	231731	7.9	L2AK	
6	L2AK	Toxaphene {5}	529902	506251	4.5	L2AK	
7							
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39							
40							
		Average			9.2		

TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/12/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911031.D

		Compound	MEAN	CCRF	%D		%Drift
41	ANM	Toxaphene Total	1725710	1593940	7.6	ANM	
42	L2AK	Toxaphene	129112	112590	13	L2AK	
43	L2AK	Toxaphene {2}	334549	293361	12	L2AK	
44	L2AK	Toxaphene {3}	361335	354062	2.0	L2AK	
45	L2AK	Toxaphene {4}	660145	630082	4.6	L2AK	
46	L2AK	Toxaphene {5}	240571	203849	15	L2AK	
47							
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80							
		Average			9.0		

Quantitation Report (QT Reviewed)

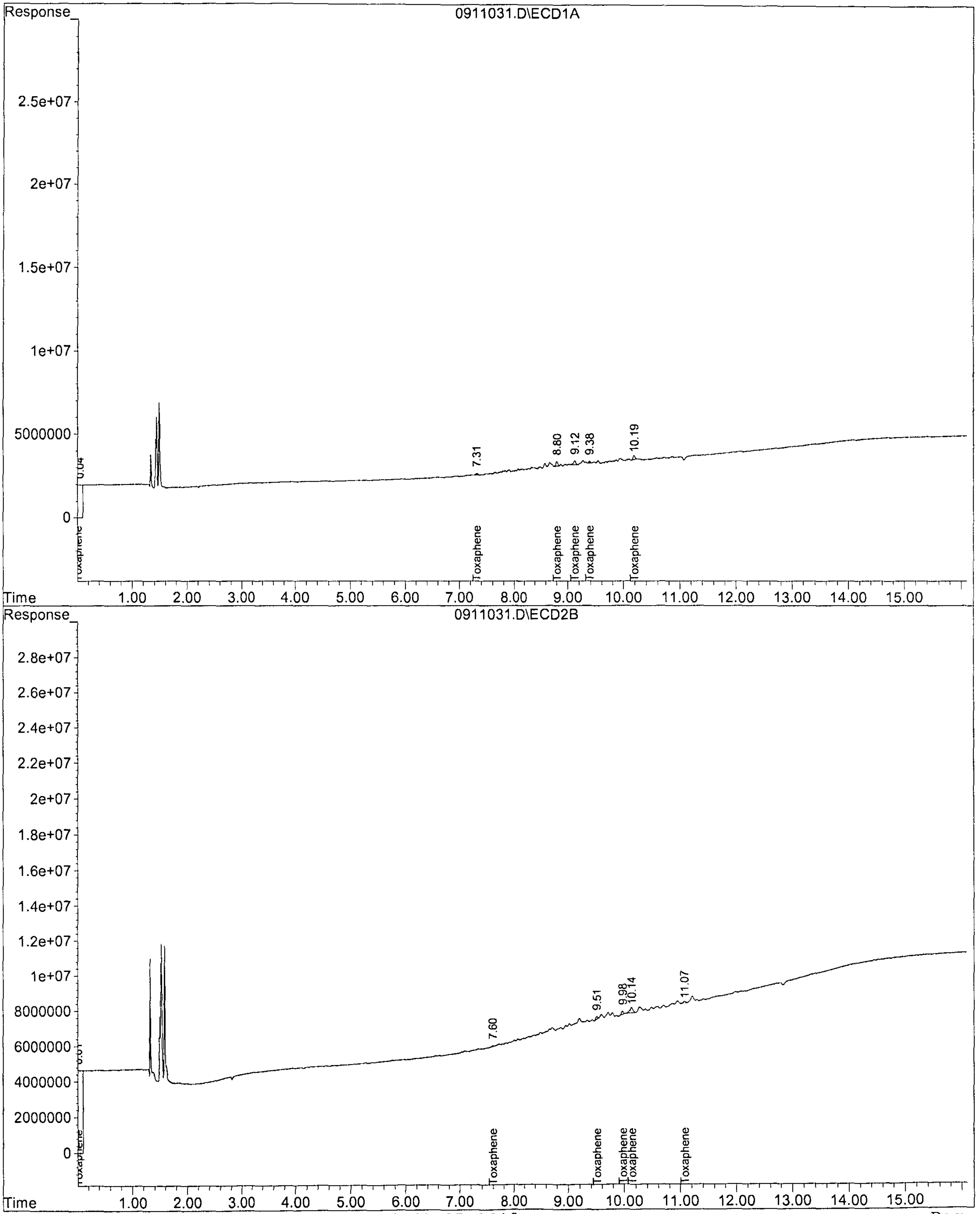
```
Signal #1 : G:\ETHEL\DATA\180911\0911031.D\ECD1A.CH        Vial: 31
Signal #2 : G:\ETHEL\DATA\180911\0911031.D\ECD2B.CH
Acq On    : 9-12-18 10:49:09                           Operator: MA
Sample    : TOX - 2 8/3/18                             Inst    : Ethel
Misc      : water                                      Multiplr: 1.00
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 12 11:16 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms            Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32               Signal #2 Info : 0.32
```

	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	Target Compounds						
1)	ANM Toxaphene Total	0.00	0.00	983147	796971	0.2649m	0.2309m
2)	L2AK Toxaphene	7.32	7.60	80541	56295	0.2353	0.2180
3)	L2AK Toxaphene {2}	8.80	9.51	279112	146680	0.2573	0.2192
4)	L2AK Toxaphene {3}	9.13	9.98	254503	177031	0.3202	0.2450
5)	L2AK Toxaphene {4}	9.38	10.14	115866	315041	0.2698	0.2386
6)	L2AK Toxaphene {5}	10.19	11.07	253125	101924	0.2388	0.2118
	Sum Toxaphene			983147	796971	1.3215	1.1327
	Average Toxaphene					0.264	0.227

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911031.D
Acq On : 9-12-18 10:49:09
Sample : TOX - 2 8/3/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 31
Operator: MA
Inst : Ethel
Multiplr: 1.00



Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/12/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911054.D

		Compound	MEAN	CCRF	%D		%Drift
1	S	TCMX	50559900	54537600	7.9	S	
2	TM	HEXACHLOROBENZENE	59828400	60904800	1.8	TM	
3	TM	A-BHC	57018700	66601700	17	TM	
4	TM	B-BHC	25982200	27405000	5.5	TM	
5	M	G-BHC(LINDANE)	55092900	63148500	15	M	
6	TM	D-BHC	57791400	62218000	7.7	TM	
7	M	HEPTACHLOR	50010700	54305700	8.6	M	
8	M	ALDRIN	48400500	52606600	8.7	M	
9	TM	HEPTACHLOR EPOXIDE	47190100	47967600	1.6	TM	
10	TM	G-CHLORDANE	50741400	52501600	3.5	TM	
11	TM	A-ENDOSULFAN	45109400	47531800	5.4	TM	
12	TM	A-CHLORDANE	50420800	51152900	1.5	TM	
13	TM	P,P-DDE	51629400	53082500	2.8	TM	
14	M	DIELDRIN	46280600	47148600	1.9	M	
15	M	ENDRIN	42631200	41360500	3.0	M	
16	TM	B-ENDOSULFAN	40224800	43073700	7.1	TM	
17	TM	P,P-DDD	41648000	44452100	6.7	TM	
18	TM	ENDRIN ALDEHYDE	31448100	33307600	5.9	TM	
19	M	P,P-DDT	41507300	43350500	4.4	M	
20	TM	ENDOSULFAN SULFATE	38088000	38232500	0.38	TM	
21	TM	ENDRIN KETONE	36638000	40224400	9.8	TM	
22	TM	METHOXYCHLOR	18981700	19714300	3.9	TM	
23	S	DBC	92723500	84207300	9.2	S	
24	S	DECA	94812400	95293200	0.51	S	
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39							
40							
		Average			5.8		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/12/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911054.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	106949000	109112000	2.0	S	
42	TM	HEXACHLOROBENZENE	99012800	102486000	3.5	TM	
43	TM	A-BHC	121700000	135012000	11	TM	
44	TM	B-BHC	51267800	53180300	3.7	TM	
45	M	G-BHC(LINDANE)	222027000	238397000	7.4	M	
46	TM	D-BHC	101771000	111063000	9.1	TM	
47	M	HEPTACHLOR	82762500	89050600	7.6	M	
48	M	ALDRIN	83185900	89324000	7.4	M	
49	TM	HEPTACHLOR EPOXIDE	77133500	80834300	4.8	TM	
50	TM	G-CHLORDANE	70434900	75341500	7.0	TM	
51	TM	A-ENDOSULFAN	62262600	65136800	4.6	TM	
52	TML	A-CHLORDANE	66854600	67692900	1.3	TML	2.3
53	TM	P,P-DDE	69751900	72972300	4.6	TM	
54	M	DIELDRIN	65074300	67251600	3.3	M	
55	ML	ENDRIN	48973700	53609900	9.5	ML	0.05
56	TML	B-ENDOSULFAN	51370200	59298500	15	TML	1.4
57	TM	P,P-DDD	51922800	54207900	4.4	TM	
58	TM	ENDRIN ALDEHYDE	36143200	39396400	9.0	TM	
59	M	P,P-DDT	43681400	46708000	6.9	M	
60	TM	ENDOSULFAN SULFATE	46801200	51432400	9.9	TM	
61	TML	ENDRIN KETONE	50140800	55687100	11	TML	1.2
62	TM	METHOXYCHLOR	23384600	24032400	2.8	TM	
63	S	DBC	35297200	39174200	11	S	
64	S	DECA	27506700	28444800	3.4	S	
65							
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		Average			6.7		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911054.D\ECD1A.CH Vial: 54
Signal #2 : G:\ETHEL\DATA\180911\0911054.D\ECD2B.CH
Acq On : 9-12-18 18:46:57 Operator: MA
Sample : OCLHX - 3 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 13 8:50 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

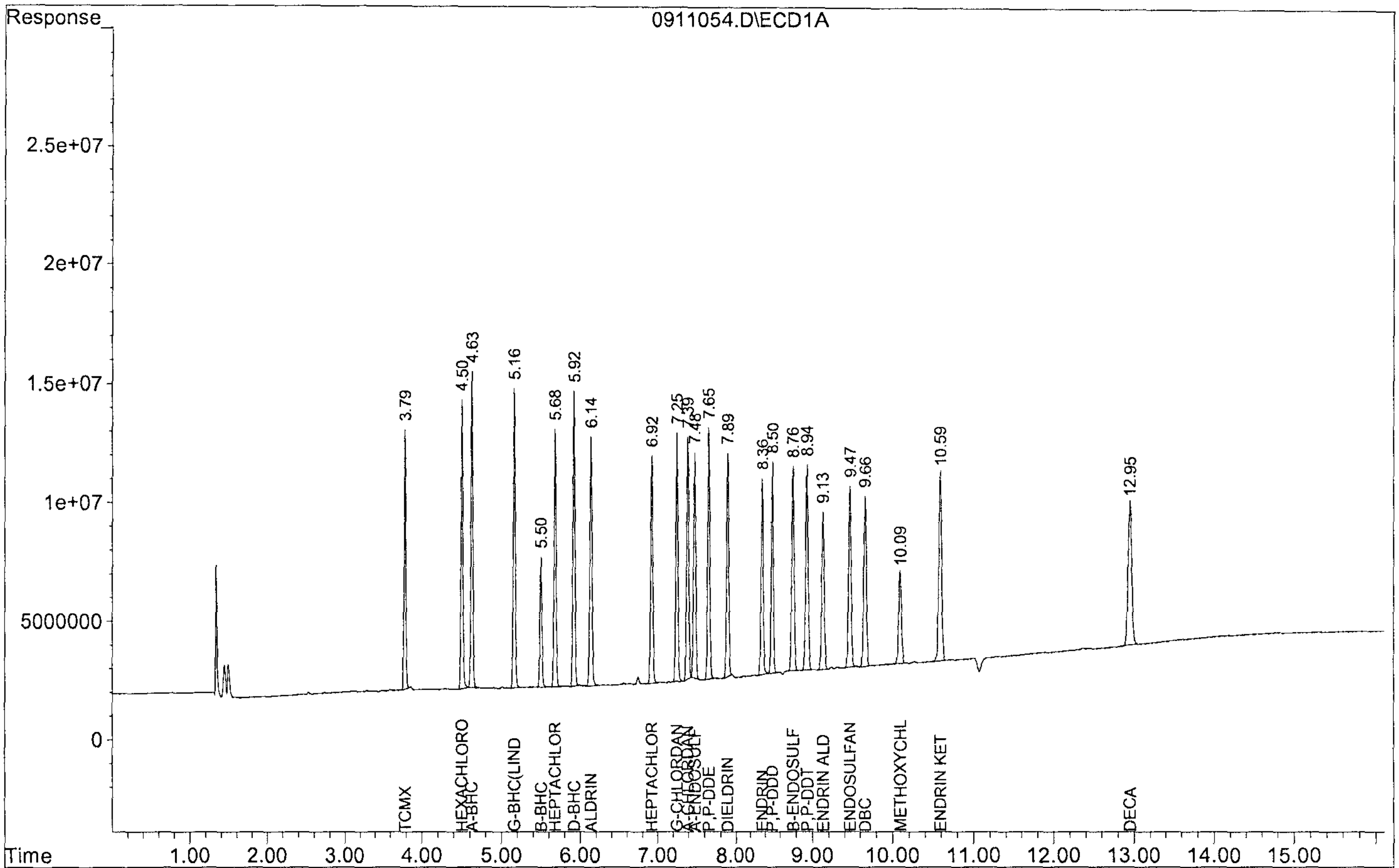
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10907513	21822376	0.1079	0.1020
Surrogate Spike 0.150 Range 25 - 150			Recovery =		71.93%	68.00%
23) S DBC	9.66	10.98	16841463	7834838	0.0908	0.1110
Surrogate Spike 0.150			Recovery =		60.53%	74.00%
24) S DECA	12.95	14.52	19058634	5688967	0.1005	0.1034
Surrogate Spike 0.150 Range 25 - 150			Recovery =		67.00%	68.93%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.50	5.39	12180951	20497241	0.1018	0.1035
3) TM A-BHC	4.63	5.27	13320342	27002361	0.1168	0.1109
4) TM B-BHC	5.50	6.17	5480995	10636059	0.1055	0.1037
5) M G-BHC(LINDANE)	5.16	5.75	12629706	47679475	0.1146	0.1074
6) TM D-BHC	5.92	6.55	12443604	22212676	0.1077	0.1091
7) M HEPTACHLOR	5.68	6.62	10861137	17810124	0.1086	0.1076
8) M ALDRIN	6.14	7.10	10521310	17864799	0.1087	0.1074
9) TM HEPTACHLOR EPOXI	6.92	7.75	9593520	16166861	0.1016	0.1048
10) TM G-CHLORDANE	7.25	8.22	10500317	15068305	0.1035	0.1070
11) TM A-ENDOSULFAN	7.48	8.36	9506356	13027353	0.1054	0.1046
12) TM A-CHLORDANE	7.39	8.29	10230584	13538584	0.1015	0.1023
13) TM P,P-DDE	7.65	8.50	10616501	14594453	0.1028	0.1046
14) M DIELDRIN	7.89	8.76	9429722	13450318	0.1019	0.1033
15) M ENDRIN	8.36	9.14	8272102	10721985	0.0970	0.1000
16) TM B-ENDOSULFAN	8.76	9.60	8614738	11859707	0.1071	0.1014
17) TM P,P-DDD	8.50	9.34	8890415	10841579	0.1067	0.1044
18) TM ENDRIN ALDEHYDE	9.13	9.79	6661511	7879280	0.1059	0.1090
19) M P,P-DDT	8.94	9.87	8670097	9341596	0.1044	0.1069
20) TM ENDOSULFAN SULFA	9.47	10.31	7646507	10286482	0.1004	0.1099
21) TM ENDRIN KETONE	10.59	11.16	8044885	11137415	0.1098	0.1012
22) TM METHOXYCHLOR	10.09	10.69	3942863	4806476	0.1039	0.1028

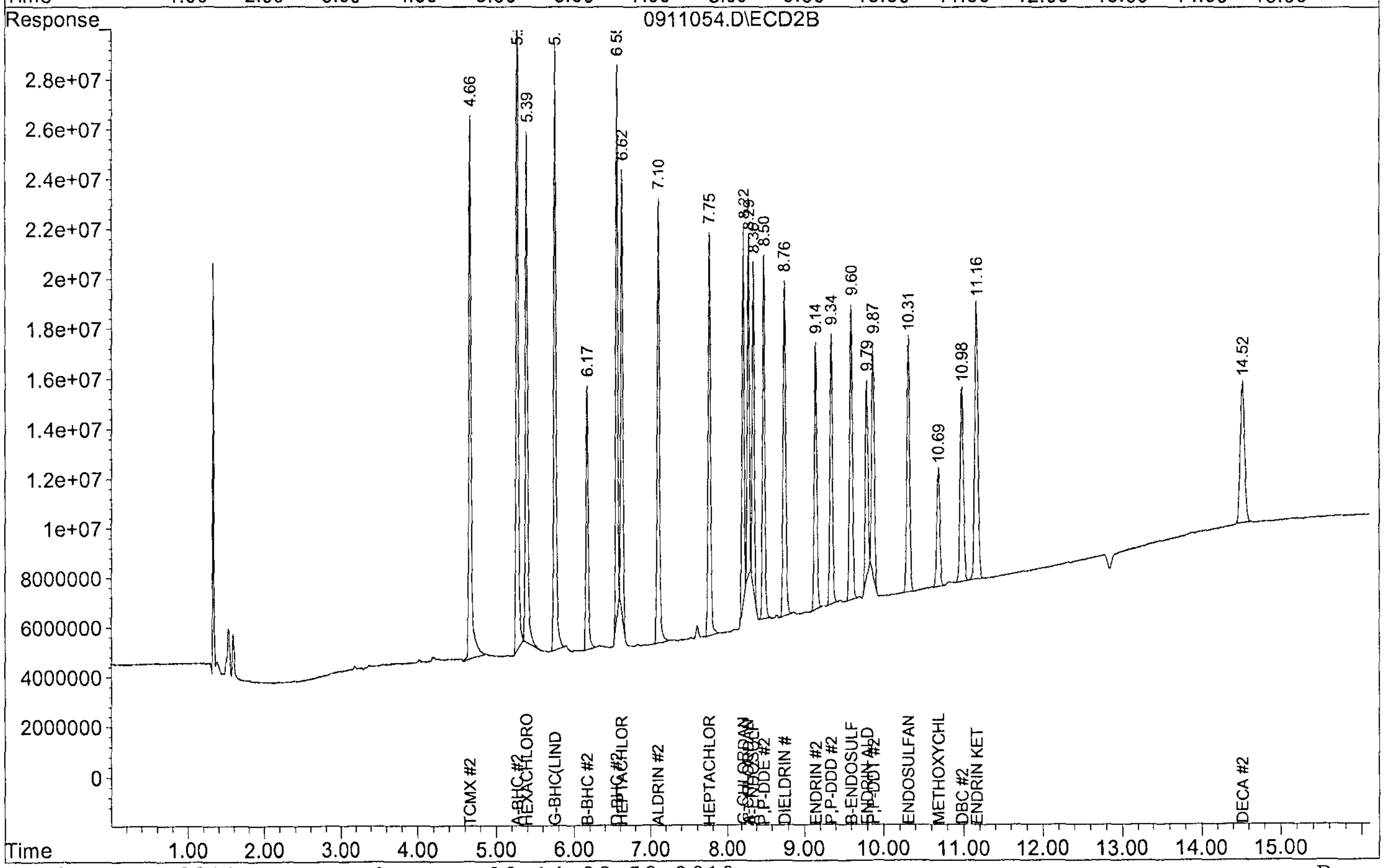
Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911054.D
Acq On : 9-12-18 18:46:57
Sample : OCLHX - 3 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 54
Operator: MA
Inst : Ethel
Multiplr: 1.00





TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/12/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911055.D

		Compound	MEAN	CCRF	%D		%Drift
1	ANM	Toxaphene Total	1855460	1926350	3.8	ANM	
2	L2AK	Toxaphene	171110	187138	9.4	L2AK	
3	L2AK	Toxaphene {2}	542307	564242	4.0	L2AK	
4	L2AK	Toxaphene {3}	397453	415629	4.6	L2AK	
5	L2AK	Toxaphene {4}	214690	222654	3.7	L2AK	
6	L2AK	Toxaphene {5}	529902	536692	1.3	L2AK	
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		Average			4.5		

TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/12/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911055.D

		Compound	MEAN	CCRF	%D		%Drift
41	ANM	Toxaphene Total	1725710	1857090	7.6	ANM	
42	L2AK	Toxaphene	129112	112005	13	L2AK	
43	L2AK	Toxaphene {2}	334549	351922	5.2	L2AK	
44	L2AK	Toxaphene {3}	361335	419733	16	L2AK	
45	L2AK	Toxaphene {4}	660145	724899	9.8	L2AK	
46	L2AK	Toxaphene {5}	240571	248529	3.3	L2AK	
47							
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80							
		Average			9.2		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911055.D\ECD1A.CH Vial: 55
Signal #2 : G:\ETHEL\DATA\180911\0911055.D\ECD2B.CH
Acq On : 9-12-18 19:05:55 Operator: MA
Sample : TOX - 2 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 13 8:50 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

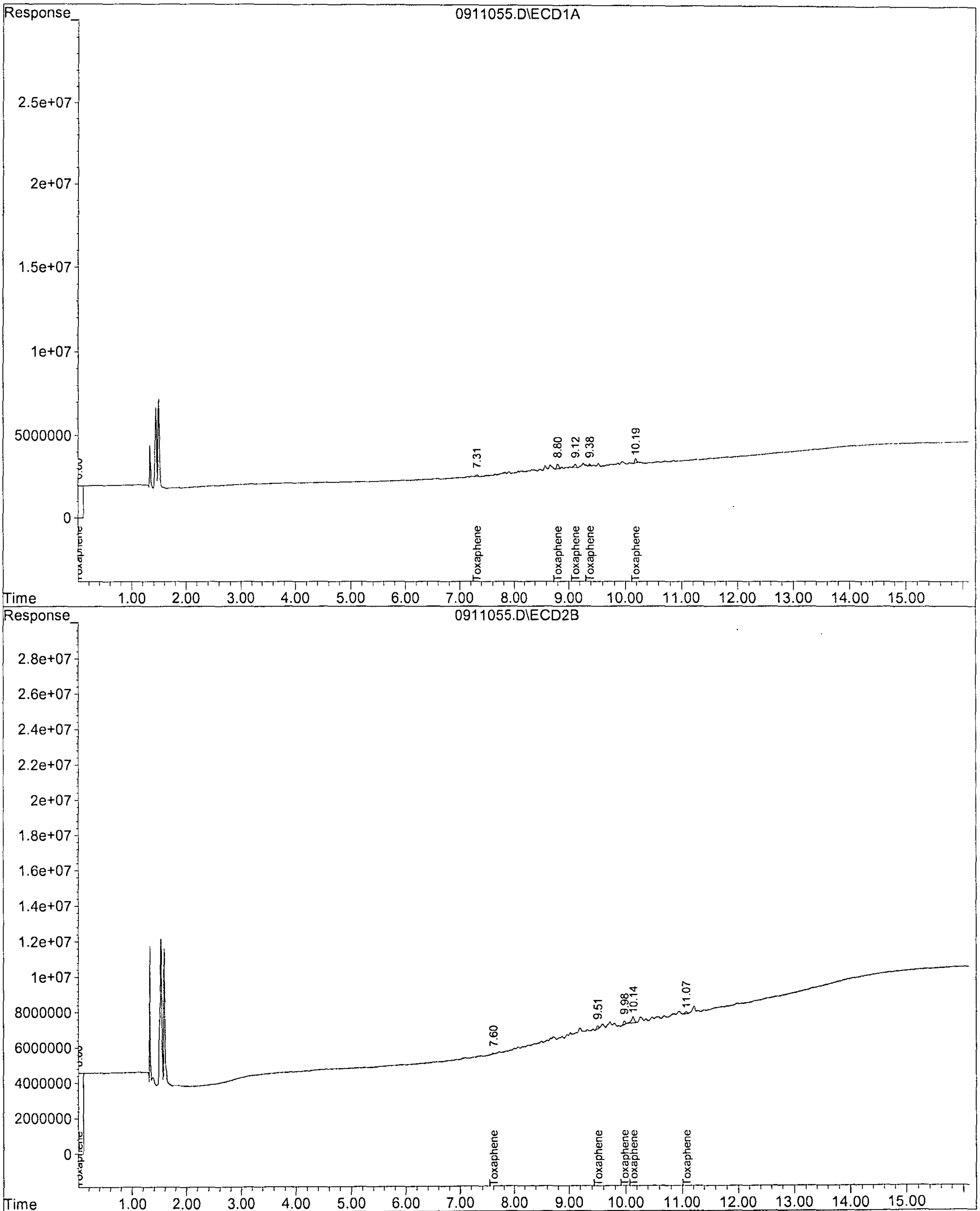
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) ANM Toxaphene Total	0.00	0.00	963177	928544	0.2596m	0.2690m
2) L2AK Toxaphene	7.32	7.60	93569	56003	0.2734	0.2169
3) L2AK Toxaphene {2}	8.80	9.51	282121	175961	0.2601	0.2630
4) L2AK Toxaphene {3}	9.12	9.98	207815	209866	0.2614	0.2904
5) L2AK Toxaphene {4}	9.38	10.14	111327	362450	0.2593	0.2745
6) L2AK Toxaphene {5}	10.19	11.07	268346	124265	0.2532	0.2583
Sum Toxaphene			963177	928544	1.3074	1.3031
Average Toxaphene					0.261	0.261

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911055.D
Acq On : 9-12-18 19:05:55
Sample : TOX - 2 8/3/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 55
Operator: MA
Inst : Ethel
Multiplr: 1.00



Data File Name:	**0911095.D**
Data File Path:	**G:\ETHEL\DATA\180911**
Operator:	**MA**
Date Acquired:	**13 Sep 2018 07:46**
Method File:	**OCL0911.M**
Sample Name:	**OCL Deg Check 1/15/18**
Vial Number:	**95**
Instrument Name:	**Ethel**

#	Name	Ret Time	Target Response
1)	P,P-DDT	8.94	46850800
2)	P,P-DDD	8.50	318852
3)	P,P-DDE	7.66	192443

Breakdown **1.08**

#	Name	Ret Time	Target Response
1)	P,P-DDT #2	9.87	53944500
2)	P,P-DDD #2	9.35	447917
3)	P,P-DDE #2	8.50	547248

Breakdown **1.8**

#	Name	Ret Time	Target Response
1)	ENDRIN	8.36	45211900
2)	ENDRIN ALDEHYDE	9.13	825662
3)	ENDRIN KETONE	10.59	1594620

Breakdown **5.1**

#	Name	Ret Time	Target Response
1)	ENDRIN #2	9.14	55326700
2)	ENDRIN ALDEHYDE #2	9.80	877004
3)	ENDRIN KETONE #2	11.16	2854840

Breakdown **6.3**

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911095.D\ECD1A.CH Vial: 95
Signal #2 : G:\ETHEL\DATA\180911\0911095.D\ECD2B.CH
Acq On : 9-13-18 7:46:51 Operator: MA
Sample : OCL Deg Check 1/15/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 12:26 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

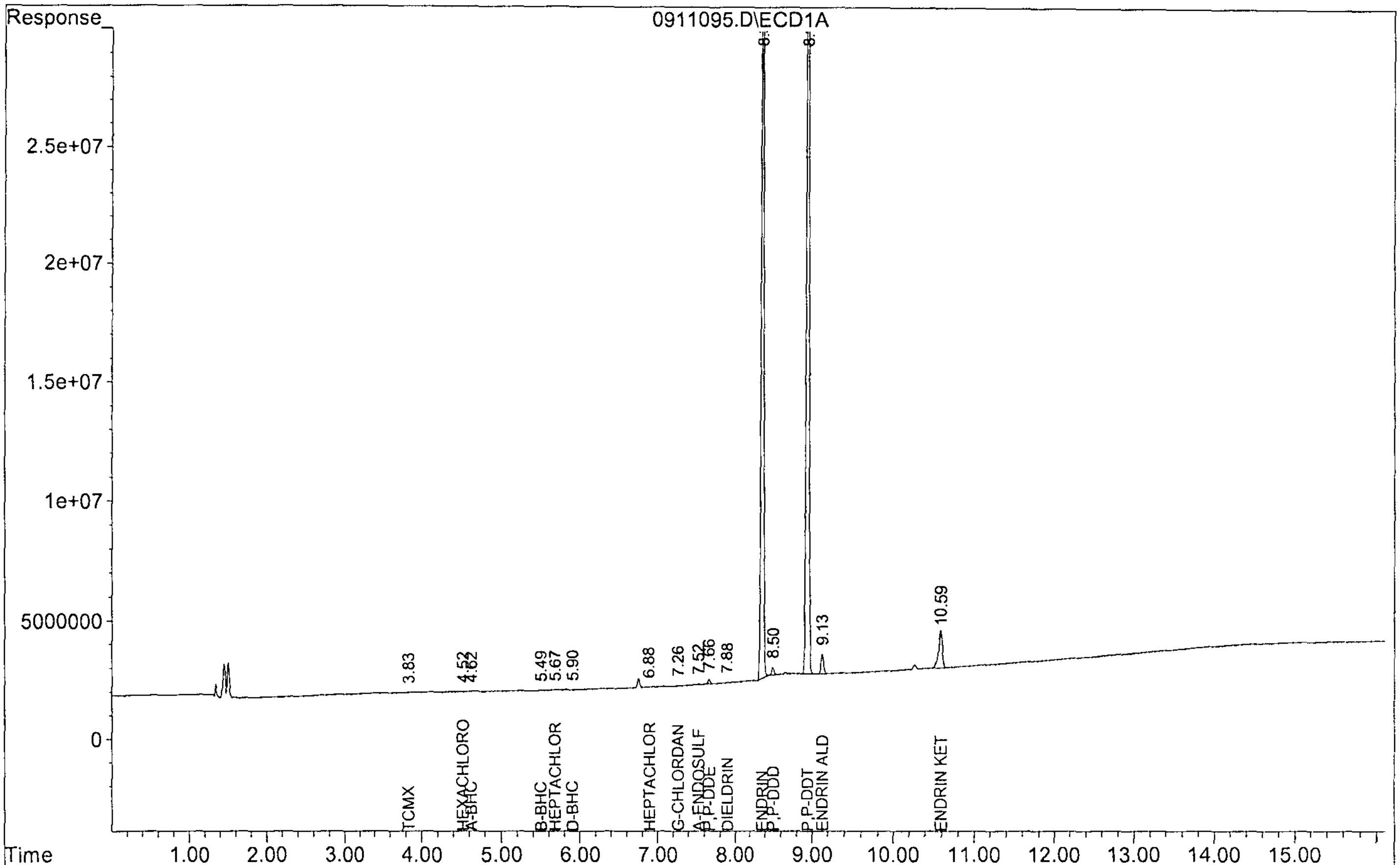
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.83f	4.73f	3517	8565	0.0000	0.0000
Surrogate Spike 0.150 Range 25 - 150 Recovery =					0.00%#	0.00%#
23) S DBC	0.00	0.00	0	0	N.D.	N.D.
Surrogate Spike 0.150 Recovery =					0.00%	0.00%
24) S DECA	0.00	0.00	0	0	N.D.	N.D.
Surrogate Spike 0.150 Range 25 - 150 Recovery =					0.00%#	0.00%#
Target Compounds						
2) TM HEXACHLOROBENZEN	4.52	5.35f	2689	6673	0.0000	0.0000 #
3) TM A-BHC	4.62	0.00	2768	0	0.0000	N.D. #
4) TM B-BHC	5.49	0.00	3276	0	0.0001	N.D. #
6) TM D-BHC	5.90	0.00	3261	0	0.0000	N.D. #
7) M HEPTACHLOR	5.67	0.00	1712	0	0.0000	N.D. #
9) TM HEPTACHLOR EPOXI	6.88f	7.73	1924	6852	0.0000	0.0000 #
10) TM G-CHLORDANE	7.26	8.21	11404	15636	0.0001	0.0001
11) TM A-ENDOSULFAN	7.52f	0.00	34793	0	0.0004	N.D. #
13) TM P,P-DDE	7.66	8.50	192443	547248	0.0019	0.0039 #
14) M DIELDRIN	7.88	0.00	2431	0	0.0000	N.D. #
15) M ENDRIN	8.36	9.14	45211913	55326683	0.5303	0.5178
17) TM P,P-DDD	8.50	9.35	318852	447917	0.0038	0.0043
18) TM ENDRIN ALDEHYDE	9.13	9.80	825662	877004	0.0131	0.0121
19) M P,P-DDT	8.94	9.87	46850837	53944495	0.5644	0.6175
21) TM ENDRIN KETONE	10.59	11.16	1594615	2854840	0.0218	0.0260
Target Compounds						
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D.	N.D.
8) M ALDRIN	0.00	0.00	0	0	N.D.	N.D.
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D.	N.D.
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D.	N.D.
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D.	N.D.
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D.	N.D.

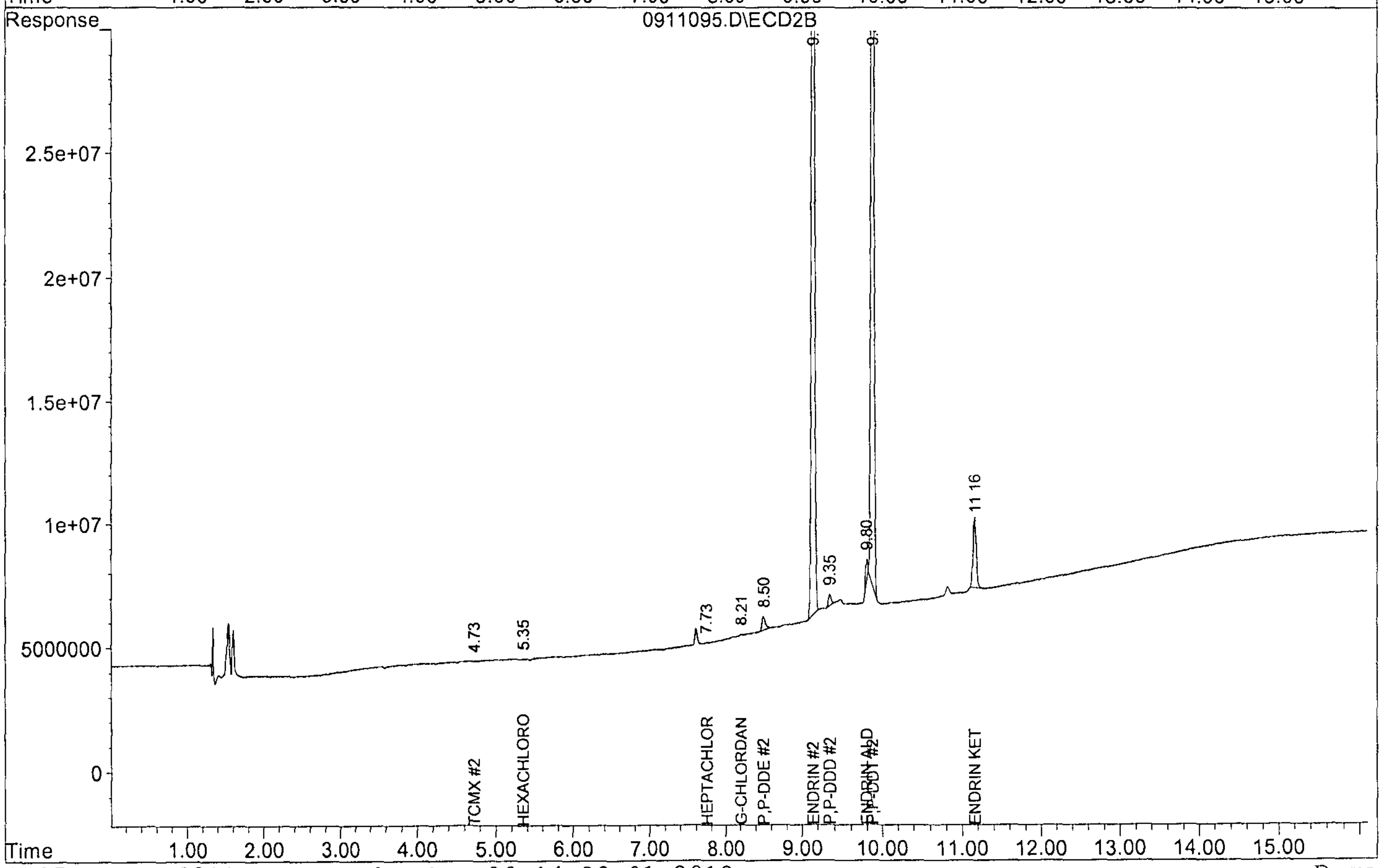
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911095.D
Acq On : 9-13-18 7:46:51
Sample : OCL Deg Check 1/15/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 95
Operator: MA
Inst : Ethel
Multiplr: 1.00





Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 09/13/18
Matrix: Water Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911115.D

		Compound	MEAN	CCRF	%D		%Drift
1	S	TCMX	50559900	56147500	11	S	
2	TM	HEXACHLOROBENZENE	59828400	62338900	4.2	TM	
3	TM	A-BHC	57018700	71504100	25	TM	
4	TM	B-BHC	25982200	28561600	9.9	TM	
5	M	G-BHC(LINDANE)	55092900	63524200	15	M	
6	TM	D-BHC	57791400	64867500	12	TM	
7	M	HEPTACHLOR	50010700	55981300	12	M	
8	M	ALDRIN	48400500	53444200	10	M	
9	TM	HEPTACHLOR EPOXIDE	47190100	51086400	8.3	TM	
10	TM	G-CHLORDANE	50741400	52961700	4.4	TM	
11	TM	A-ENDOSULFAN	45109400	48156100	6.8	TM	
12	TM	A-CHLORDANE	50420800	53224100	5.6	TM	
13	TM	P,P-DDE	51629400	54325200	5.2	TM	
14	M	DIELDRIN	46280600	47841800	3.4	M	
15	M	ENDRIN	42631200	42550900	0.19	M	
16	TM	B-ENDOSULFAN	40224800	42924700	6.7	TM	
17	TM	P,P-DDD	41648000	44600300	7.1	TM	
18	TM	ENDRIN ALDEHYDE	31448100	31697200	0.79	TM	
19	M	P,P-DDT	41507300	42164700	1.6	M	
20	TM	ENDOSULFAN SULFATE	38088000	39300200	3.2	TM	
21	TM	ENDRIN KETONE	36638000	38802800	5.9	TM	
22	TM	METHOXYCHLOR	18981700	19452900	2.5	TM	
23	S	DBC	92723500	85085600	8.2	S	
24	S	DECA	94812400	95918600	1.2	S	
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			7.1		

* see back

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/13/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911115.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	106949000	107694000	0.70	S	
42	TM	HEXACHLOROBENZENE	99012800	99221200	0.21	TM	
43	TM	A-BHC	121700000	134647000	11	TM	
44	TM	B-BHC	51267800	52919000	3.2	TM	
45	M	G-BHC(LINDANE)	222027000	233567000	5.2	M	
46	TM	D-BHC	101771000	106095000	4.2	TM	
47	M	HEPTACHLOR	82762500	86176400	4.1	M	
48	M	ALDRIN	83185900	87098300	4.7	M	
49	TM	HEPTACHLOR EPOXIDE	77133500	78400400	1.6	TM	
50	TM	G-CHLORDANE	70434900	71718900	1.8	TM	
51	TM	A-ENDOSULFAN	62262600	62982300	1.2	TM	
52	TML	A-CHLORDANE	66854600	67815000	1.4	TML	2.5
53	TM	P,P-DDE	69751900	72226800	3.5	TM	
54	M	DIELDRIN	65074300	66640500	2.4	M	
55	ML	ENDRIN	48973700	51838500	5.8	ML	3.3
56	TML	B-ENDOSULFAN	51370200	60660500	18	TML	3.7
57	TM	P,P-DDD	51922800	55784200	7.4	TM	
58	TM	ENDRIN ALDEHYDE	36143200	36799800	1.8	TM	
59	M	P,P-DDT	43681400	46089500	5.5	M	
60	TM	ENDOSULFAN SULFATE	46801200	48941400	4.6	TM	
61	TML	ENDRIN KETONE	50140800	54785600	9.3	TML	0.47
62	TM	METHOXYCHLOR	23384600	24518100	4.8	TM	
63	S	DBC	35297200	37656700	6.7	S	
64	S	DECA	27506700	29213800	6.2	S	
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
		Average			4.8		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911115.D\ECD1A.CH Vial: 15
Signal #2 : G:\ETHEL\DATA\180911\0911115.D\ECD2B.CH
Acq On : 9-13-18 14:05:04 Operator: MA
Sample : OCLHX - 3 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 13 14:34 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

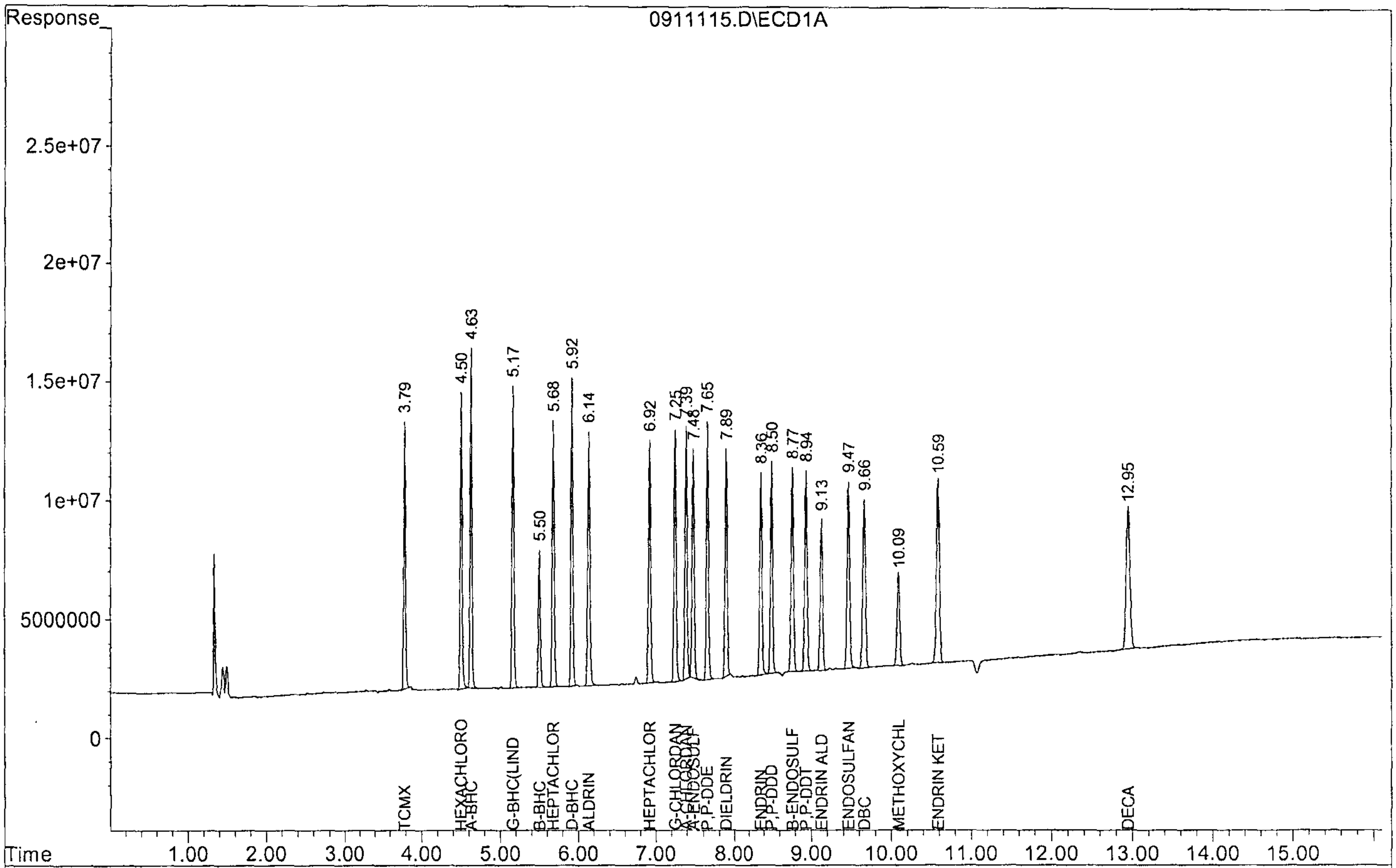
Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

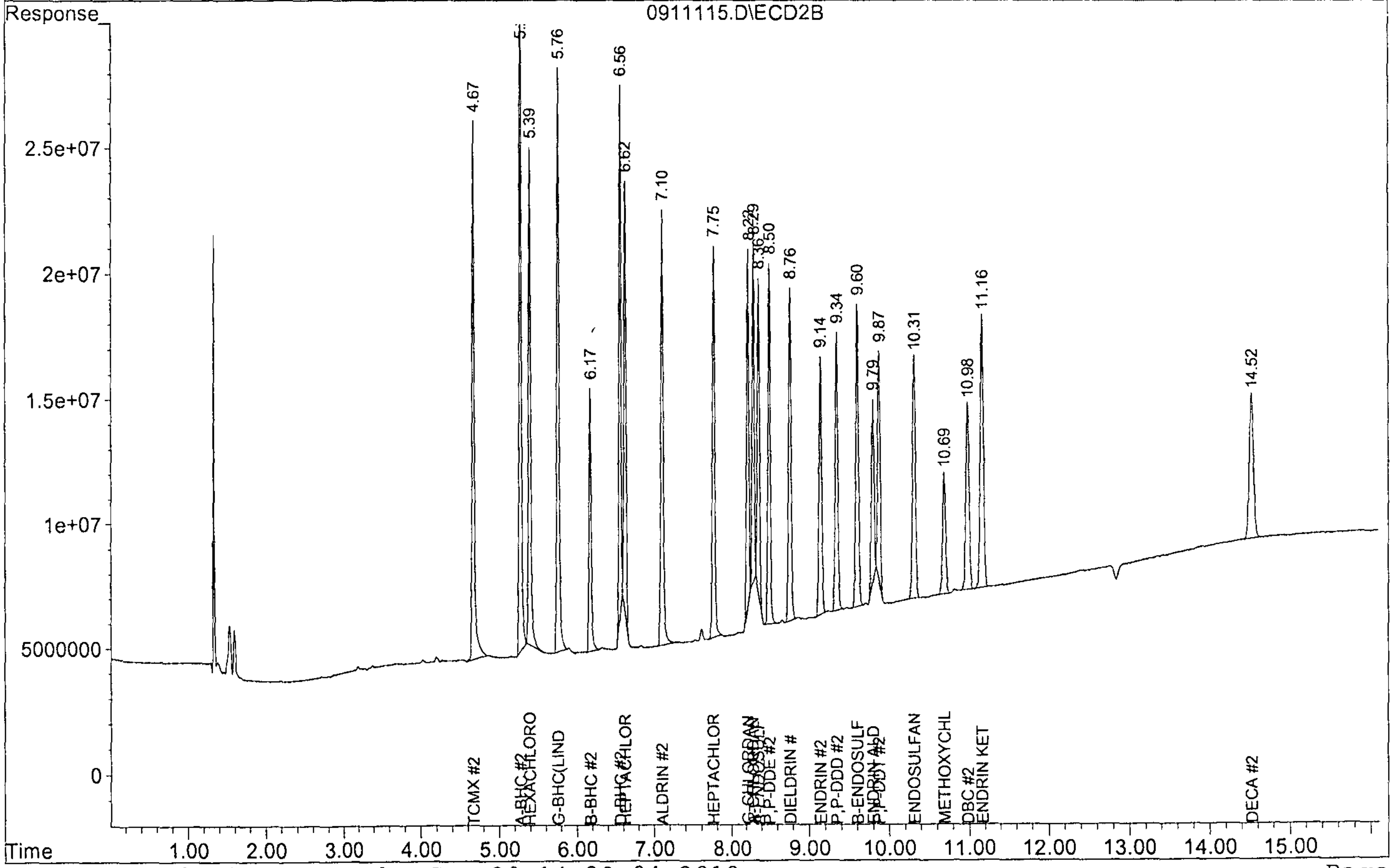
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.67	11229498	21538859	0.1111	0.1007
	Surrogate Spike 0.150 Range 25 - 150 Recovery =					74.07%	67.13%
23) S	DBC	9.66	10.98	17017114	7531333	0.0918	0.1067
	Surrogate Spike 0.150 Recovery =					61.20%	71.13%
24) S	DECA	12.95	14.52	19183727	5842762	0.1012	0.1062
	Surrogate Spike 0.150 Range 25 - 150 Recovery =					67.47%	70.80%
	Target Compounds						
2) TM	HEXACHLOROBENZEN	4.50	5.39	12467786	19844232	0.1042	0.1002
3) TM	A-BHC	4.63	5.27	14300812	26929414	0.1254	0.1106
4) TM	B-BHC	5.50	6.17	5712319	10583804	0.1099	0.1032
5) M	G-BHC(LINDANE)	5.17	5.76	12704842	46713327	0.1153	0.1052
6) TM	D-BHC	5.92	6.56	12973504	21219085	0.1122	0.1042
7) M	HEPTACHLOR	5.68	6.62	11196258	17235285	0.1119	0.1041
8) M	ALDRIN	6.14	7.10	10688841	17419657	0.1104	0.1047
9) TM	HEPTACHLOR EPOXI	6.92	7.75	10217278	15680070	0.1083	0.1016
10) TM	G-CHLORDANE	7.25	8.22	10592330	14343776	0.1044	0.1018
11) TM	A-ENDOSULFAN	7.48	8.36	9631213	12596461	0.1068	0.1012
12) TM	A-CHLORDANE	7.39	8.29	10644828	13562998	0.1056	0.1025
13) TM	P,P-DDE	7.65	8.50	10865037	14445354	0.1052	0.1035
14) M	DIELDRIN	7.89	8.76	9568359	13328090	0.1034	0.1024
15) M	ENDRIN	8.36	9.14	8510188	10367694	0.0998	0.0967
16) TM	B-ENDOSULFAN	8.77	9.60	8584943	12132097	0.1067	0.1037
17) TM	P,P-DDD	8.50	9.34	8920057	11156835	0.1071	0.1074
18) TM	ENDRIN ALDEHYDE	9.13	9.79	6339433	7359967	0.1008	0.1018
19) M	P,P-DDT	8.94	9.87	8432939	9217891	0.1016	0.1055
20) TM	ENDOSULFAN SULFA	9.47	10.31	7860048	9788278	0.1032	0.1046
21) TM	ENDRIN KETONE	10.59	11.16	7760558	10957115	0.1059	0.0995
22) TM	METHOXYCHLOR	10.09	10.69	3890571	4903614	0.1025	0.1048

Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Data File : G:\ETHEL\DATA\180911\0911115.D Vial: 15
Acq On : 9-13-18 14:05:04 Operator: MA
Sample : OCLHX - 3 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M





Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/13/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911139.D

		Compound	MEAN	CCRF	%D		%Drift
1	S	TCMX	50559900	56754500	12	S	
2	TM	HEXACHLOROBENZENE	59828400	63252200	5.7	TM	
3	TM	A-BHC	57018700	71743900	26	TM	
4	TM	B-BHC	25982200	28453000	9.5	TM	
5	M	G-BHC(LINDANE)	55092900	63369100	15	M	
6	TM	D-BHC	57791400	66218500	15	TM	
7	M	HEPTACHLOR	50010700	56067300	12	M	
8	M	ALDRIN	48400500	55819800	15	M	
9	TM	HEPTACHLOR EPOXIDE	47190100	51207600	8.5	TM	
10	TM	G-CHLORDANE	50741400	55223200	8.8	TM	
11	TM	A-ENDOSULFAN	45109400	49066600	8.8	TM	
12	TM	A-CHLORDANE	50420800	54402700	7.9	TM	
13	TM	P,P-DDE	51629400	56713200	9.8	TM	
14	M	DIELDRIN	46280600	51231300	11	M	
15	M	ENDRIN	42631200	43293500	1.6	M	
16	TM	B-ENDOSULFAN	40224800	45984600	14	TM	
17	TM	P,P-DDD	41648000	45281500	8.7	TM	
18	TM	ENDRIN ALDEHYDE	31448100	34551200	9.9	TM	
19	M	P,P-DDT	41507300	44497000	7.2	M	
20	TM	ENDOSULFAN SULFATE	38088000	39053500	2.5	TM	
21	TM	ENDRIN KETONE	36638000	40874300	12	TM	
22	TM	METHOXYCHLOR	18981700	19579500	3.1	TM	
23	S	DBC	92723500	87798200	5.3	S	
24	S	DECA	94812400	99590200	5.0	S	
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			9.8		

* see back

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/13/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911139.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	106949000	111095000	3.9	S	
42	TM	HEXACHLOROBENZENE	99012800	100544000	1.5	TM	
43	TM	A-BHC	121700000	136837000	12	TM	
44	TM	B-BHC	51267800	52510600	2.4	TM	
45	M	G-BHC(LINDANE)	222027000	237428000	6.9	M	
46	TM	D-BHC	101771000	106791000	4.9	TM	
47	M	HEPTACHLOR	82762500	85093300	2.8	M	
48	M	ALDRIN	83185900	87929600	5.7	M	
49	TM	HEPTACHLOR EPOXIDE	77133500	81217000	5.3	TM	
50	TM	G-CHLORDANE	70434900	73267700	4.0	TM	
51	TM	A-ENDOSULFAN	62262600	64369600	3.4	TM	
52	TML	A-CHLORDANE	66854600	68080600	1.8	TML	2.9
53	TM	P,P-DDE	69751900	71205400	2.1	TM	
54	M	DIELDRIN	65074300	66814400	2.7	M	
55	ML	ENDRIN	48973700	51725200	5.6	ML	3.5
56	TML	B-ENDOSULFAN	51370200	59190900	15	TML	1.2
57	TM	P,P-DDD	51922800	52920400	1.9	TM	
58	TM	ENDRIN ALDEHYDE	36143200	37897100	4.9	TM	
59	M	P,P-DDT	43681400	43906600	0.52	M	
60	TM	ENDOSULFAN SULFATE	46801200	50016500	6.9	TM	
61	TML	ENDRIN KETONE	50140800	56001400	12	TML	1.7
62	TM	METHOXYCHLOR	23384600	23157000	0.97	TM	
63	S	DBC	35297200	38246800	8.4	S	
64	S	DECA	27506700	26733700	2.8	S	
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
		Average			4.9		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911139.D\ECD1A.CH Vial: 39
Signal #2 : G:\ETHEL\DATA\180911\0911139.D\ECD2B.CH
Acq On : 9-13-18 21:40:59 Operator: MA
Sample : OCLHX - 3 4/13/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 14 8:51 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

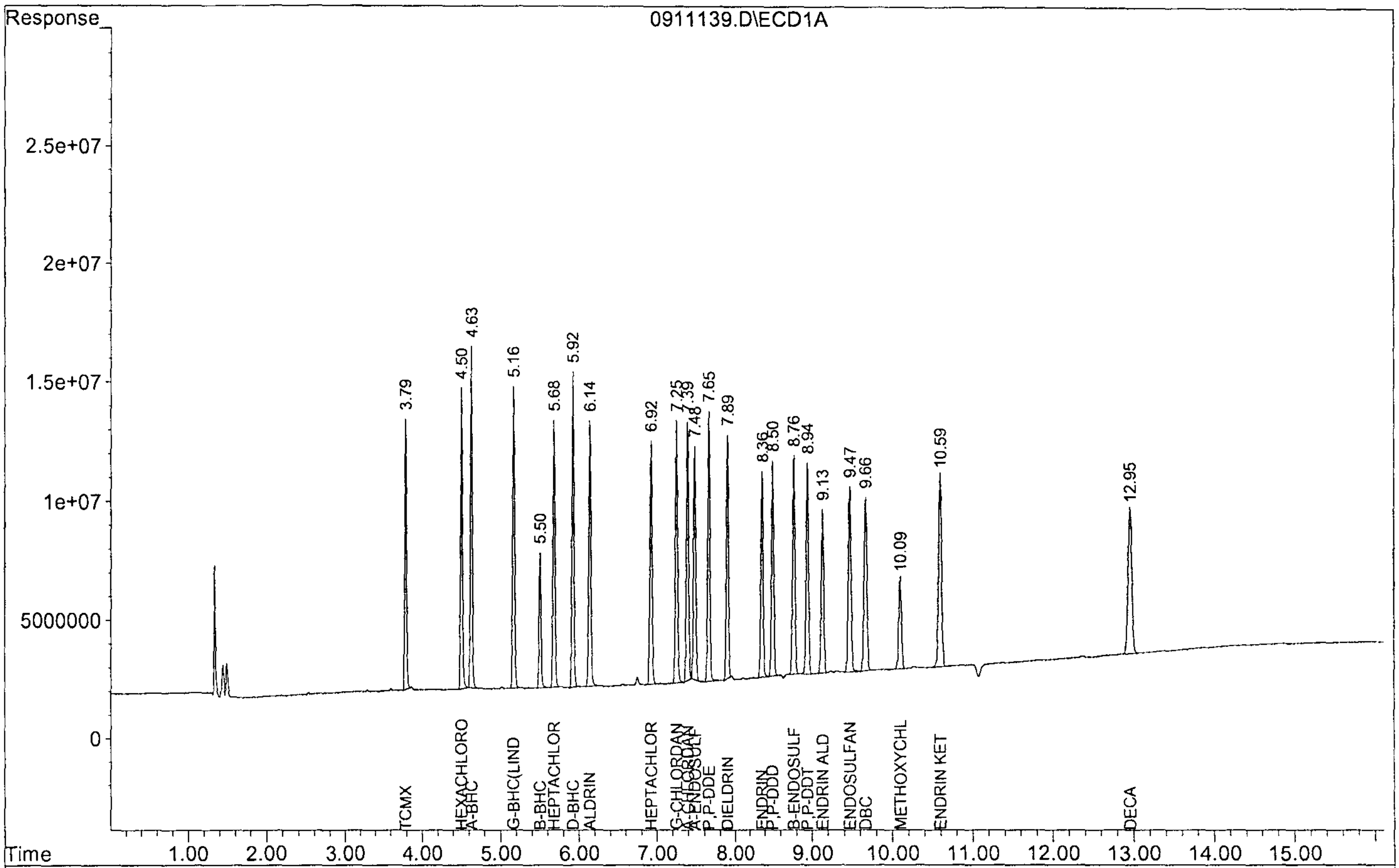
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.66	11350909	22219002	0.1123	0.1039
	Surrogate Spike 0.150 Range 25 - 150 Recovery =					74.87%	69.27%
23) S	DBC	9.66	10.98	17559644	7649353	0.0947	0.1084
	Surrogate Spike 0.150 Recovery =					63.13%	72.27%
24) S	DECA	12.95	14.52	19918039	5346730	0.1050	0.0972
	Surrogate Spike 0.150 Range 25 - 150 Recovery =					70.00%	64.80%
	Target Compounds						
2) TM	HEXACHLOROBENZEN	4.50	5.39	12650445	20108819	0.1057	0.1015
3) TM	A-BHC	4.63	5.27	14348775	27367414	0.1258	0.1124
4) TM	B-BHC	5.50	6.17	5690605	10502128	0.1095	0.1024
5) M	G-BHC(LINDANE)	5.16	5.75	12673813	47485621	0.1150	0.1069
6) TM	D-BHC	5.92	6.55	13243691	21358254	0.1146	0.1049
7) M	HEPTACHLOR	5.68	6.62	11213467	17018657	0.1121	0.1028
8) M	ALDRIN	6.14	7.10	11163955	17585922	0.1153	0.1057
9) TM	HEPTACHLOR EPOXI	6.92	7.75	10241525	16243398	0.1085	0.1053
10) TM	G-CHLORDANE	7.25	8.21	11044634	14653531	0.1088	0.1040
11) TM	A-ENDOSULFAN	7.48	8.35	9813318	12873918	0.1088	0.1034
12) TM	A-CHLORDANE	7.39	8.29	10880531	13616115	0.1079	0.1029
13) TM	P,P-DDE	7.65	8.49	11342643	14241072	0.1098	0.1021
14) M	DIELDRIN	7.89	8.76	10246254	13362889	0.1107	0.1027
15) M	ENDRIN	8.36	9.14	8658694	10345034	0.1016	0.0965
16) TM	B-ENDOSULFAN	8.76	9.60	9196923	11838173	0.1143	0.1012
17) TM	P,P-DDD	8.50	9.34	9056302	10584071	0.1087	0.1019
18) TM	ENDRIN ALDEHYDE	9.13	9.79	6910241	7579427	0.1099	0.1049
19) M	P,P-DDT	8.94	9.87	8899396	8781318	0.1072	0.1005
20) TM	ENDOSULFAN SULFA	9.47	10.31	7810703	10003304	0.1025	0.1069
21) TM	ENDRIN KETONE	10.59	11.16	8174865	11200282	0.1116	0.1017
22) TM	METHOXYCHLOR	10.09	10.69	3915893	4631405	0.1031	0.0990

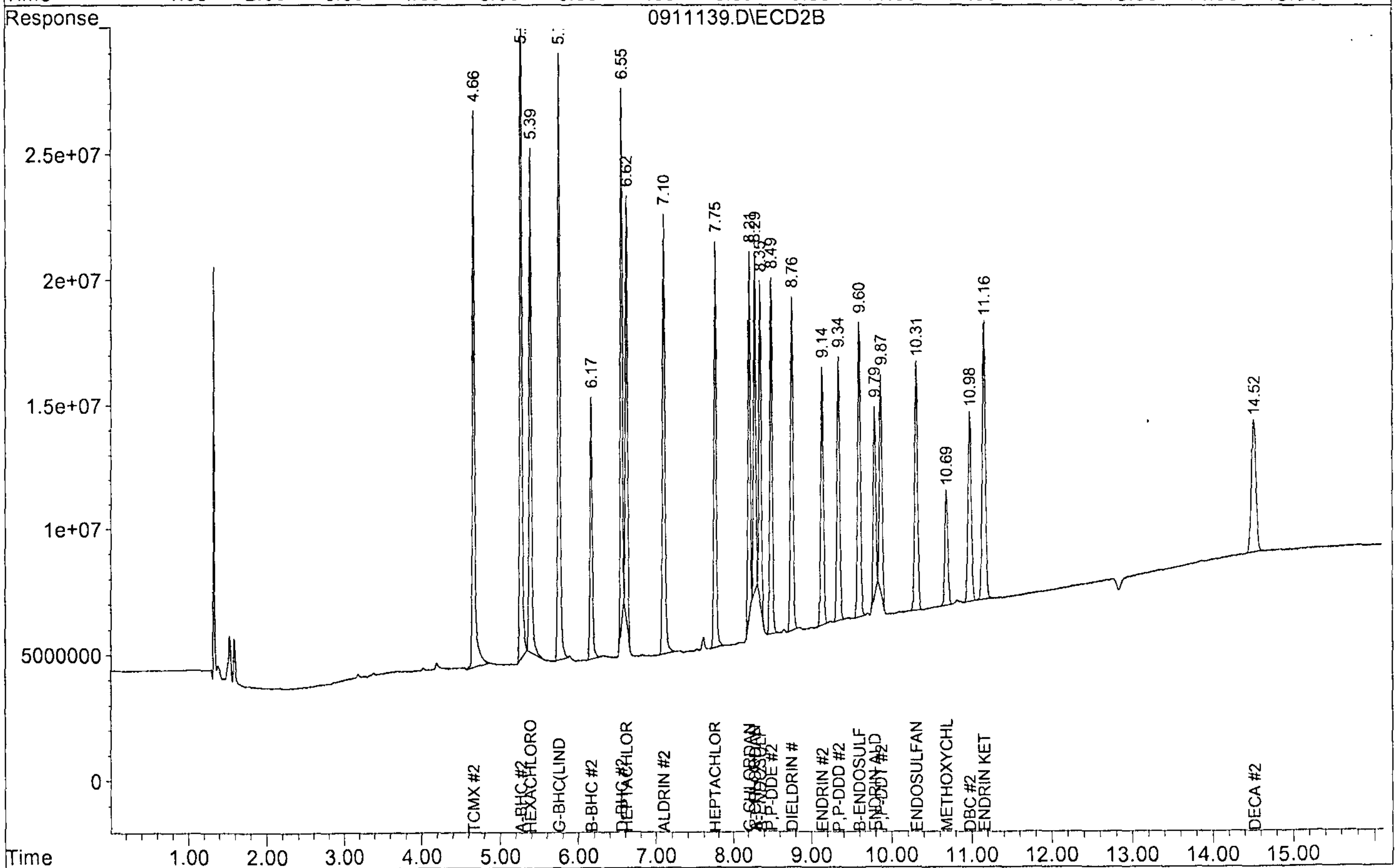
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Data File : G:\ETHEL\DATA\180911\0911139.D
Acq On : 9-13-18 21:40:59
Sample : OCLHX - 3 4/13/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 39
Operator: MA
Inst : Ethel
Multiplr: 1.00





Data File Name:	**0911144.D**
Data File Path:	**G:\ETHEL\DATA\180911**
Operator:	**MA**
Date Acquired:	**14 Sep 2018 09:02**
Method File:	**OCL0911.M**
Sample Name:	**OCL Deg Check 1/15/18**
Vial Number:	**44**
Instrument Name:	**Ethel**

#	Name	Ret Time	Target Response
1)	P,P-DDT	8.94	39283800
2)	P,P-DDD	8.50	674392
3)	P,P-DDE	7.66	242639

Breakdown **2.3**

#	Name	Ret Time	Target Response
1)	P,P-DDT #2	9.87	49044400
2)	P,P-DDD #2	9.35	794639
3)	P,P-DDE #2	8.50	562266

Breakdown **2.7**

#	Name	Ret Time	Target Response
1)	ENDRIN	8.36	41976200
2)	ENDRIN ALDEHYDE	9.13	1024080
3)	ENDRIN KETONE	10.59	1900530

Breakdown **6.5**

#	Name	Ret Time	Target Response
1)	ENDRIN #2	9.14	53311700
2)	ENDRIN ALDEHYDE #2	9.80	894396
3)	ENDRIN KETONE #2	11.16	3089590

Breakdown **7.0**

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911144.D\ECD1A.CH Vial: 44
Signal #2 : G:\ETHEL\DATA\180911\0911144.D\ECD2B.CH
Acq On : 9-14-18 9:02:53 Operator: MA
Sample : OCL Deg Check 1/15/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 14 9:21 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

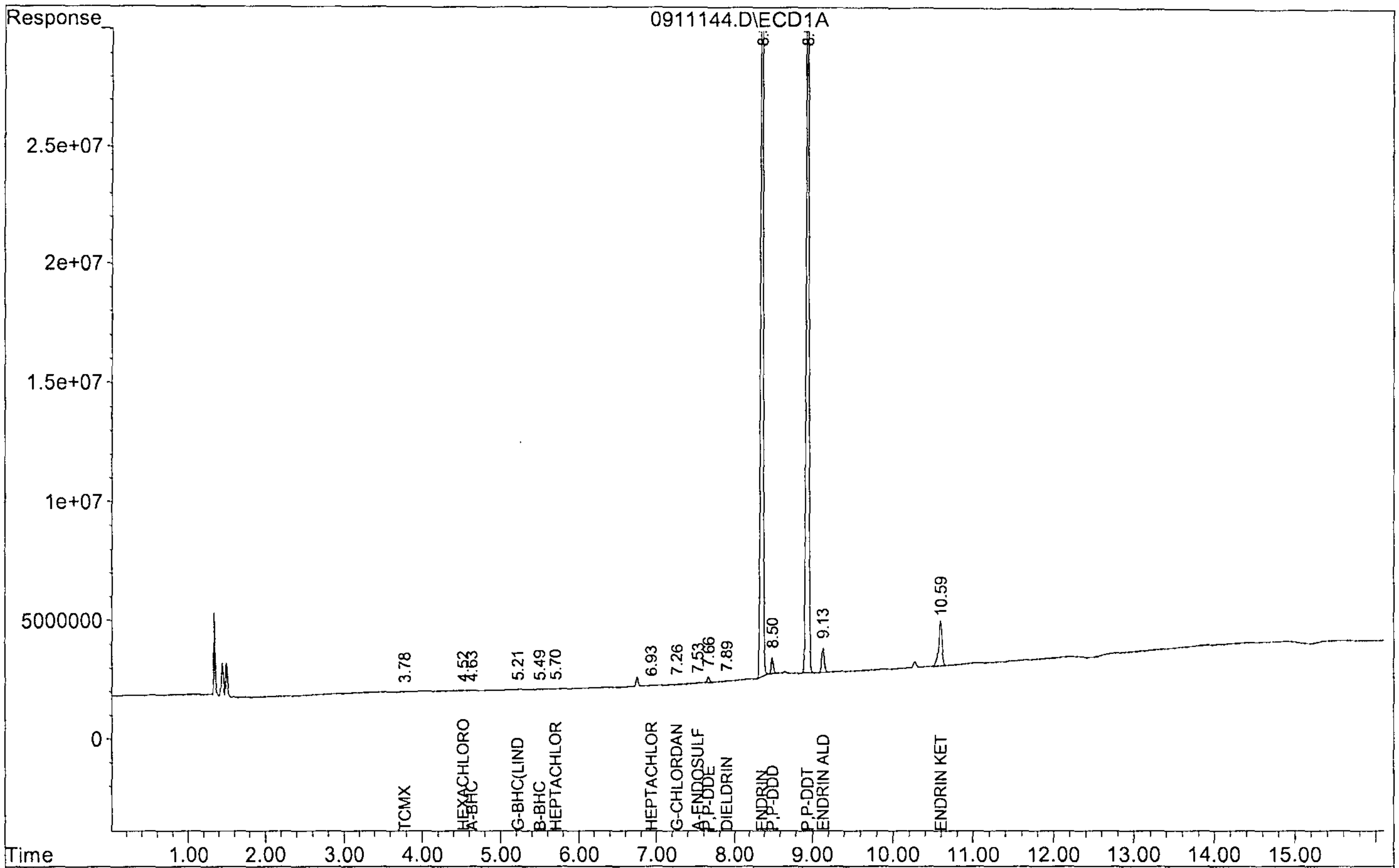
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1)	S TCMX	3.78	4.69	3620	9089	0.0000	0.0000
	Surrogate Spike 0.150 Range 25 - 150			Recovery	=	0.00%#	0.00%#
23)	S DBC	0.00	0.00	0	0	N.D.	N.D.
	Surrogate Spike 0.150			Recovery	=	0.00%	0.00%
24)	S DECA	0.00	0.00	0	0	N.D.	N.D.
	Surrogate Spike 0.150 Range 25 - 150			Recovery	=	0.00%#	0.00%#
	Target Compounds						
2)	TM HEXACHLOROBENZEN	4.52	0.00	3484	0	0.0000	N.D. #
3)	TM A-BHC	4.63	5.26	5416	8215	0.0000	0.0000 #
4)	TM B-BHC	5.49	0.00	4345	0	0.0001	N.D. #
5)	M G-BHC(LINDANE)	5.21f	5.75	4815	6011	0.0000	0.0000 #
6)	TM D-BHC	0.00	6.55	0	13148	N.D.	0.0001 #
7)	M HEPTACHLOR	5.70	6.63	2851	7759	0.0000	0.0000 #
9)	TM HEPTACHLOR EPOXI	6.93	7.73	18382	6336	0.0002	0.0000 #
10)	TM G-CHLORDANE	7.26	8.21	14996	47357	0.0001	0.0003 #
11)	TM A-ENDOSULFAN	7.53f	8.41f	30972	9724	0.0003	0.0001 #
13)	TM P,P-DDE	7.66	8.50	242639	562266	0.0023	0.0040 #
14)	M DIELDRIN	7.89	0.00	15181	0	0.0002	N.D. #
15)	M ENDRIN	8.36	9.14	41976244	53311655	0.4923	0.4989
17)	TM P,P-DDD	8.50	9.34	674392	794639	0.0081	0.0077
18)	TM ENDRIN ALDEHYDE	9.13	9.80	1024080	894396	0.0163	0.0124
19)	M P,P-DDT	8.94	9.87	39283845	49044405	0.4732	0.5614
21)	TM ENDRIN KETONE	10.59	11.16	1900529	3089593	0.0259	0.0281
	Target Compounds						
8)	M ALDRIN	0.00	0.00	0	0	N.D.	N.D.
12)	TM A-CHLORDANE	0.00	8.29	0	6775	N.D.	N.D.
16)	TM B-ENDOSULFAN	0.00	0.00	0	0	N.D.	N.D.
20)	TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D.	N.D.
22)	TM METHOXYCHLOR	0.00	0.00	0	0	N.D.	N.D.

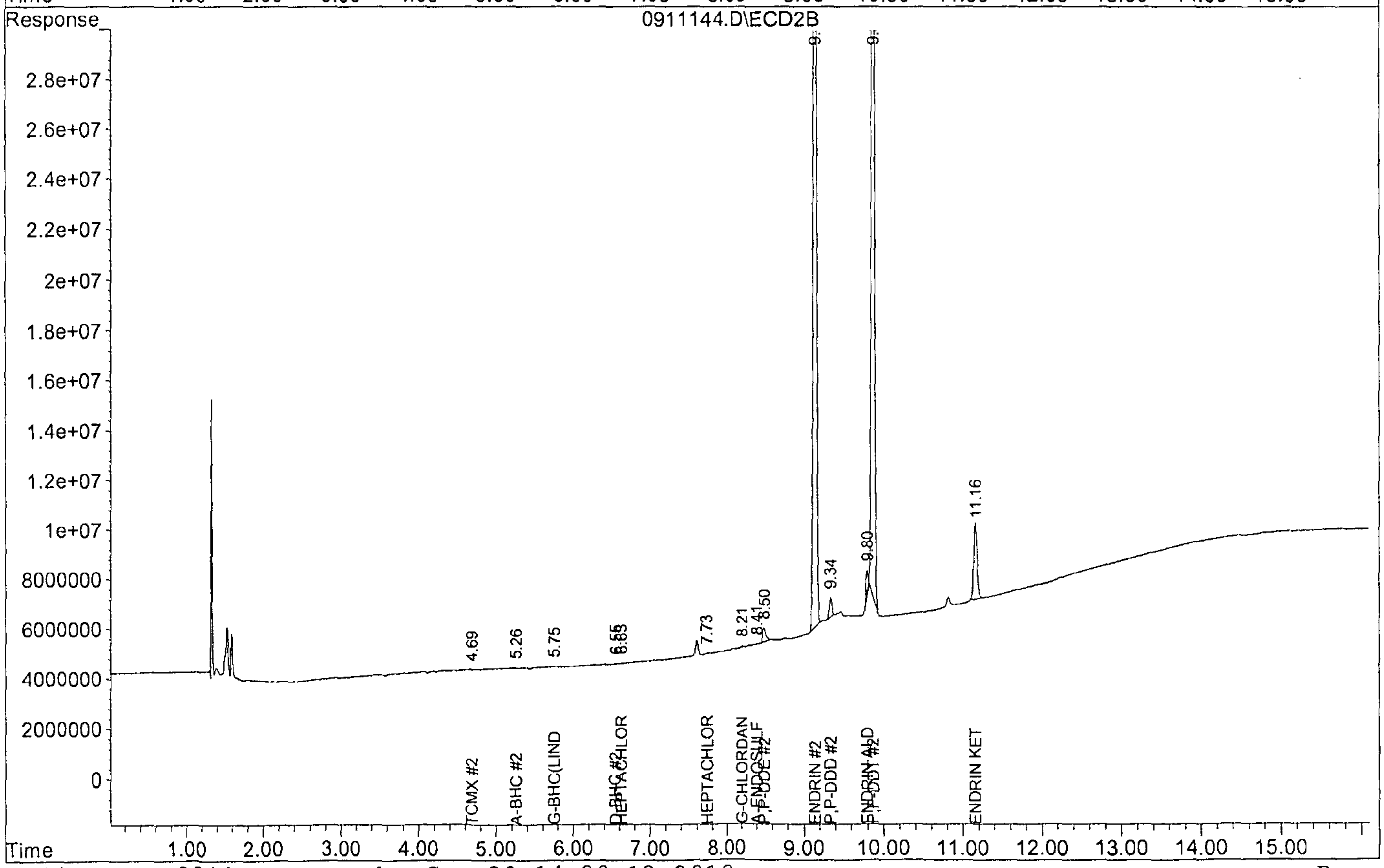
(f)=RT Delta > 1/2 Window (#)=Amounts differ by ≥ 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911144.D
Acq On : 9-14-18 9:02:53
Sample : OCL Deg Check 1/15/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 44
Operator: MA
Inst : Ethel
Multiplr: 1.00





Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
SDG No:
Case No:
Date Analyzed: 09/14/18
Matrix: Water
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911151.D

		Compound	MEAN	CCRF	%D		%Drift
1	S	TCMX	50559900	53151600	5.1	S	
2	TM	HEXACHLOROBENZENE	59828400	65393900	9.3	TM	
3	TM	A-BHC	57018700	69727200	22	TM	* see back
4	TM	B-BHC	25982200	28411900	9.4	TM	
5	M	G-BHC(LINDANE)	55092900	62913600	14	M	
6	TM	D-BHC	57791400	64376900	11	TM	
7	M	HEPTACHLOR	50010700	55429800	11	M	
8	M	ALDRIN	48400500	54443800	12	M	
9	TM	HEPTACHLOR EPOXIDE	47190100	50389500	6.8	TM	
10	TM	G-CHLORDANE	50741400	55425600	9.2	TM	
11	TM	A-ENDOSULFAN	45109400	51723200	15	TM	
12	TM	A-CHLORDANE	50420800	51686700	2.5	TM	
13	TM	P,P-DDE	51629400	56384900	9.2	TM	
14	M	DIELDRIN	46280600	48330700	4.4	M	
15	M	ENDRIN	42631200	41311400	3.1	M	
16	TM	B-ENDOSULFAN	40224800	45023900	12	TM	
17	TM	P,P-DDD	41648000	44798800	7.6	TM	
18	TM	ENDRIN ALDEHYDE	31448100	29878500	5.0	TM	
19	M	P,P-DDT	41507300	42457800	2.3	M	
20	TM	ENDOSULFAN SULFATE	38088000	41175600	8.1	TM	
21	TM	ENDRIN KETONE	36638000	38262600	4.4	TM	
22	TM	METHOXYCHLOR	18981700	20571800	8.4	TM	
23	S	DBC	92723500	79489600	14	S	
24	S	DECA	94812400	92458400	2.5	S	
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			8.7		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911151.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	106949000	102009000	4.6	S	
42	TM	HEXACHLOROBENZENE	99012800	101634000	2.6	TM	
43	TM	A-BHC	121700000	129215000	6.2	TM	
44	TM	B-BHC	51267800	50474300	1.5	TM	
45	M	G-BHC(LINDANE)	222027000	226113000	1.8	M	
46	TM	D-BHC	101771000	104279000	2.5	TM	
47	M	HEPTACHLOR	82762500	85548200	3.4	M	
48	M	ALDRIN	83185900	84195800	1.2	M	
49	TM	HEPTACHLOR EPOXIDE	77133500	75619600	2.0	TM	
50	TM	G-CHLORDANE	70434900	71138100	1.0	TM	
51	TM	A-ENDOSULFAN	62262600	65575500	5.3	TM	
52	TML	A-CHLORDANE	66854600	61956200	7.3	TML	6.4
53	TM	P,P-DDE	69751900	66543000	4.6	TM	
54	M	DIELDRIN	65074300	65366800	0.45	M	
55	ML	ENDRIN	48973700	49996800	2.1	ML	6.7
56	TML	B-ENDOSULFAN	51370200	58290100	13	TML	0.34
57	TM	P,P-DDD	51922800	52927700	1.9	TM	
58	TM	ENDRIN ALDEHYDE	36143200	33380800	7.6	TM	
59	M	P,P-DDT	43681400	43910000	0.52	M	
60	TM	ENDOSULFAN SULFATE	46801200	49913800	6.7	TM	
61	TML	ENDRIN KETONE	50140800	51873100	3.5	TML	5.8
62	TM	METHOXYCHLOR	23384600	24545400	5.0	TM	
63	S	DBC	35297200	33392600	5.4	S	
64	S	DECA	27506700	24573200	11	S	
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
		Average			4.2		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911151.D\ECD1A.CH Vial: 51
Signal #2 : G:\ETHEL\DATA\180911\0911151.D\ECD2B.CH
Acq On : 9-14-18 11:35:47 Operator: MA
Sample : OCLHX - 3 9/12/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 14 11:53 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.66	10630312	20401847	0.1051	0.0954
	Surrogate Spike 0.150 Range 25 - 150			Recovery =		70.07%	63.60%
23) S	DBC	9.66	10.97	15897926	6678517	0.0857	0.0946
	Surrogate Spike 0.150			Recovery =		57.13%	63.07%
24) S	DECA	12.95	14.51	18491674	4914640	0.0975	0.0893
	Surrogate Spike 0.150 Range 25 - 150			Recovery =		65.00%	59.53%
	Target Compounds						
2) TM	HEXACHLOROBENZEN	4.50	5.39	13078771	20326829	0.1093	0.1026
3) TM	A-BHC	4.63	5.27	13945441	25842976	0.1223	0.1062
4) TM	B-BHC	5.50	6.16	5682386	10094859	0.1094	0.0985
5) M	G-BHC(LINDANE)	5.17	5.75	12582716	45222527	0.1142	0.1018
6) TM	D-BHC	5.92	6.55	12875370	20855878	0.1114	0.1025
7) M	HEPTACHLOR	5.68	6.62	11085962	17109644	0.1108	0.1034
8) M	ALDRIN	6.14	7.10	10888751	16839162	0.1125	0.1012
9) TM	HEPTACHLOR EPOXI	6.92	7.75	10077894	15123911	0.1068	0.0980
10) TM	G-CHLORDANE	7.25	8.21	11085128	14227612	0.1092	0.1010
11) TM	A-ENDOSULFAN	7.48	8.35	10344640	13115093	0.1147	0.1053
12) TM	A-CHLORDANE	7.39	8.28	10337346	12391244	0.1025	0.0936
13) TM	P,P-DDE	7.65	8.49	11276970	13308591	0.1092	0.0954
14) M	DIELDRIN	7.89	8.75	9666142	13073356	0.1044	0.1004
15) M	ENDRIN	8.36	9.14	8262278	9999362	0.0969	0.0933
16) TM	B-ENDOSULFAN	8.76	9.60	9004786	11658027	0.1119	0.0997
17) TM	P,P-DDD	8.50	9.34	8959750	10585537	0.1076	0.1019
18) TM	ENDRIN ALDEHYDE	9.13	9.79	5975705	6676150	0.0950	0.0924
19) M	P,P-DDT	8.93	9.87	8491558	8781996	0.1023	0.1005
20) TM	ENDOSULFAN SULFA	9.46	10.31	8235112	9982763	0.1081	0.1067
21) TM	ENDRIN KETONE	10.59	11.16	7652515	10374615	0.1044	0.0942
22) TM	METHOXYCHLOR	10.09	10.68	4114356	4909076	0.1084	0.1050

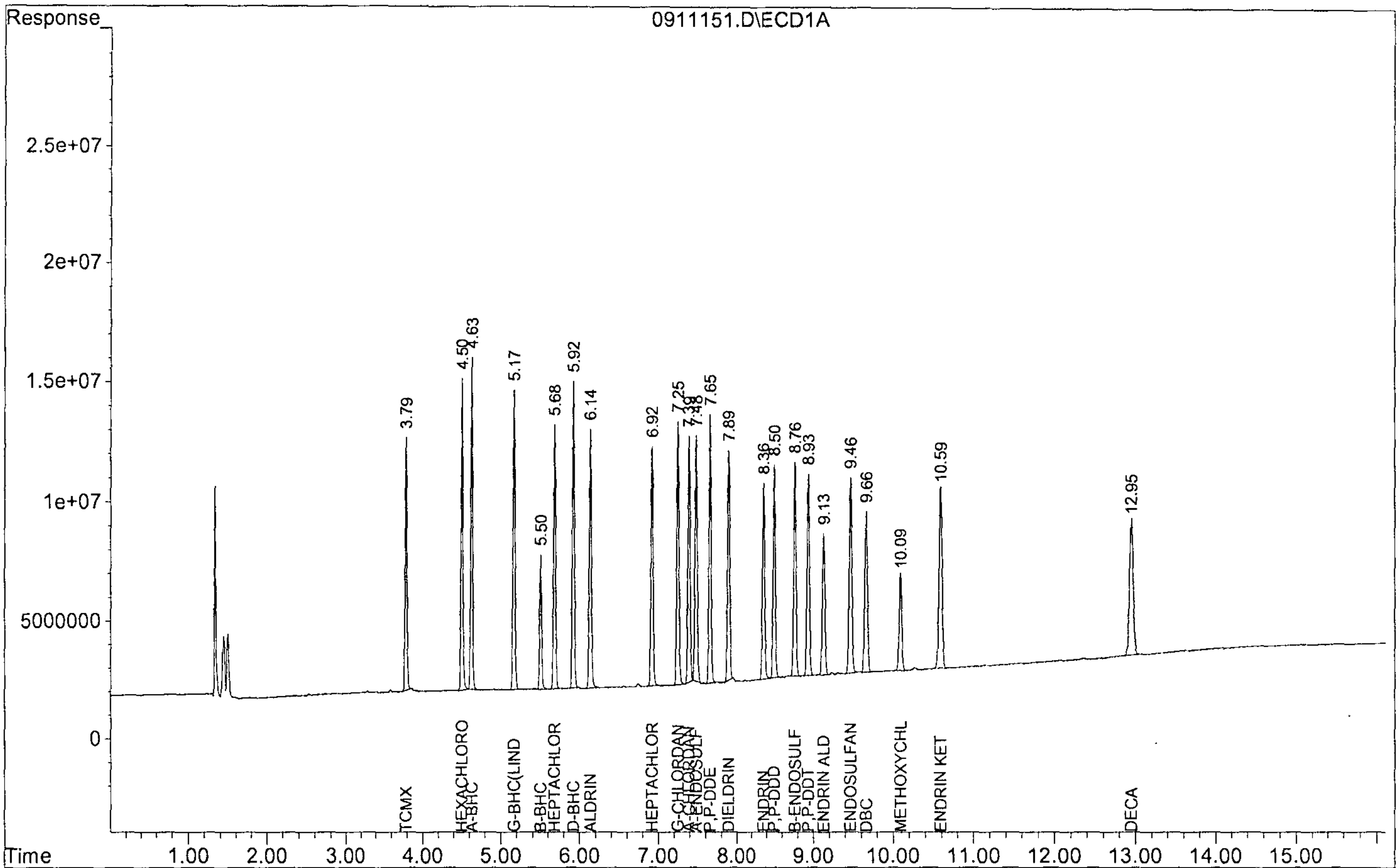
Target Compounds

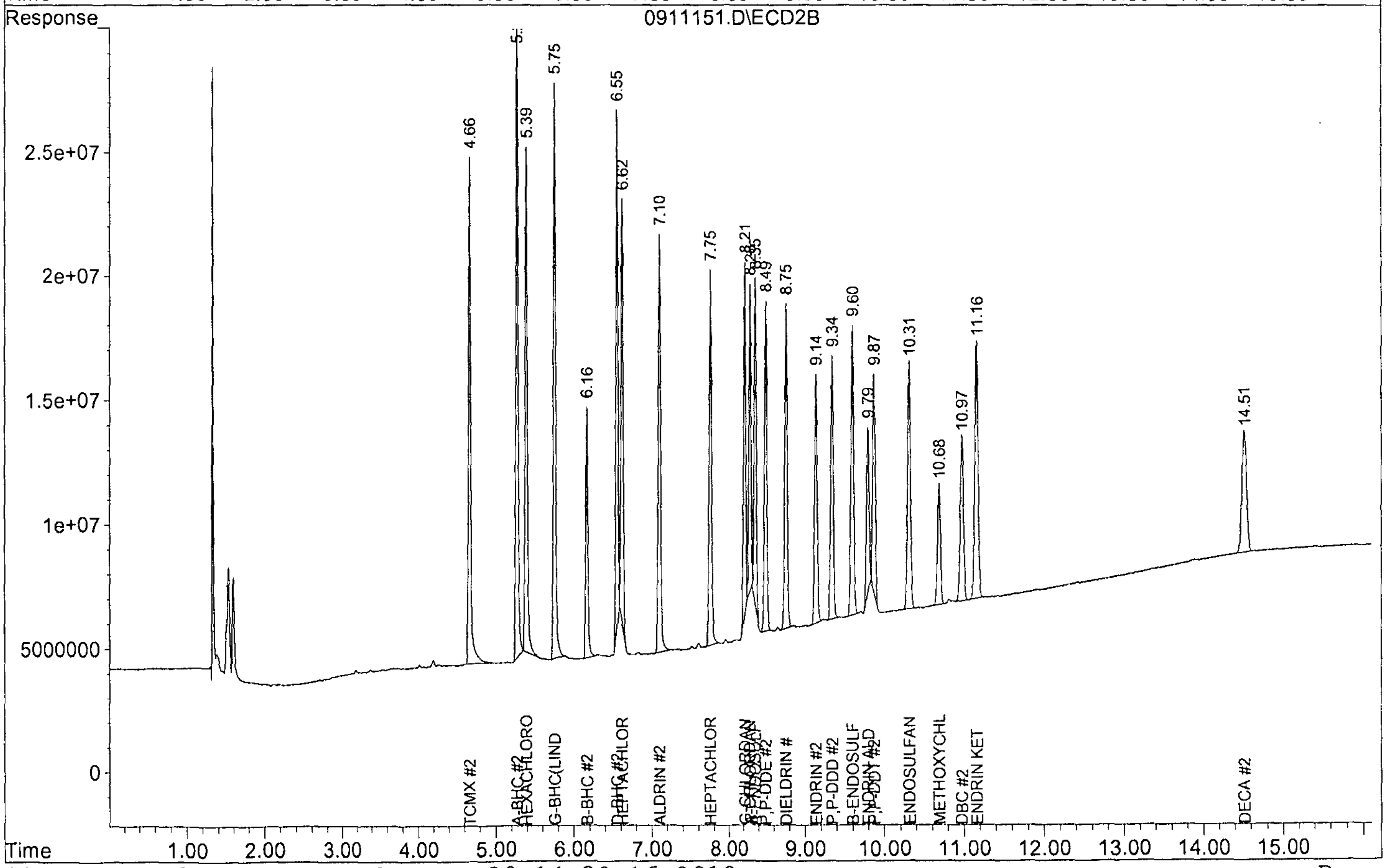
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911151.D
Acq On : 9-14-18 11:35:47
Sample : OCLHX - 3 9/12/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 51
Operator: MA
Inst : Ethel
Multiplr: 1.00





TOXAPHENE
METHOD 608/8081 TOX0911

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911152.D

		Compound	MEAN	CCRF	%D		%Drift
1	ANM	Toxaphene Total	1855460	1931770	4.1	ANM	
2	L2AK	Toxaphene	171110	190982	12	L2AK	
3	L2AK	Toxaphene {2}	542307	556638	2.6	L2AK	
4	L2AK	Toxaphene {3}	397453	405440	2.0	L2AK	
5	L2AK	Toxaphene {4}	214690	237148	10	L2AK	
6	L2AK	Toxaphene {5}	529902	541560	2.2	L2AK	
7							
8							
9							
10							
11							
12							
13							
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34							
35							
36							
37							
38							
39							
40							
		Average			5.5		

TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911152.D

		Compound	MEAN	CCRF	%D		%Drift
41	ANM	Toxaphene Total	1725710	1697810	1.6	ANM	
42	L2AK	Toxaphene	129112	102526	21	L2AK	
43	L2AK	Toxaphene {2}	334549	335567	0.30	L2AK	
44	L2AK	Toxaphene {3}	361335	358617	0.75	L2AK	
45	L2AK	Toxaphene {4}	660145	671090	1.7	L2AK	
46	L2AK	Toxaphene {5}	240571	230013	4.4	L2AK	
47							
48							
49							
50							
51							
52							
53							
54							
55							
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77							
78							
79							
80							
		Average			5.0		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911152.D\ECD1A.CH Vial: 52
Signal #2 : G:\ETHEL\DATA\180911\0911152.D\ECD2B.CH
Acq On : 9-14-18 11:54:45 Operator: MA
Sample : TOX - 2 8/3/18 Inst : Ethel
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 19 9:48 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Tue Sep 18 10:11:58 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

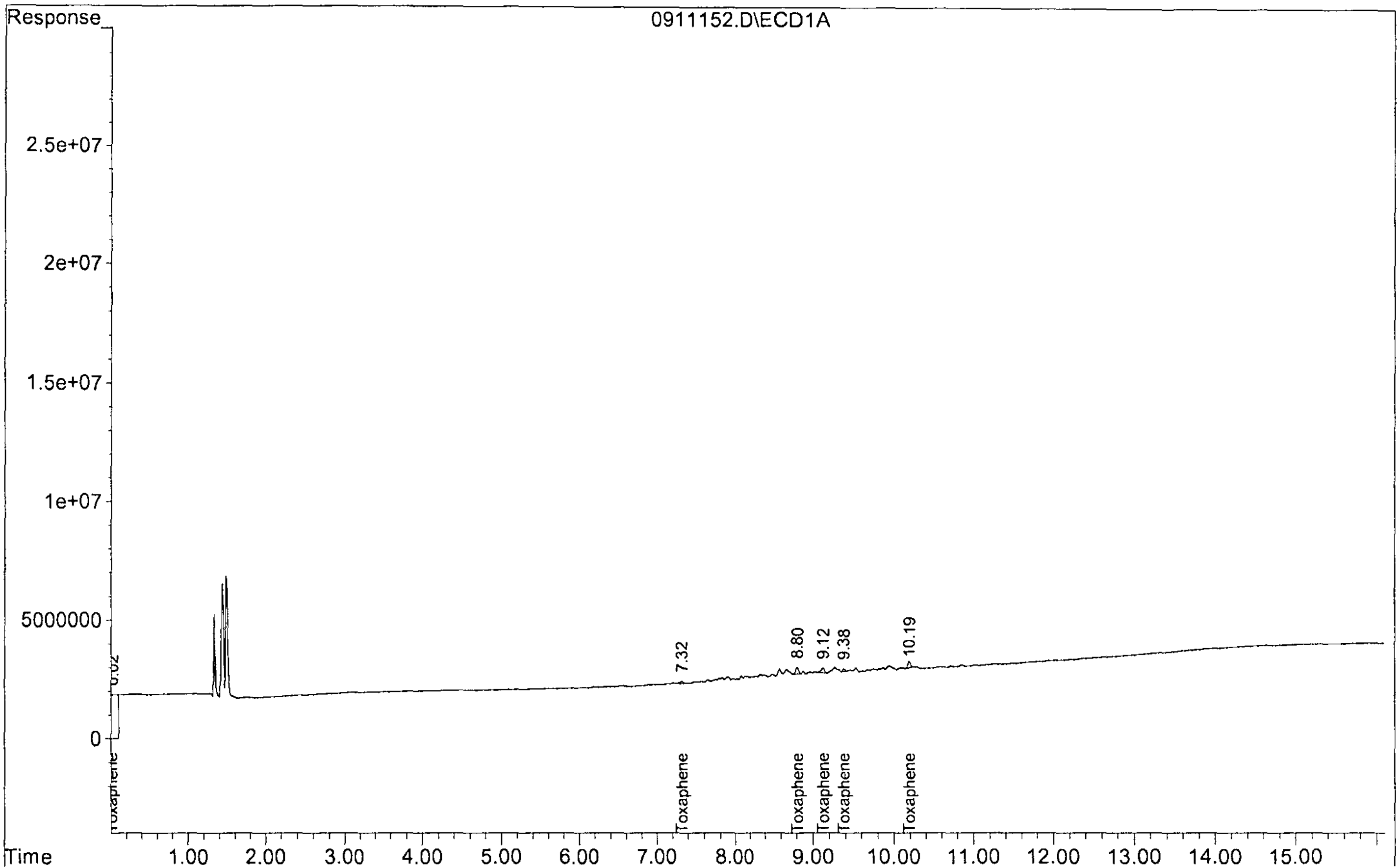
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
	Target Compounds							
1)	ANM Toxaphene Total	0.00	0.00	965884	848907	0.2603m	0.2460m	
2)	L2AK Toxaphene	7.32	7.60	95491	51263	0.2790	0.1985	#
3)	L2AK Toxaphene {2}	8.80	9.50	278319	167784	0.2566	0.2508	
4)	L2AK Toxaphene {3}	9.12	9.97	202720	179309	0.2550	0.2481	
5)	L2AK Toxaphene {4}	9.38	10.14	118574	335545	0.2762	0.2541	
6)	L2AK Toxaphene {5}	10.19	11.07	270780	115006	0.2555	0.2390	
	Sum Toxaphene			965884	848907	1.3223	1.1906	
	Average Toxaphene					0.264	0.238	

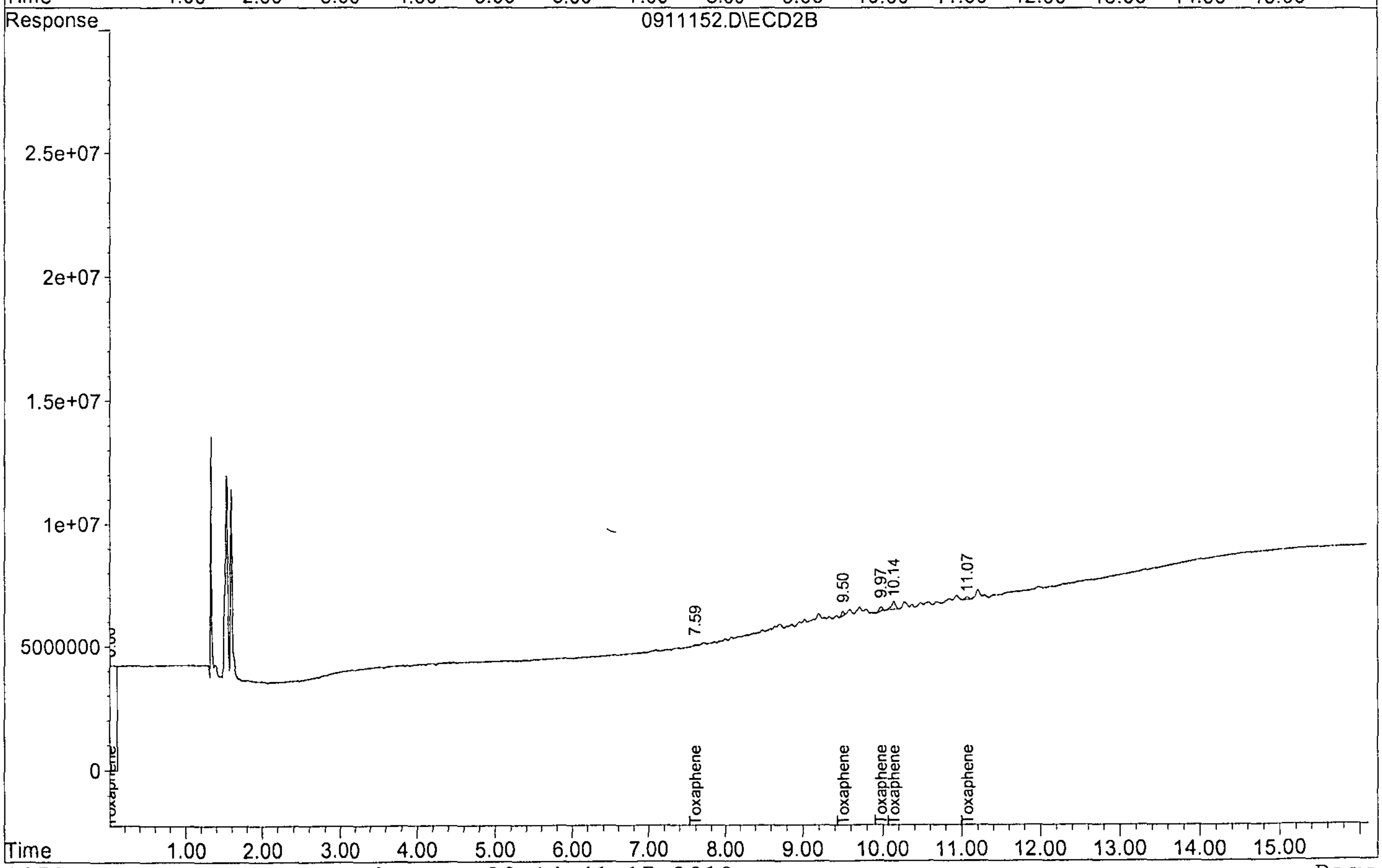
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911152.D
Acq On : 9-14-18 11:54:45
Sample : TOX - 2 8/3/18
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 52
Operator: MA
Inst : Ethel
Multiplr: 1.00





Data File Name:	**0911170.D**
Data File Path:	**G:\ETHEL\DATA\180911**
Operator:	**MA**
Date Acquired:	**14 Sep 2018 17:36**
Method File:	**OCL0911.M**
Sample Name:	**OCL Deg Check 1/15/18**
Vial Number:	**70**
Instrument Name:	**Ethel**

#	Name	Ret Time	Target Response
1)	P,P-DDT	8.94	38623700
2)	P,P-DDD	8.50	3051310
3)	P,P-DDE	7.66	200764

Breakdown **7.8**

#	Name	Ret Time	Target Response
1)	P,P-DDT #2	9.87	48083000
2)	P,P-DDD #2	9.35	3812580
3)	P,P-DDE #2	8.50	491226

Breakdown **8.2**

#	Name	Ret Time	Target Response
1)	ENDRIN	8.36	44036600
2)	ENDRIN ALDEHYDE	9.13	582834
3)	ENDRIN KETONE	10.59	1570960

Breakdown **4.7**

#	Name	Ret Time	Target Response
1)	ENDRIN #2	9.14	56518200
2)	ENDRIN ALDEHYDE #2	9.80	701652
3)	ENDRIN KETONE #2	11.16	2757840

Breakdown **5.8**

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911170.D\ECD1A.CH Vial: 70
Signal #2 : G:\ETHEL\DATA\180911\0911170.D\ECD2B.CH
Acq On : 9-14-18 17:36:42 Operator: MA
Sample : OCL Deg Check 1/15/18 Inst : Ethel
Misc : soil Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 8:49 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

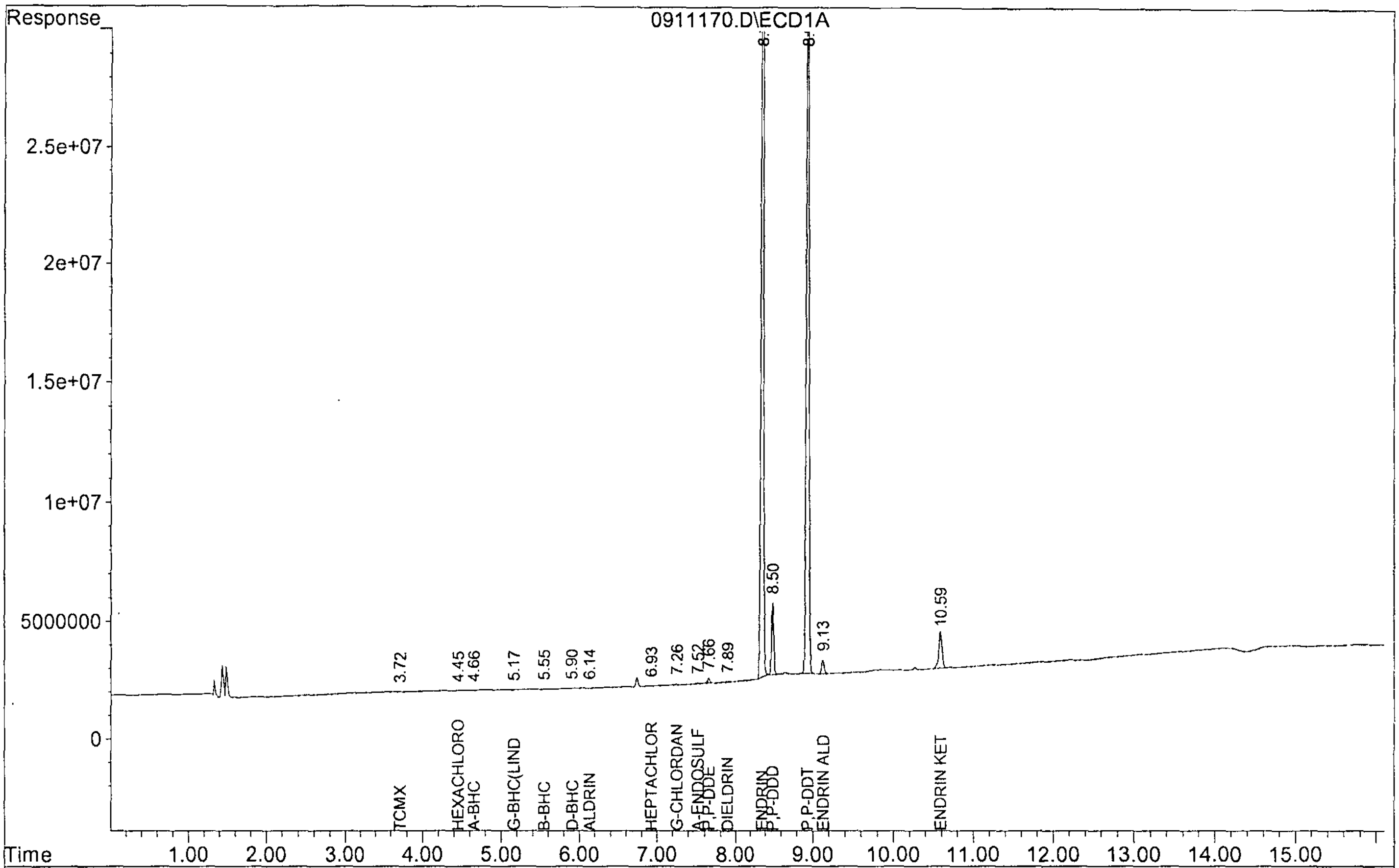
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.72f	4.65	7805	5533	0.0001	0.0000 #
Surrogate Spike 0.100			Recovery	=	0.10%	0.00%
23) S DBC	0.00	0.00	0	0	N.D.	N.D.
Surrogate Spike 0.100			Recovery	=	0.00%	0.00%
24) S DECA	0.00	0.00	0	0	N.D.	N.D.
Surrogate Spike 0.100			Recovery	=	0.00%	0.00%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.45f	5.46f	2766	4720	0.0000	0.0000
3) TM A-BHC	4.66	5.26	3218	9206	0.0000	0.0000 #
4) TM B-BHC	5.55f	0.00	11190	0	0.0002	N.D. #
5) M G-BHC(LINDANE)	5.17	0.00	3267	0	0.0000	N.D. #
6) TM D-BHC	5.90	6.61f	1014	5946	0.0000	0.0000 #
7) M HEPTACHLOR	0.00	6.61	0	5946	N.D.	0.0000 #
8) M ALDRIN	6.14	0.00	7061	0	0.0001	N.D. #
9) TM HEPTACHLOR EPOXI	6.93	7.73	11609	7164	0.0001	0.0000 #
10) TM G-CHLORDANE	7.26	8.21	34164	45042	0.0003	0.0003
11) TM A-ENDOSULFAN	7.52f	0.00	31723	0	0.0004	N.D. #
13) TM P,P-DDE	7.66	8.50	200764	491226	0.0019	0.0035 #
14) M DIELDRIN	7.89	0.00	18649	0	0.0002	N.D. #
15) M ENDRIN	8.36	9.14	44036598	56518188	0.5165	0.5289
17) TM P,P-DDD	8.50	9.34	3051311	3812584	0.0366	0.0367
18) TM ENDRIN ALDEHYDE	9.13	9.79	582834	701652	0.0093	0.0097
19) M P,P-DDT	8.94	9.87	38623657	48082955	0.4653	0.5504
21) TM ENDRIN KETONE	10.59	11.16	1570964	2757844	0.0214	0.0251
Target Compounds						
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D.	N.D.
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D.	N.D.
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D.	N.D.
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D.	N.D.

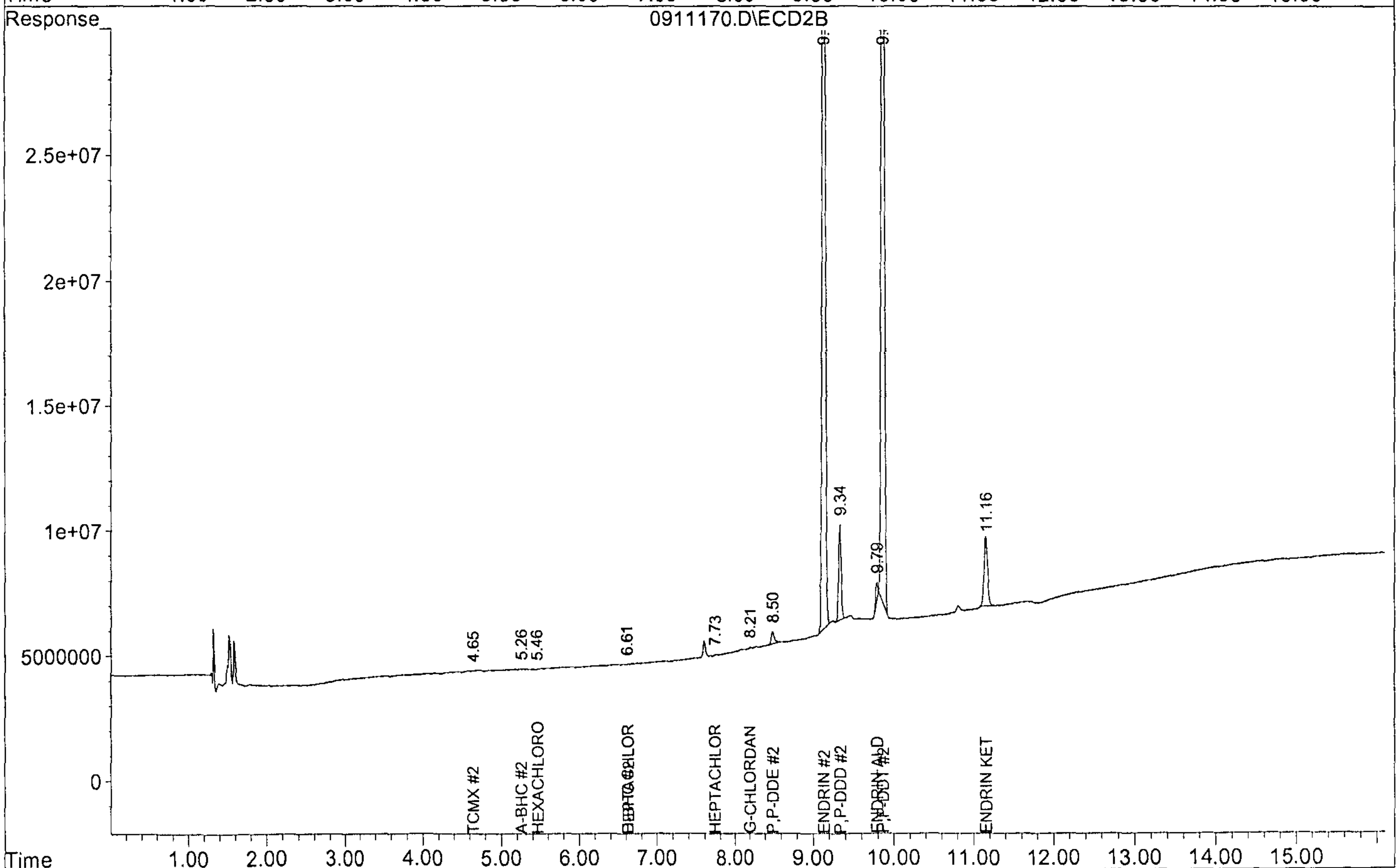
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911170.D
Acq On : 9-14-18 17:36:42
Sample : OCL Deg Check 1/15/18
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 70
Operator: MA
Inst : Ethel
Multiplr: 1.00





Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911171.D

		Compound	MEAN	CCRF	%D		%Drift
1	S	TCMX	50559900	52257500	3.4	S	
2	TM	HEXACHLOROBENZENE	59828400	62322200	4.2	TM	
3	TM	A-BHC	57018700	67801500	19	TM	
4	TM	B-BHC	25982200	27119400	4.4	TM	
5	M	G-BHC(LINDANE)	55092900	61045700	11	M	
6	TM	D-BHC	57791400	62674200	8.4	TM	
7	M	HEPTACHLOR	50010700	53485900	6.9	M	
8	M	ALDRIN	48400500	51152100	5.7	M	
9	TM	HEPTACHLOR EPOXIDE	47190100	48481600	2.7	TM	
10	TM	G-CHLORDANE	50741400	53498000	5.4	TM	
11	TM	A-ENDOSULFAN	45109400	49794400	10	TM	
12	TM	A-CHLORDANE	50420800	49720500	1.4	TM	
13	TM	P,P-DDE	51629400	52619300	1.9	TM	
14	M	DIELDRIN	46280600	47120200	1.8	M	
15	M	ENDRIN	42631200	39861600	6.5	M	
16	TM	B-ENDOSULFAN	40224800	44616200	11	TM	
17	TM	P,P-DDD	41648000	46185400	11	TM	
18	TM	ENDRIN ALDEHYDE	31448100	28160300	10	TM	
19	M	P,P-DDT	41507300	36675900	12	M	
20	TM	ENDOSULFAN SULFATE	38088000	40705700	6.9	TM	
21	TM	ENDRIN KETONE	36638000	38734300	5.7	TM	
22	TM	METHOXYCHLOR	18981700	18682700	1.6	TM	
23	S	DBC	92723500	76321200	18	S	
24	S	DECA	94812400	88426600	6.7	S	
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39							
40							
		Average			7.3		

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911171.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	106949000	101784000	4.8	S	
42	TM	HEXACHLOROBENZENE	99012800	102016000	3.0	TM	
43	TM	A-BHC	121700000	129636000	6.5	TM	
44	TM	B-BHC	51267800	51620100	0.69	TM	
45	M	G-BHC(LINDANE)	222027000	230697000	3.9	M	
46	TM	D-BHC	101771000	105226000	3.4	TM	
47	M	HEPTACHLOR	82762500	85331900	3.1	M	
48	M	ALDRIN	83185900	86616300	4.1	M	
49	TM	HEPTACHLOR EPOXIDE	77133500	76873000	0.34	TM	
50	TM	G-CHLORDANE	70434900	73033800	3.7	TM	
51	TM	A-ENDOSULFAN	62262600	65283500	4.9	TM	
52	TML	A-CHLORDANE	66854600	63605300	4.9	TML	3.9
53	TM	P,P-DDE	69751900	71148300	2.0	TM	
54	M	DIELDRIN	65074300	65332800	0.40	M	
55	ML	ENDRIN	48973700	49911500	1.9	ML	6.9
56	TML	B-ENDOSULFAN	51370200	58916700	15	TML	0.73
57	TM	P,P-DDD	51922800	56239000	8.3	TM	
58	TM	ENDRIN ALDEHYDE	36143200	32964300	8.8	TM	
59	M	P,P-DDT	43681400	41752200	4.4	M	
60	TM	ENDOSULFAN SULFATE	46801200	51561500	10	TM	
61	TML	ENDRIN KETONE	50140800	53420800	6.5	TML	3.0
62	TM	METHOXYCHLOR	23384600	22806100	2.5	TM	
63	S	DBC	35297200	35149100	0.42	S	
64	S	DECA	27506700	25683500	6.6	S	
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		Average			4.6		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911171.D\ECD1A.CH Vial: 71
Signal #2 : G:\ETHEL\DATA\180911\0911171.D\ECD2B.CH
Acq On : 9-14-18 17:55:49 Operator: MA
Sample : OCLHX - 3 9/12/18 Inst : Ethel
Misc : soil Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 8:50 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10451509	20356796	0.1034	0.0952
Surrogate Spike 0.100			Recovery	=	103.40%	95.20%
23) S DBC	9.66	10.97	15264246	7029822	0.0823	0.0996
Surrogate Spike 0.100			Recovery	=	82.30%	99.60%
24) S DECA	12.95	14.51	17685328	5136691	0.0933	0.0934
Surrogate Spike 0.100			Recovery	=	93.30%	93.40%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.50	5.38	12464439	20403154	0.1042	0.1030
3) TM A-BHC	4.63	5.27	13560297	25927216	0.1189	0.1065
4) TM B-BHC	5.50	6.16	5423876	10324020	0.1044	0.1007
5) M G-BHC(LINDANE)	5.16	5.75	12209149	46139362	0.1108	0.1039
6) TM D-BHC	5.92	6.55	12534845	21045299	0.1084	0.1034
7) M HEPTACHLOR	5.68	6.62	10697174	17066389	0.1069	0.1031
8) M ALDRIN	6.14	7.10	10230422	17323266	0.1057	0.1041
9) TM HEPTACHLOR EPOXI	6.92	7.75	9696329	15374605	0.1027	0.0997
10) TM G-CHLORDANE	7.25	8.21	10699605	14606763	0.1054	0.1037
11) TM A-ENDOSULFAN	7.48	8.35	9958887	13056706	0.1104	0.1049
12) TM A-CHLORDANE	7.39	8.28	9944099	12721062	0.0986	0.0961
13) TM P,P-DDE	7.65	8.49	10523863	14229657	0.1019	0.1020
14) M DIELDRIN	7.89	8.75	9424031	13066566	0.1018	0.1004
15) M ENDRIN	8.36	9.14	7972325	9982298	0.0935	0.0931
16) TM B-ENDOSULFAN	8.76	9.59	8923231	11783341	0.1109	0.1007
17) TM P,P-DDD	8.50	9.34	9237086	11247790	0.1109	0.1083
18) TM ENDRIN ALDEHYDE	9.13	9.79	5632060	6592864	0.0895	0.0912
19) M P,P-DDT	8.93	9.87	7335171	8350446	0.0884	0.0956
20) TM ENDOSULFAN SULFA	9.46	10.31	8141137	10312293	0.1069	0.1102
21) TM ENDRIN KETONE	10.59	11.15	7746855	10684160	0.1057	0.0970
22) TM METHOXYCHLOR	10.09	10.68	3736544	4561228	0.0984	0.0975

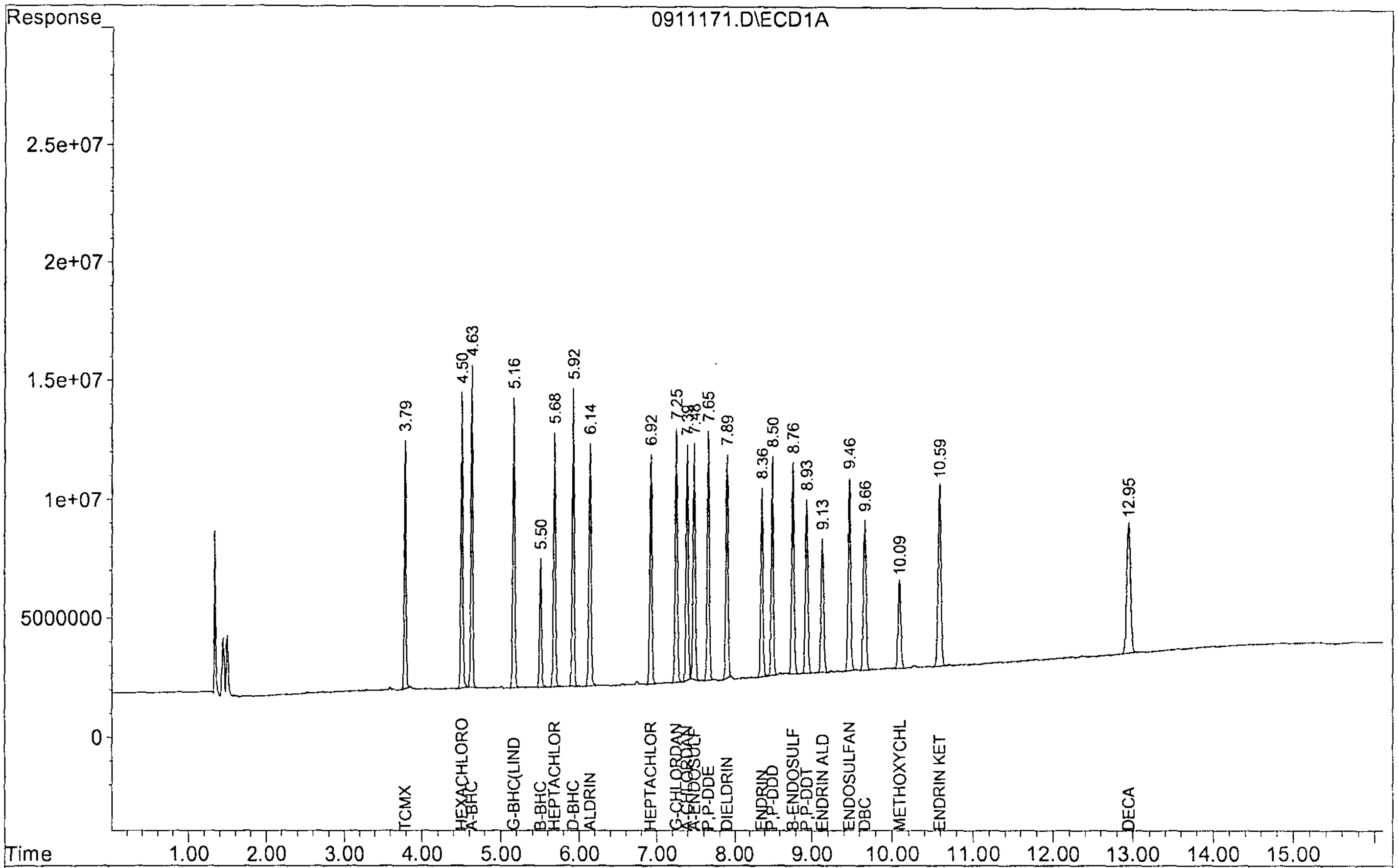
Target Compounds

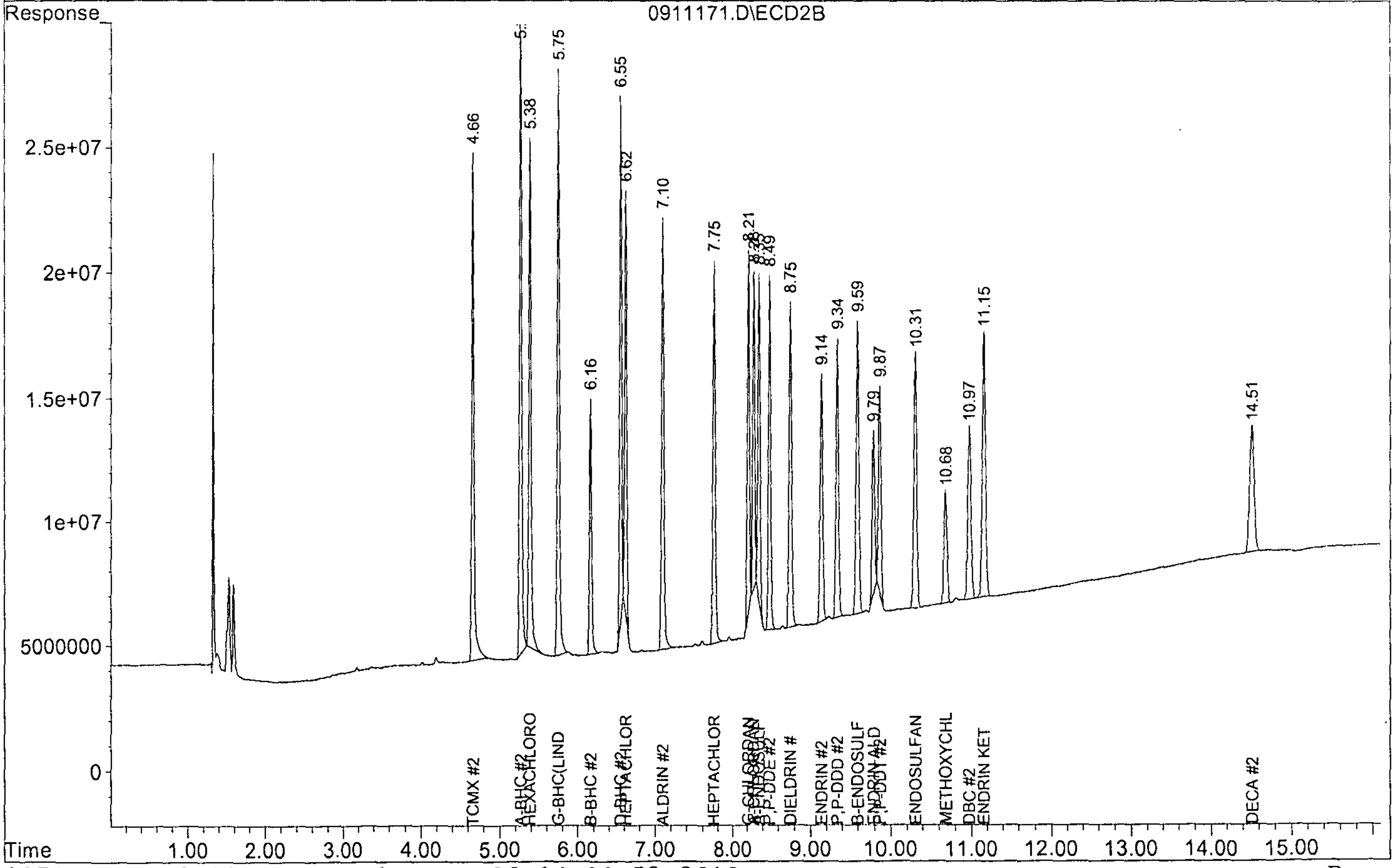
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911171.D
Acq On : 9-14-18 17:55:49
Sample : OCLHX - 3 9/12/18
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 71
Operator: MA
Inst : Ethel
Multiplr: 1.00





TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911172.D

		Compound	MEAN	CCRF	%D		%Drift
1	ANM	Toxaphene Total	1855460	1907380	2.8	ANM	
2	L2AK	Toxaphene	171110	203208	19	L2AK	
3	L2AK	Toxaphene {2}	542307	538037	0.79	L2AK	
4	L2AK	Toxaphene {3}	397453	406811	2.4	L2AK	
5	L2AK	Toxaphene {4}	214690	221994	3.4	L2AK	
6	L2AK	Toxaphene {5}	529902	537332	1.4	L2AK	
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40							
		Average			5.0		

TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911172.D

		Compound	MEAN	CCRF	%D		%Drift
41	ANM	Toxaphene Total	1725710	1708360	1.0	ANM	
42	L2AK	Toxaphene	129112	111510	14	L2AK	
43	L2AK	Toxaphene {2}	334549	366202	9.5	L2AK	
44	L2AK	Toxaphene {3}	361335	349297	3.3	L2AK	
45	L2AK	Toxaphene {4}	660145	666762	1.0	L2AK	
46	L2AK	Toxaphene {5}	240571	214584	11	L2AK	
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80							
		Average			6.6		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911172.D\ECD1A.CH Vial: 72
Signal #2 : G:\ETHEL\DATA\180911\0911172.D\ECD2B.CH
Acq On : 9-14-18 18:14:46 Operator: MA
Sample : TOX - 2 8/3/18 Inst : Ethel
Misc : soil Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 8:50 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

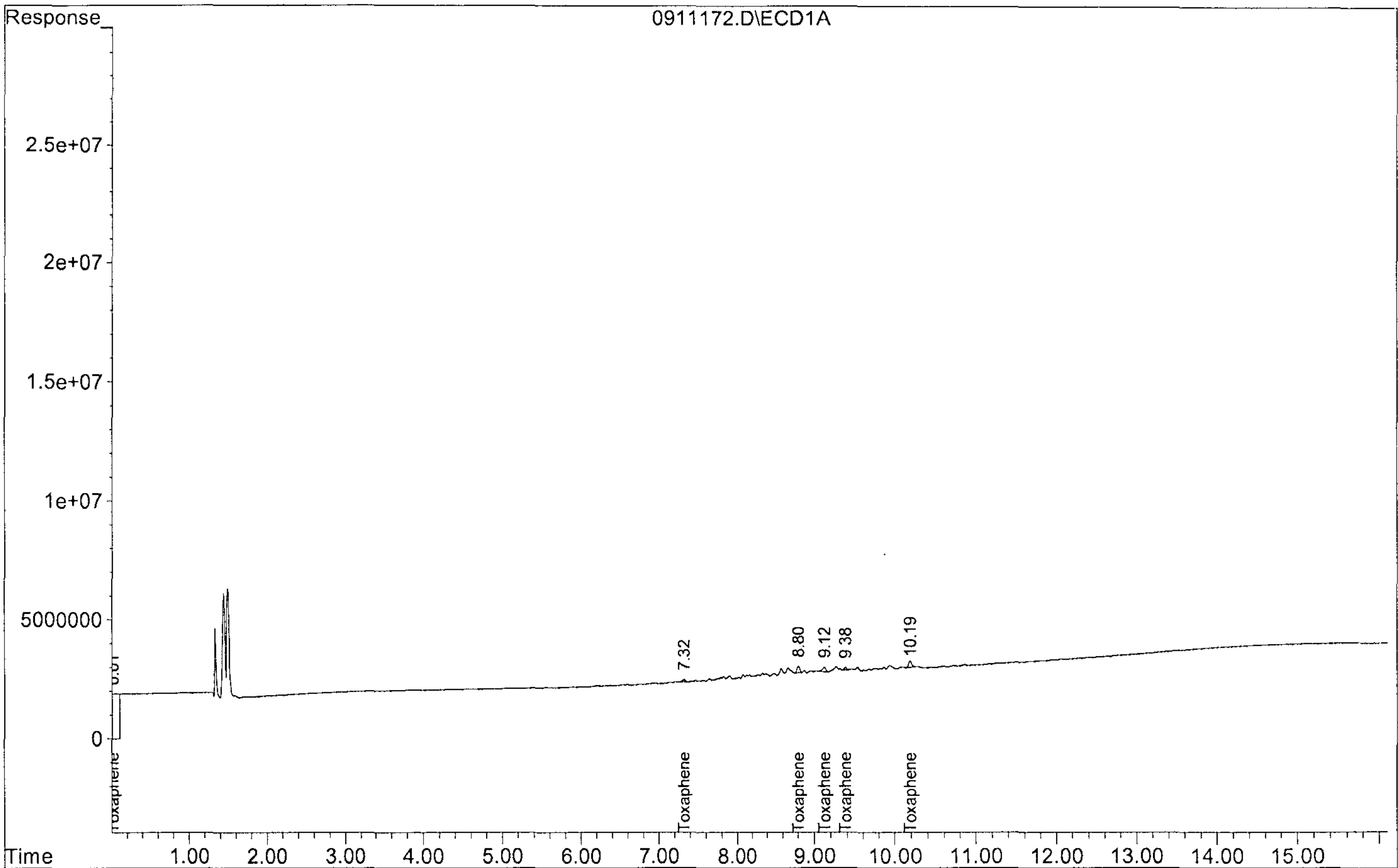
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

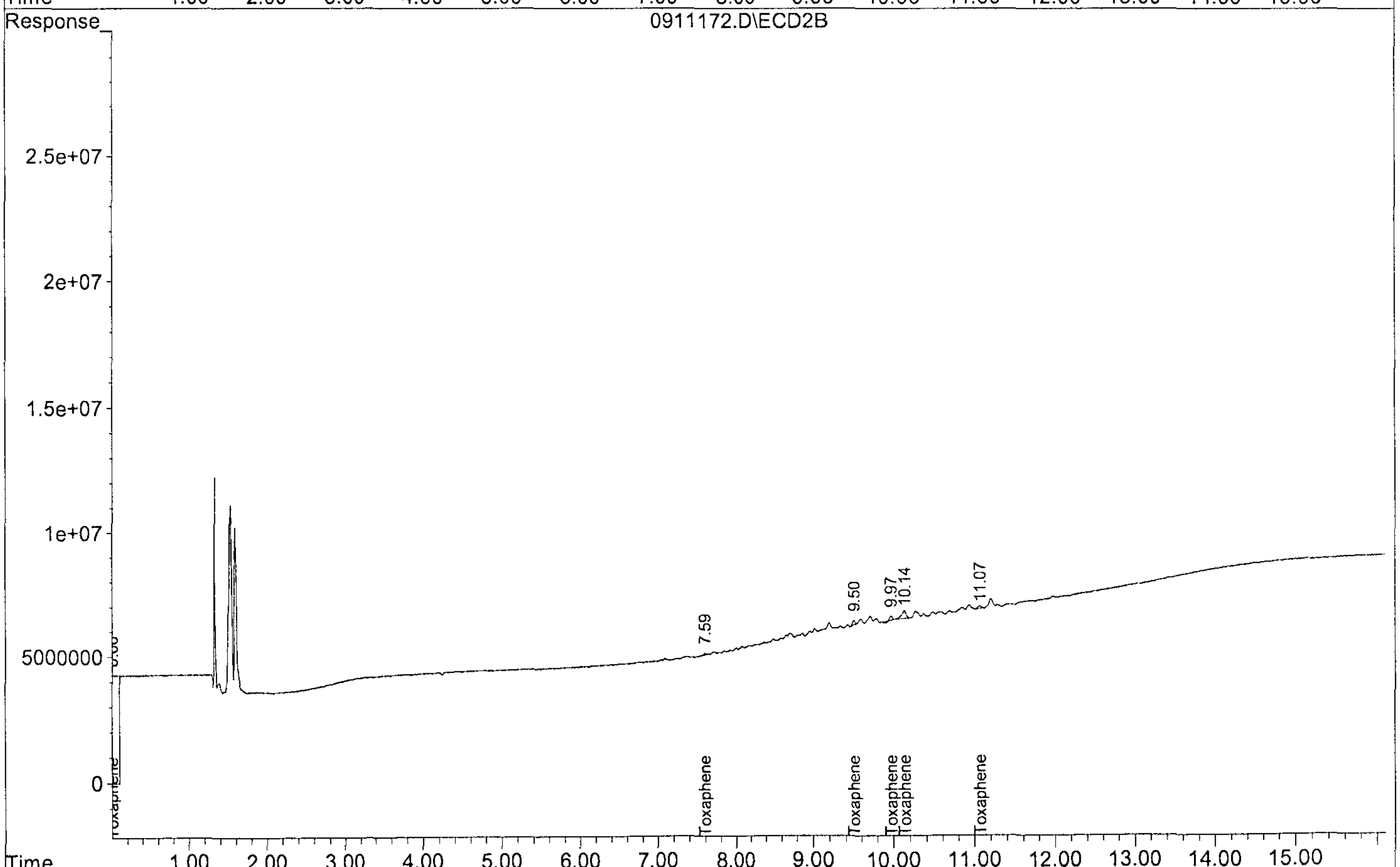
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	953691	854178	0.2570m	0.2475m	
2) L2AK Toxaphene	7.32	7.60	101604	55755	0.2969	0.2159	#
3) L2AK Toxaphene {2}	8.80	9.50	269018	183101	0.2480	0.2737	
4) L2AK Toxaphene {3}	9.12	9.97	203406	174648	0.2559	0.2417	
5) L2AK Toxaphene {4}	9.38	10.14	110997	333381	0.2585	0.2525	
6) L2AK Toxaphene {5}	10.19	11.07	268666	107292	0.2535	0.2230	
Sum Toxaphene			953691	854178	1.3128	1.2067	
Average Toxaphene					0.263	0.241	

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911172.D
Acq On : 9-14-18 18:14:46
Sample : TOX - 2 8/3/18
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 72
Operator: MA
Inst : Ethel
Multiplr: 1.00





Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911183.D

		Compound	MEAN	CCRF	%D		%Drift	
1	S	TCMX	50559900	51878500	2.6	S		
2	TM	HEXACHLOROBENZENE	59828400	61989000	3.6	TM		
3	TM	A-BHC	57018700	67982200	19	TM		
4	TM	B-BHC	25982200	27844800	7.2	TM		
5	M	G-BHC(LINDANE)	55092900	62302200	13	M		
6	TM	D-BHC	57791400	62858400	8.8	TM		
7	M	HEPTACHLOR	50010700	52998900	6.0	M		
8	M	ALDRIN	48400500	51795600	7.0	M		
9	TM	HEPTACHLOR EPOXIDE	47190100	48735800	3.3	TM		
10	TM	G-CHLORDANE	50741400	53286900	5.0	TM		
11	TM	A-ENDOSULFAN	45109400	49665400	10	TM		
12	TM	A-CHLORDANE	50420800	50267700	0.30	TM		
13	TM	P,P-DDE	51629400	53018500	2.7	TM		
14	M	DIELDRIN	46280600	46305700	0.05	M		
15	M	ENDRIN	42631200	39784700	6.7	M		
16	TM	B-ENDOSULFAN	40224800	36777900	8.6	TM		
17	TM	P,P-DDD	41648000	45345800	8.9	TM		
18	TM	ENDRIN ALDEHYDE	31448100	28069600	11	TM		
19	M	P,P-DDT	41507300	30855700	26	M		* see back
20	TM	ENDOSULFAN SULFATE	38088000	40139600	5.4	TM		
21	TM	ENDRIN KETONE	36638000	38184100	4.2	TM		
22	TM	METHOXYCHLOR	18981700	17671400	6.9	TM		
23	S	DBC	92723500	76720200	17	S		
24	S	DECA	94812400	88155900	7.0	S		
25								
26								
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34								
35								
36								
37								
38								
39								
40								
		Average			7.9			

Organochlorine Pesticides Analysis by
EPA Method 608/8081 OCL0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911183.D

		Compound	MEAN	CCRF	%D		%Drift
41	S	TCMX	106949000	99975200	6.5	S	
42	TM	HEXACHLOROBENZENE	99012800	100433000	1.4	TM	
43	TM	A-BHC	121700000	126888000	4.3	TM	
44	TM	B-BHC	51267800	49435100	3.6	TM	
45	M	G-BHC(LINDANE)	222027000	226039000	1.8	M	
46	TM	D-BHC	101771000	102924000	1.1	TM	
47	M	HEPTACHLOR	82762500	82186900	0.70	M	
48	M	ALDRIN	83185900	83269300	0.10	M	
49	TM	HEPTACHLOR EPOXIDE	77133500	74866700	2.9	TM	
50	TM	G-CHLORDANE	70434900	71241800	1.1	TM	
51	TM	A-ENDOSULFAN	62262600	64268200	3.2	TM	
52	TML	A-CHLORDANE	66854600	62562600	6.4	TML	5.5
53	TM	P,P-DDE	69751900	70046600	0.42	TM	
54	M	DIELDRIN	65074300	60106800	7.6	M	
55	ML	ENDRIN	48973700	49613300	1.3	ML	7.4
56	TML	B-ENDOSULFAN	51370200	56649800	10	TML	3.2
57	TM	P,P-DDD	51922800	57863400	11	TM	
58	TM	ENDRIN ALDEHYDE	36143200	32721900	9.5	TM	
59	M	P,P-DDT	43681400	37635500	14	M	
60	TM	ENDOSULFAN SULFATE	46801200	50022000	6.9	TM	
61	TML	ENDRIN KETONE	50140800	50954900	1.6	TML	7.4
62	TM	METHOXYCHLOR	23384600	21078200	9.9	TM	
63	S	DBC	35297200	34355400	2.7	S	
64	S	DECA	27506700	25806600	6.2	S	
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80							
		Average			4.8		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911183.D\ECD1A.CH Vial: 83
Signal #2 : G:\ETHEL\DATA\180911\0911183.D\ECD2B.CH
Acq On : 9-14-18 21:43:59 Operator: MA
Sample : OCLHX - 3 9/12/18 Inst : Ethel
Misc : soil Multiplr: 1.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 8:48 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

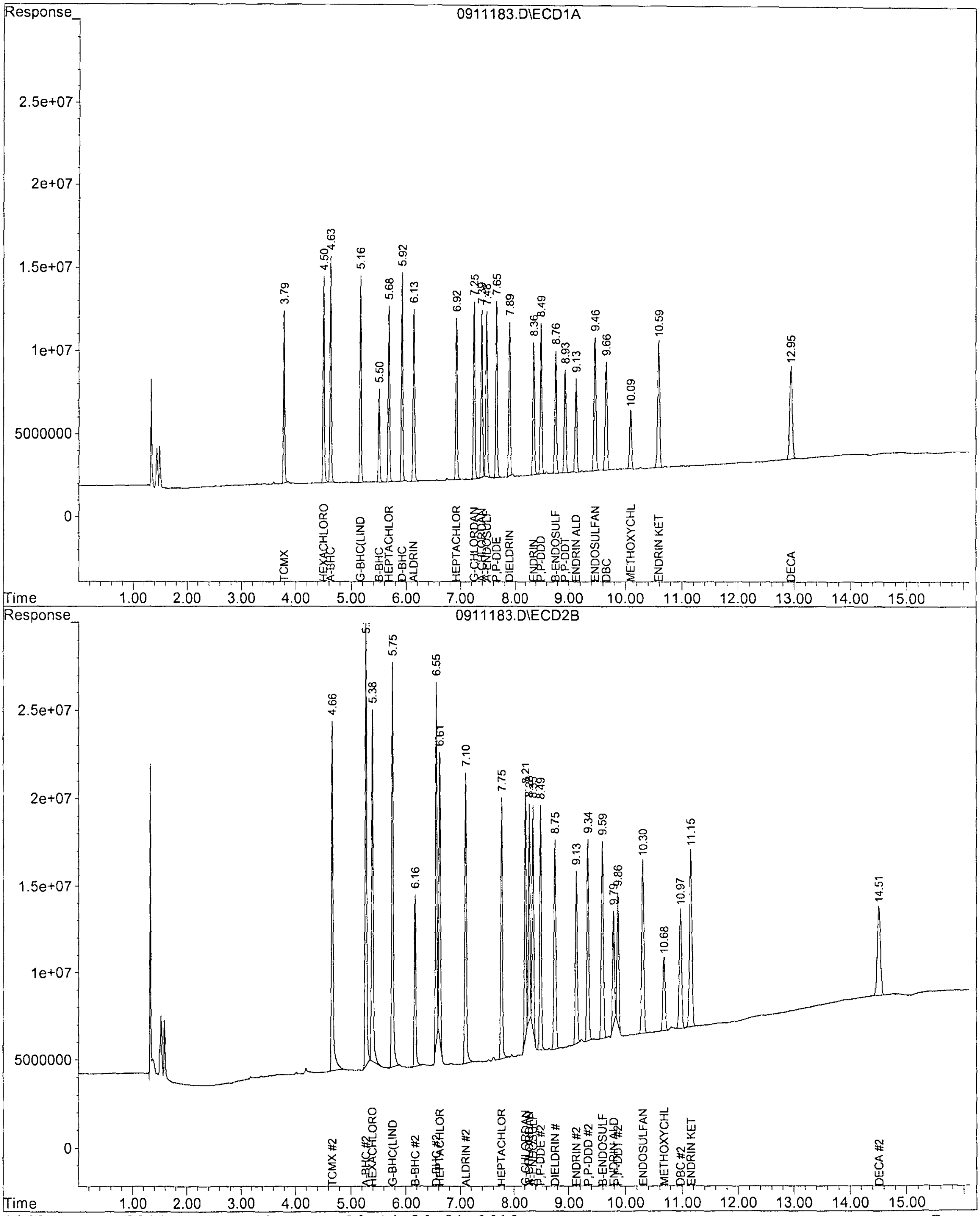
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10375708	19995049	0.1026	0.0935
Surrogate Spike 0.100			Recovery	=	102.60%	93.50%
23) S DBC	9.66	10.97	15344048	6871074	0.0827	0.0973
Surrogate Spike 0.100			Recovery	=	82.70%	97.30%
24) S DECA	12.95	14.51	17631181	5161329	0.0930	0.0938
Surrogate Spike 0.100			Recovery	=	93.00%	93.80%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.50	5.38	12397809	20086686	0.1036	0.1014
3) TM A-BHC	4.63	5.26	13596432	25377524	0.1192	0.1043
4) TM B-BHC	5.50	6.16	5568963	9887021	0.1072	0.0964
5) M G-BHC(LINDANE)	5.16	5.75	12460436	45207776	0.1131	0.1018
6) TM D-BHC	5.92	6.55	12571679	20584787	0.1088	0.1011
7) M HEPTACHLOR	5.68	6.61	10599780	16437373	0.1060	0.0993
8) M ALDRIN	6.13	7.10	10359116	16653855	0.1070	0.1001
9) TM HEPTACHLOR EPOXI	6.92	7.75	9747155	14973333	0.1033	0.0971
10) TM G-CHLORDANE	7.25	8.21	10657381	14248353	0.1050	0.1011
11) TM A-ENDOSULFAN	7.48	8.35	9933086	12853643	0.1101	0.1032
12) TM A-CHLORDANE	7.39	8.28	10053542	12512524	0.0997	0.0945
13) TM P,P-DDE	7.65	8.49	10603703	14009317	0.1027	0.1004
14) M DIELDRIN	7.89	8.75	9261130	12021360	0.1001	0.0924
15) M ENDRIN	8.36	9.13	7956938	9922658	0.0933	0.0926
16) TM B-ENDOSULFAN	8.76	9.59	7355588	11329963	0.0914	0.0968
17) TM P,P-DDD	8.49	9.34	9069163	11572680	0.1089	0.1114
18) TM ENDRIN ALDEHYDE	9.13	9.79	5613926	6544383	0.0893	0.0905
19) M P,P-DDT	8.93	9.86	6171145	7527101	0.0743	0.0862
20) TM ENDOSULFAN SULFA	9.46	10.30	8027915	10004409	0.1054	0.1069
21) TM ENDRIN KETONE	10.59	11.15	7636823	10190978	0.1042	0.0926
22) TM METHOXYCHLOR	10.09	10.68	3534279	4215644	0.0931	0.0901

Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911183.D
Acq On : 9-14-18 21:43:59
Sample : OCLHX - 3 9/12/18
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 83
Operator: MA
Inst : Ethel
Multiplr: 1.00



TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Initial Cal. Date: 09/11/18
Data File: 0911184.D

		Compound	MEAN	CCRF	%D		%Drift
1	ANM	Toxaphene Total	1855460	1836810	1.0	ANM	
2	L2AK	Toxaphene	171110	201946	18	L2AK	
3	L2AK	Toxaphene {2}	542307	532628	1.8	L2AK	
4	L2AK	Toxaphene {3}	397453	399581	0.54	L2AK	
5	L2AK	Toxaphene {4}	214690	218392	1.7	L2AK	
6	L2AK	Toxaphene {5}	529902	484258	8.6	L2AK	
7							
8							
9							
10							
11							
12							
13							
14							
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28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			5.3		

TOXAPHENE
METHOD 608/8081 TOX0911

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Ethel
Cal. Date: 09/11/18
Data File: 0911184.D

		Compound	MEAN	CCRF	%D		%Drift
41	ANM	Toxaphene Total	1725710	1693640	1.9	ANM	
42	L2AK	Toxaphene	129112	115888	10	L2AK	
43	L2AK	Toxaphene {2}	334549	367763	9.9	L2AK	
44	L2AK	Toxaphene {3}	361335	364256	0.81	L2AK	
45	L2AK	Toxaphene {4}	660145	644409	2.4	L2AK	
46	L2AK	Toxaphene {5}	240571	201321	16	L2AK	
47							
48							
49							
50							
51							
52							
53							
54							
55							
56							
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69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
		Average			6.8		

Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911184.D\ECD1A.CH Vial: 84
Signal #2 : G:\ETHEL\DATA\180911\0911184.D\ECD2B.CH
Acq On : 9-14-18 22:03:00 Operator: MA
Sample : TOX - 2 8/3/18 Inst : Ethel
Misc : soil Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 8:49 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

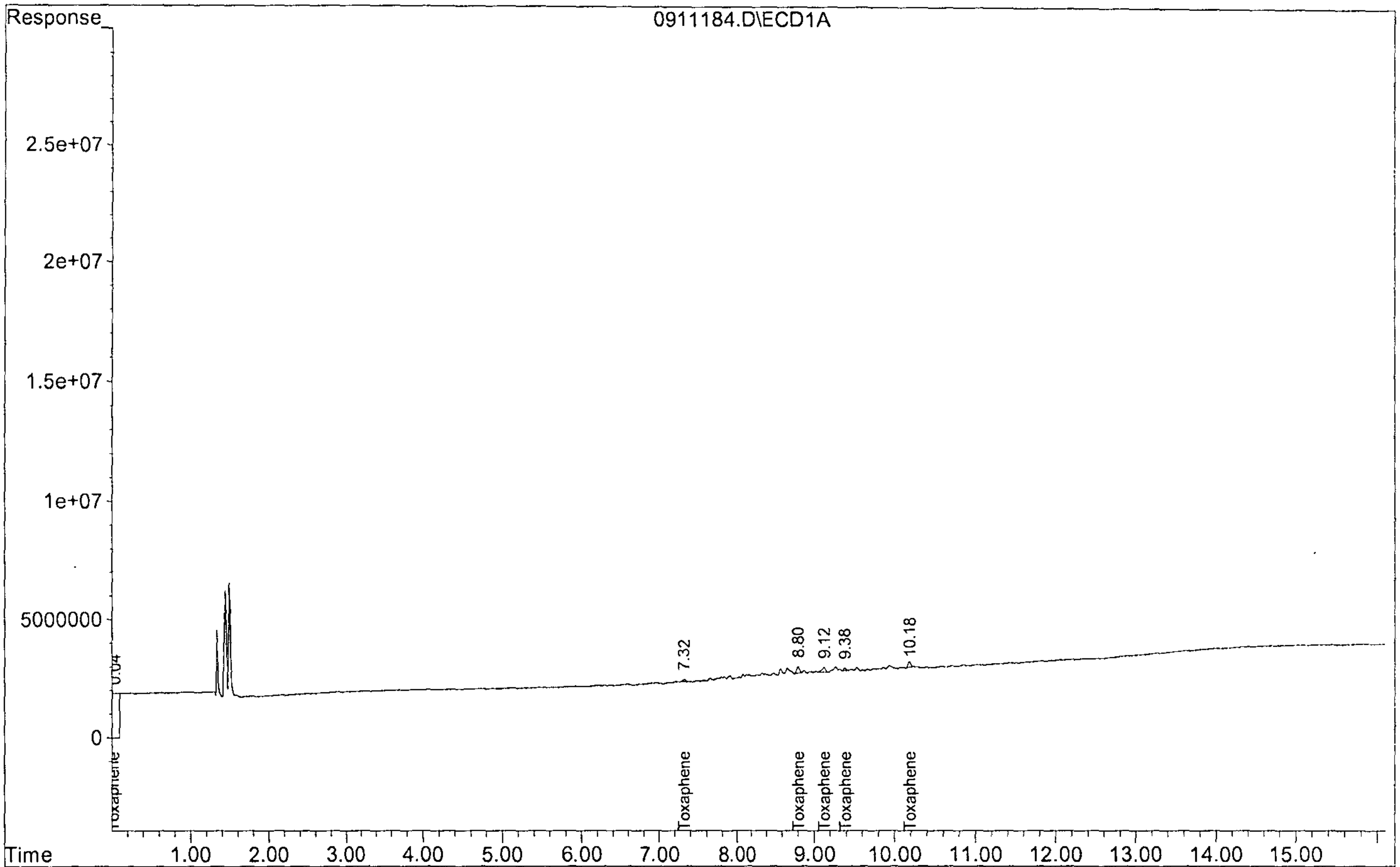
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

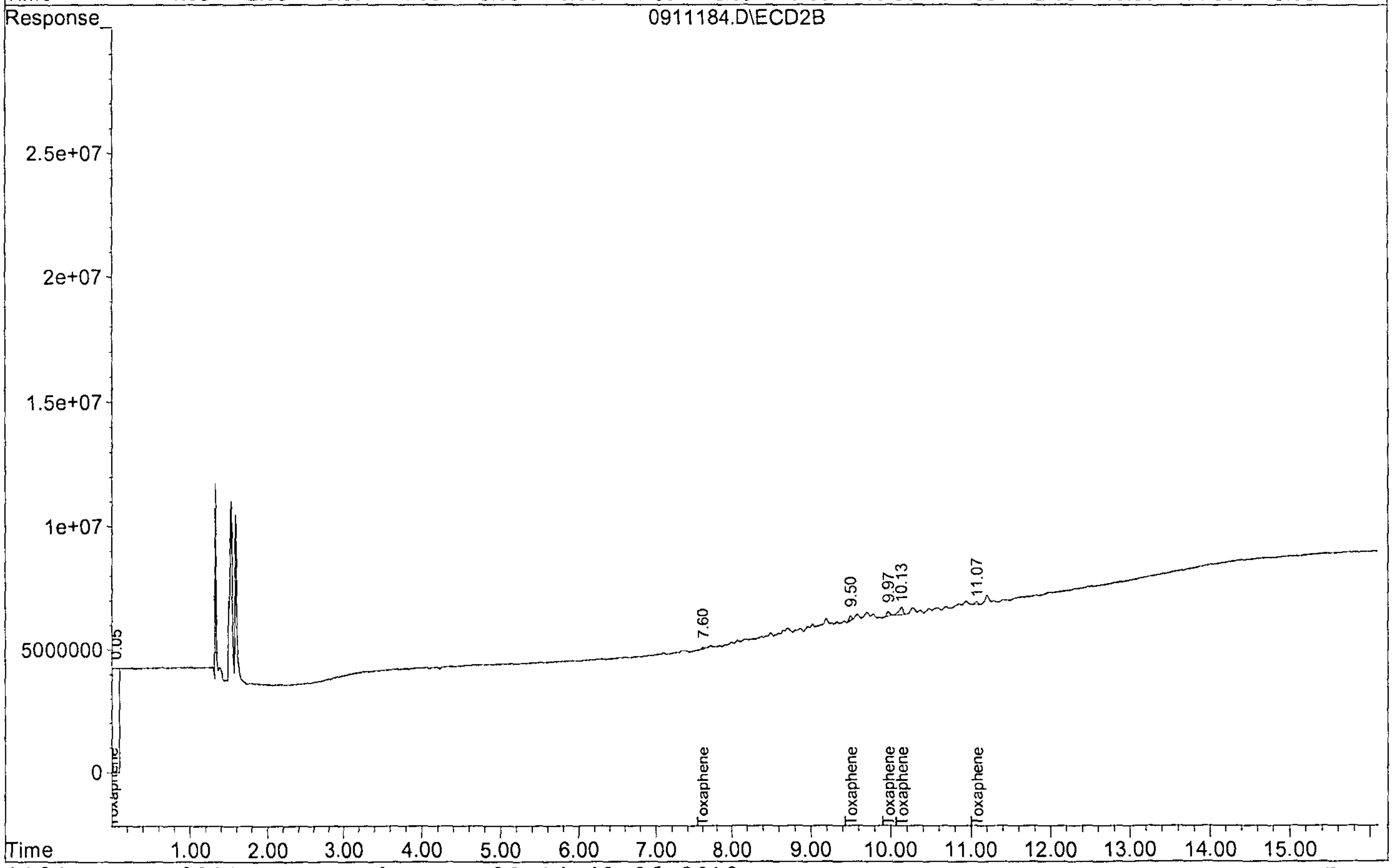
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) ANM Toxaphene Total	0.00	0.00	918403	846819	0.2475m	0.2454m
2) L2AK Toxaphene	7.32	7.60	100973	57944	0.2951	0.2244
3) L2AK Toxaphene {2}	8.80	9.50	266314	183881	0.2455	0.2748
4) L2AK Toxaphene {3}	9.12	9.97	199791	182128	0.2513	0.2520
5) L2AK Toxaphene {4}	9.38	10.14	109196	322205	0.2543	0.2440
6) L2AK Toxaphene {5}	10.19	11.08	242129	100661	0.2285	0.2092
Sum Toxaphene			918403	846819	1.2747	1.2045
Average Toxaphene					0.255	0.241

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911184.D
Acq On : 9-14-18 22:03:00
Sample : TOX - 2 8/3/18
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 84
Operator: MA
Inst : Ethel
Multiplr: 1.00





ORGANICS
Raw Data

APPL, INC.

Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911159.D\ECD1A.CH Vial: 59
Signal #2 : G:\ETHEL\DATA\180911\0911159.D\ECD2B.CH
Acq On : 9-14-18 14:07:43 Operator: MA
Sample : AZ79146S01 5X1/0.05/30.41G DF20 Inst : Ethel
Misc : soil Multiplr: 3288.39
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:52 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

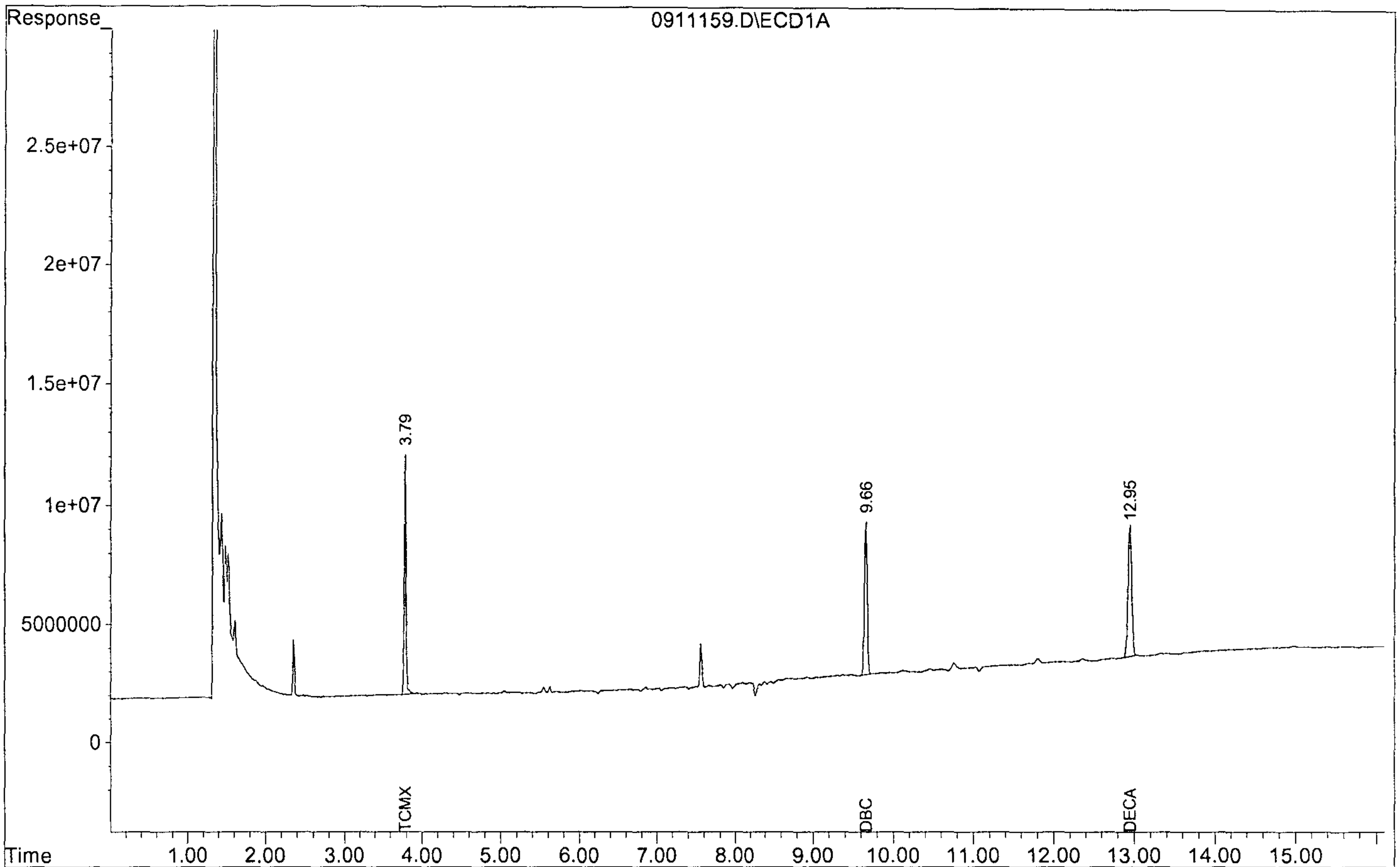
Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

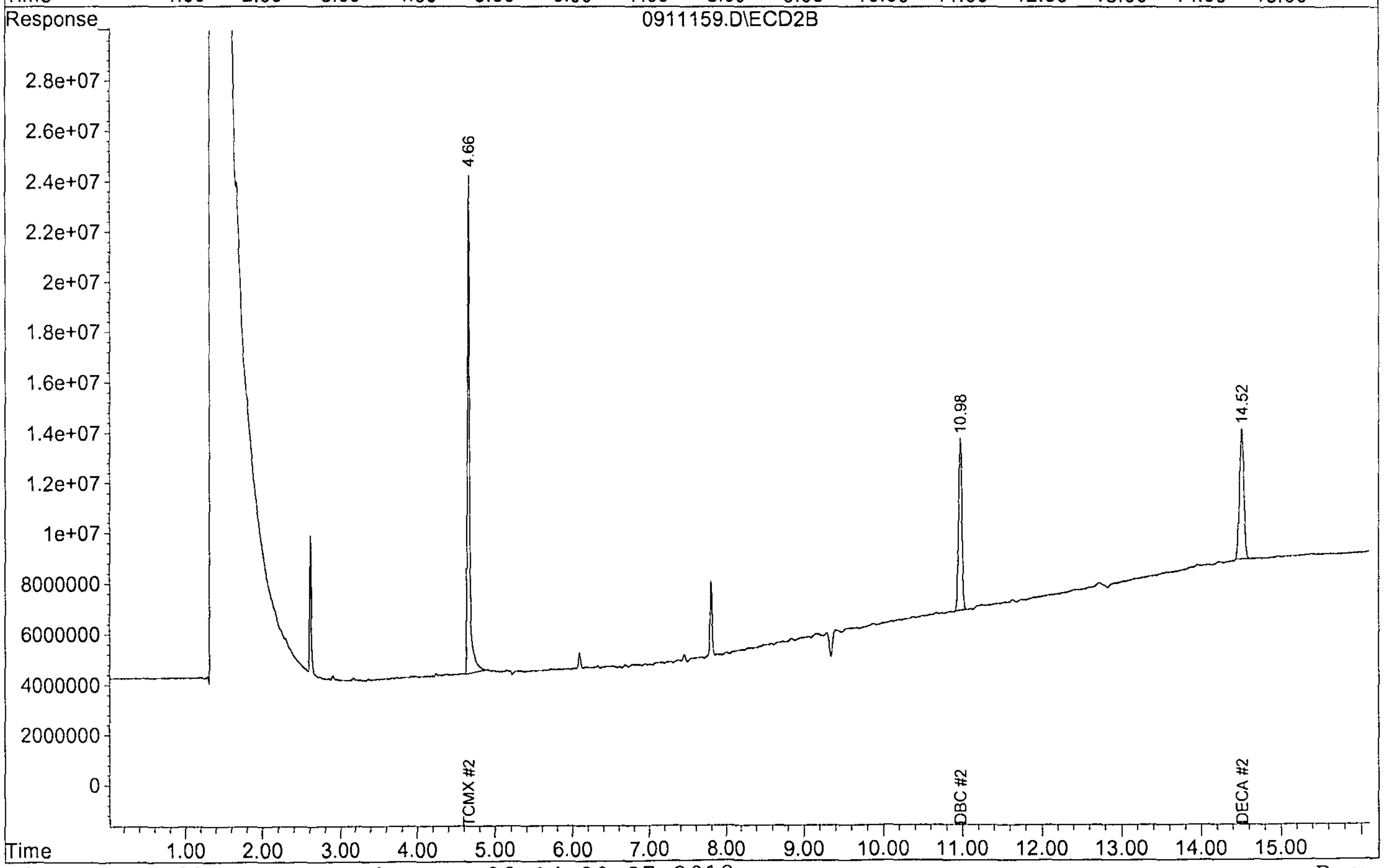
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10037338	19805524	326.4120	304.4839
Surrogate Spike 328.839			Recovery	=	99.26%	92.59%
23) S DBC	9.66	10.98	15098876	6874716	267.7368	320.2345
Surrogate Spike 328.839			Recovery	=	81.42%	97.38%
24) S DECA	12.95	14.52	17278389	5225142	299.6343	312.3293
Surrogate Spike 328.839			Recovery	=	91.12%	94.98%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by ≥ 25% (m)=manual int.

Data File : G:\ETHEL\DATA\180911\0911159.D
Acq On : 9-14-18 14:07:43
Sample : AZ79146S01 5X1/0.05/30.41G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 59
Operator: MA
Inst : Ethel
Multiplr: 3288.39





Quantitation Report (QT Reviewed)

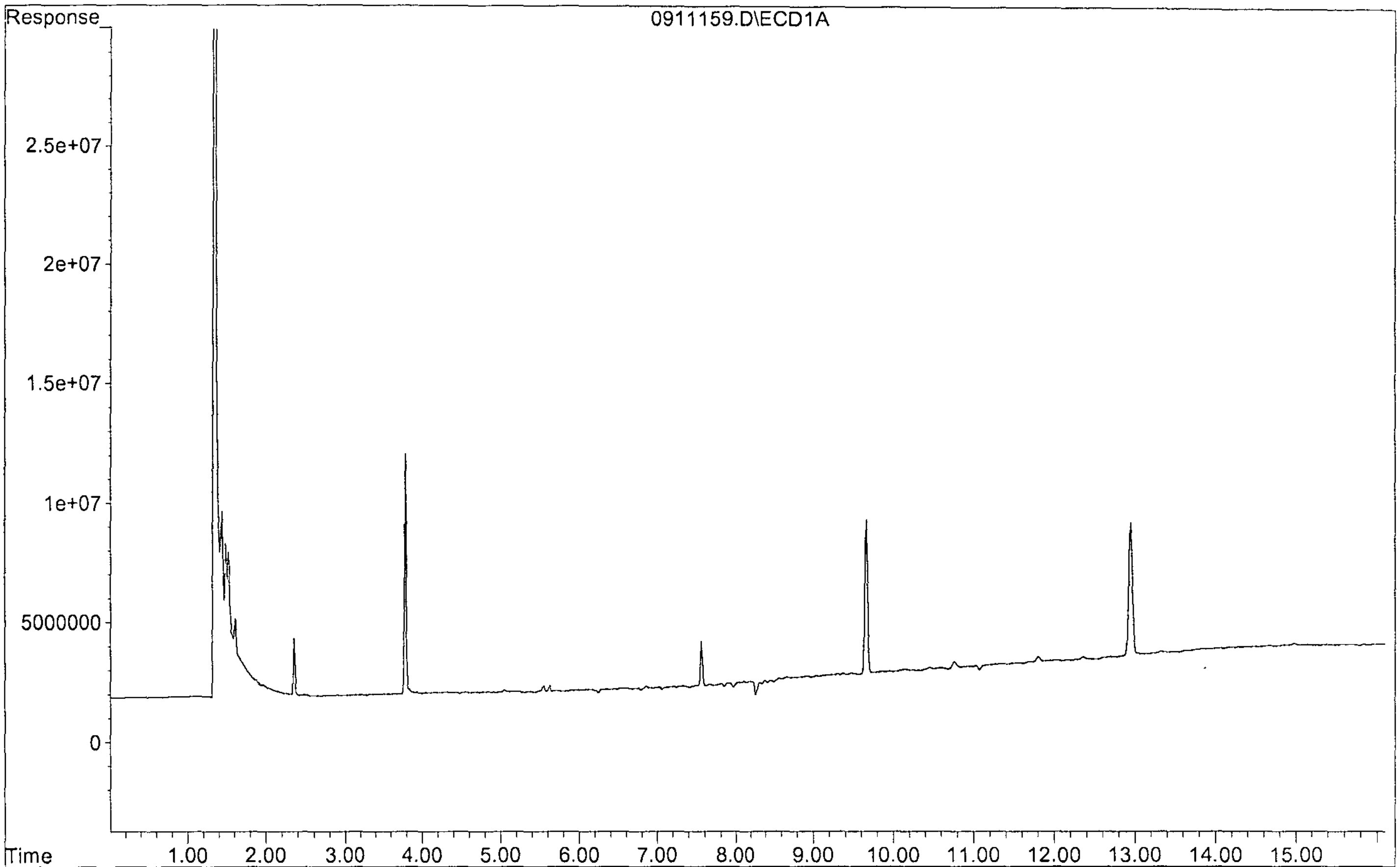
```
Signal #1 : G:\ETHEL\DATA\180911\0911159.D\ECD1A.CH      Vial: 59
Signal #2 : G:\ETHEL\DATA\180911\0911159.D\ECD2B.CH
Acq On    : 9-14-18 14:07:43                          Operator: MA
Sample    : AZ79146S01 5X1/0.05/30.41G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3288.39
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 14:52 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

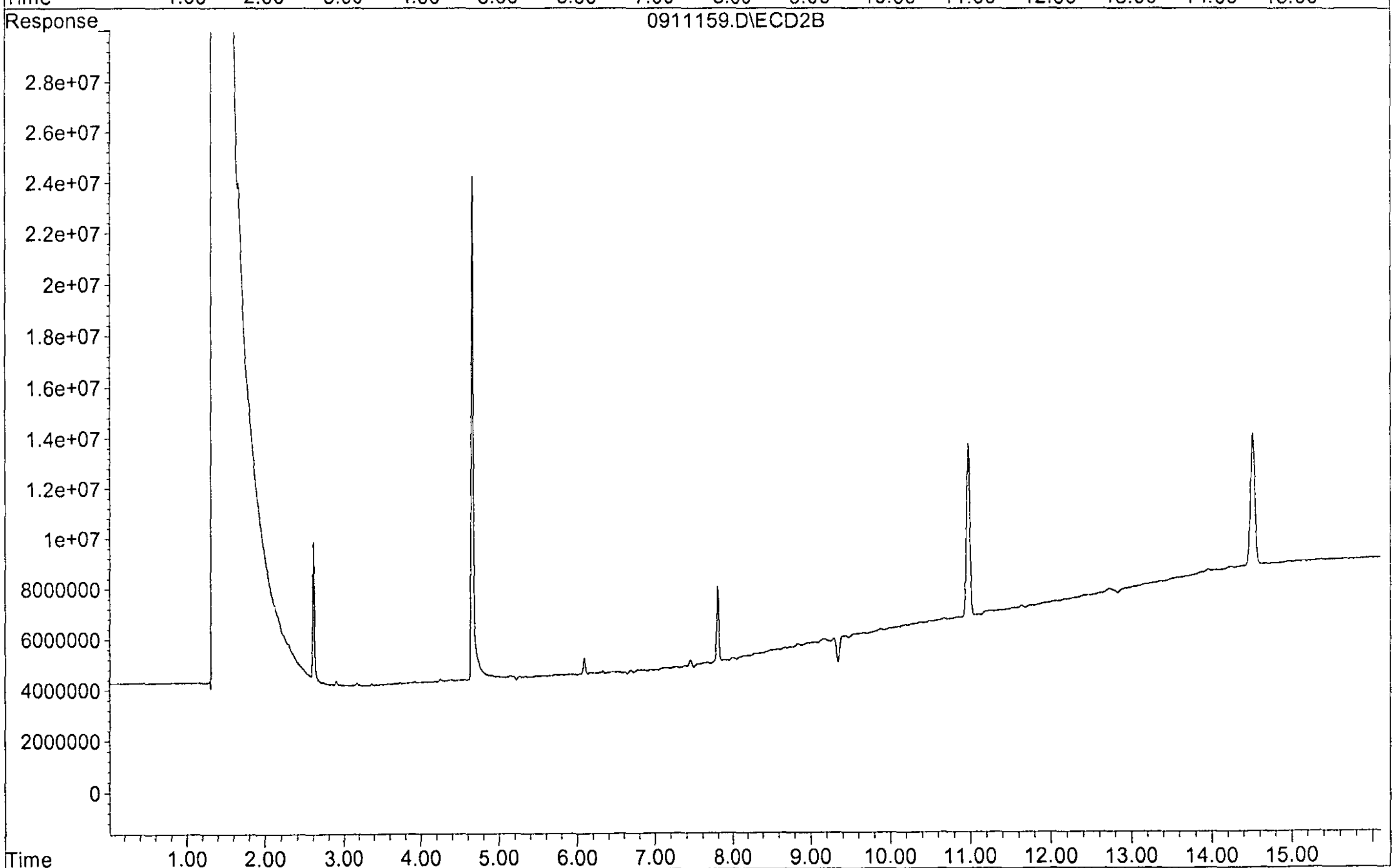
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911159.D
Acq On : 9-14-18 14:07:43
Sample : AZ79146S01 5X1/0.05/30.41G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 59
Operator: MA
Inst : Ethel
Multiplr: 3288.39





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911160.D\ECD1A.CH Vial: 60
Signal #2 : G:\ETHEL\DATA\180911\0911160.D\ECD2B.CH
Acq On : 9-14-18 14:26:41 Operator: MA
Sample : AZ79147S01 5X1/0.05/30.30G DF20 Inst : Ethel
Misc : soil Multiplr: 3300.33
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:53 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

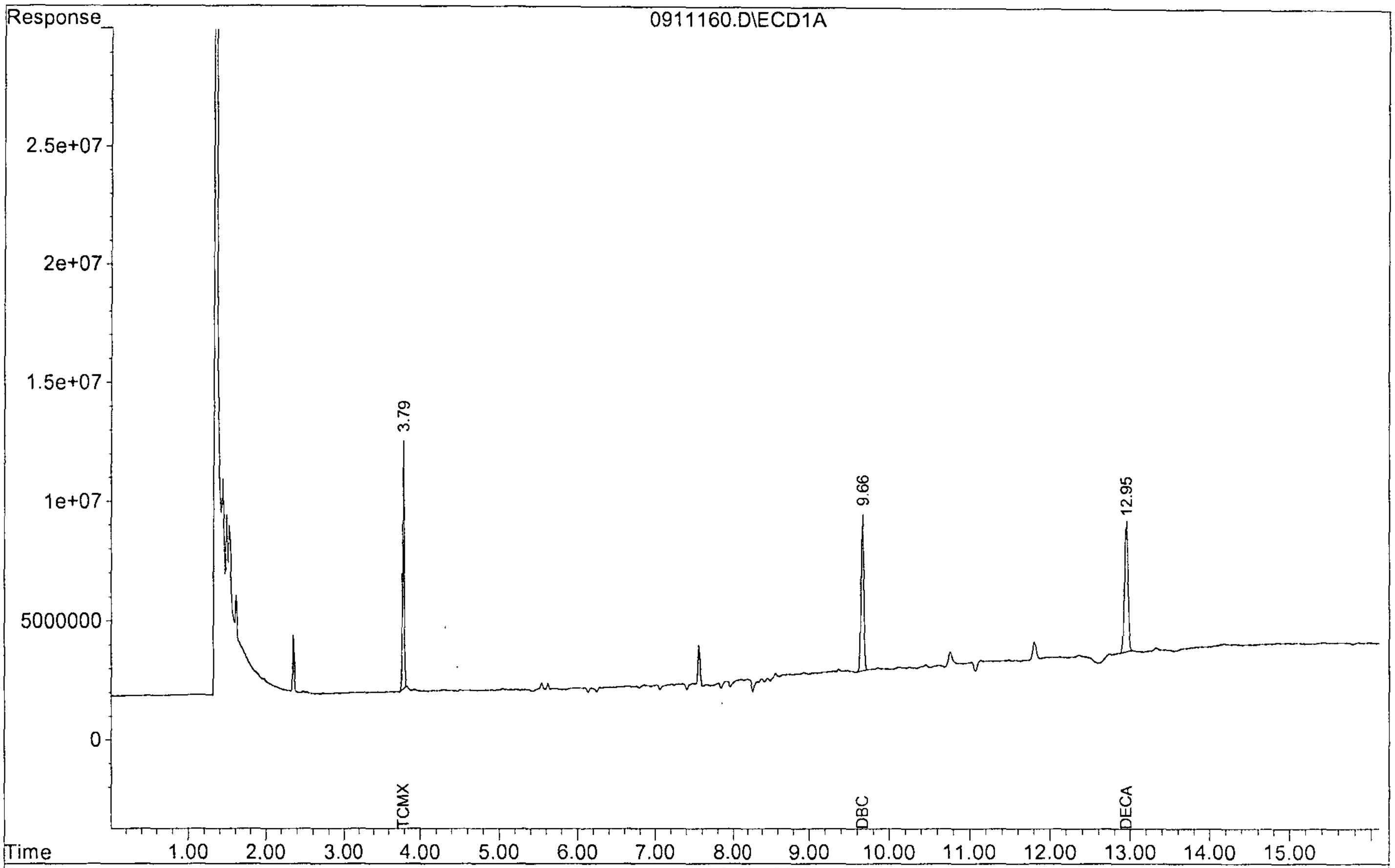
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10423621	20236869	340.2046	312.2450
Surrogate Spike 330.033			Recovery	=	103.08%	94.61%
23) S DBC	9.66	10.98	15199321	7064604	270.4965	330.2746
Surrogate Spike 330.033			Recovery	=	81.96%	100.07%
24) S DECA	12.95	14.52	17379724	5220104	302.4860	313.1611
Surrogate Spike 330.033			Recovery	=	91.65%	94.89%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

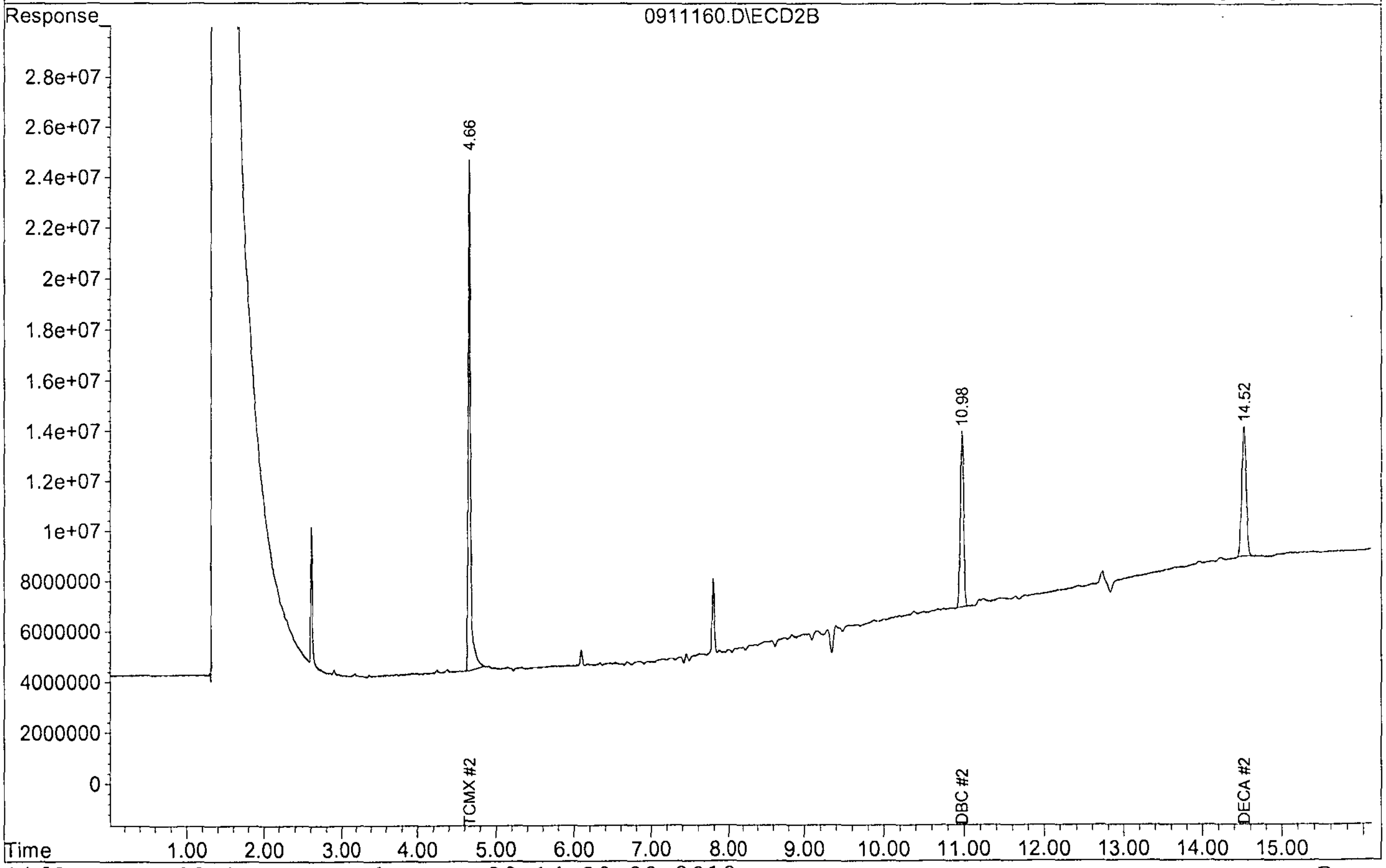
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911160.D
Acq On : 9-14-18 14:26:41
Sample : AZ79147S01 5X1/0.05/30.30G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 60
Operator: MA
Inst : Ethel
Multiplr: 3300.33





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911160.D\ECD1A.CH Vial: 60
Signal #2 : G:\ETHEL\DATA\180911\0911160.D\ECD2B.CH
Acq On : 9-14-18 14:26:41 Operator: MA
Sample : AZ79147S01 5X1/0.05/30.30G DF20 Inst : Ethel
Misc : soil Multiplr: 3300.33
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 14:53 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

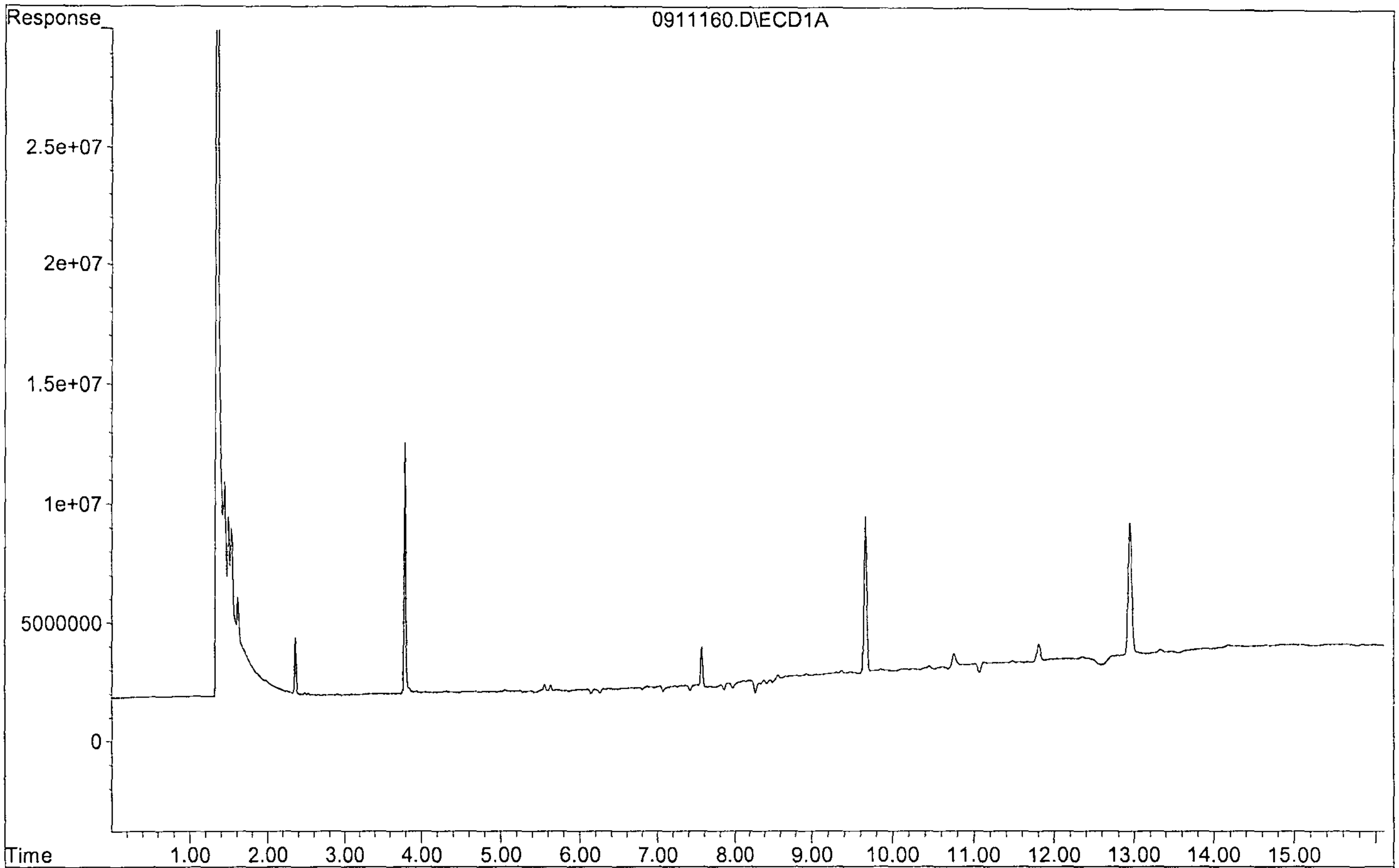
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

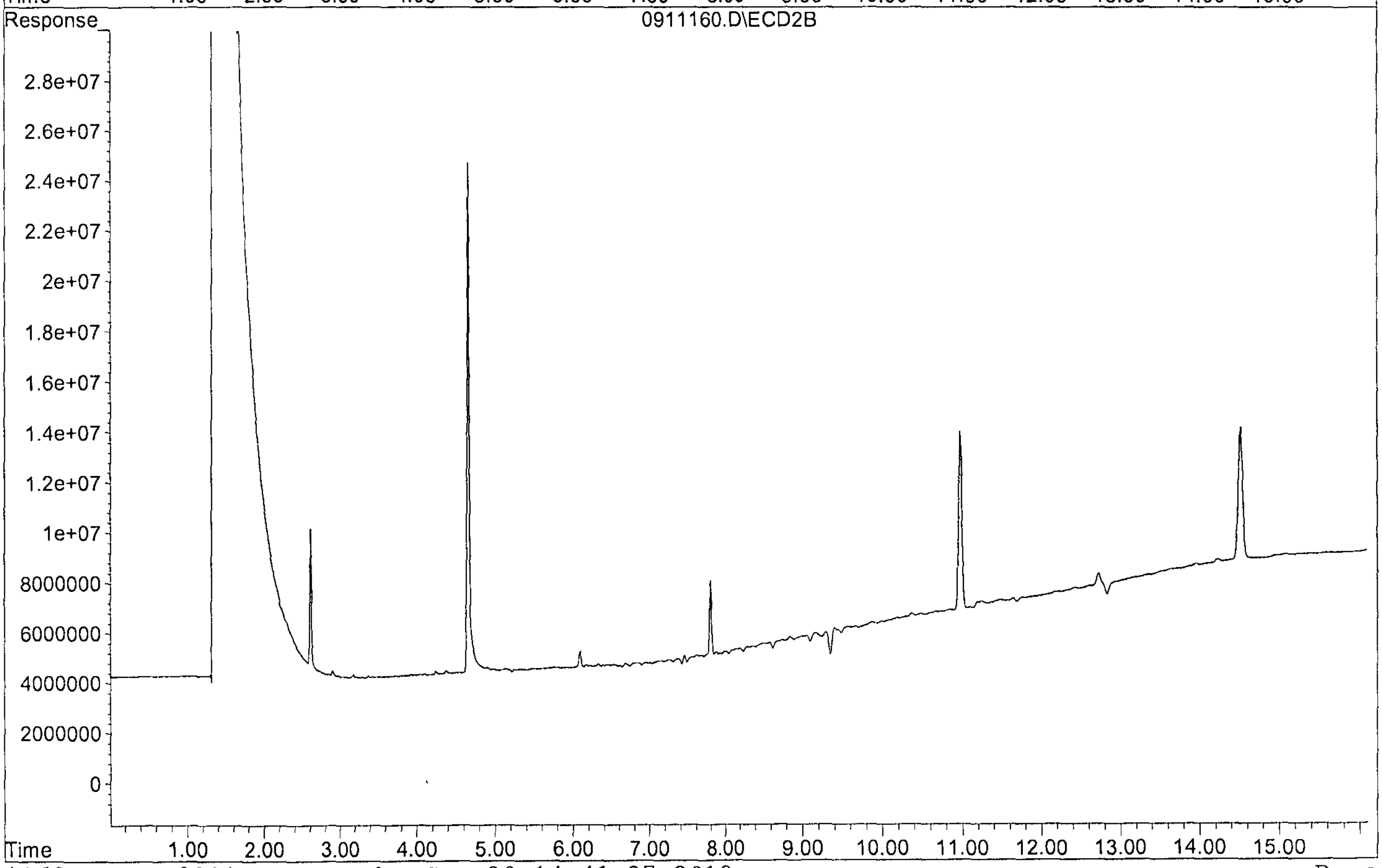
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911160.D
Acq On : 9-14-18 14:26:41
Sample : AZ79147S01 5X1/0.05/30.30G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 60
Operator: MA
Inst : Ethel
Multiplr: 3300.33





Quantitation Report (QT Reviewed)

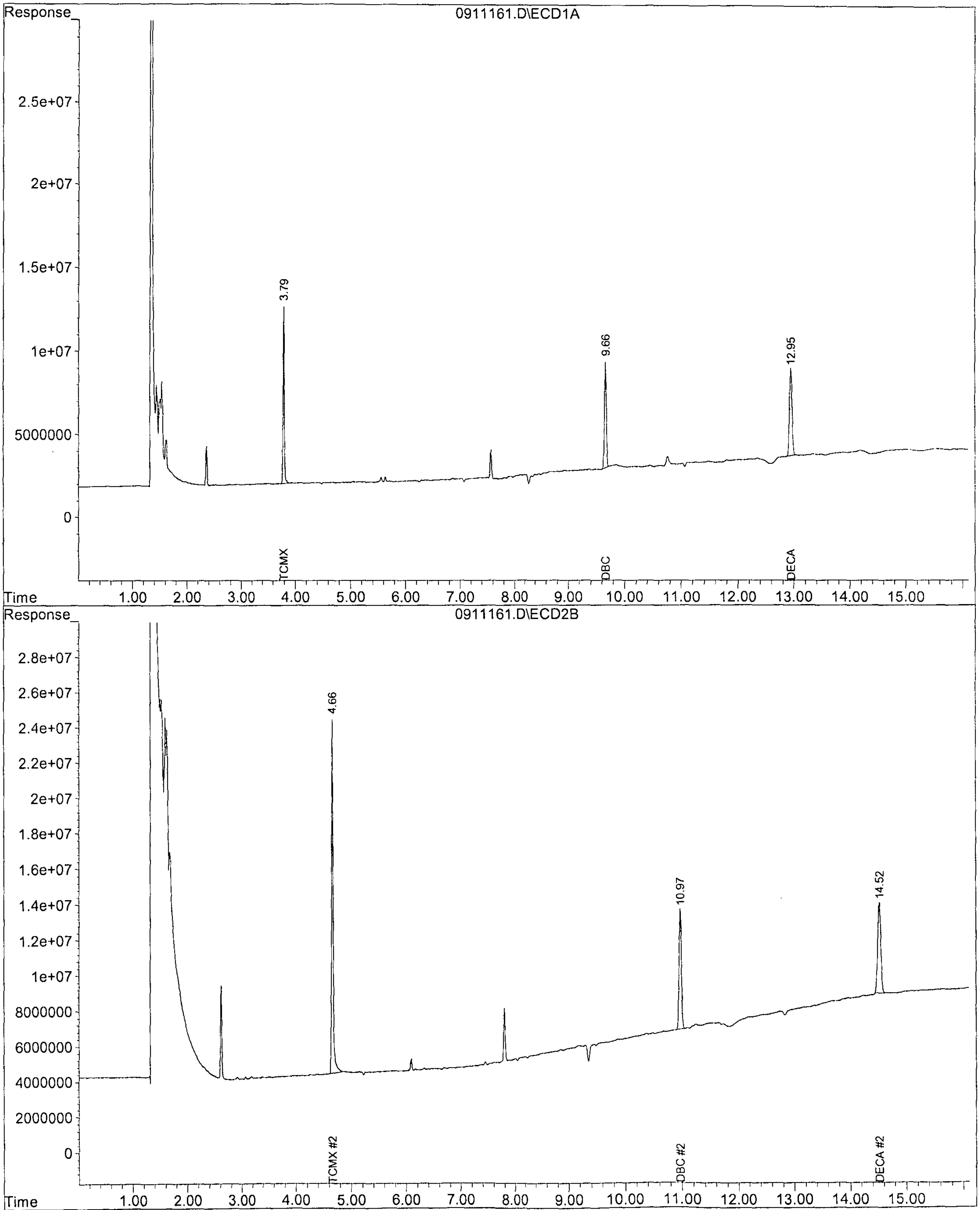
```
Signal #1 : G:\ETHEL\DATA\180911\0911161.D\ECD1A.CH      Vial: 61
Signal #2 : G:\ETHEL\DATA\180911\0911161.D\ECD2B.CH
Acq On    : 9-14-18 14:45:41                          Operator: MA
Sample    : AZ79148S01 5X1/0.05/30.23G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3307.97
IntFile Signal #1: rteint.p     IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:54 2018  Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35MS           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10628855	19961289	347.7061	308.7059
Surrogate Spike 330.797			Recovery	=	105.11%	93.32%
23) S DBC	9.66	10.97	14872324	6812538	265.2898	319.2277
Surrogate Spike 330.797			Recovery	=	80.20%	96.50%
24) S DECA	12.95	14.52	17087065	5133417	298.0808	308.6735
Surrogate Spike 330.797			Recovery	=	90.11%	93.31%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911161.D
Acq On : 9-14-18 14:45:41
Sample : AZ79148S01 5X1/0.05/30.23G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 61
Operator: MA
Inst : Ethel
Multiplr: 3307.97



```
Signal #1 : G:\ETHEL\DATA\180911\0911161.D\ECD1A.CH      Vial: 61
Signal #2 : G:\ETHEL\DATA\180911\0911161.D\ECD2B.CH
Acq On    : 9-14-18 14:45:41                          Operator: MA
Sample    : AZ79148S01 5X1/0.05/30.23G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3307.97
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 14:54 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

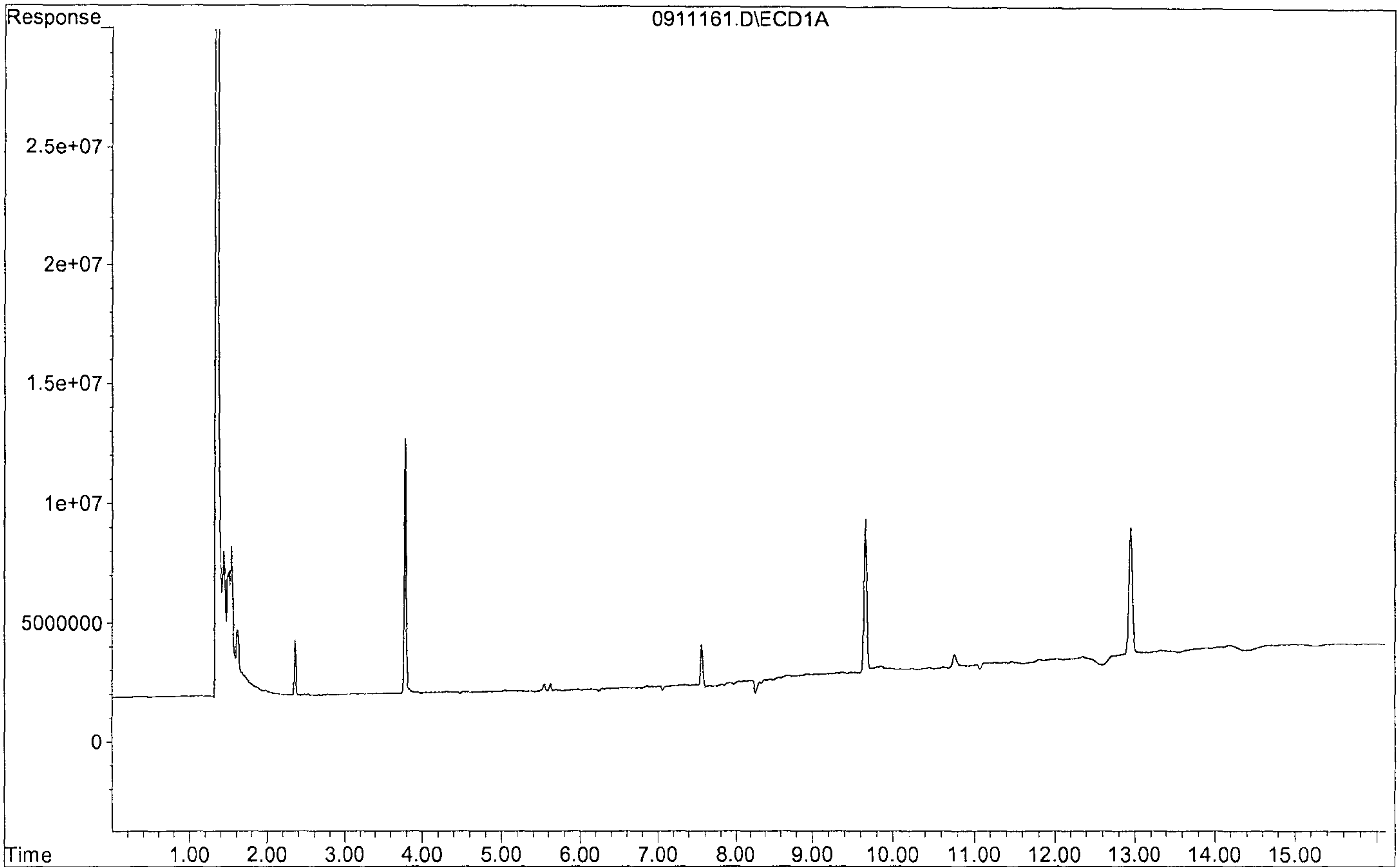
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

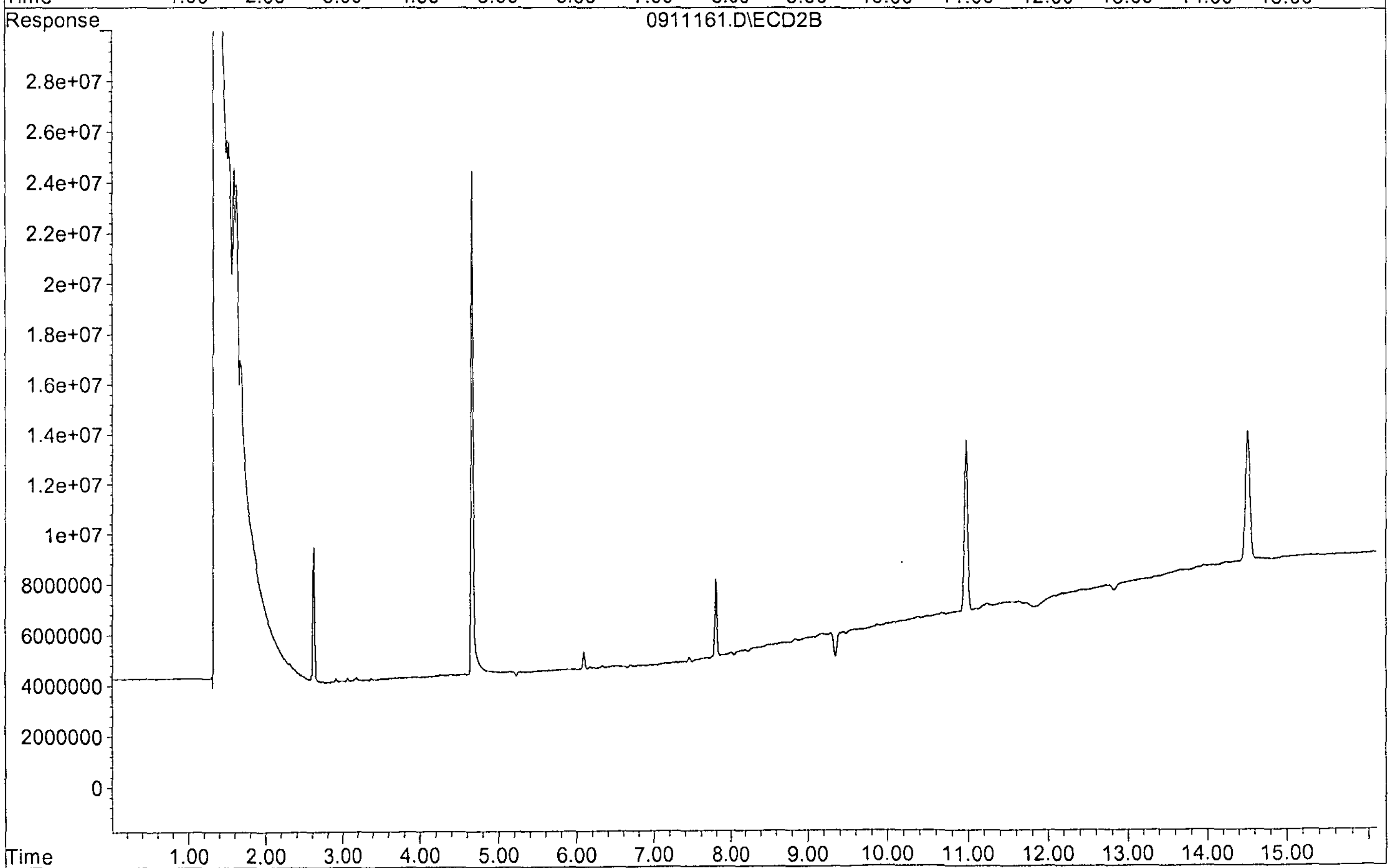
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911161.D
Acq On : 9-14-18 14:45:41
Sample : AZ79148S01 5X1/0.05/30.23G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 61
Operator: MA
Inst : Ethel
Multiplr: 3307.97





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911162.D\ECD1A.CH Vial: 62
Signal #2 : G:\ETHEL\DATA\180911\0911162.D\ECD2B.CH
Acq On : 9-14-18 15:04:41 Operator: MA
Sample : AZ79149S01 5X1/0.05/30.91G DF20 Inst : Ethel
Misc : soil Multiplr: 3235.20
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:54 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

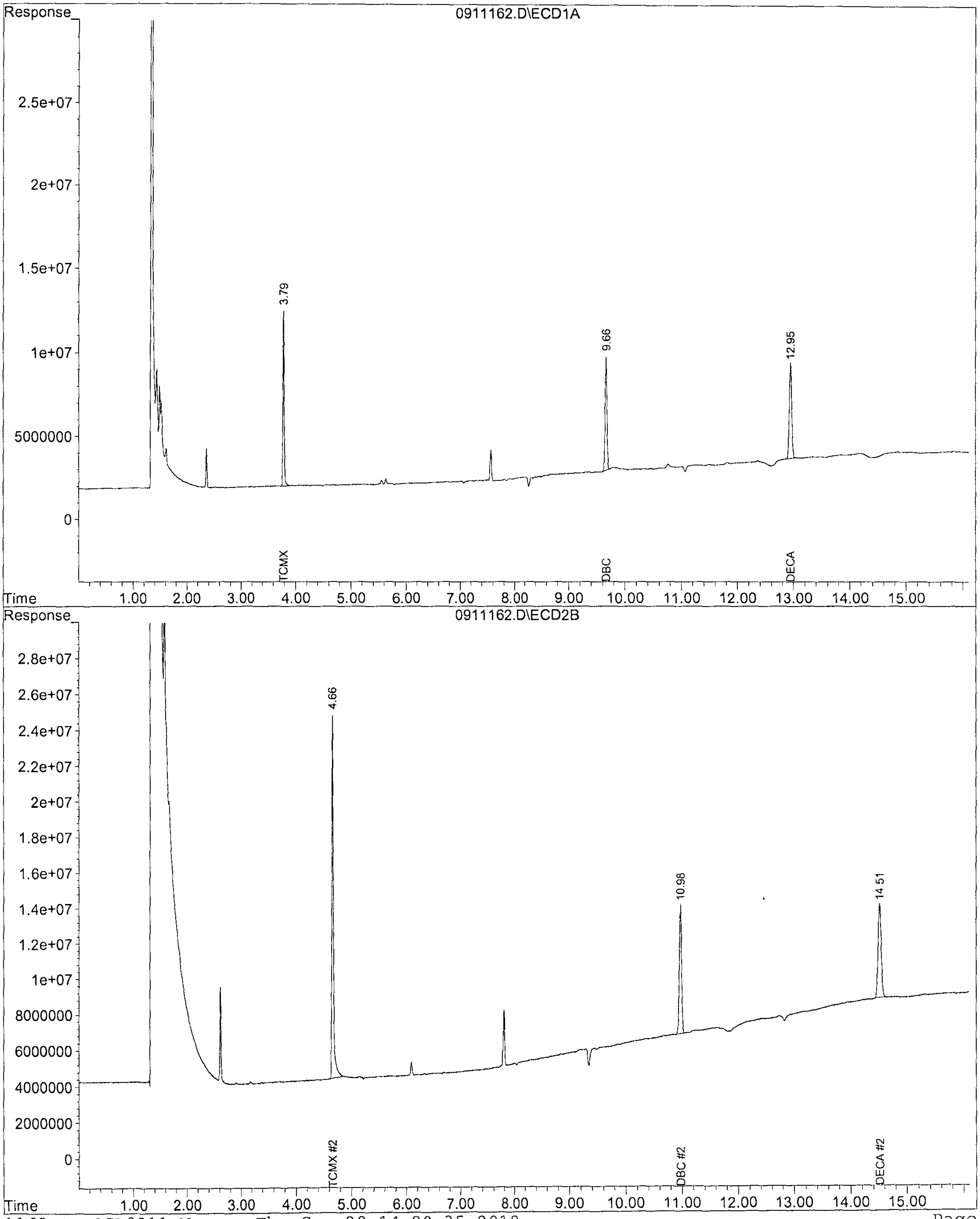
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.66	10434638	20373808	333.8434	308.1542
	Surrogate Spike 323.520			Recovery	=	103.19%	95.25%
23) S	DBC	9.66	10.98	15754639	7348802	274.8462	336.7811
	Surrogate Spike 323.520			Recovery	=	84.95%	104.10%
24) S	DECA	12.95	14.51	17989822	5333015	306.9255	313.6211
	Surrogate Spike 323.520			Recovery	=	94.87%	96.94%
	Target Compounds						
	Target Compounds						
2) TM	HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM	A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM	B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M	G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM	D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M	HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M	ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM	HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM	G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM	A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM	A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM	P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M	DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M	ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM	B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM	P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM	ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M	P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM	ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM	ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM	METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911162.D
Acq On : 9-14-18 15:04:41
Sample : AZ79149S01 5X1/0.05/30.91G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 62
Operator: MA
Inst : Ethel
Multiplr: 3235.20



Quantitation Report (QT Reviewed)

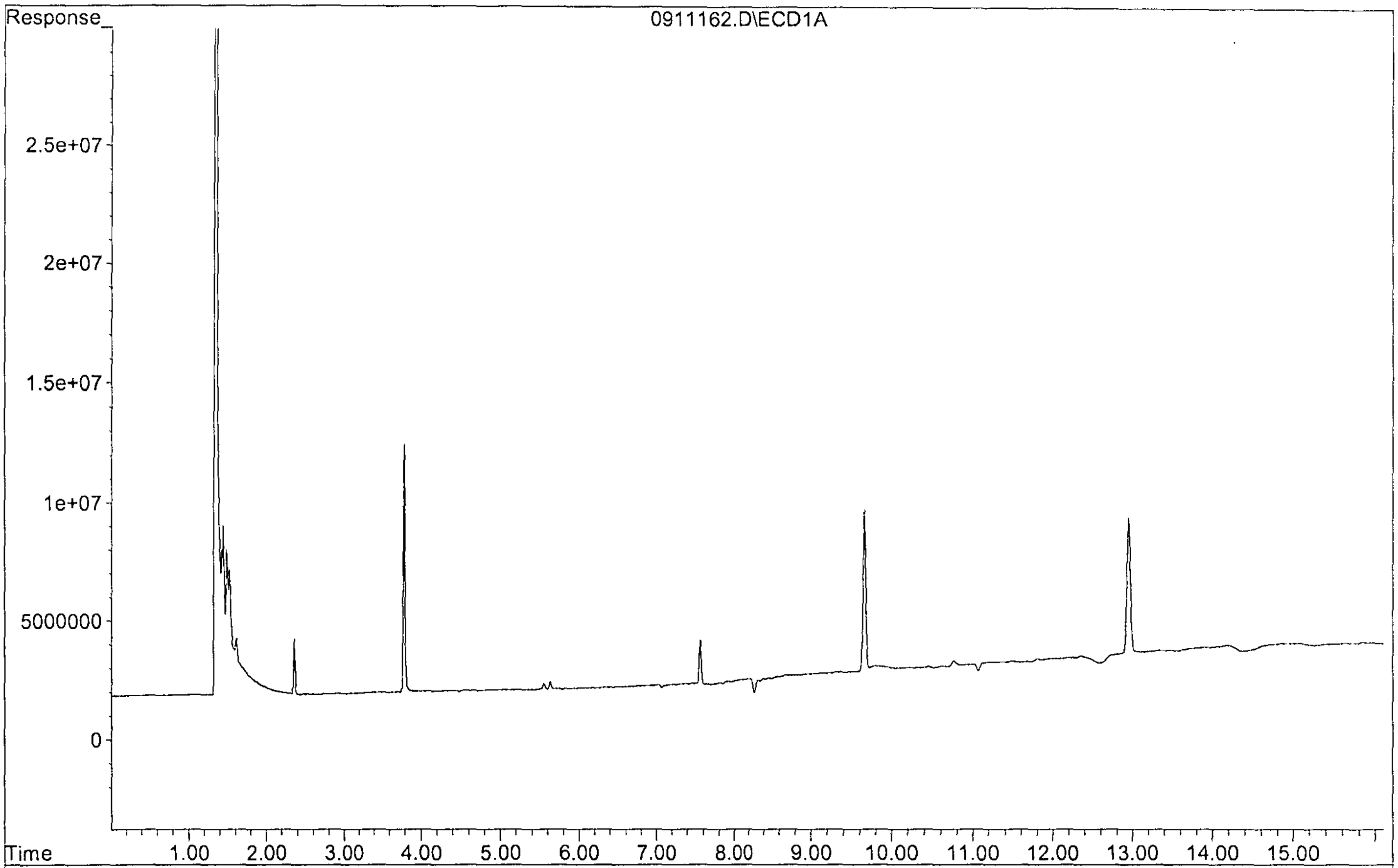
```
Signal #1 : G:\ETHEL\DATA\180911\0911162.D\ECD1A.CH      Vial: 62
Signal #2 : G:\ETHEL\DATA\180911\0911162.D\ECD2B.CH
Acq On    : 9-14-18 15:04:41                        Operator: MA
Sample    : AZ79149S01 5X1/0.05/30.91G DF20         Inst    : Ethel
Misc      : soil                                    Multiplr: 3235.20
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 14:54 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

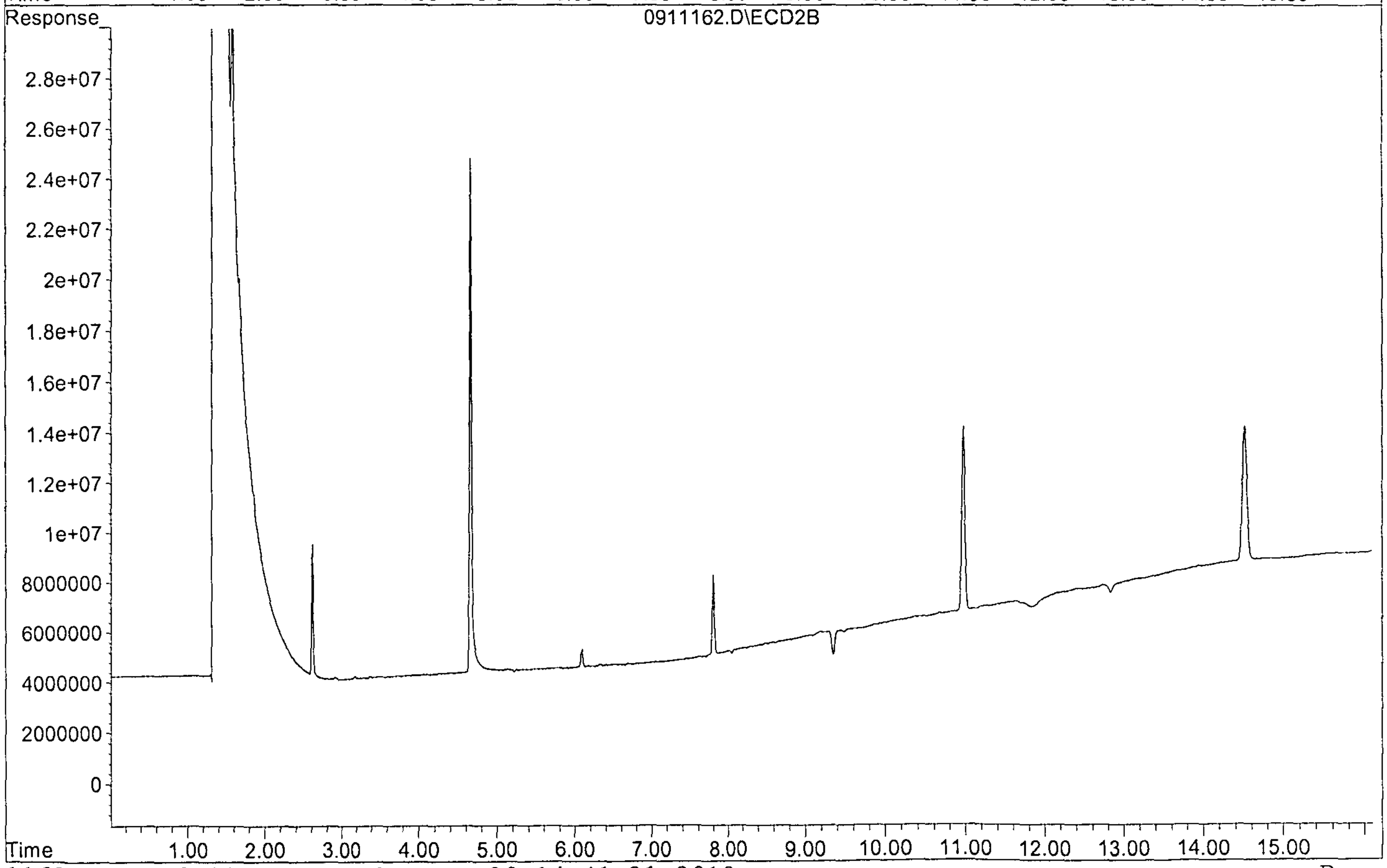
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911162.D
Acq On : 9-14-18 15:04:41
Sample : AZ79149S01 5X1/0.05/30.91G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 62
Operator: MA
Inst : Ethel
Multiplr: 3235.20





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911163.D\ECD1A.CH Vial: 63
Signal #2 : G:\ETHEL\DATA\180911\0911163.D\ECD2B.CH
Acq On : 9-14-18 15:23:47 Operator: MA
Sample : AZ79150S01 5X1/0.05/30.06G DF20 Inst : Ethel
Misc : soil Multiplr: 3326.68
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:55 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

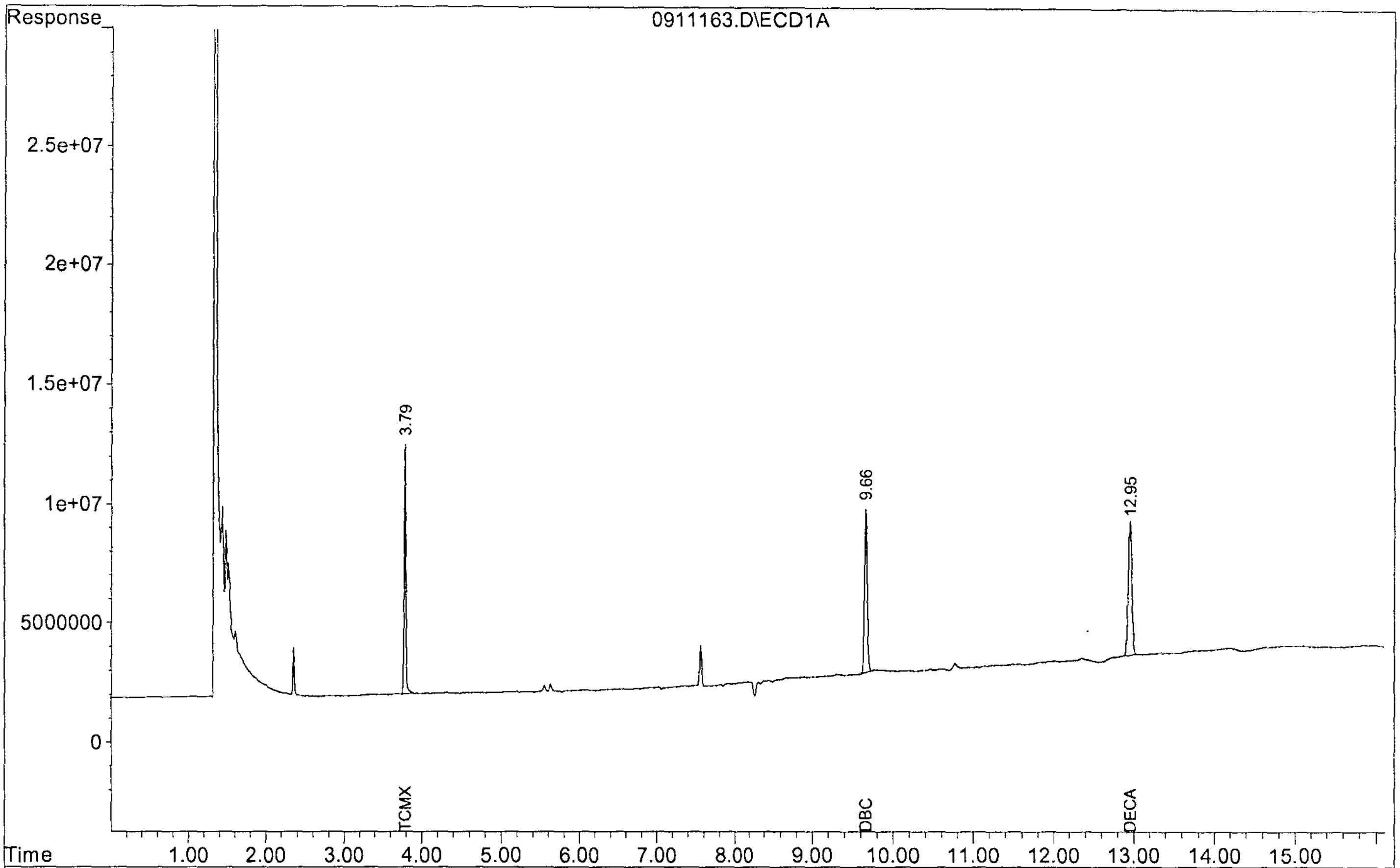
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10460206	20735530	344.1244	322.4935
Surrogate Spike 332.668			Recovery	=	103.44%	96.94%
23) S DBC	9.66	10.98	16221106	7503785	290.9856	353.6075
Surrogate Spike 332.668			Recovery	=	87.47%	106.29%
24) S DECA	12.95	14.51	18370513	5506926	322.2829	333.0056
Surrogate Spike 332.668			Recovery	=	96.88%	100.10%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

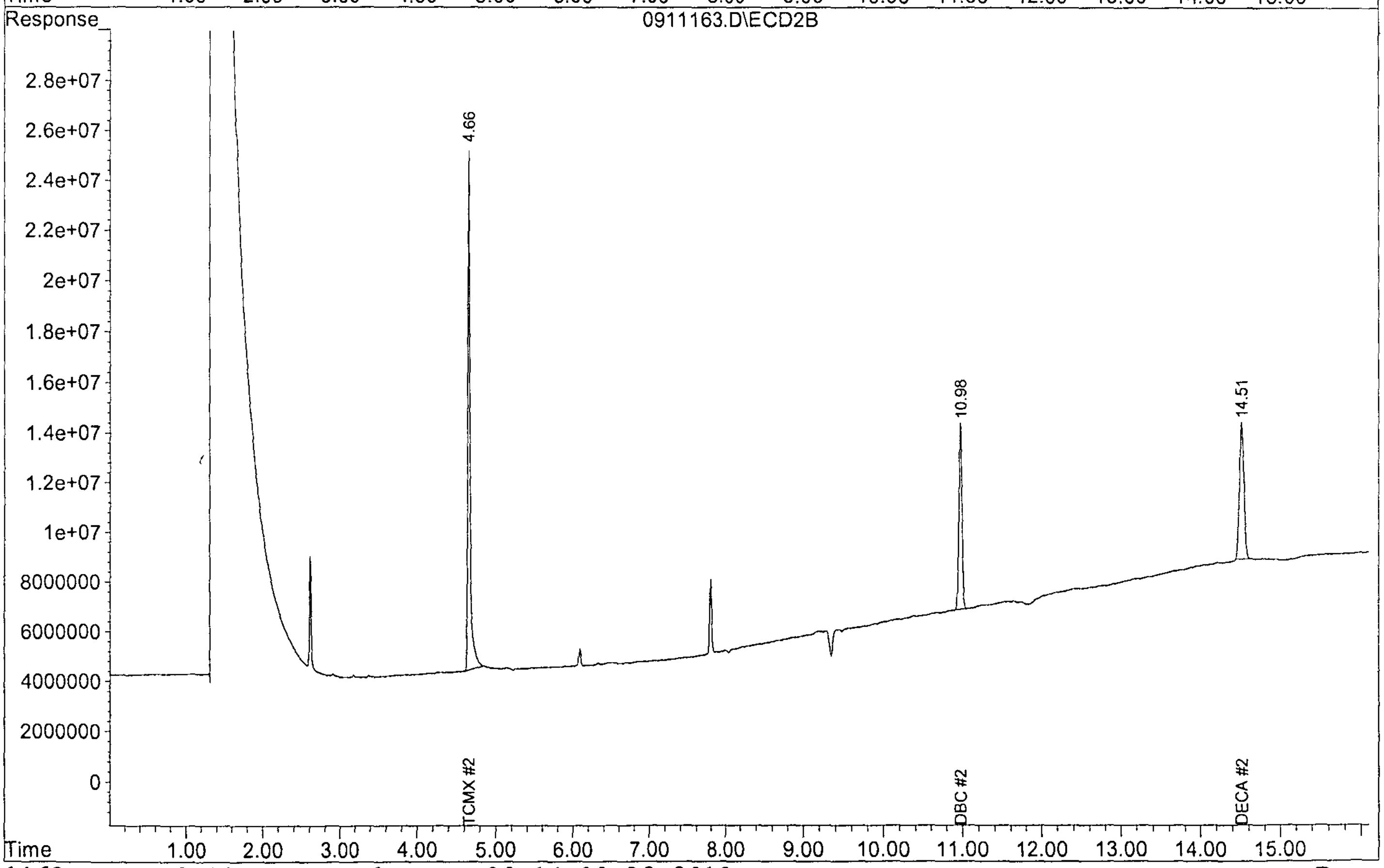
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911163.D
Acq On : 9-14-18 15:23:47
Sample : AZ79150S01 5X1/0.05/30.06G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 63
Operator: MA
Inst : Ethel
Multiplr: 3326.68





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911163.D\ECD1A.CH Vial: 63
Signal #2 : G:\ETHEL\DATA\180911\0911163.D\ECD2B.CH
Acq On : 9-14-18 15:23:47 Operator: MA
Sample : AZ79150S01 5X1/0.05/30.06G DF20 Inst : Ethel
Misc : soil Multiplr: 3326.68
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 14:55 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

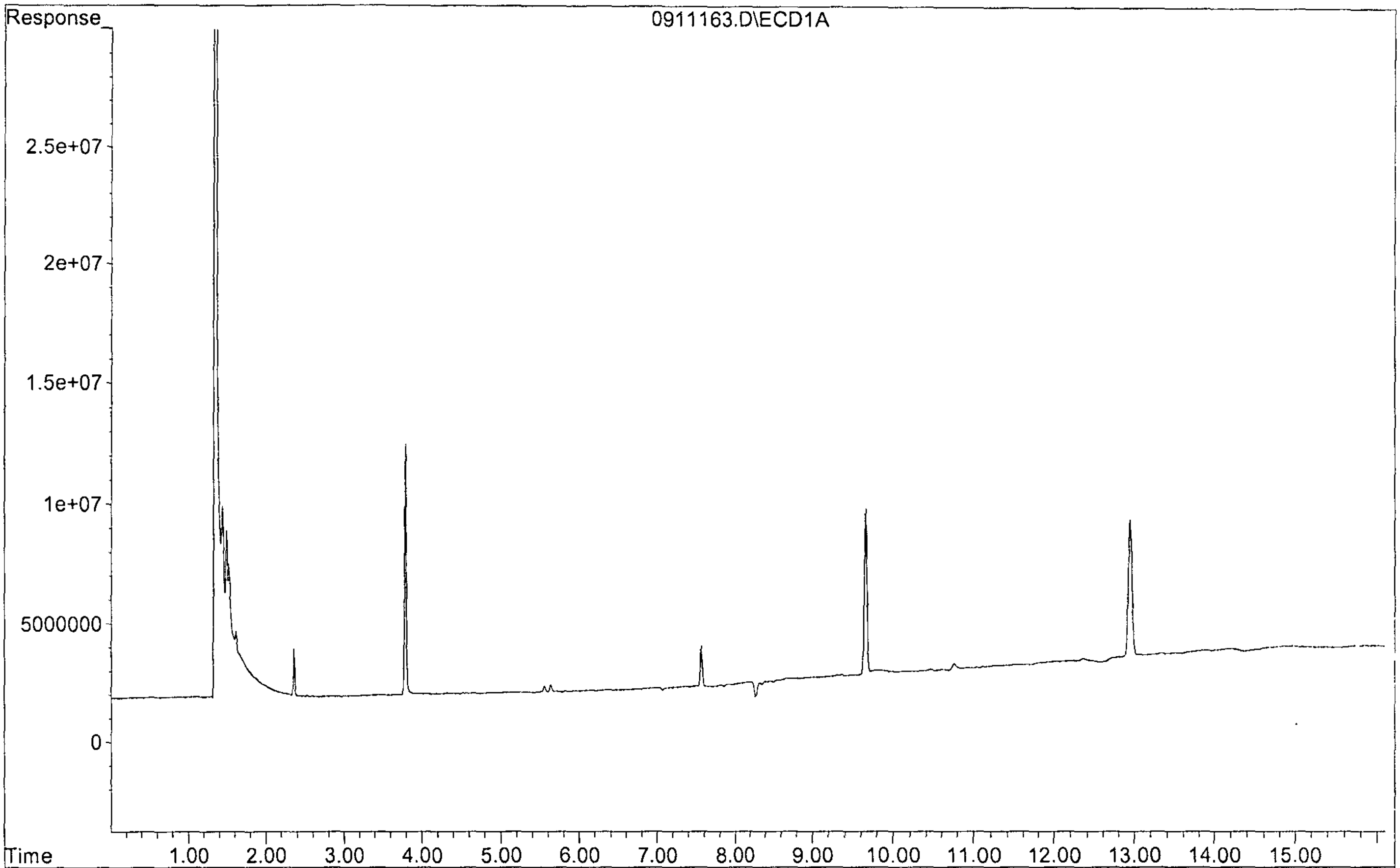
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

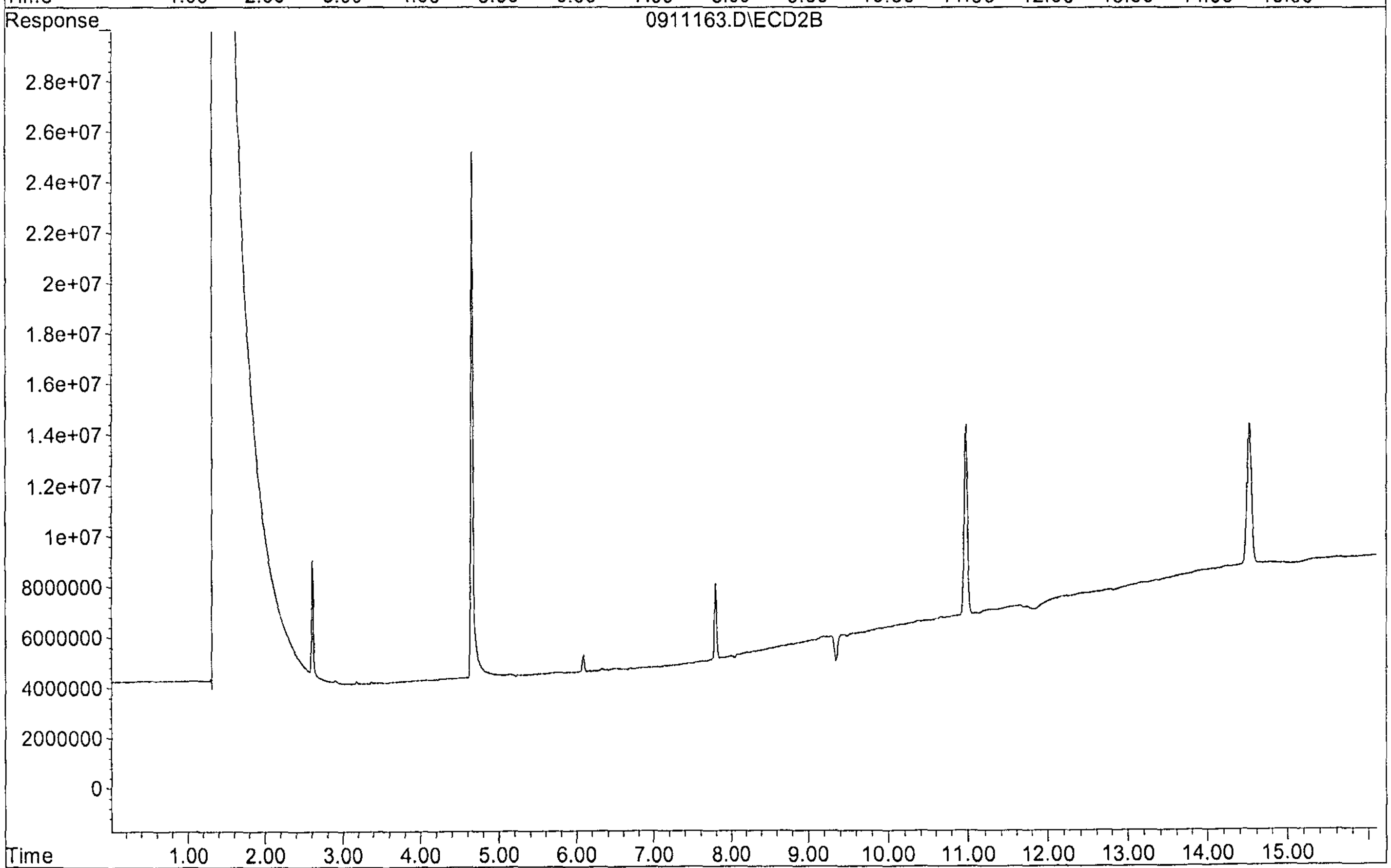
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911163.D
Acq On : 9-14-18 15:23:47
Sample : AZ79150S01 5X1/0.05/30.06G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 63
Operator: MA
Inst : Ethel
Multiplr: 3326.68





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911164.D\ECD1A.CH Vial: 64
Signal #2 : G:\ETHEL\DATA\180911\0911164.D\ECD2B.CH
Acq On : 9-14-18 15:42:45 Operator: MA
Sample : AZ79151S01 5X1/0.05/30.07G DF20 Inst : Ethel
Misc : soil Multiplr: 3325.57
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:55 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

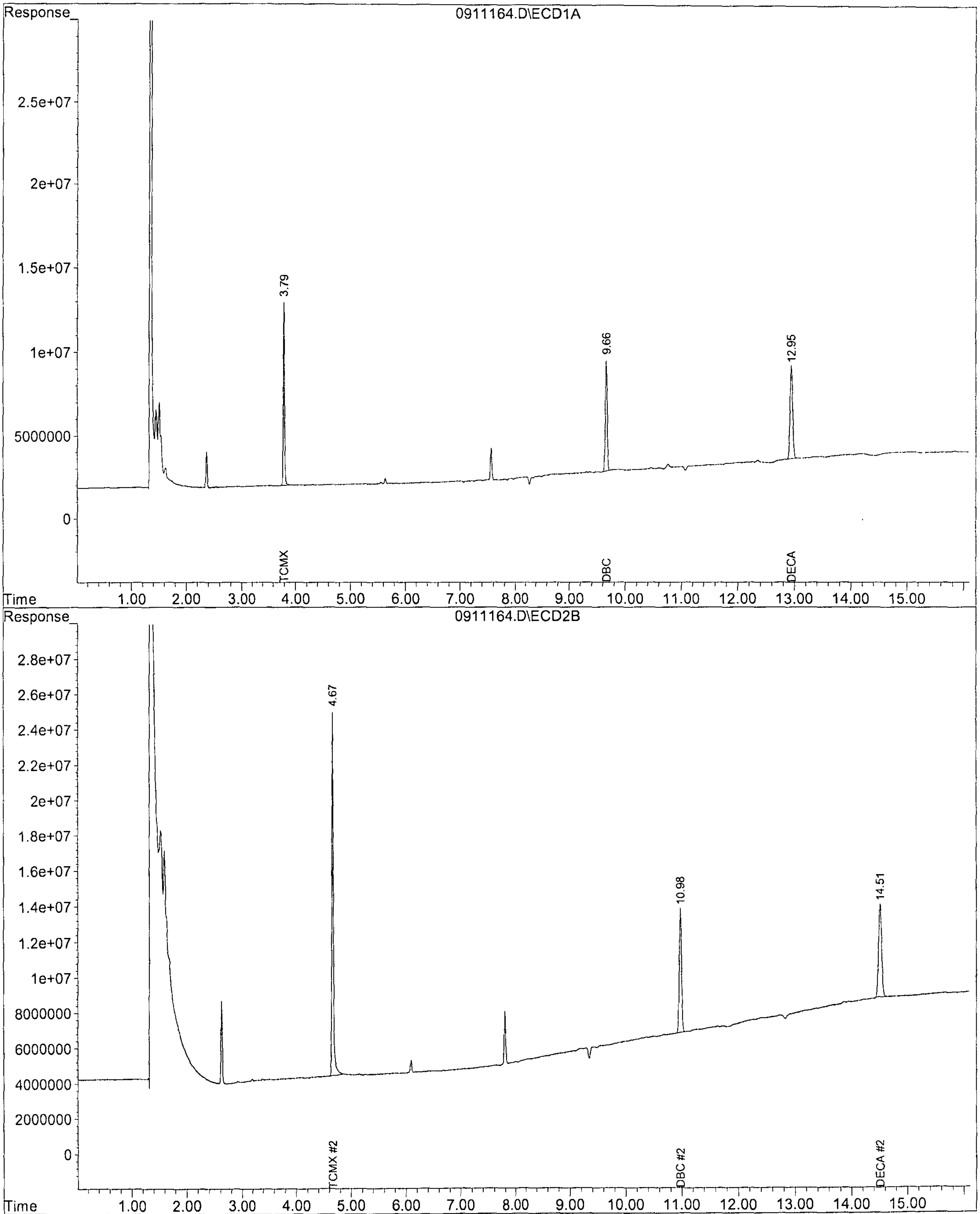
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.67	10931053	20521213	359.4946	319.0538
	Surrogate Spike 332.557			Recovery	=	108.10%	95.94%
23) S	DBC	9.66	10.98	15738126	7041889	282.2274	331.7304
	Surrogate Spike 332.557			Recovery	=	84.87%	99.75%
24) S	DECA	12.95	14.51	17740301	5254289	311.1230	317.6225
	Surrogate Spike 332.557			Recovery	=	93.55%	95.51%
	Target Compounds						
	Target Compounds						
2) TM	HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM	A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM	B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M	G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM	D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M	HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M	ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM	HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM	G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM	A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM	A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM	P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M	DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M	ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM	B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM	P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM	ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M	P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM	ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM	ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM	METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by ≥ 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911164.D
Acq On : 9-14-18 15:42:45
Sample : AZ79151S01 5X1/0.05/30.07G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 64
Operator: MA
Inst : Ethel
Multiplr: 3325.57



Quantitation Report (QT Reviewed)

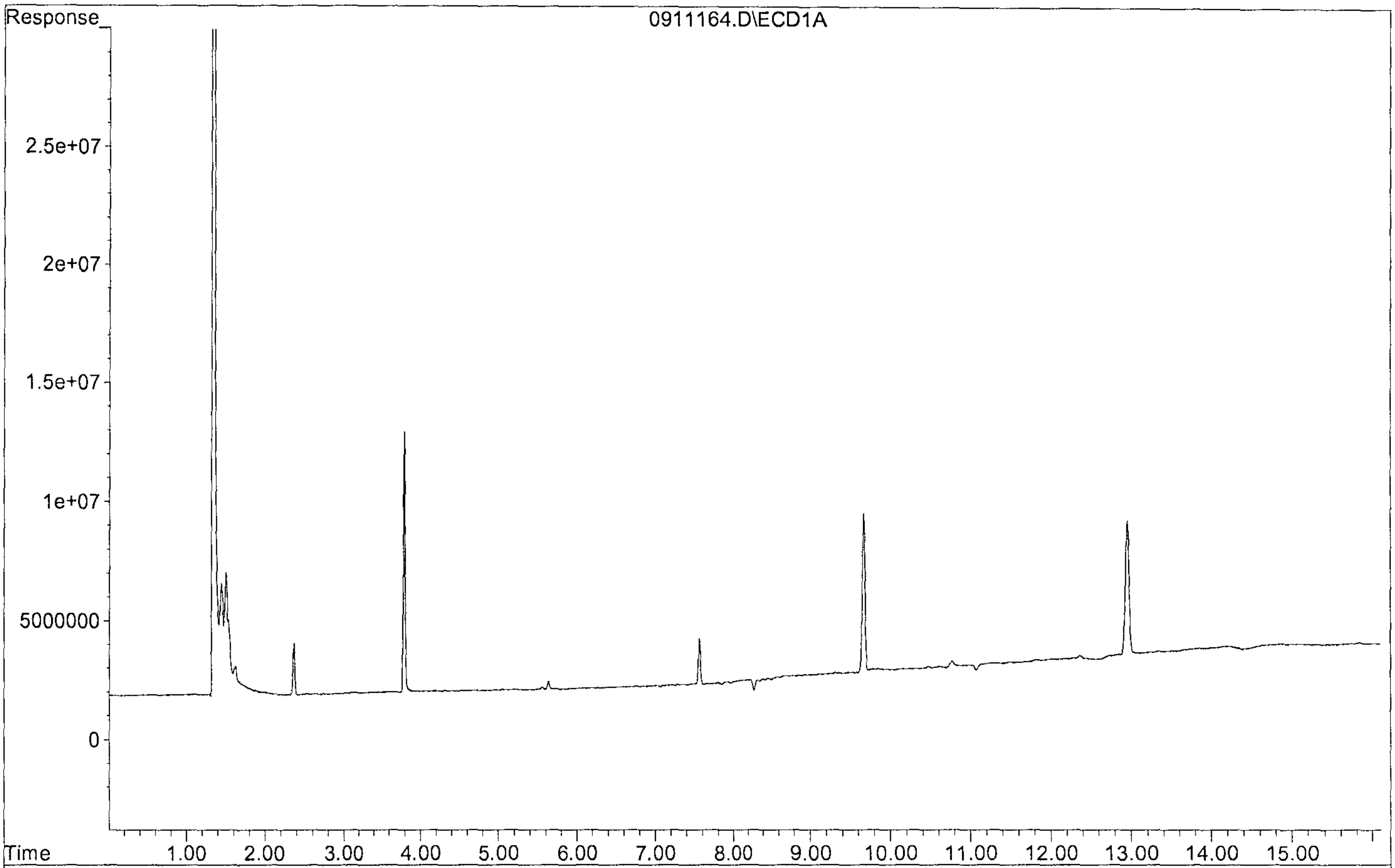
```
Signal #1 : G:\ETHEL\DATA\180911\0911164.D\ECD1A.CH      Vial: 64
Signal #2 : G:\ETHEL\DATA\180911\0911164.D\ECD2B.CH
Acq On    : 9-14-18 15:42:45                           Operator: MA
Sample    : AZ79151S01 5X1/0.05/30.07G DF20            Inst    : Ethel
Misc      : soil                                       Multiplr: 3325.57
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 14:55 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

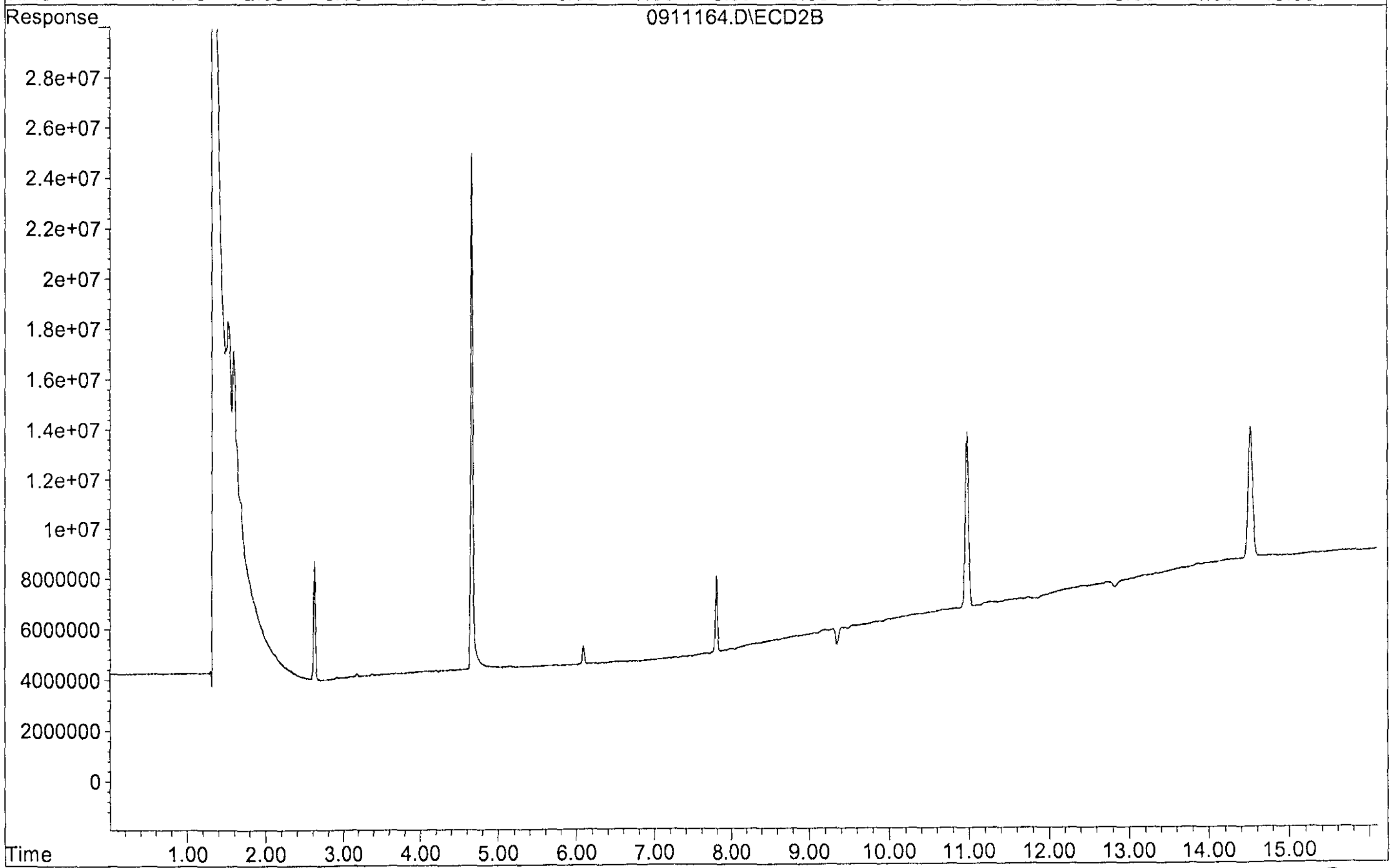
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911164.D
Acq On : 9-14-18 15:42:45
Sample : AZ79151S01 5X1/0.05/30.07G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 64
Operator: MA
Inst : Ethel
Multiplr: 3325.57





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911173.D\ECD1A.CH Vial: 73
Signal #2 : G:\ETHEL\DATA\180911\0911173.D\ECD2B.CH
Acq On : 9-14-18 18:33:45 Operator: MA
Sample : AZ79152S01 5X1/0.05/30.22G DF20 Inst : Ethel
Misc : soil Multiplr: 3309.07
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:57 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

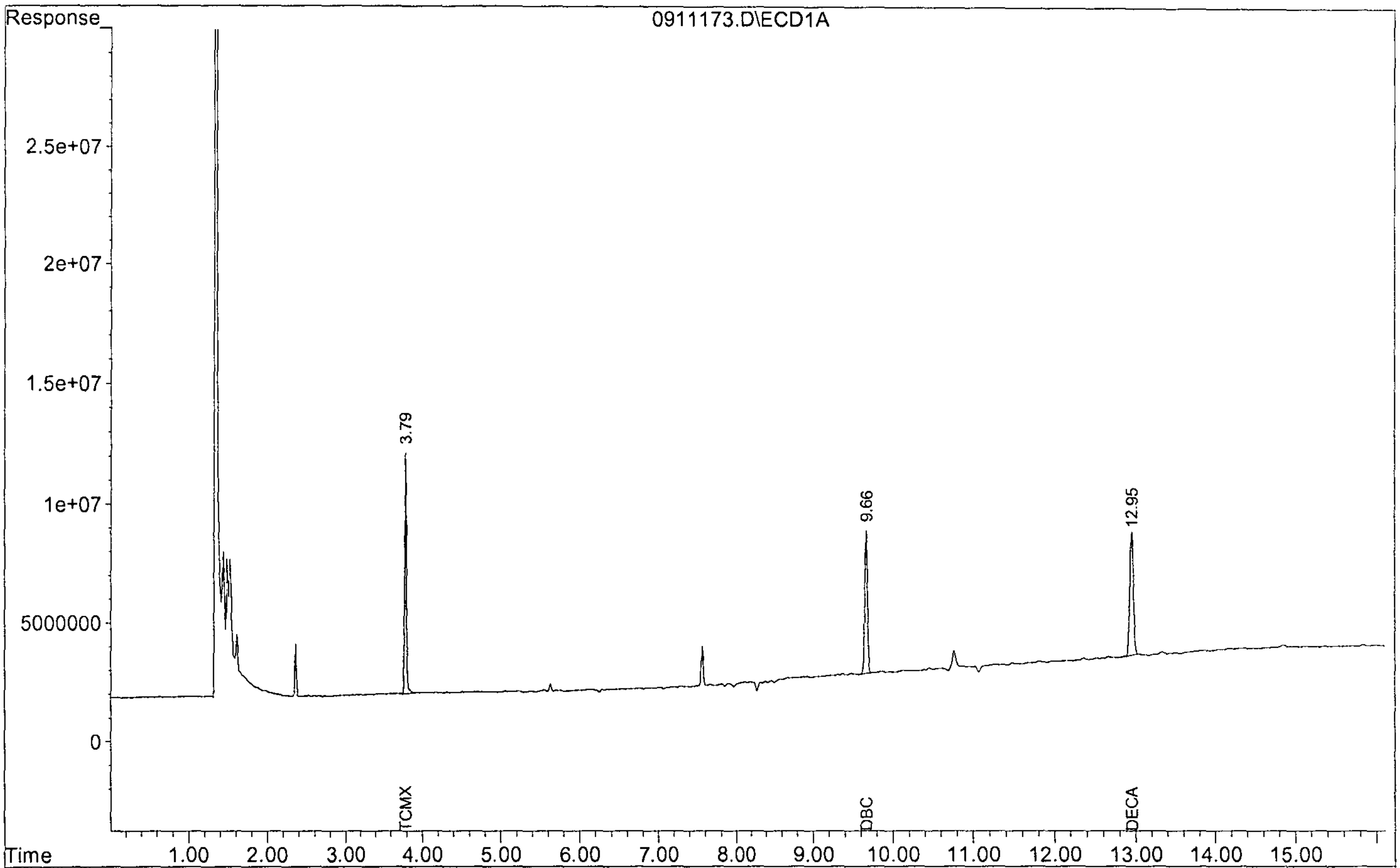
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10107840	19572886	330.7718	302.7998
Surrogate Spike 330.907			Recovery	=	99.96%	91.51%
23) S DBC	9.66	10.97	14490117	6407859	258.5580	300.3647
Surrogate Spike 330.907			Recovery	=	78.14%	90.77%
24) S DECA	12.95	14.51	16452423	4715902	287.1050	283.6625
Surrogate Spike 330.907			Recovery	=	86.76%	85.72%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

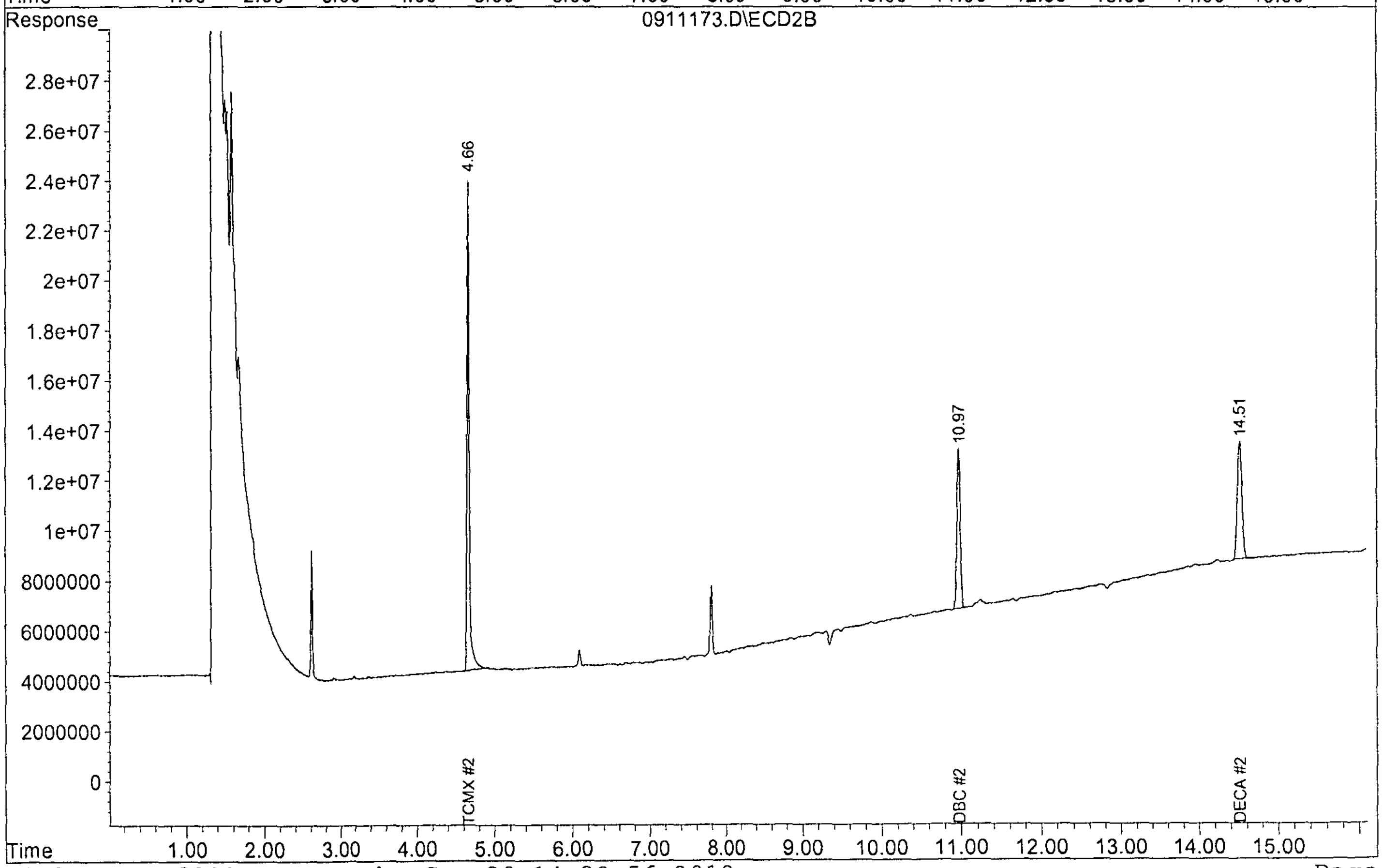
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911173.D
Acq On : 9-14-18 18:33:45
Sample : AZ79152S01 5X1/0.05/30.22G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 73
Operator: MA
Inst : Ethel
Multiplr: 3309.07





Quantitation Report (QT Reviewed)

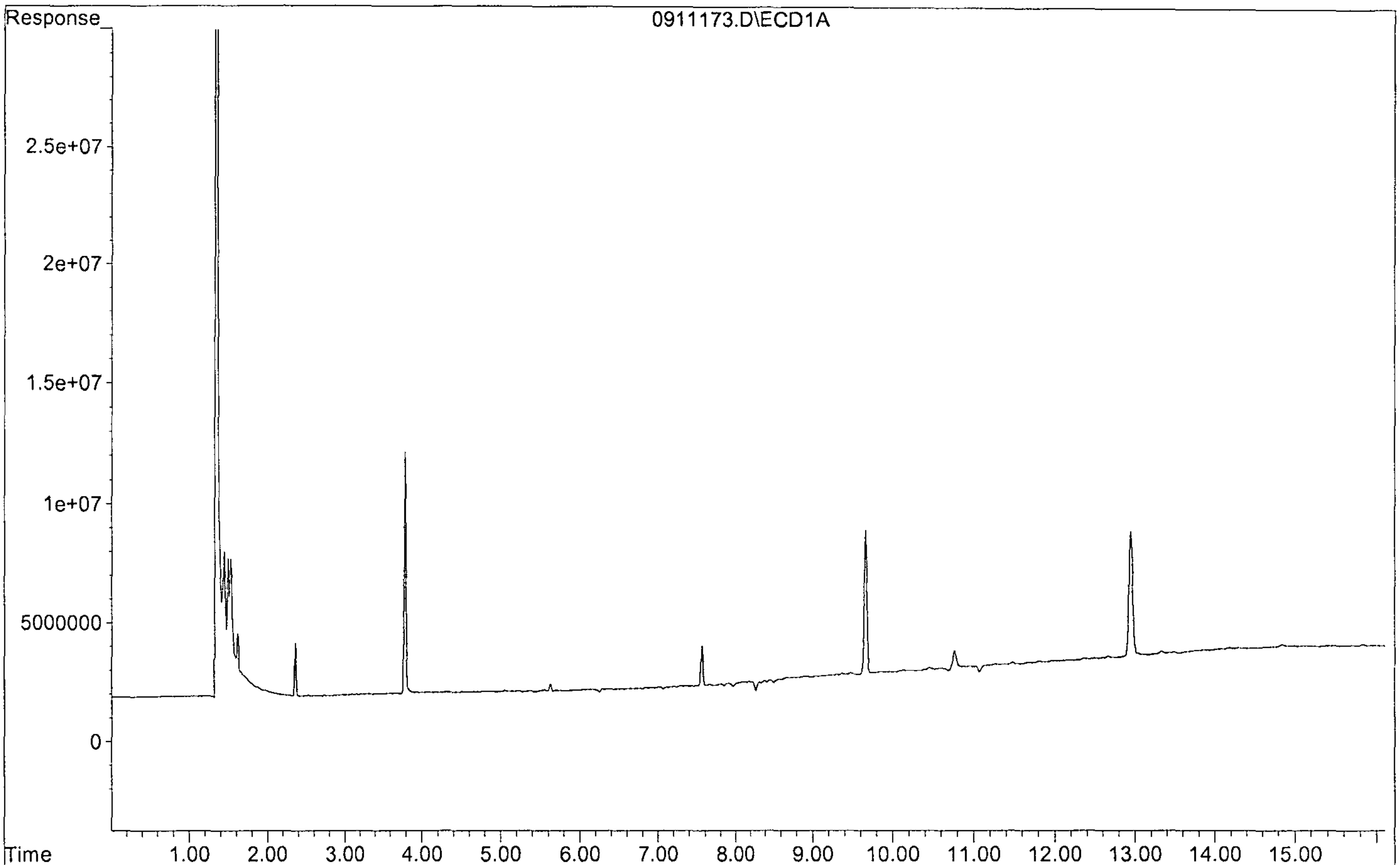
```
Signal #1 : G:\ETHEL\DATA\180911\0911173.D\ECD1A.CH      Vial: 73
Signal #2 : G:\ETHEL\DATA\180911\0911173.D\ECD2B.CH
Acq On    : 9-14-18 18:33:45                          Operator: MA
Sample    : AZ79152S01 5X1/0.05/30.22G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3309.07
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 14:57 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2ul
Signal #1 Phase : DB-35ms          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

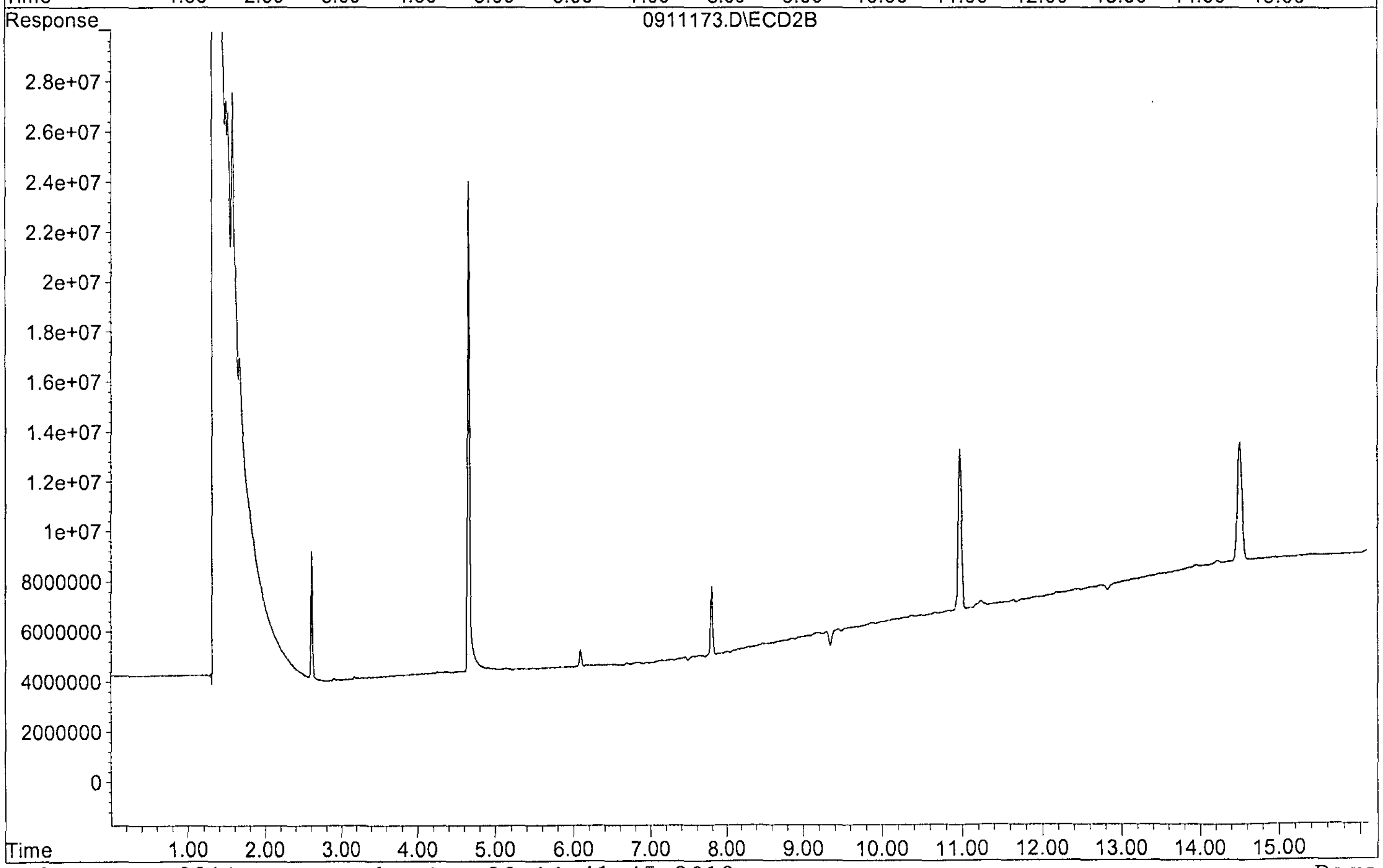
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911173.D
Acq On : 9-14-18 18:33:45
Sample : AZ79152S01 5X1/0.05/30.22G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 73
Operator: MA
Inst : Ethel
Multiplr: 3309.07





```
Data File : G:\ETHEL\DATA\180911\0911174.D\ECD1A.CH      Vial: 74
Acq On    : 9-14-18 18:52:41                          Operator: MA
Sample    : AZ79153S01 5X1/0.05/30.49G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3279.76
IntFile   : rteint.p

Data File : G:\ETHEL\DATA\180911\0911174.D\ECD2B.CH      Vial: 74
Acq On    : 9-14-18 18:52:42                          Operator: MA
Sample    : AZ79153S01 5X1/0.05/30.49G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3279.76
IntFile   : rteint2.p
Quant Time: Sep 17 14:57 2018  Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35MS            Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32               Signal #2 Info : 0.32
```

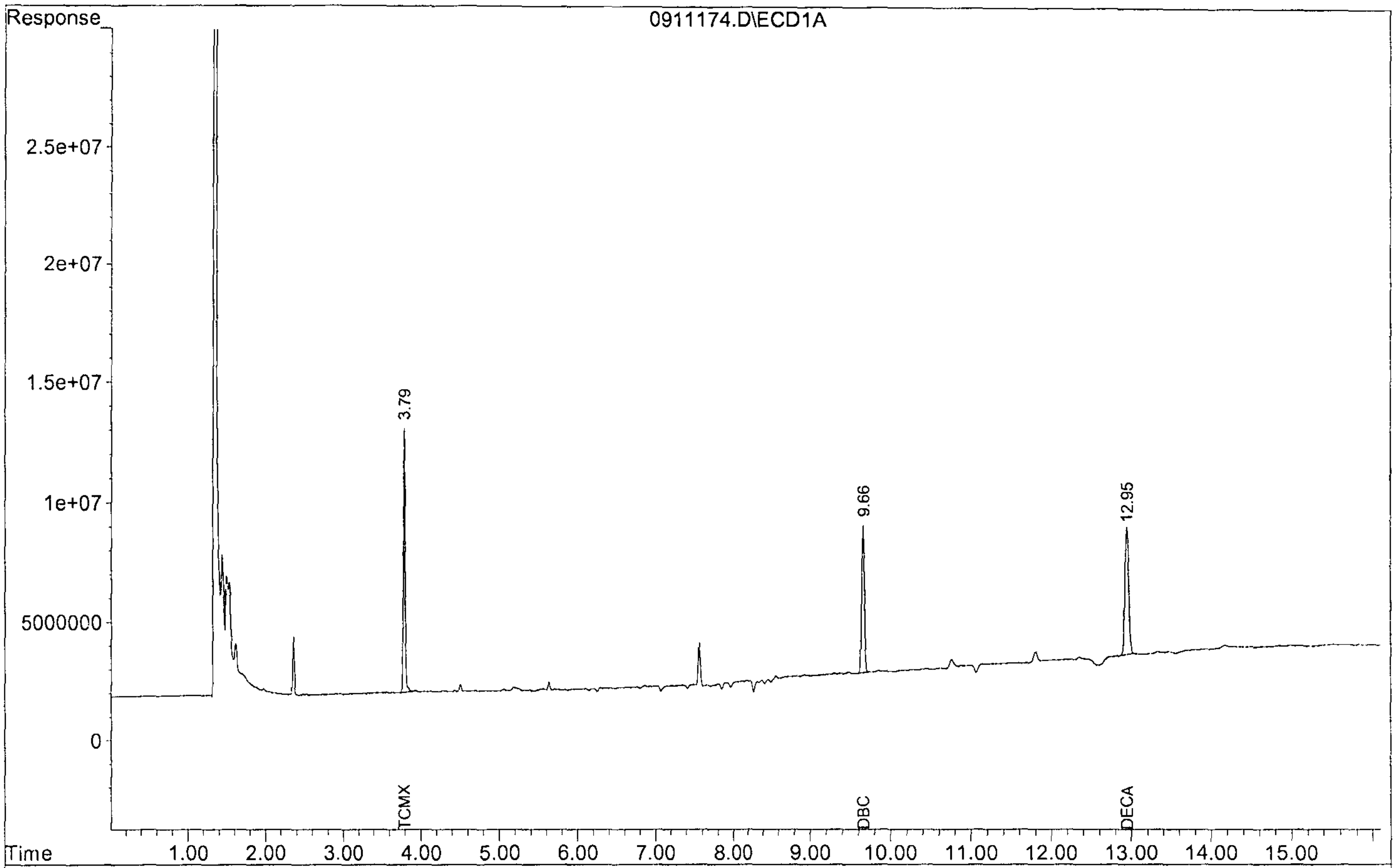
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	11035528	20661895	357.9311	316.8159
Surrogate Spike 327.976			Recovery	=	109.13%	96.60%
23) S DBC	9.66	10.97	14667996	6838932	259.4137	317.7316
Surrogate Spike 327.976			Recovery	=	79.10%	96.88%
24) S DECA	12.95	14.51	17126405	5156473	296.2192	307.4157
Surrogate Spike 327.976			Recovery	=	90.32%	93.73%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

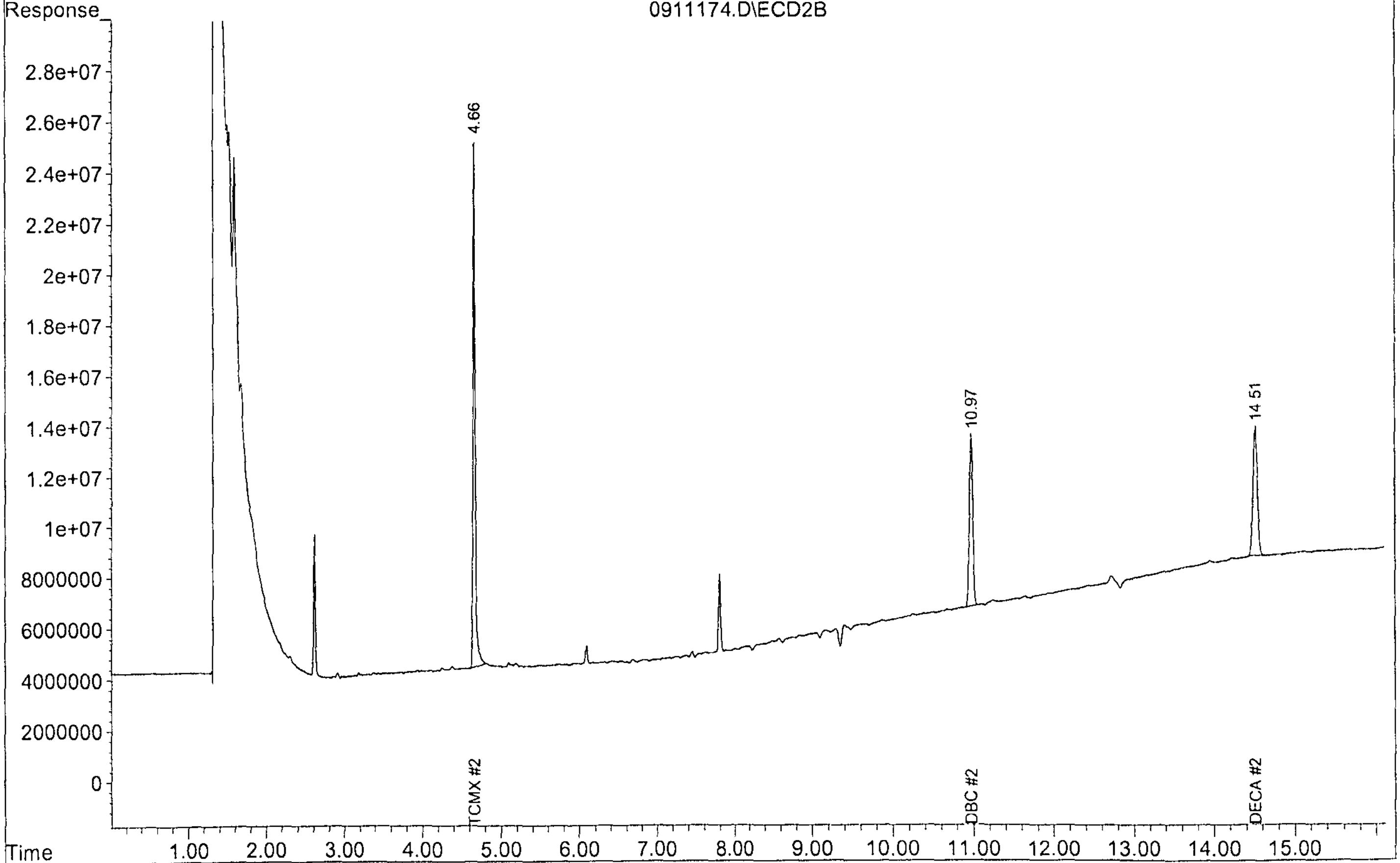
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911174.D
Acq On : 9-14-18 18:52:41
Sample : AZ79153S01 5X1/0.05/30.49G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 74
Operator: MA
Inst : Ethel
Multiplr: 3279.76





Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911174.D\ECD1A.CH Vial: 74
Acq On : 9-14-18 18:52:41 Operator: MA
Sample : AZ79153S01 5X1/0.05/30.49G DF20 Inst : Ethel
Misc : soil Multiplr: 3279.76
IntFile : events.e

Data File : G:\ETHEL\DATA\180911\0911174.D\ECD2B.CH Vial: 74
Acq On : 9-14-18 18:52:42 Operator: MA
Sample : AZ79153S01 5X1/0.05/30.49G DF20 Inst : Ethel
Misc : soil Multiplr: 3279.76
IntFile : events2.e
Quant Time: Sep 17 14:57 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

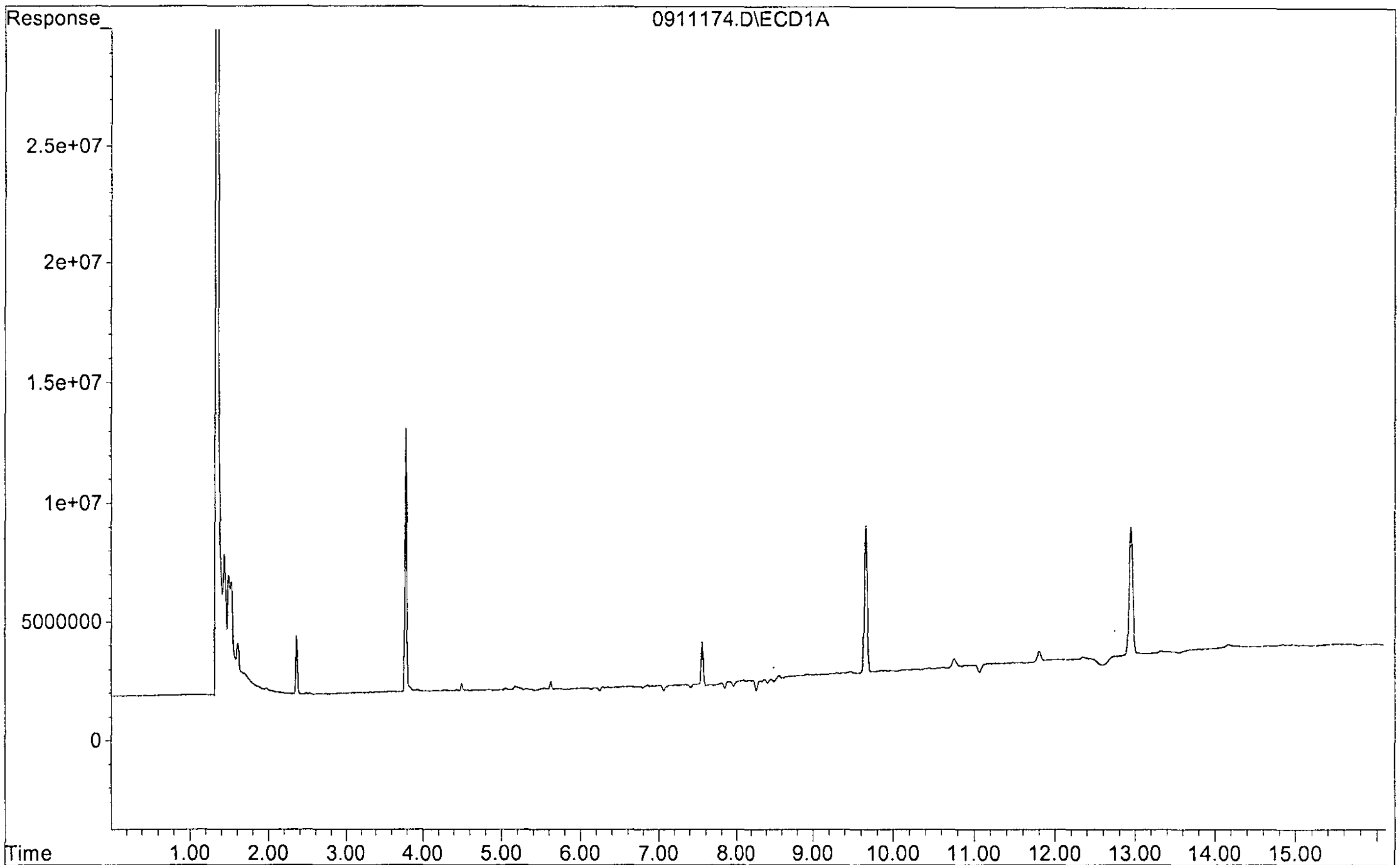
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

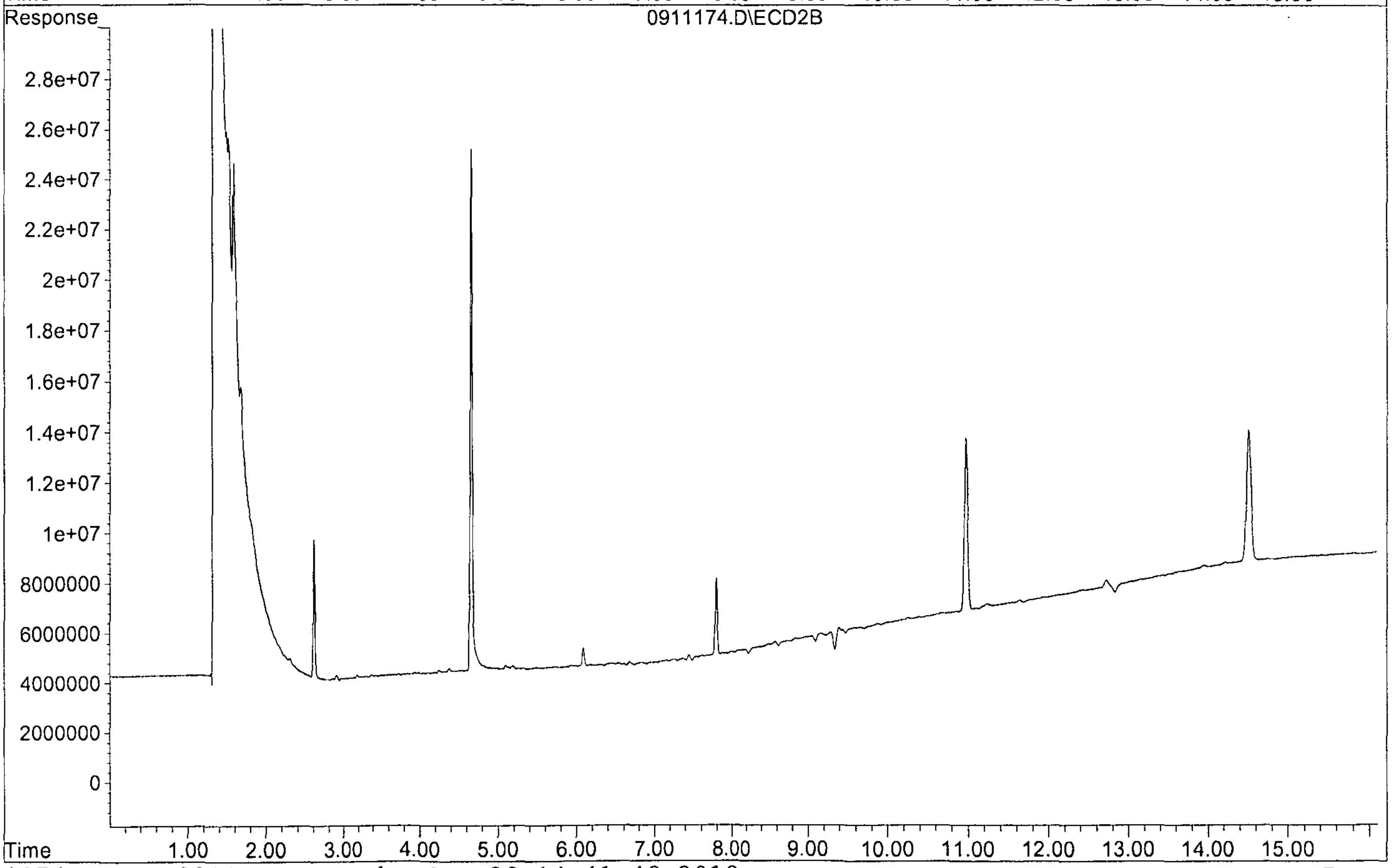
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911174.D
Acq On : 9-14-18 18:52:41
Sample : AZ79153S01 5X1/0.05/30.49G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 74
Operator: MA
Inst : Ethel
Multiplr: 3279.76





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911175.D\ECD1A.CH Vial: 75
Signal #2 : G:\ETHEL\DATA\180911\0911175.D\ECD2B.CH
Acq On : 9-14-18 19:11:47 Operator: MA
Sample : AZ79154S01 5X1/0.05/30.94G DF20 Inst : Ethel
Misc : soil Multiplr: 3232.06
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:58 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

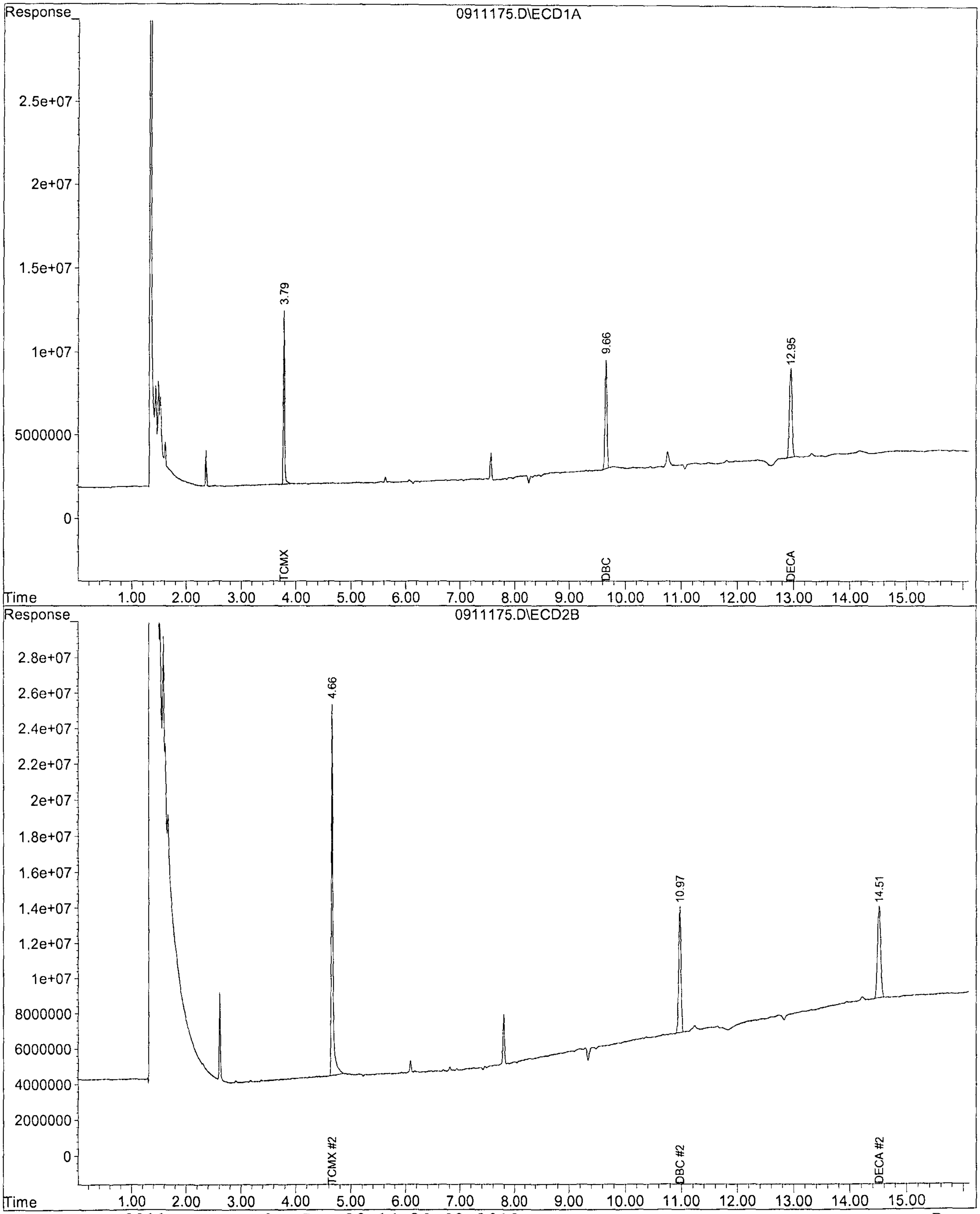
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.66	10422506	20830584	333.1316	314.7571
	Surrogate Spike 323.206			Recovery	=	103.07%	97.39%
23) S	DBC	9.66	10.97	15362192	7179886	267.7396	328.7207
	Surrogate Spike 323.206			Recovery	=	82.84%	101.71%
24) S	DECA	12.95	14.51	17499514	5191995	298.2705	305.0317
	Surrogate Spike 323.206			Recovery	=	92.28%	94.38%
	Target Compounds						
	Target Compounds						
2) TM	HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM	A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM	B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M	G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM	D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M	HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M	ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM	HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM	G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM	A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM	A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM	P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M	DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M	ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM	B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM	P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM	ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M	P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM	ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM	ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM	METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by ≥ 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911175.D
Acq On : 9-14-18 19:11:47
Sample : AZ79154S01 5X1/0.05/30.94G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 75
Operator: MA
Inst : Ethel
Multiplr: 3232.06



Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911175.D\ECD1A.CH Vial: 75
Signal #2 : G:\ETHEL\DATA\180911\0911175.D\ECD2B.CH
Acq On : 9-14-18 19:11:47 Operator: MA
Sample : AZ79154S01 5X1/0.05/30.94G DF20 Inst : Ethel
Misc : soil Multiplr: 3232.06
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 14:58 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

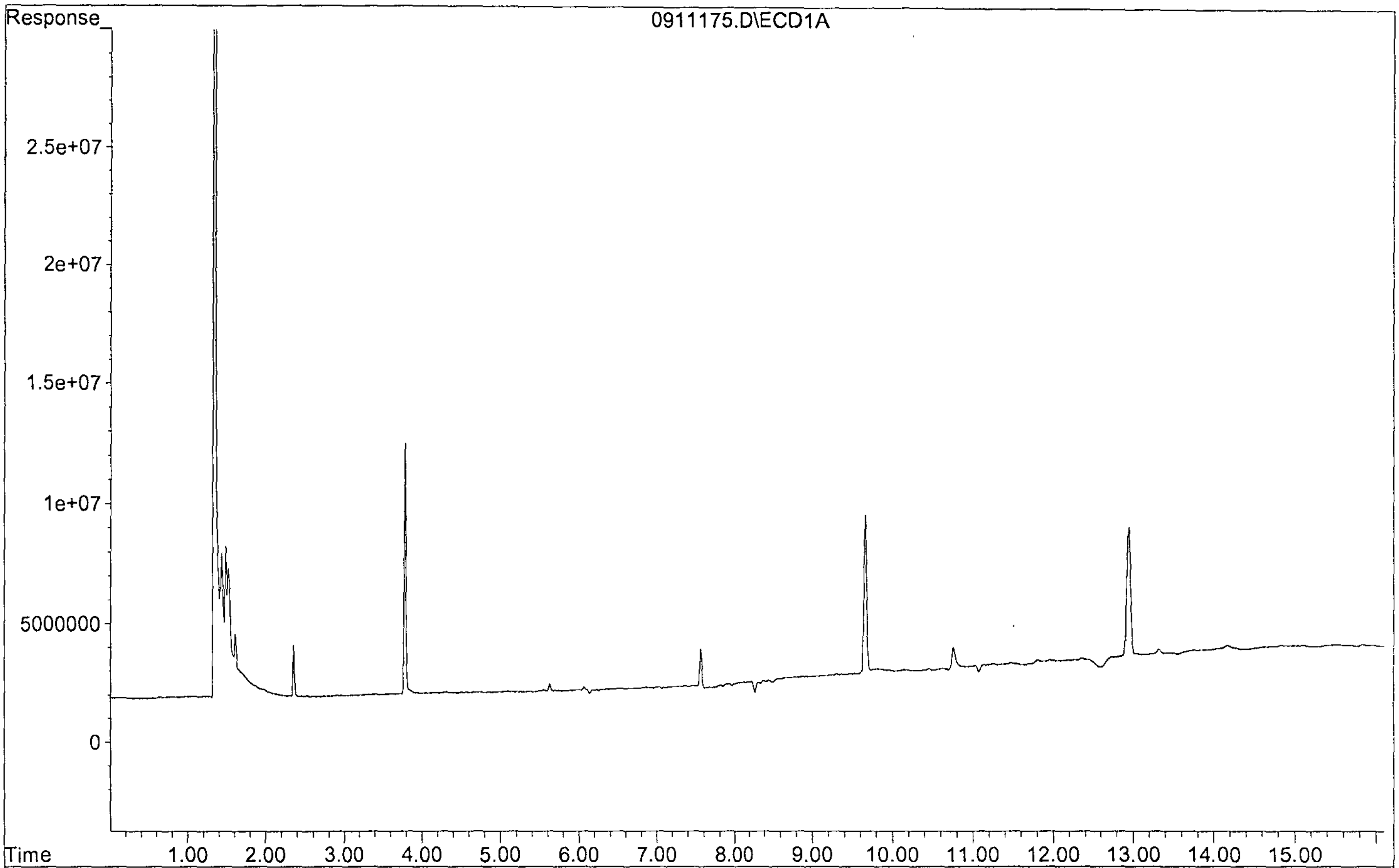
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

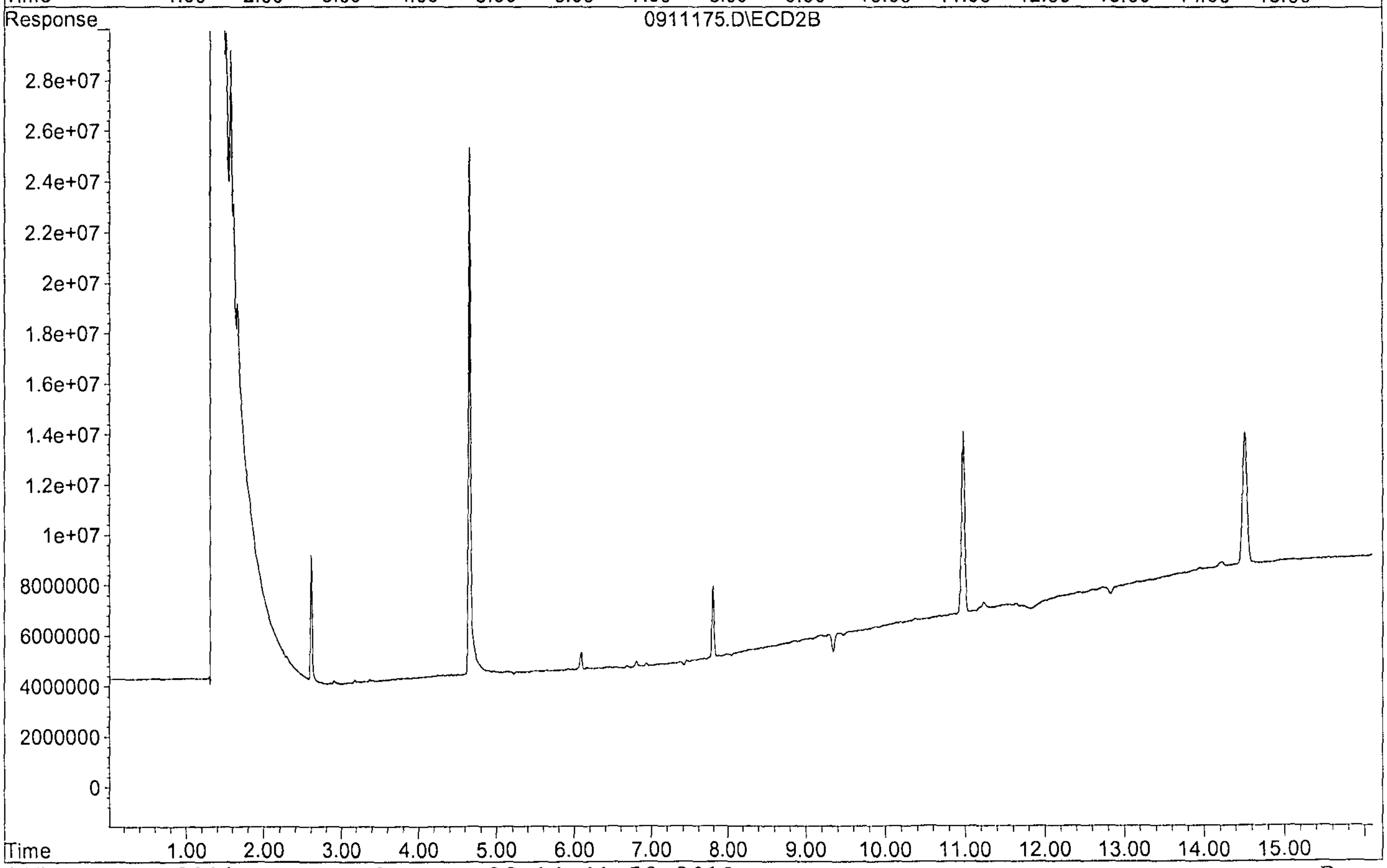
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911175.D
Acq On : 9-14-18 19:11:47
Sample : AZ79154S01 5X1/0.05/30.94G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 75
Operator: MA
Inst : Ethel
Multiplr: 3232.06





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911176.D\ECD1A.CH Vial: 76
Signal #2 : G:\ETHEL\DATA\180911\0911176.D\ECD2B.CH
Acq On : 9-14-18 19:30:48 Operator: MA
Sample : AZ79155S01 5X1/0.05/30.74G DF20 Inst : Ethel
Misc : soil Multiplr: 3253.09
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:58 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

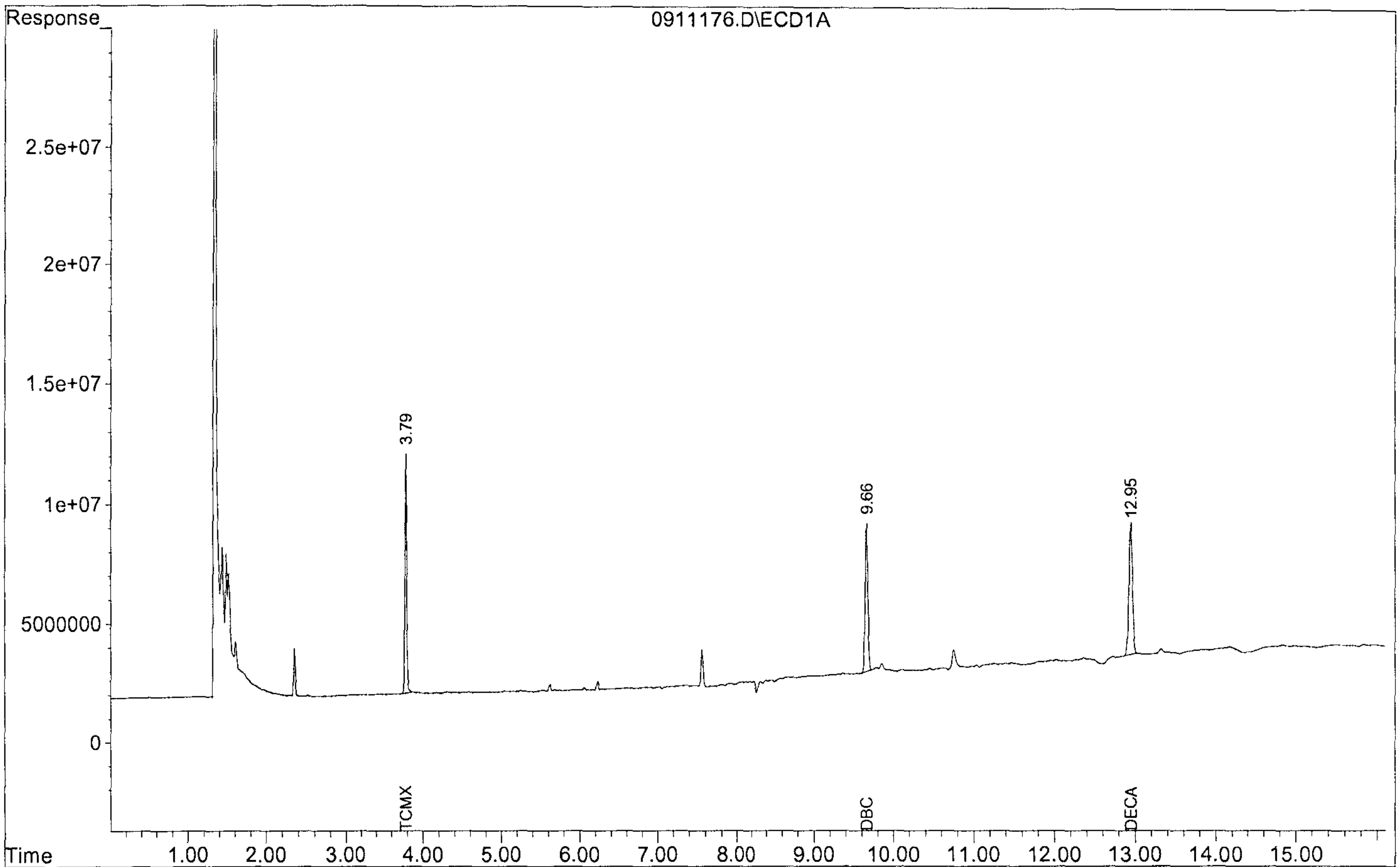
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1)	S TCMX	3.79	4.66	10021809	19991327	322.4085	304.0412
	Surrogate Spike 325.309			Recovery	=	99.11%	93.46%
23)	S DBC	9.66	10.97	14574894	6922781	255.6711	319.0118
	Surrogate Spike 325.309			Recovery	=	78.59%	98.06%
24)	S DECA	12.95	14.51	16790577	5075633	288.0492	300.1356
	Surrogate Spike 325.309			Recovery	=	88.55%	92.26%
	Target Compounds						
	Target Compounds						
2)	TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3)	TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4)	TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5)	M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6)	TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7)	M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8)	M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9)	TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10)	TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11)	TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12)	TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13)	TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14)	M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15)	M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16)	TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17)	TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18)	TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19)	M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20)	TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21)	TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22)	TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

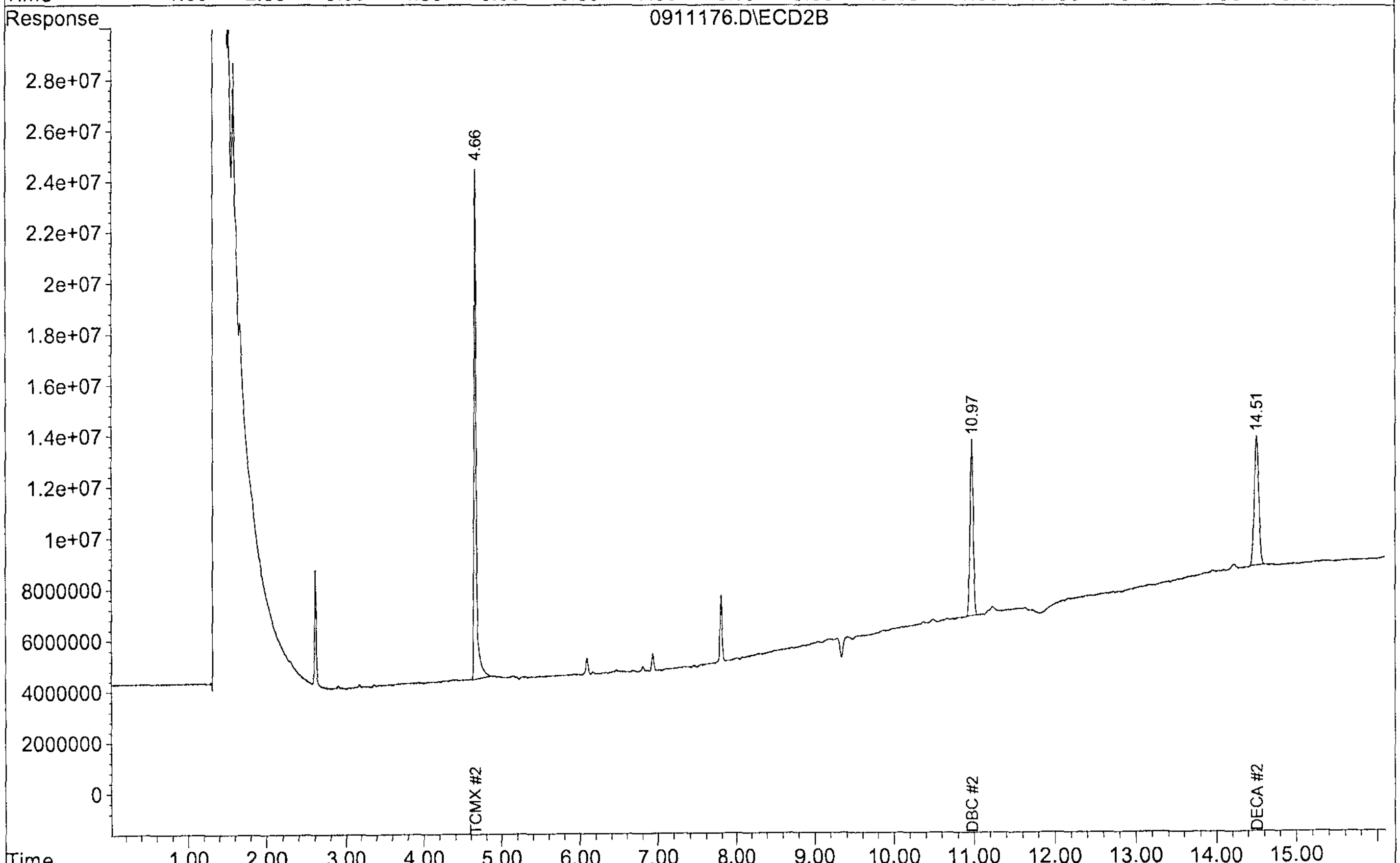
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911176.D
Acq On : 9-14-18 19:30:48
Sample : AZ79155S01 5X1/0.05/30.74G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 76
Operator: MA
Inst : Ethel
Multiplr: 3253.09





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911176.D\ECD1A.CH Vial: 76
Signal #2 : G:\ETHEL\DATA\180911\0911176.D\ECD2B.CH
Acq On : 9-14-18 19:30:48 Operator: MA
Sample : AZ79155S01 5X1/0.05/30.74G DF20 Inst : Ethel
Misc : soil Multiplr: 3253.09
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 14:58 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

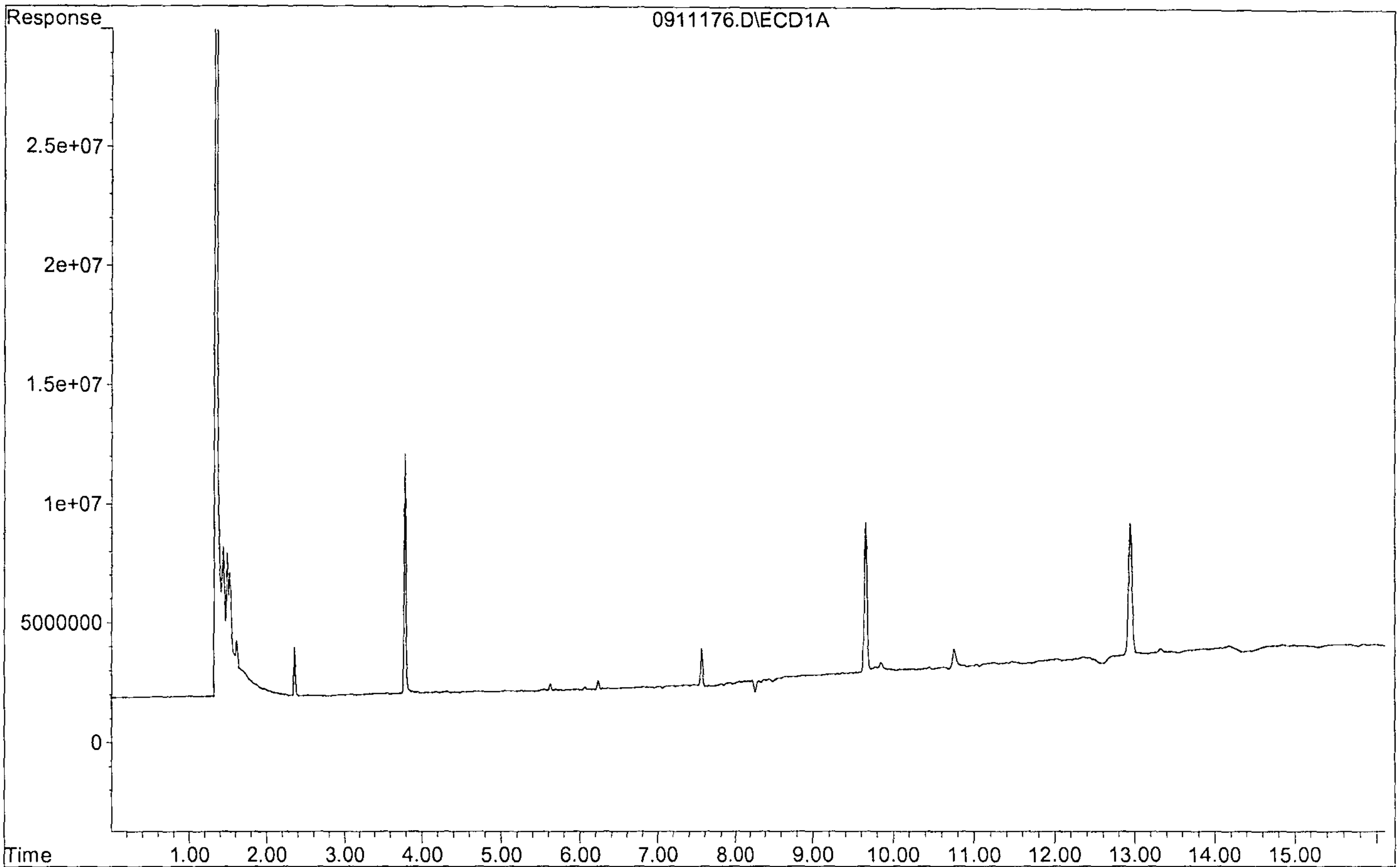
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

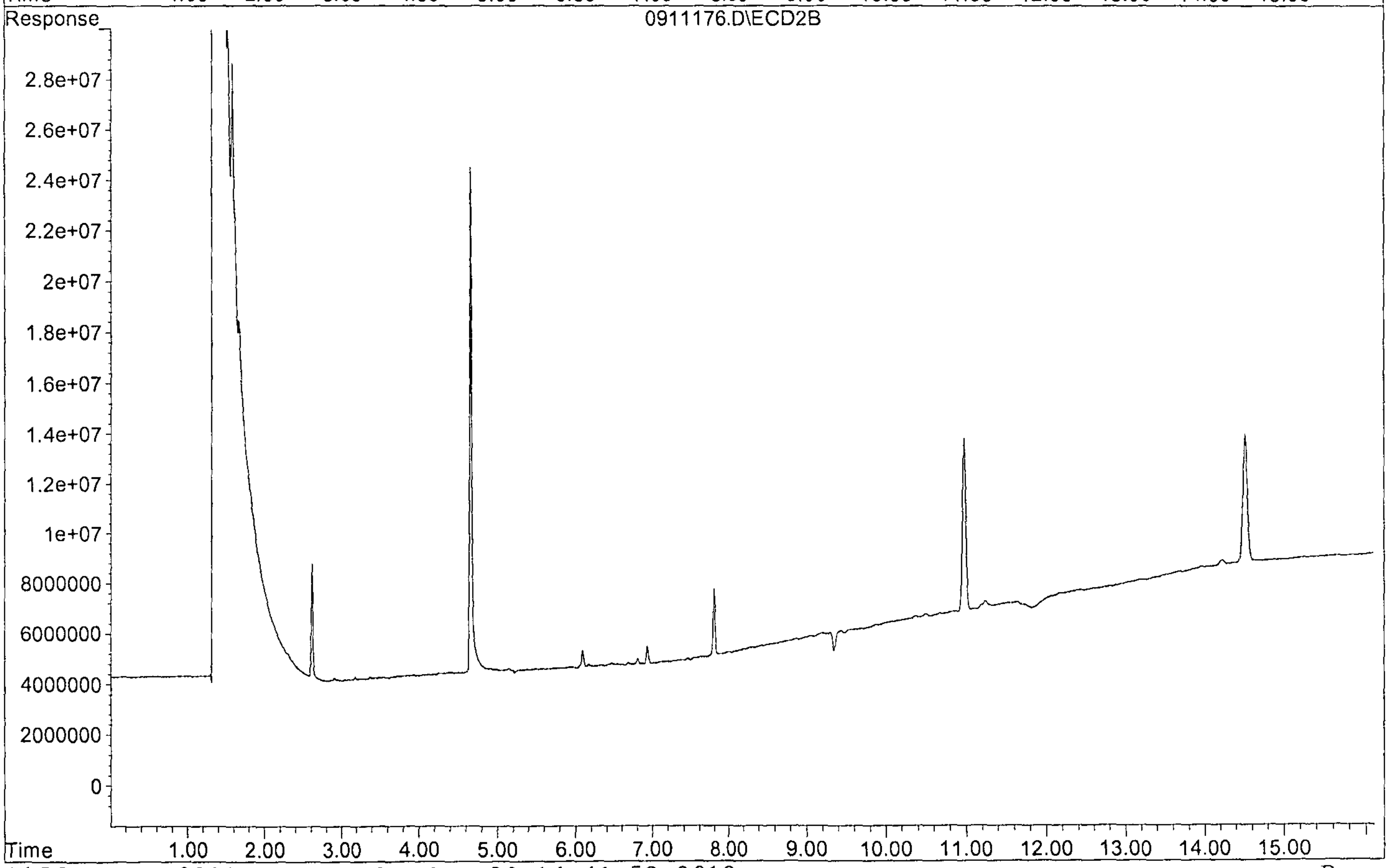
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911176.D
Acq On : 9-14-18 19:30:48
Sample : AZ79155S01 5X1/0.05/30.74G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 76
Operator: MA
Inst : Ethel
Multiplr: 3253.09





Quantitation Report (QT Reviewed)

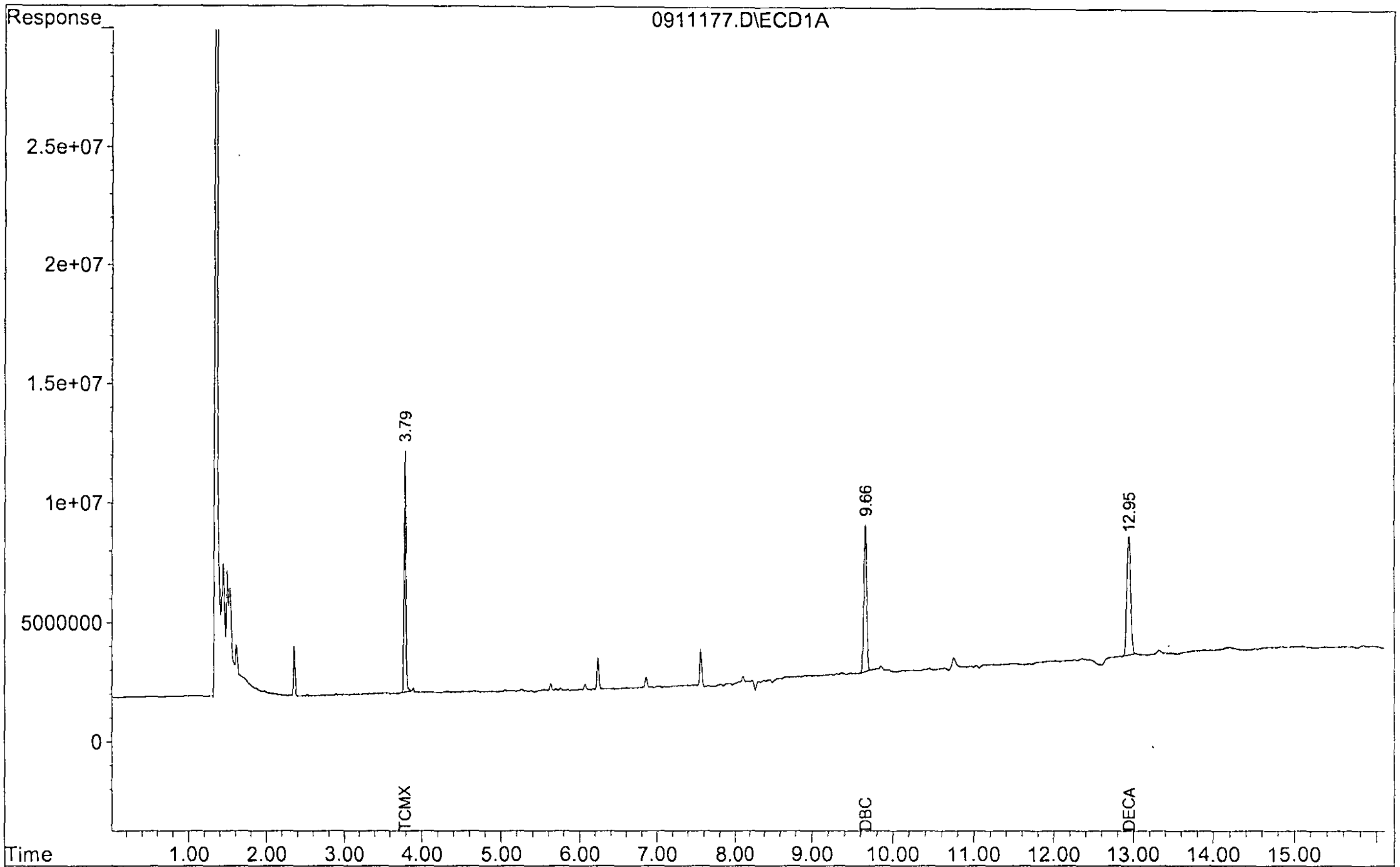
```
Data File : G:\ETHEL\DATA\180911\0911177.D\ECD1A.CH      Vial: 77
Acq On    : 9-14-18 19:49:46                          Operator: MA
Sample    : AZ79156S01 5X1/0.05/30.72G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3255.21
IntFile   : rteint.p

Data File : G:\ETHEL\DATA\180911\0911177.D\ECD2B.CH      Vial: 77
Acq On    : 9-14-18 19:49:47                          Operator: MA
Sample    : AZ79156S01 5X1/0.05/30.72G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3255.21
IntFile   : rteint2.p
Quant Time: Sep 17 14:59 2018  Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35MS          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

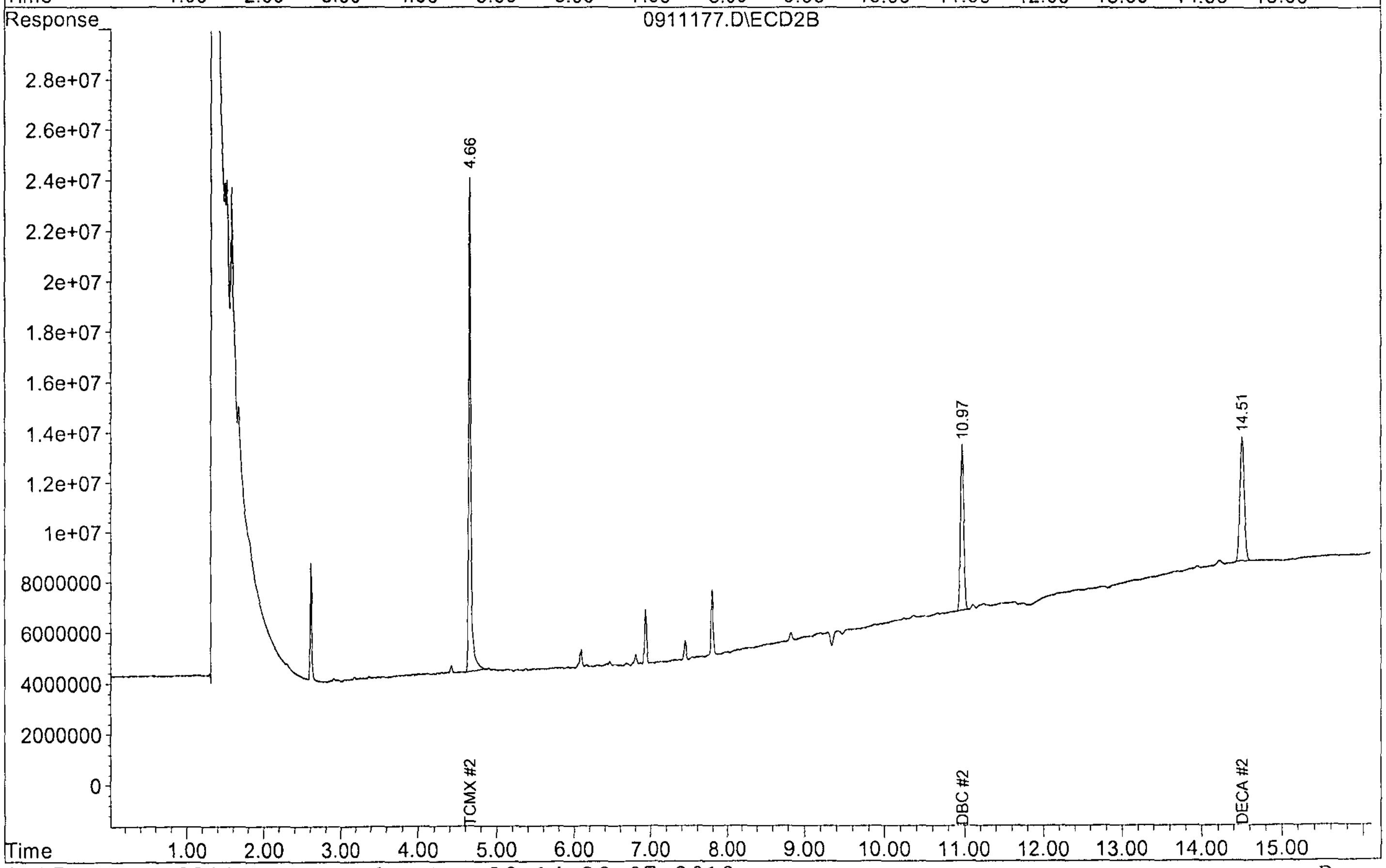
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.66	10102885	19632197	325.2285	298.7739
	Surrogate Spike 325.521			Recovery	=	99.91%	91.78%
23) S	DBC	9.66	10.97	14421635	6671187	253.1475	307.6183
	Surrogate Spike 325.521			Recovery	=	77.77%	94.50%
24) S	DECA	12.95	14.51	16539427	4999608	283.9255	295.8327
	Surrogate Spike 325.521			Recovery	=	87.22%	90.88%
	Target Compounds						
	Target Compounds						
2) TM	HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM	A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM	B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M	G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM	D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M	HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M	ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM	HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM	G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM	A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM	A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM	P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M	DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M	ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM	B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM	P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM	ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M	P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM	ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM	ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM	METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911177.D
Acq On : 9-14-18 19:49:46
Sample : AZ79156S01 5X1/0.05/30.72G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 77
Operator: MA
Inst : Ethel
Multiplr: 3255.21





Quantitation Report (QT Reviewed)

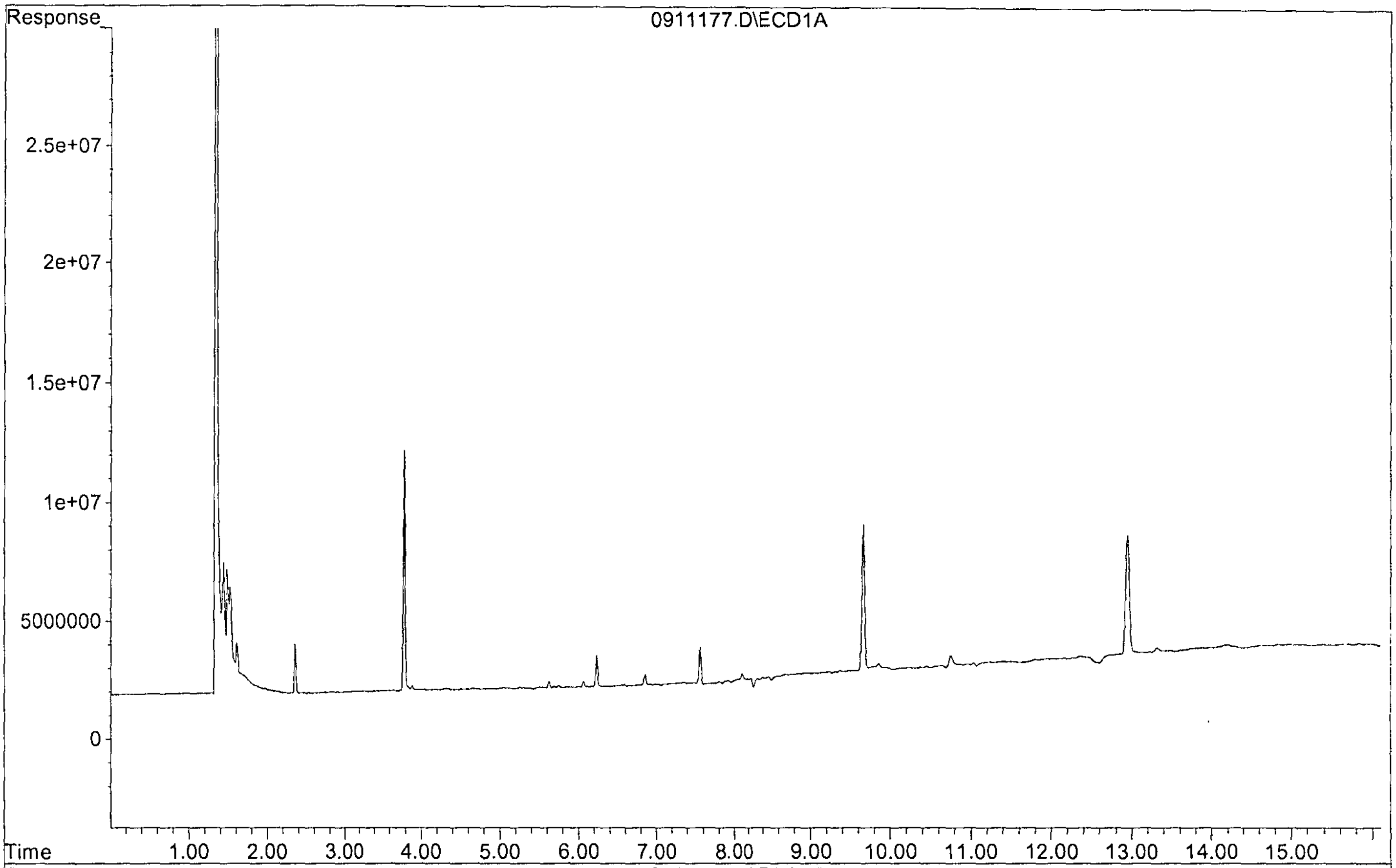
```
Data File : G:\ETHEL\DATA\180911\0911177.D\ECD1A.CH      Vial: 77
Acq On    : 9-14-18 19:49:46                          Operator: MA
Sample    : AZ79156S01 5X1/0.05/30.72G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3255.21
IntFile   : events.e

Data File : G:\ETHEL\DATA\180911\0911177.D\ECD2B.CH      Vial: 77
Acq On    : 9-14-18 19:49:47                          Operator: MA
Sample    : AZ79156S01 5X1/0.05/30.72G DF20           Inst    : Ethel
Misc      : soil                                      Multiplr: 3255.21
IntFile   : events2.e
Quant Time: Sep 17 14:59 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

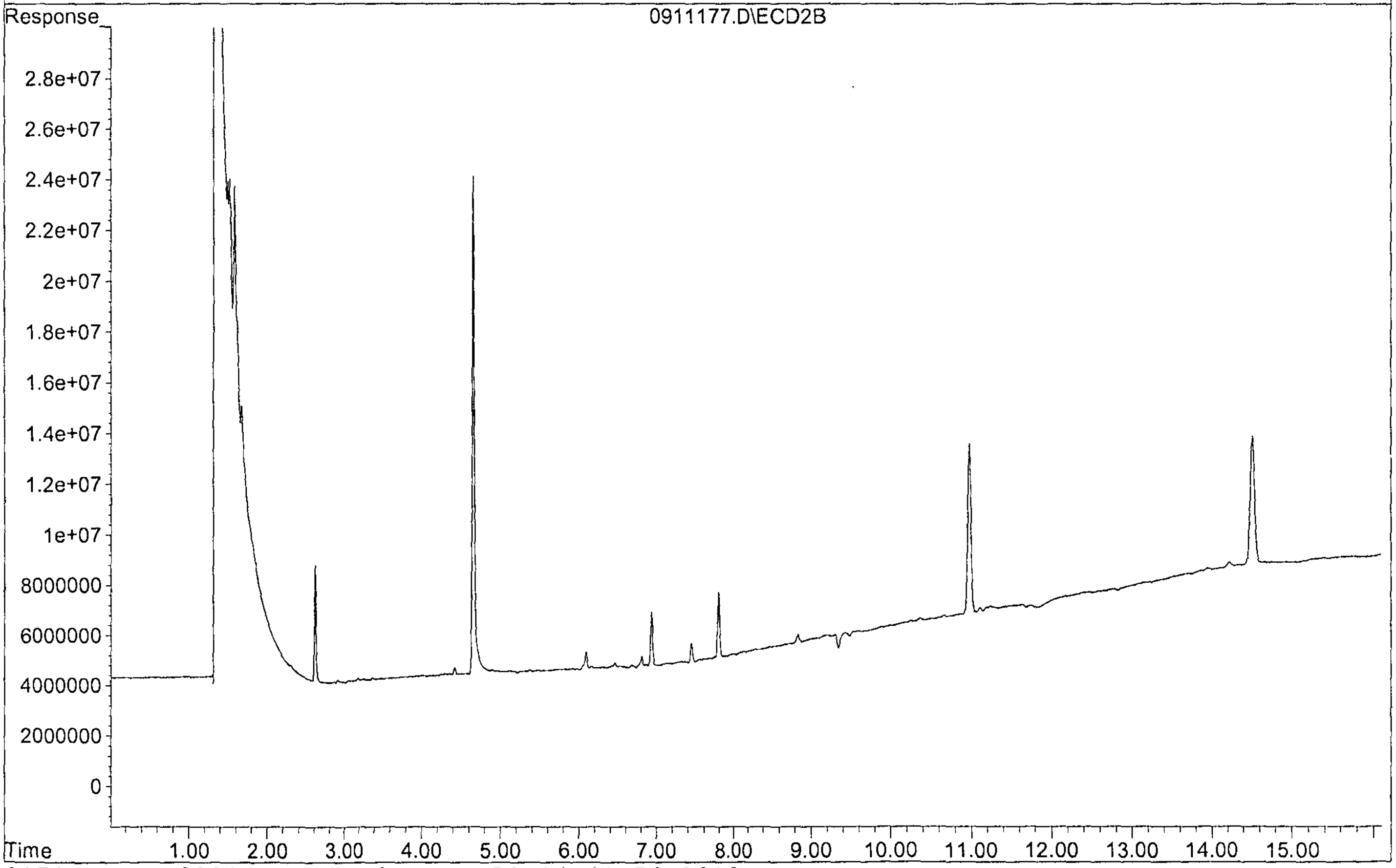
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911177.D
Acq On : 9-14-18 19:49:46
Sample : AZ79156S01 5X1/0.05/30.72G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 77
Operator: MA
Inst : Ethel
Multiplr: 3255.21





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911178.D\ECD1A.CH Vial: 78
Signal #2 : G:\ETHEL\DATA\180911\0911178.D\ECD2B.CH
Acq On : 9-14-18 20:08:44 Operator: MA
Sample : AZ79157S01 5X1/0.05/30.63G DF20 Inst : Ethel
Misc : soil Multiplr: 3264.77
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:59 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

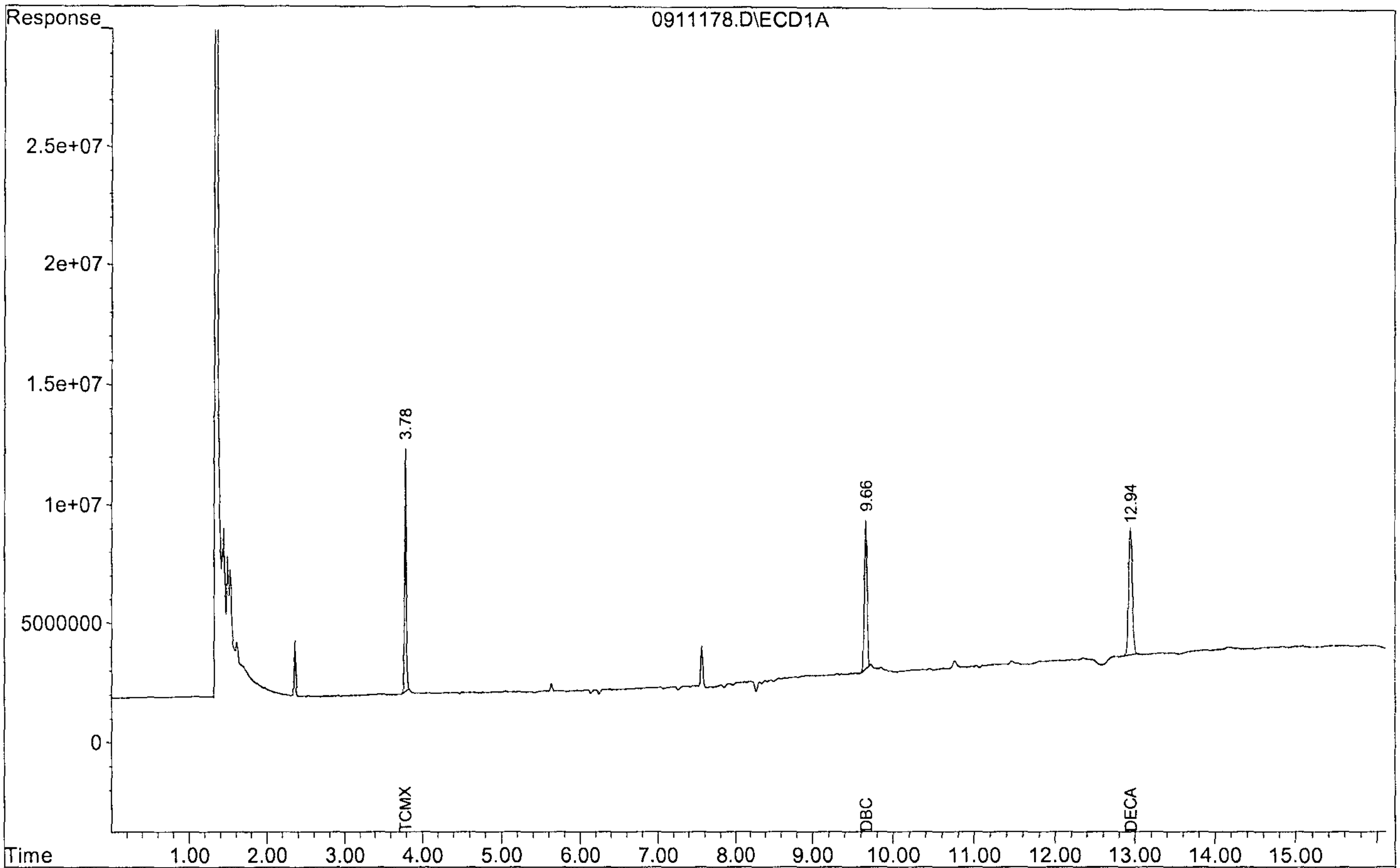
Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

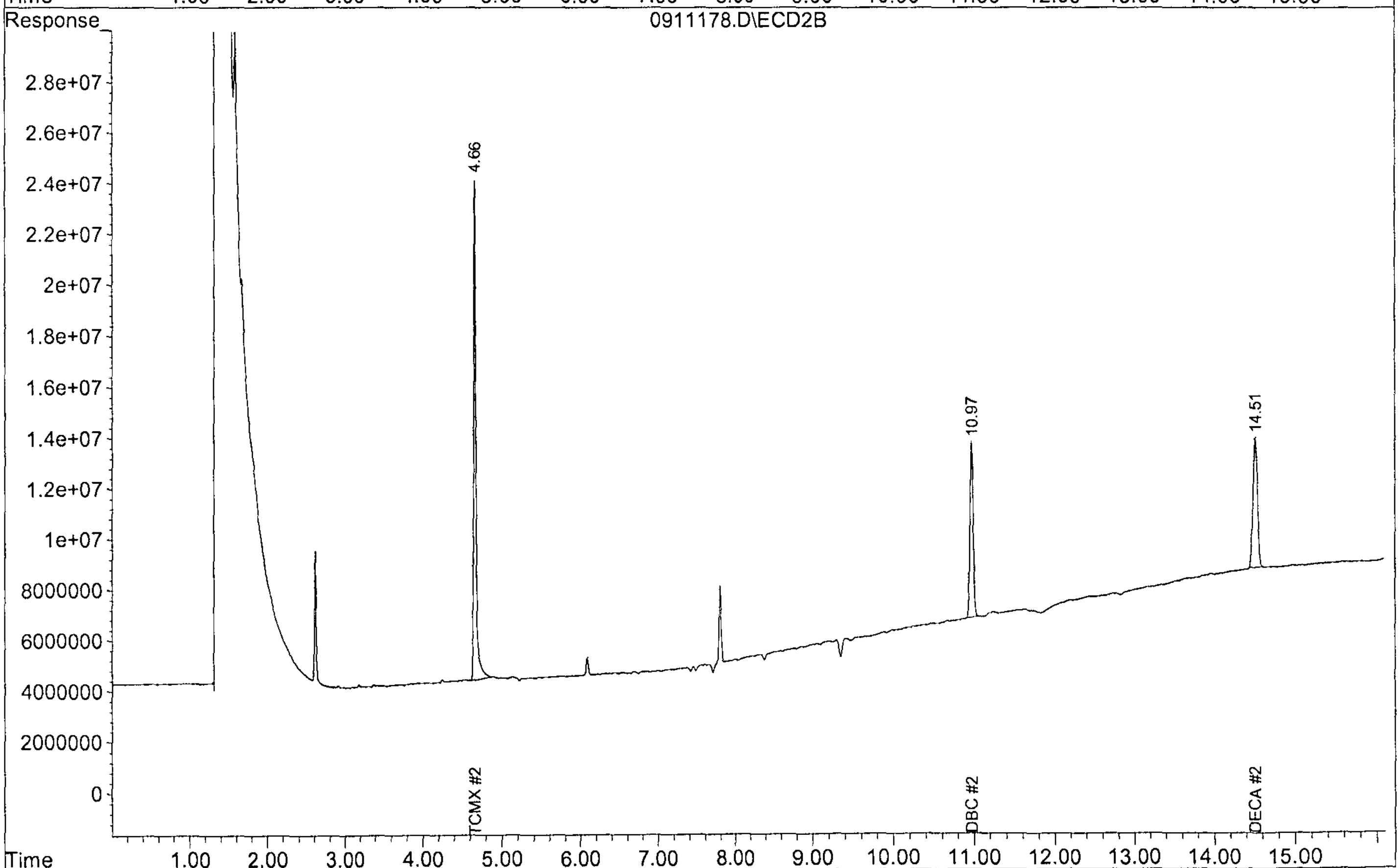
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.78	4.66	10228574	19646941	330.2417	299.8764
Surrogate Spike 326.477			Recovery	=	101.15%	91.85%
23) S DBC	9.66	10.97	14397660	6988612	253.4688	323.2016 #
Surrogate Spike 326.477			Recovery	=	77.64%	99.00%
24) S DECA	12.94	14.51	17217687	5179117	296.4370	307.3545
Surrogate Spike 326.477			Recovery	=	90.80%	94.14%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911178.D
Acq On : 9-14-18 20:08:44
Sample : AZ79157S01 5X1/0.05/30.63G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 78
Operator: MA
Inst : Ethel
Multiplr: 3264.77





Quantitation Report (QT Reviewed)

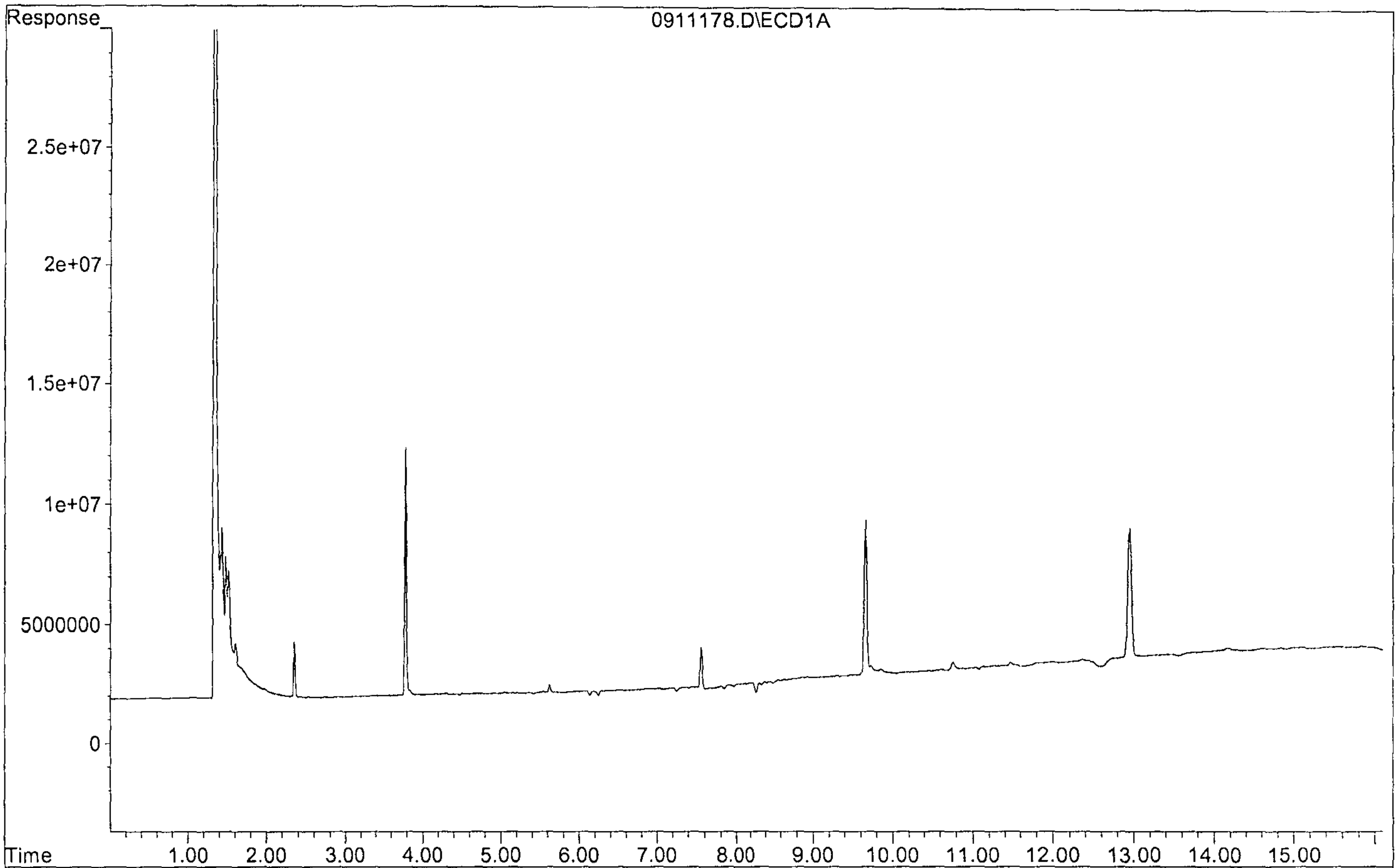
```
Signal #1 : G:\ETHEL\DATA\180911\0911178.D\ECD1A.CH       Vial: 78
Signal #2 : G:\ETHEL\DATA\180911\0911178.D\ECD2B.CH
Acq On    : 9-14-18 20:08:44                            Operator: MA
Sample    : AZ79157S01 5X1/0.05/30.63G DF20            Inst    : Ethel
Misc      : soil                                        Multiplr: 3264.77
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 15:00 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

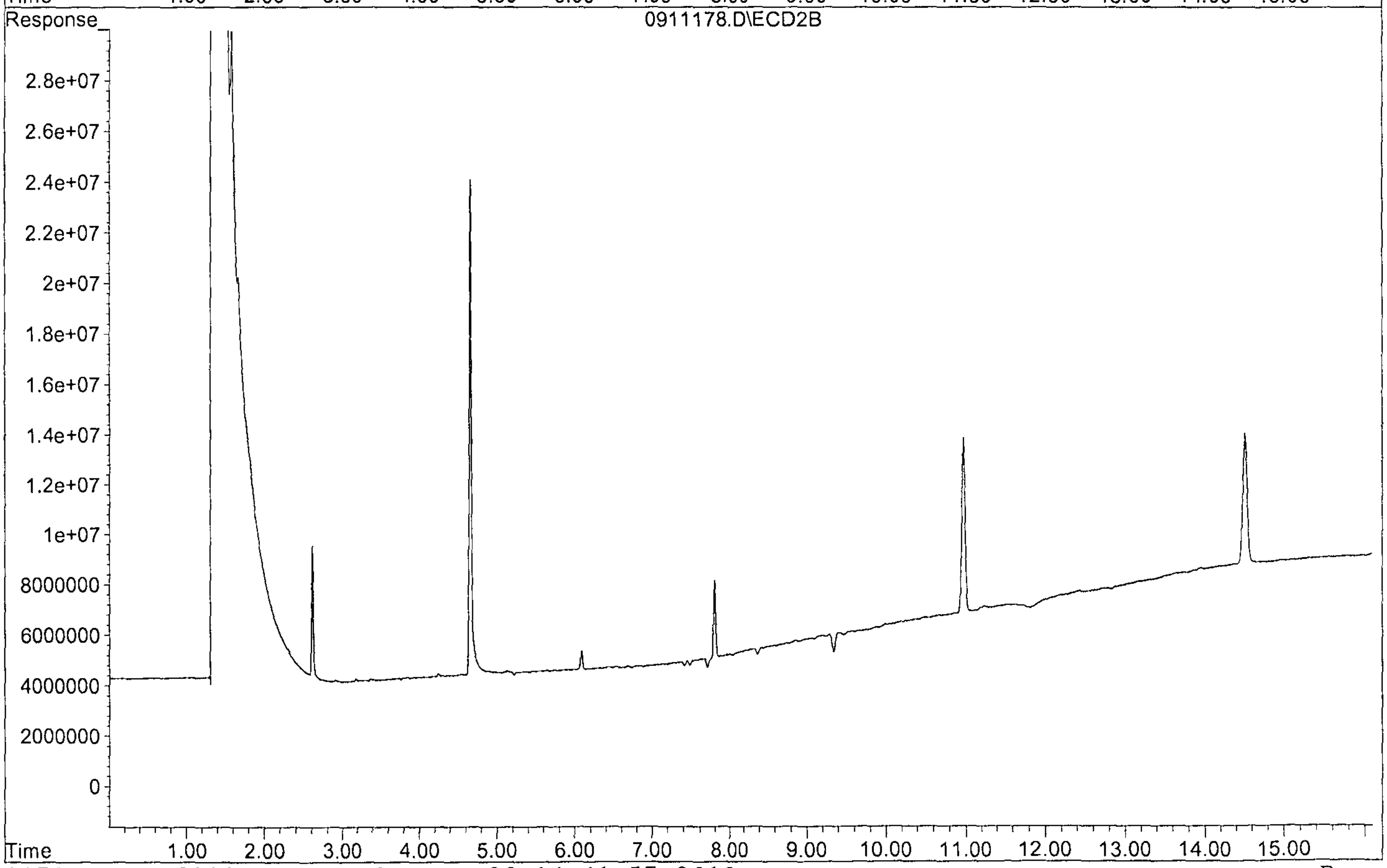
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911178.D
Acq On : 9-14-18 20:08:44
Sample : AZ79157S01 5X1/0.05/30.63G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 78
Operator: MA
Inst : Ethel
Multiplr: 3264.77





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911179.D\ECD1A.CH Vial: 79
Signal #2 : G:\ETHEL\DATA\180911\0911179.D\ECD2B.CH
Acq On : 9-14-18 20:27:52 Operator: MA
Sample : AZ79158S01 5X1/0.05/30.30G DF20 Inst : Ethel
Misc : soil Multiplr: 3300.33
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 15:00 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

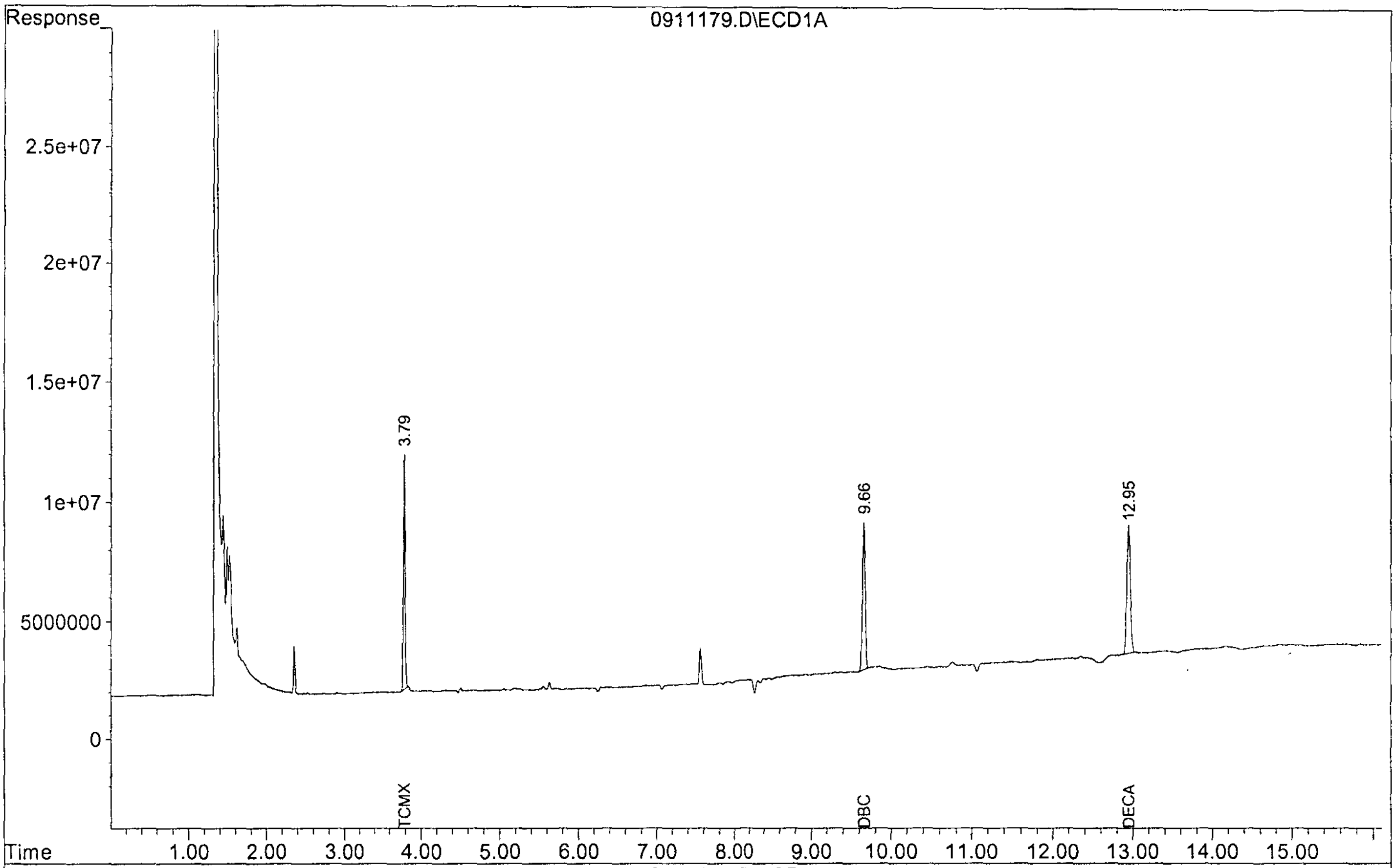
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	9829726	19554209	320.8212	301.7118
Surrogate Spike 330.033			Recovery	=	97.21%	91.42%
23) S DBC	9.66	10.97	14518796	6824270	258.3854	319.0389
Surrogate Spike 330.033			Recovery	=	78.29%	96.67%
24) S DECA	12.95	14.51	16735612	4916357	291.2755	294.9389
Surrogate Spike 330.033			Recovery	=	88.26%	89.37%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

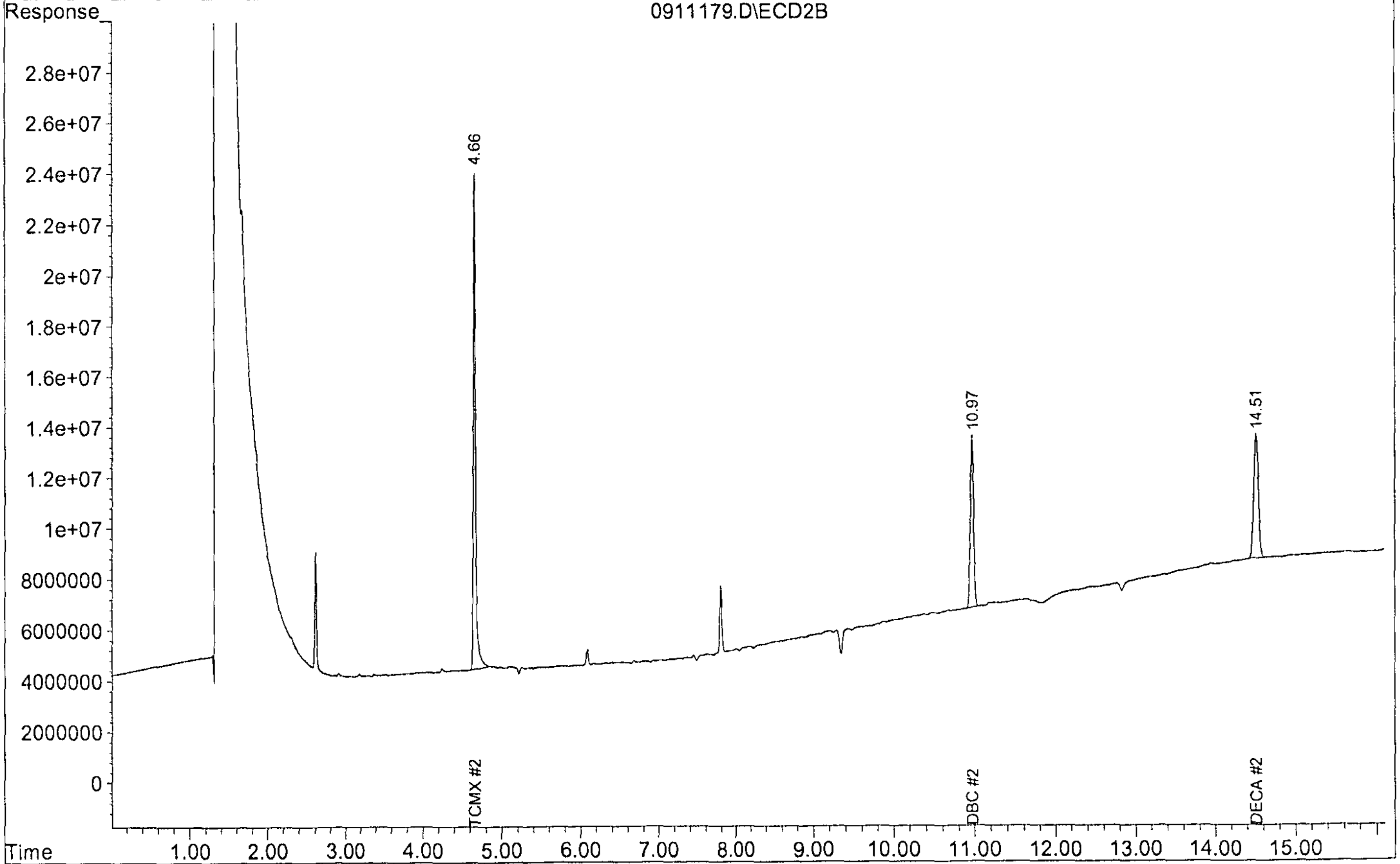
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911179.D
Acq On : 9-14-18 20:27:52
Sample : AZ79158S01 5X1/0.05/30.30G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 79
Operator: MA
Inst : Ethel
Multiplr: 3300.33





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911179.D\ECD1A.CH Vial: 79
Signal #2 : G:\ETHEL\DATA\180911\0911179.D\ECD2B.CH
Acq On : 9-14-18 20:27:52 Operator: MA
Sample : AZ79158S01 5X1/0.05/30.30G DF20 Inst : Ethel
Misc : soil Multiplr: 3300.33
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 15:00 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

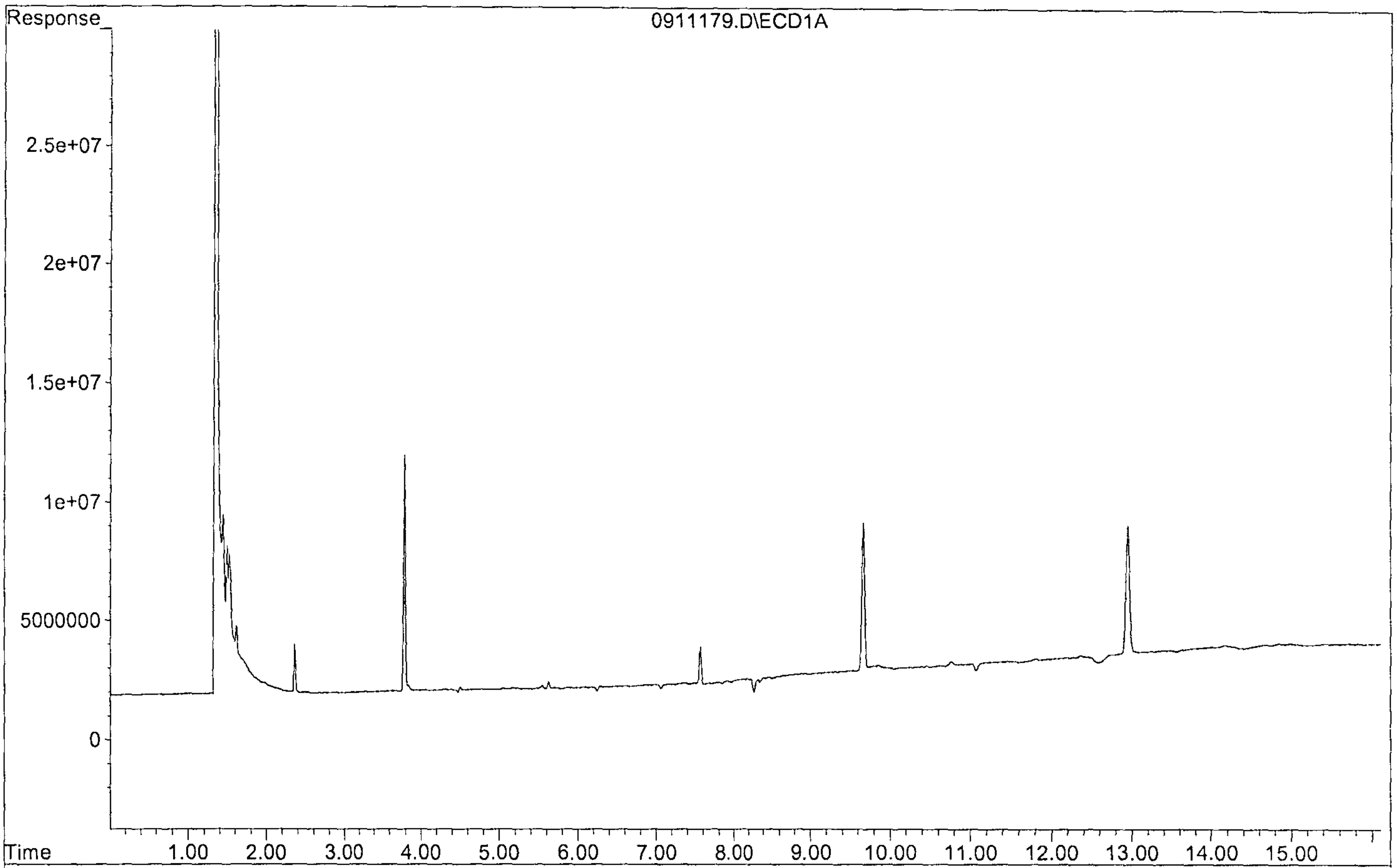
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

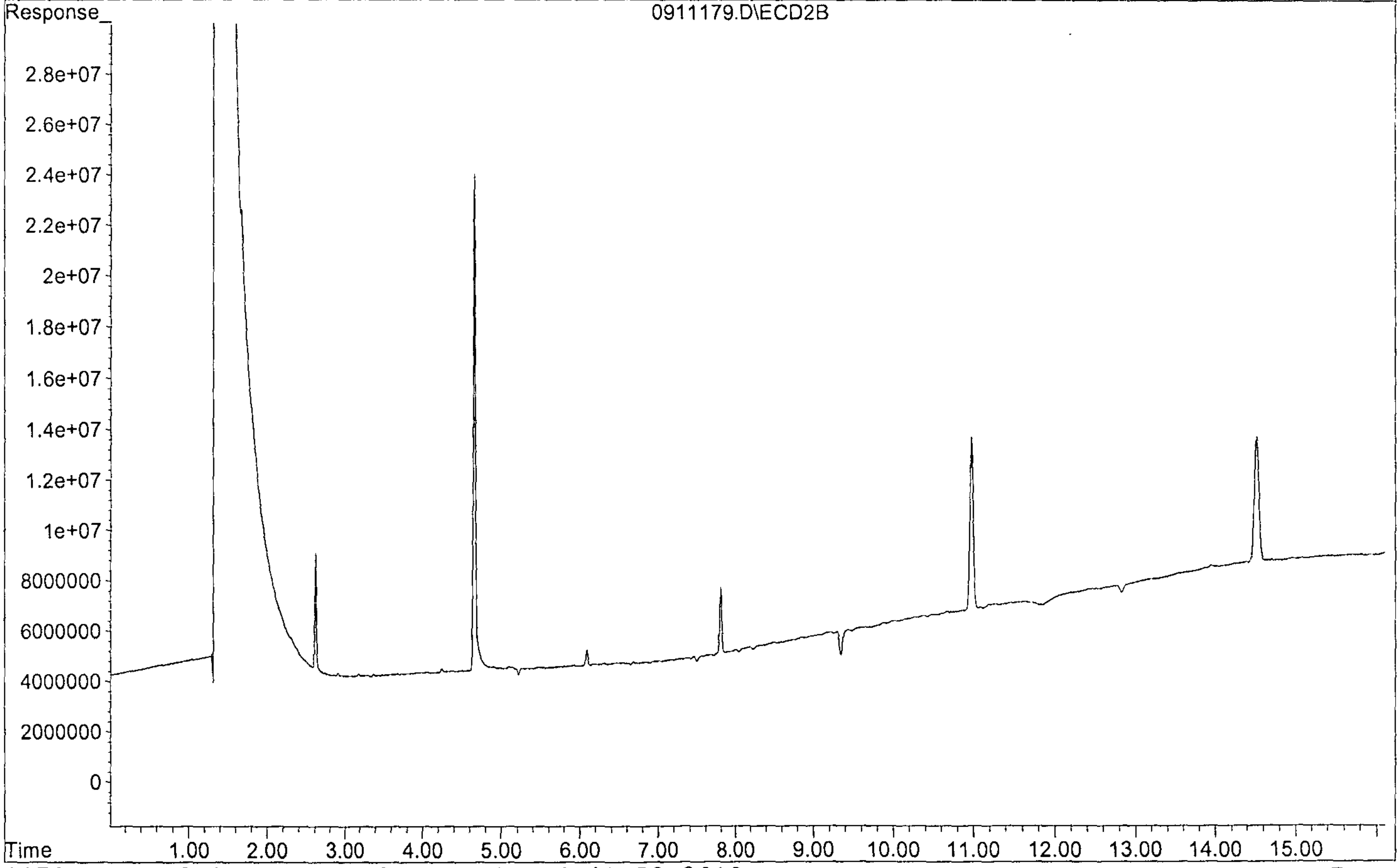
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911179.D
Acq On : 9-14-18 20:27:52
Sample : AZ79158S01 5X1/0.05/30.30G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 79
Operator: MA
Inst : Ethel
Multiplr: 3300.33





Quantitation Report (QT Reviewed)

```
Signal #1 : G:\ETHEL\DATA\180911\0911180.D\ECD1A.CH      Vial: 80
Signal #2 : G:\ETHEL\DATA\180911\0911180.D\ECD2B.CH
Acq On    : 9-14-18 20:46:55                           Operator: MA
Sample    : AZ79159S01 5X1/0.05/30.22G DF20            Inst    : Ethel
Misc      : soil                                       Multiplr: 3309.07
IntFile Signal #1: rteint.p    IntFile Signal #2: rteint2.p
Quant Time: Sep 17 15:01 2018  Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35MS          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

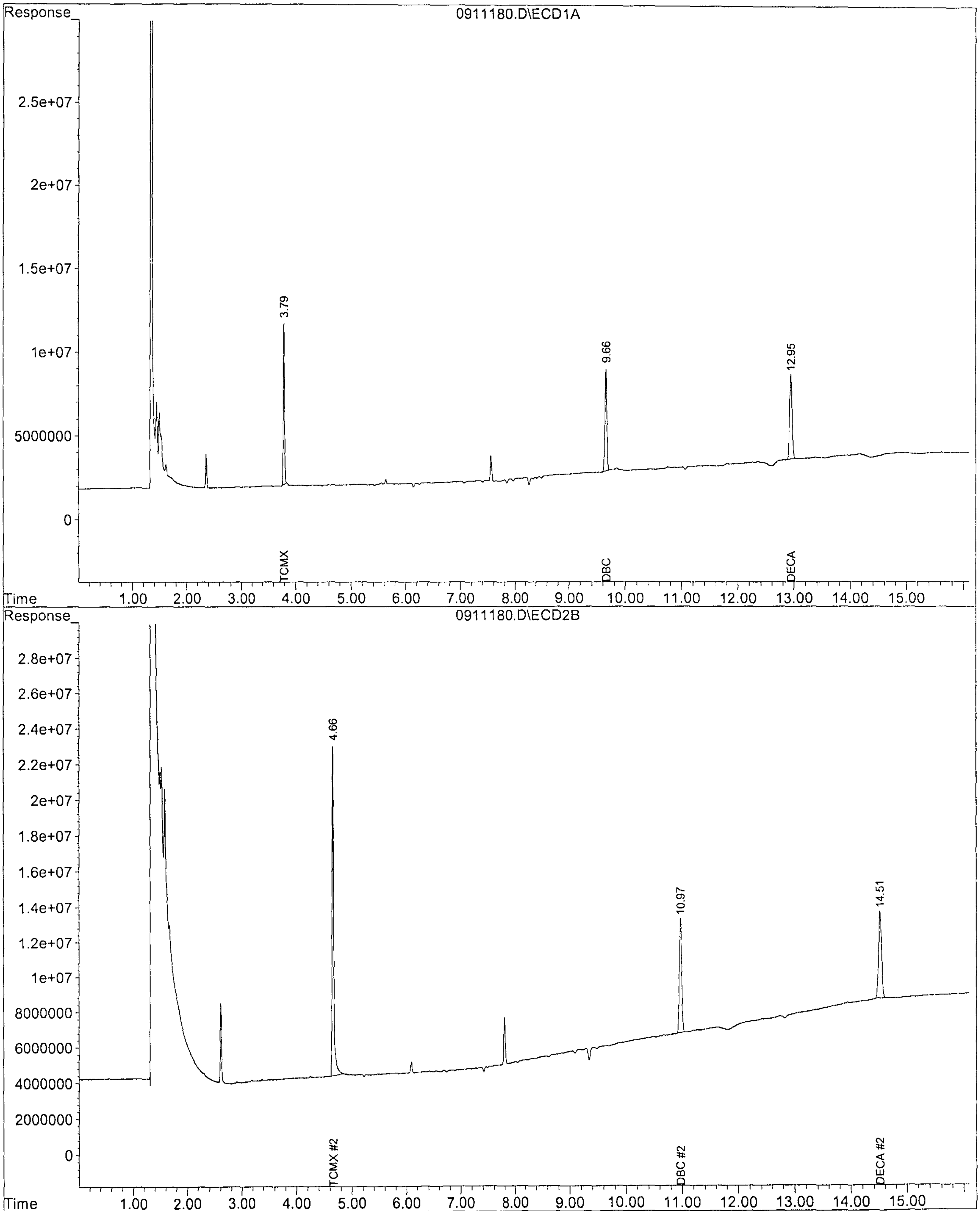
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	9597314	18568965	314.0652	287.2688
Surrogate Spike 330.907			Recovery	=	94.91%	86.81%
23) S DBC	9.66	10.97	14110531	6527611	251.7847	305.9780
Surrogate Spike 330.907			Recovery	=	76.09%	92.47%
24) S DECA	12.95	14.51	16326607	4958225	284.9095	298.2383
Surrogate Spike 330.907			Recovery	=	86.10%	90.13%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911180.D
Acq On : 9-14-18 20:46:55
Sample : AZ79159S01 5X1/0.05/30.22G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 80
Operator: MA
Inst : Ethel
Multiplr: 3309.07



Quantitation Report (QT Reviewed)

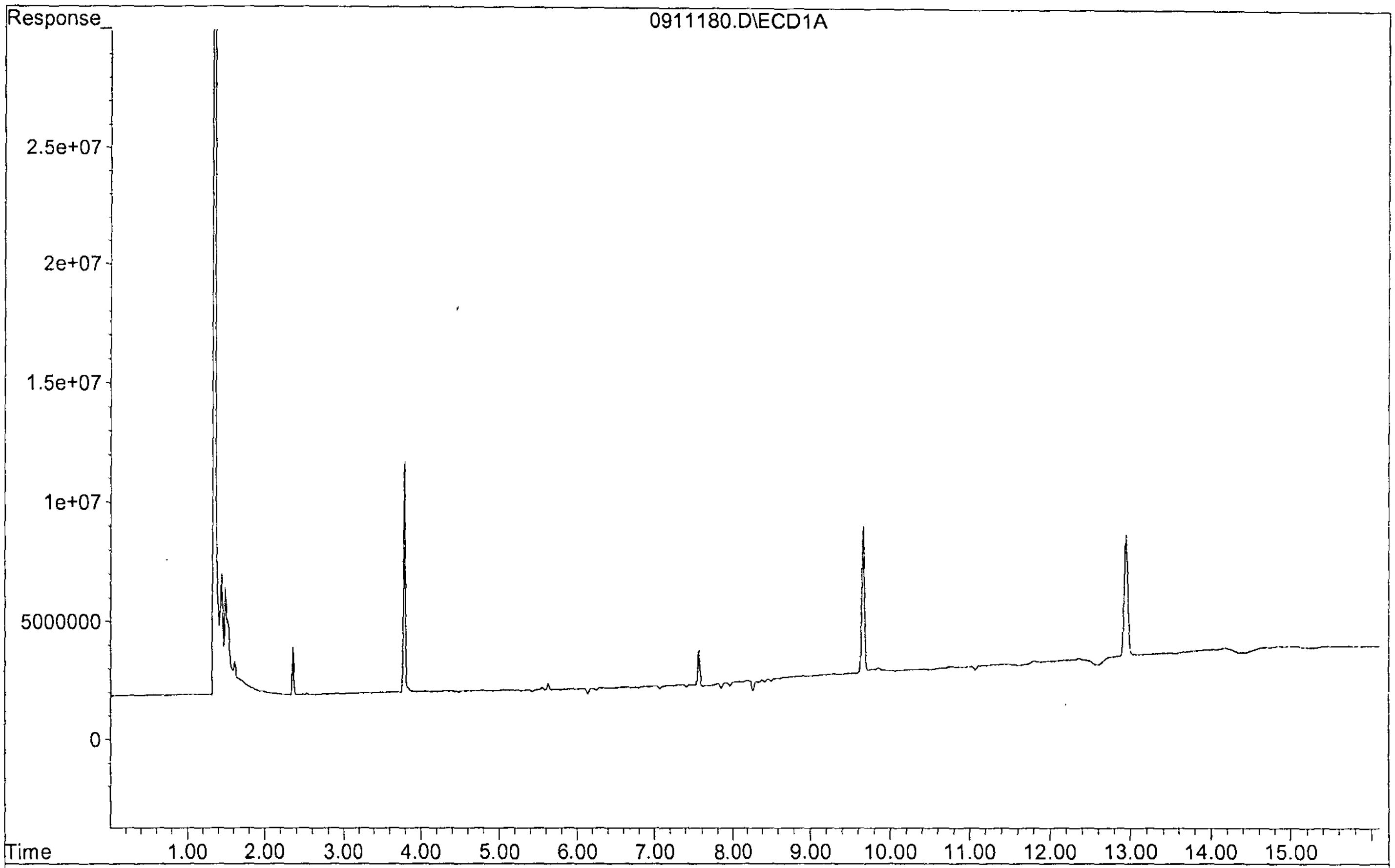
```
Signal #1 : G:\ETHEL\DATA\180911\0911180.D\ECD1A.CH      Vial: 80
Signal #2 : G:\ETHEL\DATA\180911\0911180.D\ECD2B.CH
Acq On    : 9-14-18 20:46:55                           Operator: MA
Sample    : AZ79159S01 5X1/0.05/30.22G DF20            Inst    : Ethel
Misc      : soil                                       Multiplr: 3309.07
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 15:01 2018  Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title        : 508/608/8081
Last Update  : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2ul
Signal #1 Phase : DB-35ms          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

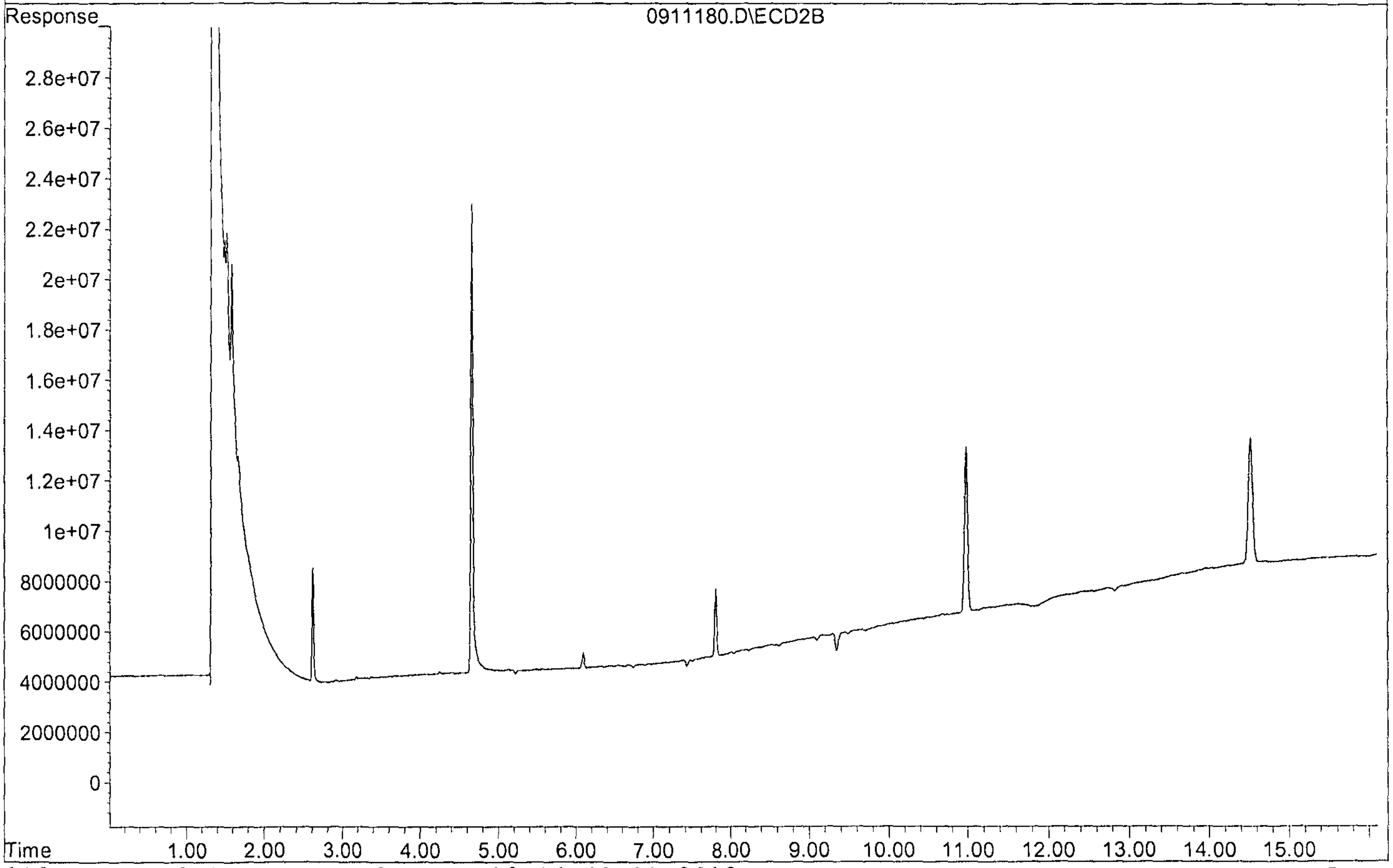
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911180.D
Acq On : 9-14-18 20:46:55
Sample : AZ79159S01 5X1/0.05/30.22G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 80
Operator: MA
Inst : Ethel
Multiplr: 3309.07





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911181.D\ECD1A.CH Vial: 81
Signal #2 : G:\ETHEL\DATA\180911\0911181.D\ECD2B.CH
Acq On : 9-14-18 21:05:53 Operator: MA
Sample : AZ79160S01 5X1/0.05/30.69G DF20 Inst : Ethel
Misc : soil Multiplr: 3258.39
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 15:11 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

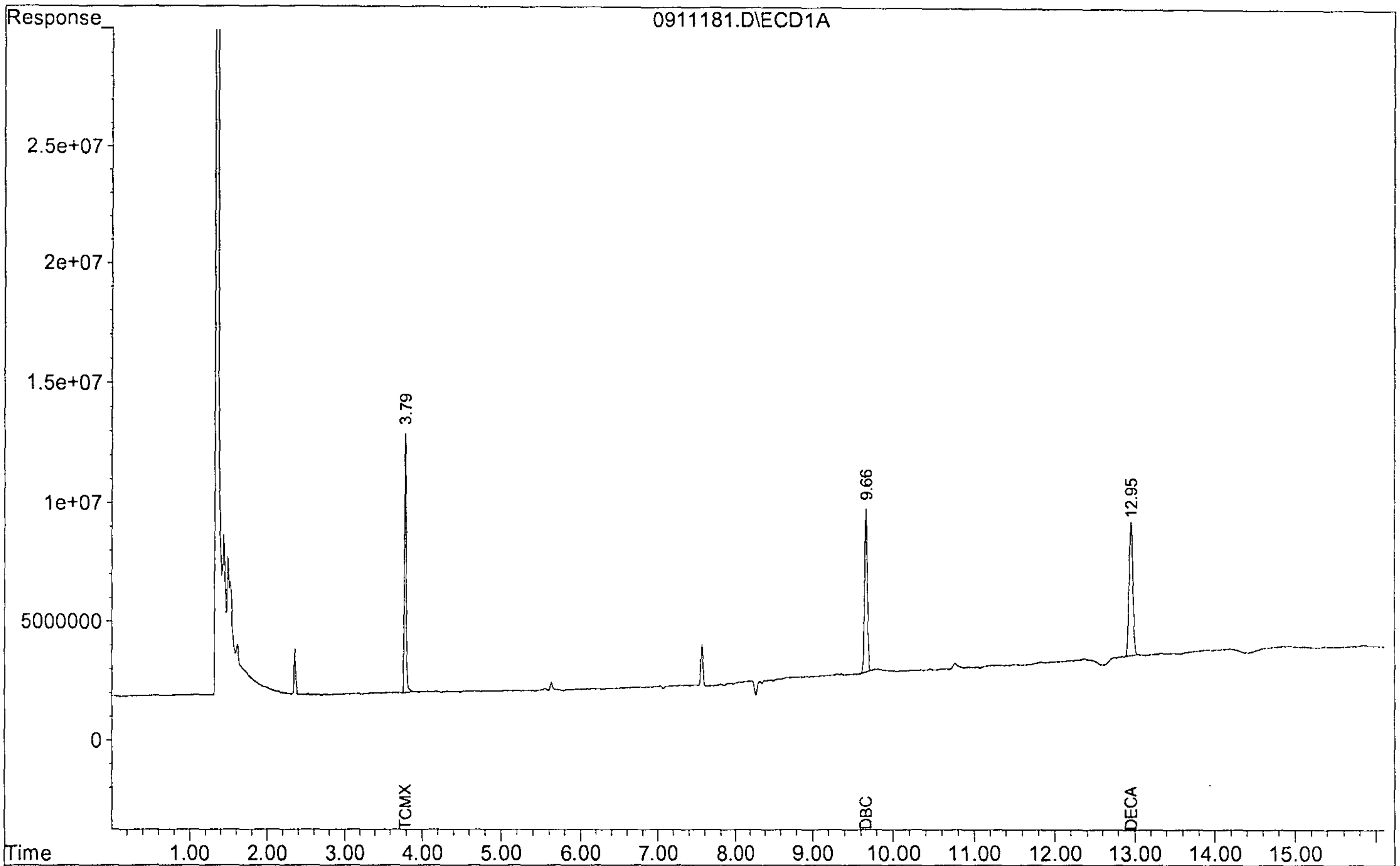
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10891719	20626032	350.9649	314.2053
Surrogate Spike 325.839			Recovery	=	107.71%	96.43%
23) S DBC	9.66	10.97	16265971	7270652	285.8006	335.5880
Surrogate Spike 325.839			Recovery	=	87.71%	102.99%
24) S DECA	12.95	14.51	18296498	5392092	314.3953	319.3682
Surrogate Spike 325.839			Recovery	=	96.49%	98.01%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

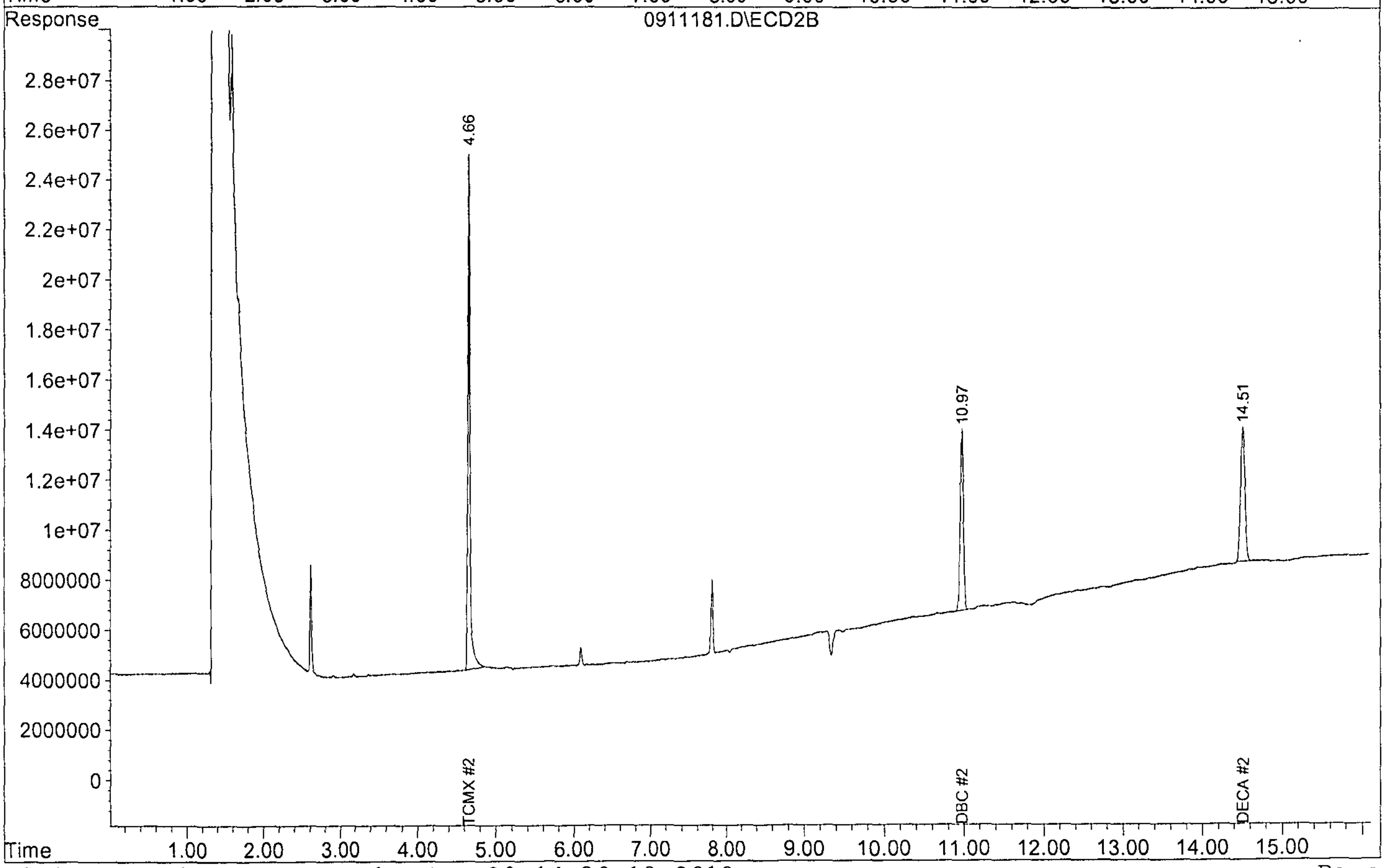
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911181.D
Acq On : 9-14-18 21:05:53
Sample : AZ79160S01 5X1/0.05/30.69G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 81
Operator: MA
Inst : Ethel
Multiplr: 3258.39





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911181.D\ECD1A.CH Vial: 81
Signal #2 : G:\ETHEL\DATA\180911\0911181.D\ECD2B.CH
Acq On : 9-14-18 21:05:53 Operator: MA
Sample : AZ79160S01 5X1/0.05/30.69G DF20 Inst : Ethel
Misc : soil Multiplr: 3258.39
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 15:11 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

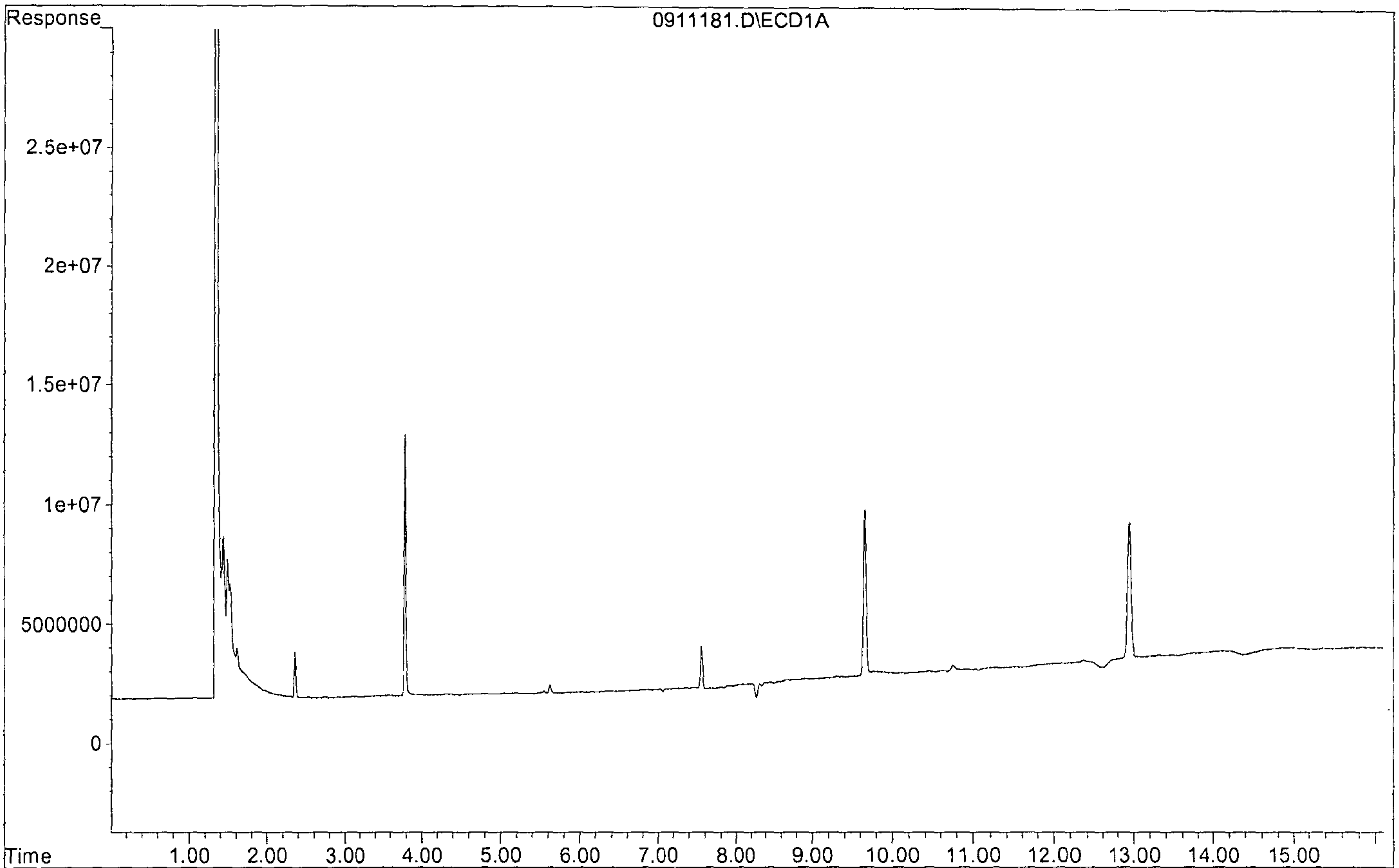
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

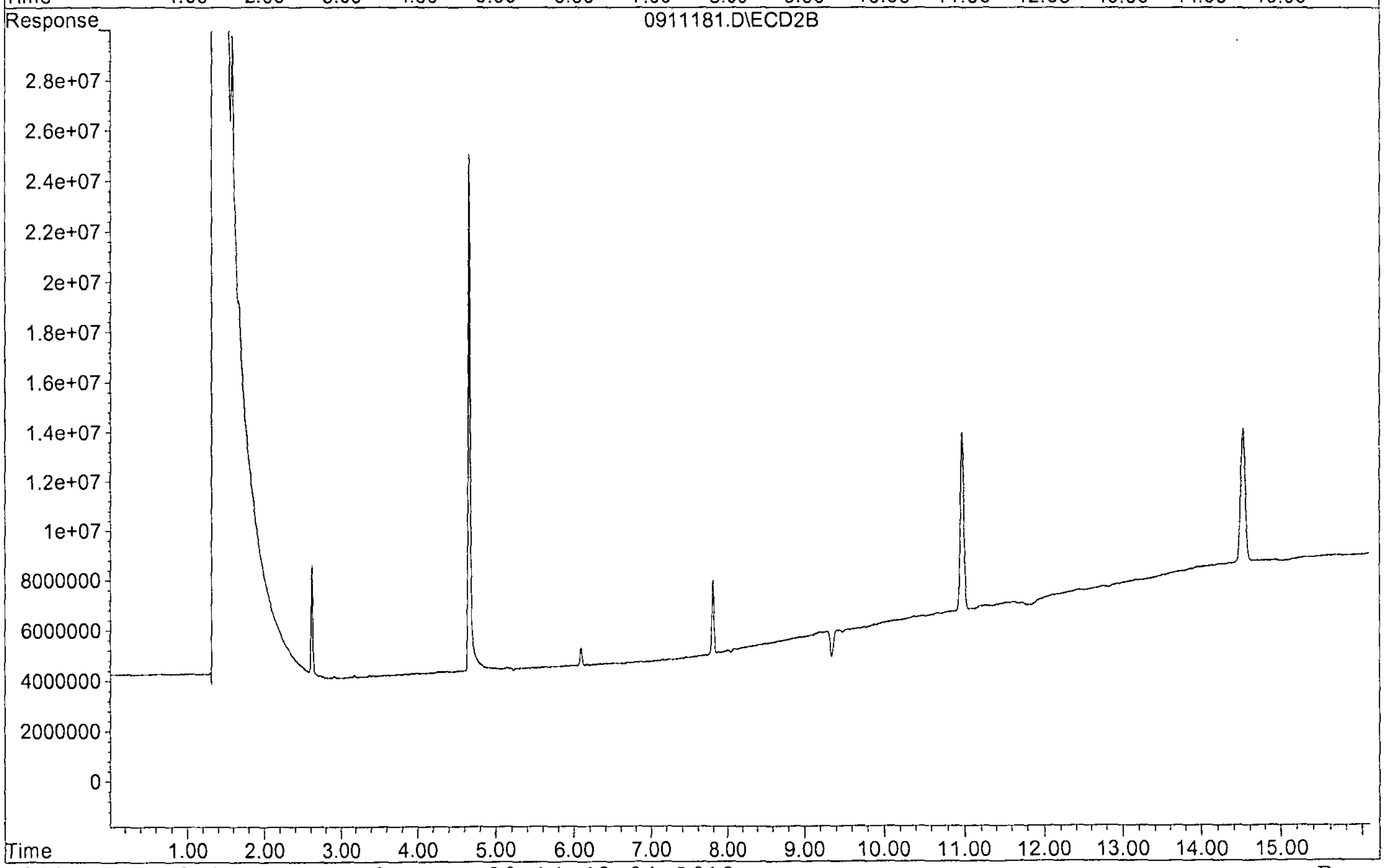
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911181.D
Acq On : 9-14-18 21:05:53
Sample : AZ79160S01 5X1/0.05/30.69G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 81
Operator: MA
Inst : Ethel
Multiplr: 3258.39





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911038.D\ECD1A.CH Vial: 38
Signal #2 : G:\ETHEL\DATA\180911\0911038.D\ECD2B.CH
Acq On : 9-12-18 13:02:09 Operator: MA
Sample : AZ79179W06 1/490 DF5 Inst : Ethel
Misc : water Multiplr: 10.20
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 13:23 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

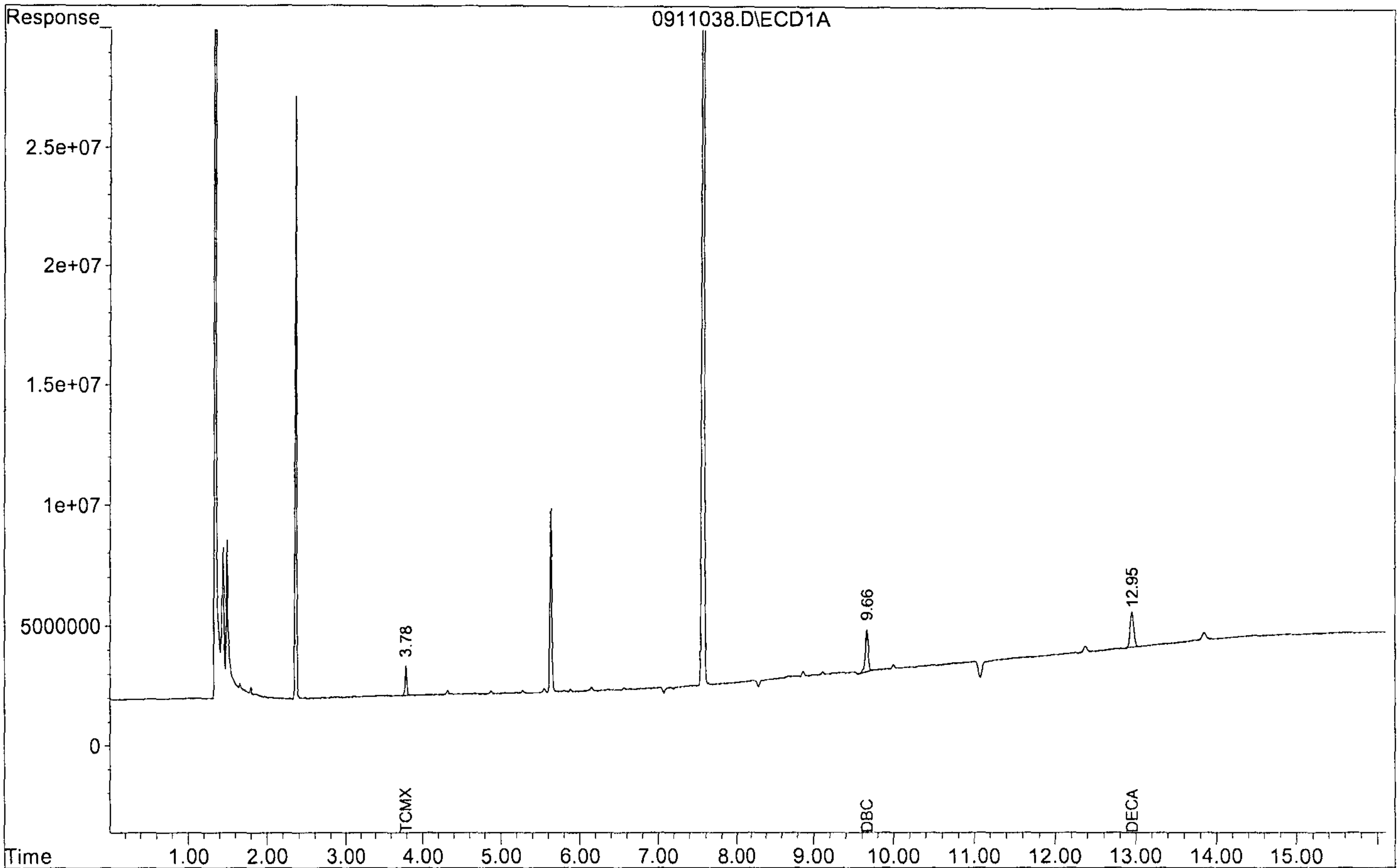
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.78	4.66	1223045	2925132	0.1234	0.1395
Surrogate Spike 0.306 Range 25 - 150			Recovery =		40.31%	45.57%
23) S DBC	9.66	10.98	4503050	1708029	0.2478	0.2469
Surrogate Spike 0.306			Recovery =		80.95%	80.65%
24) S DECA	12.95	14.52	4580771	1376200	0.2465	0.2553
Surrogate Spike 0.306 Range 25 - 150			Recovery =		80.52%	83.40%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

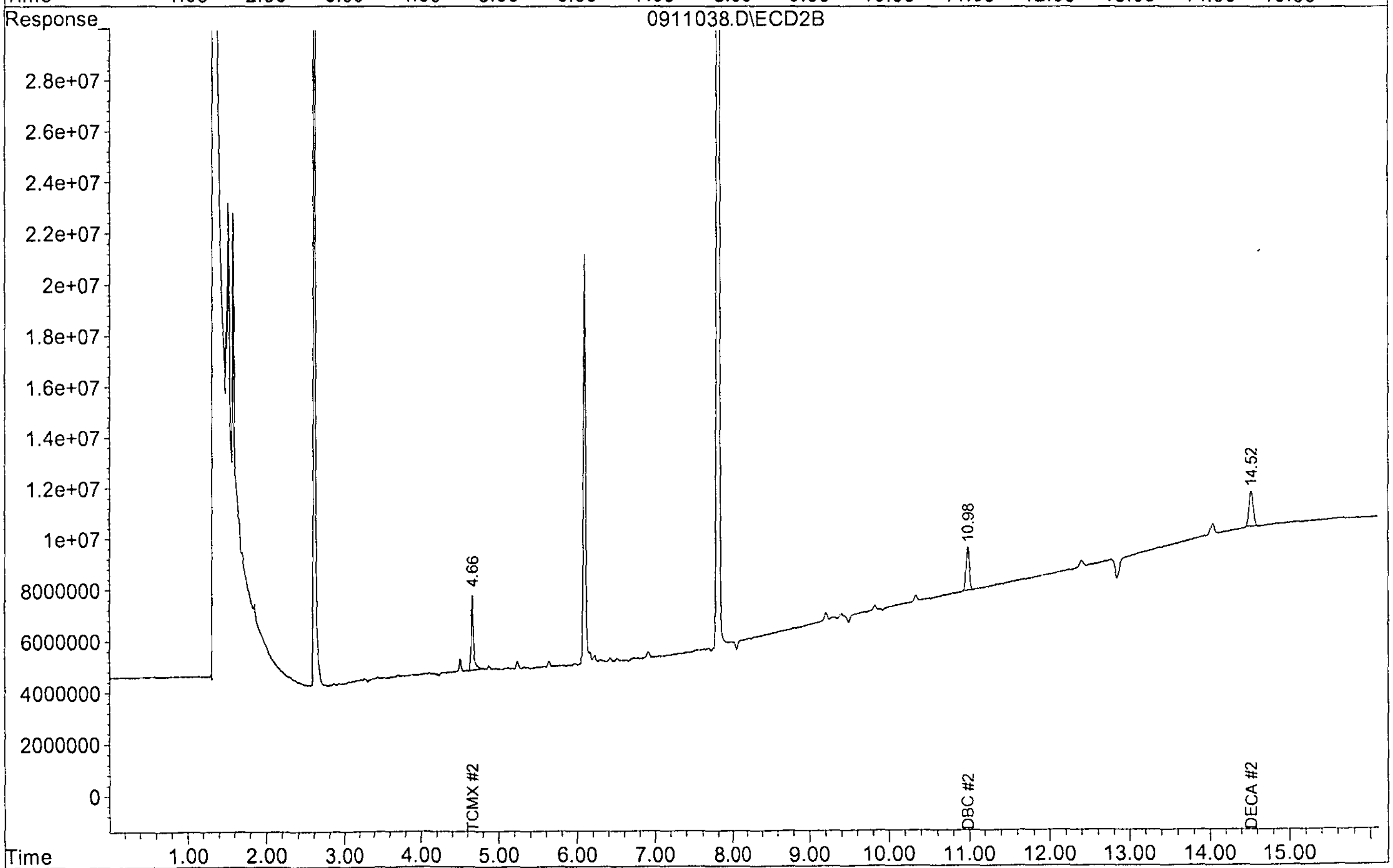
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911038.D
Acq On : 9-12-18 13:02:09
Sample : AZ79179W06 1/490 DF5
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 38
Operator: MA
Inst : Ethel
Multiplr: 10.20





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911038.D\ECD1A.CH Vial: 38
Signal #2 : G:\ETHEL\DATA\180911\0911038.D\ECD2B.CH
Acq On : 9-12-18 13:02:09 Operator: MA
Sample : AZ79179W06 1/490 DF5 Inst : Ethel
Misc : water Multiplr: 10.20
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 13:23 2018 Quant Results File: TOX0911.RES

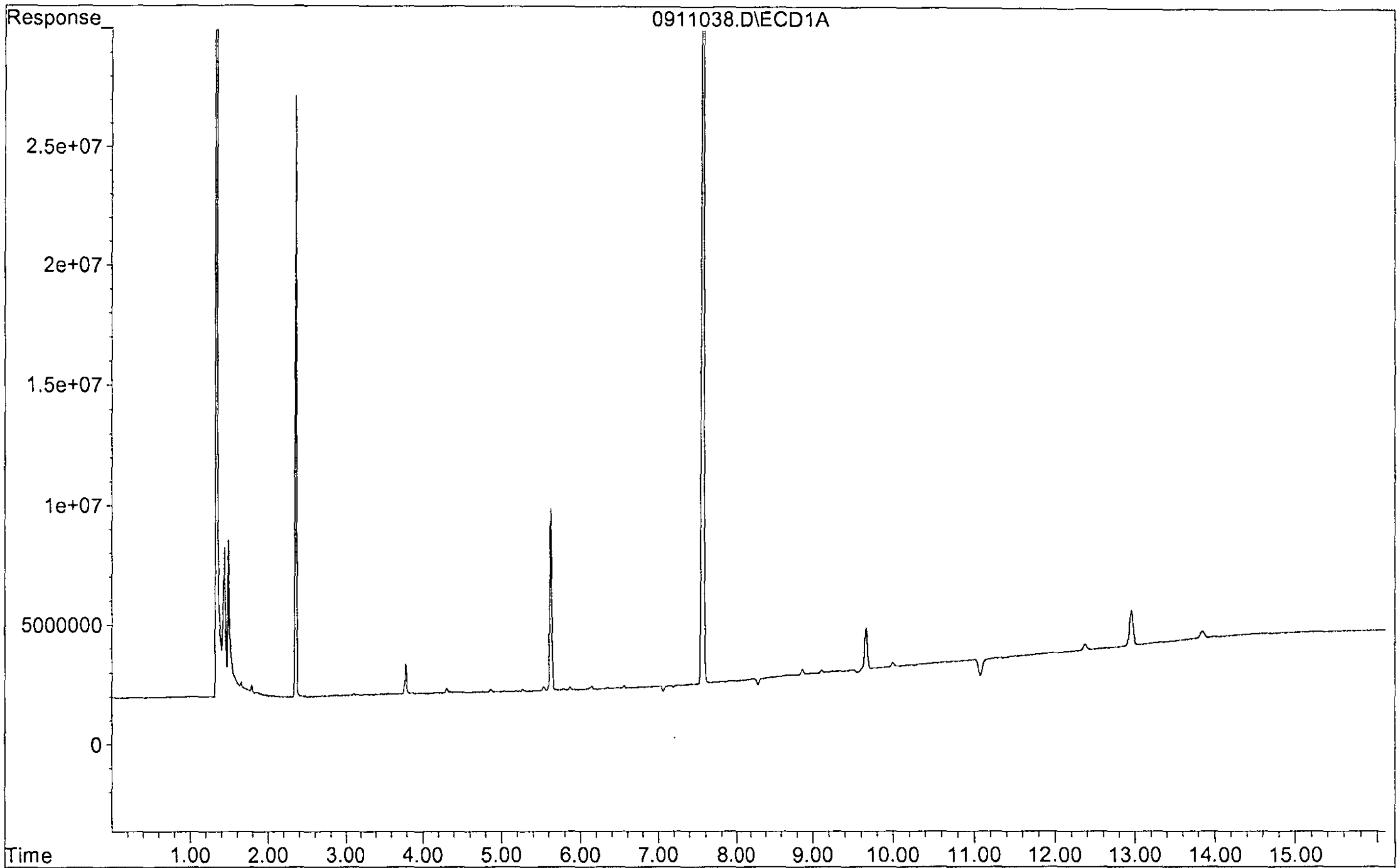
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

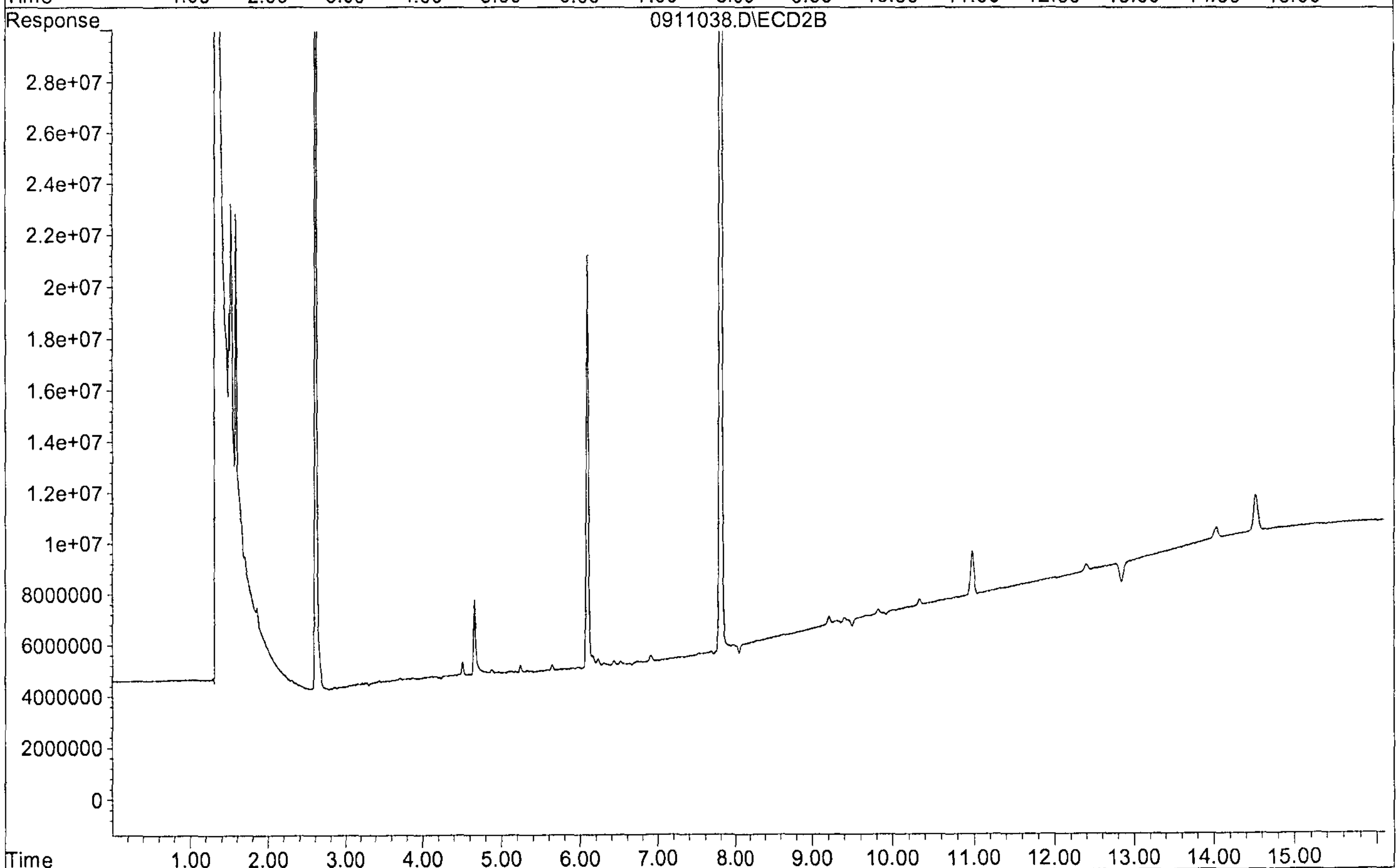
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

Data File : G:\ETHEL\DATA\180911\0911038.D
Acq On : 9-12-18 13:02:09
Sample : AZ79179W06 1/490 DF5
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 38
Operator: MA
Inst : Ethel
Multiplr: 10.20





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911153.D\ECD1A.CH Vial: 53
Signal #2 : G:\ETHEL\DATA\180911\0911153.D\ECD2B.CH
Acq On : 9-14-18 12:13:42 Operator: MA
Sample : 180912A BLK 5X1/0.05/30.12G DF20 Inst : Ethel
Misc : soil Multiplr: 3320.05
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 14 15:13 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

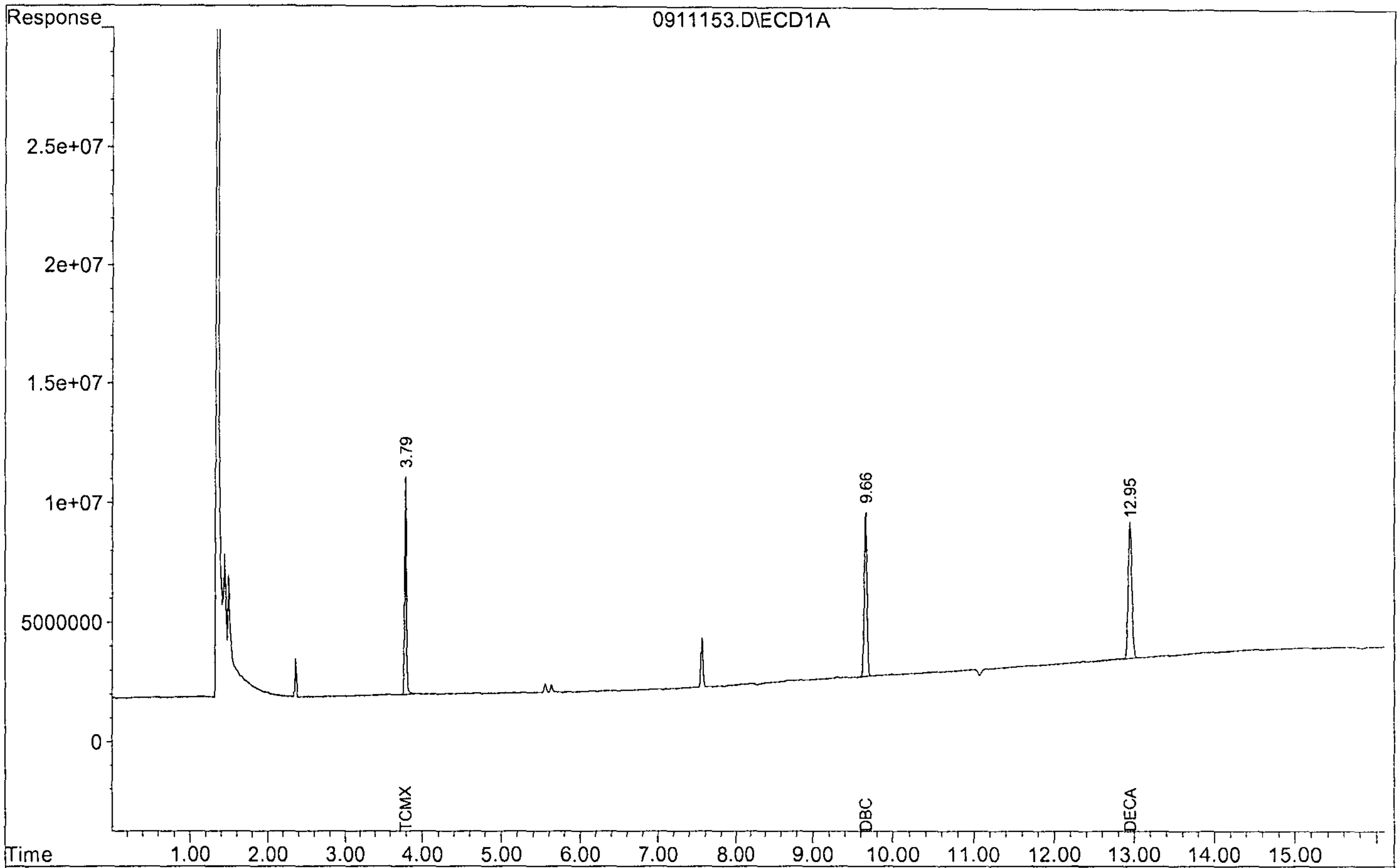
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	9106430	17936658	298.9902	278.4075
Surrogate Spike 332.005			Recovery	=	90.06%	83.86%
23) S DBC	9.66	10.98	16113064	6683013	288.4714	314.3019
Surrogate Spike 332.005			Recovery	=	86.89%	94.67%
24) S DECA	12.95	14.51	18358804	5005293	321.4356	302.0685
Surrogate Spike 332.005			Recovery	=	96.82%	90.98%
Target Compounds						
Target Compounds						
2) TM HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

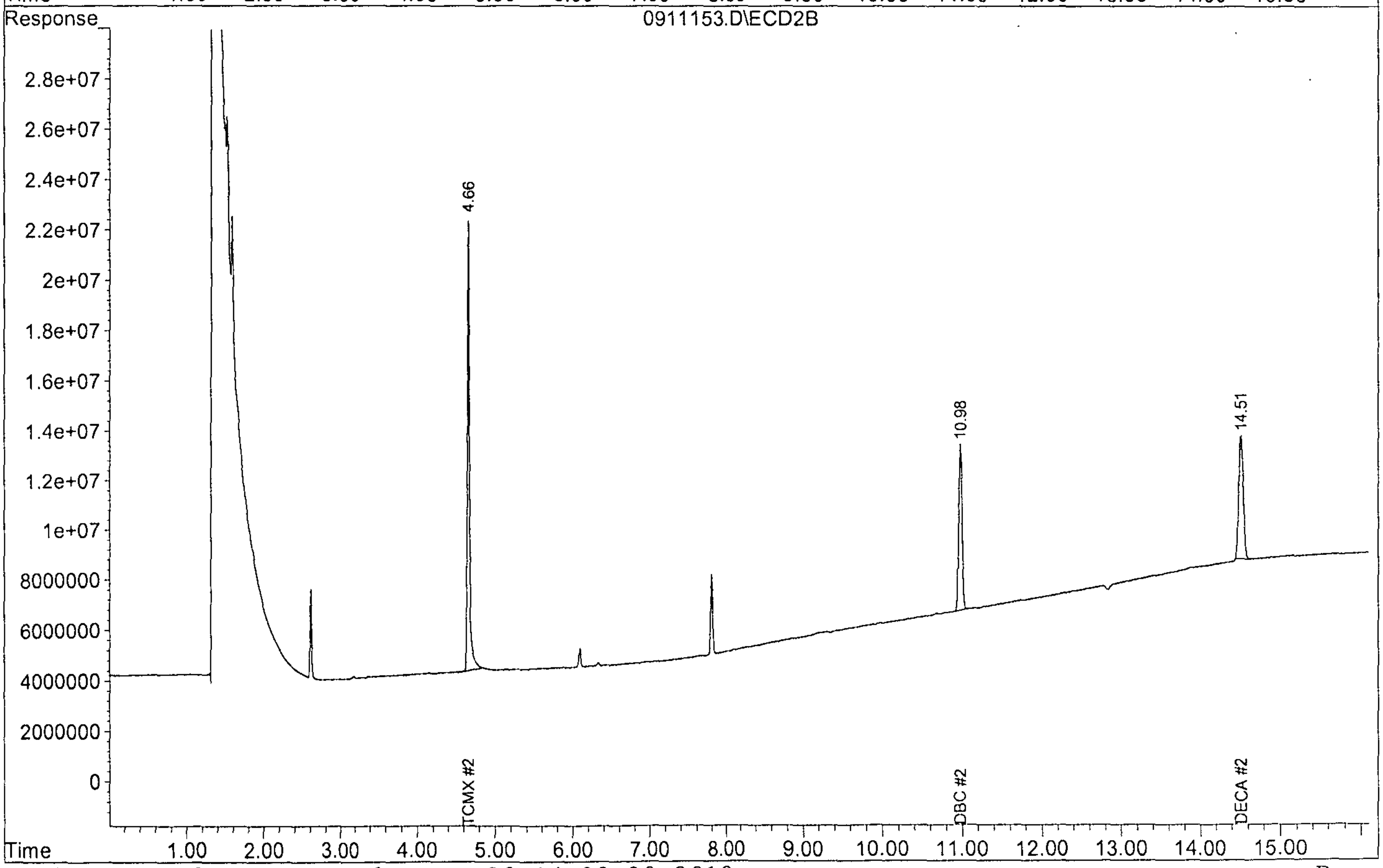
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911153.D
Acq On : 9-14-18 12:13:42
Sample : 180912A BLK 5X1/0.05/30.12G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 53
Operator: MA
Inst : Ethel
Multiplr: 3320.05





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911153.D\ECD1A.CH Vial: 53
Signal #2 : G:\ETHEL\DATA\180911\0911153.D\ECD2B.CH
Acq On : 9-14-18 12:13:42 Operator: MA
Sample : 180912A BLK 5X1/0.05/30.12G DF20 Inst : Ethel
Misc : soil Multiplr: 3320.05
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 14:35 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

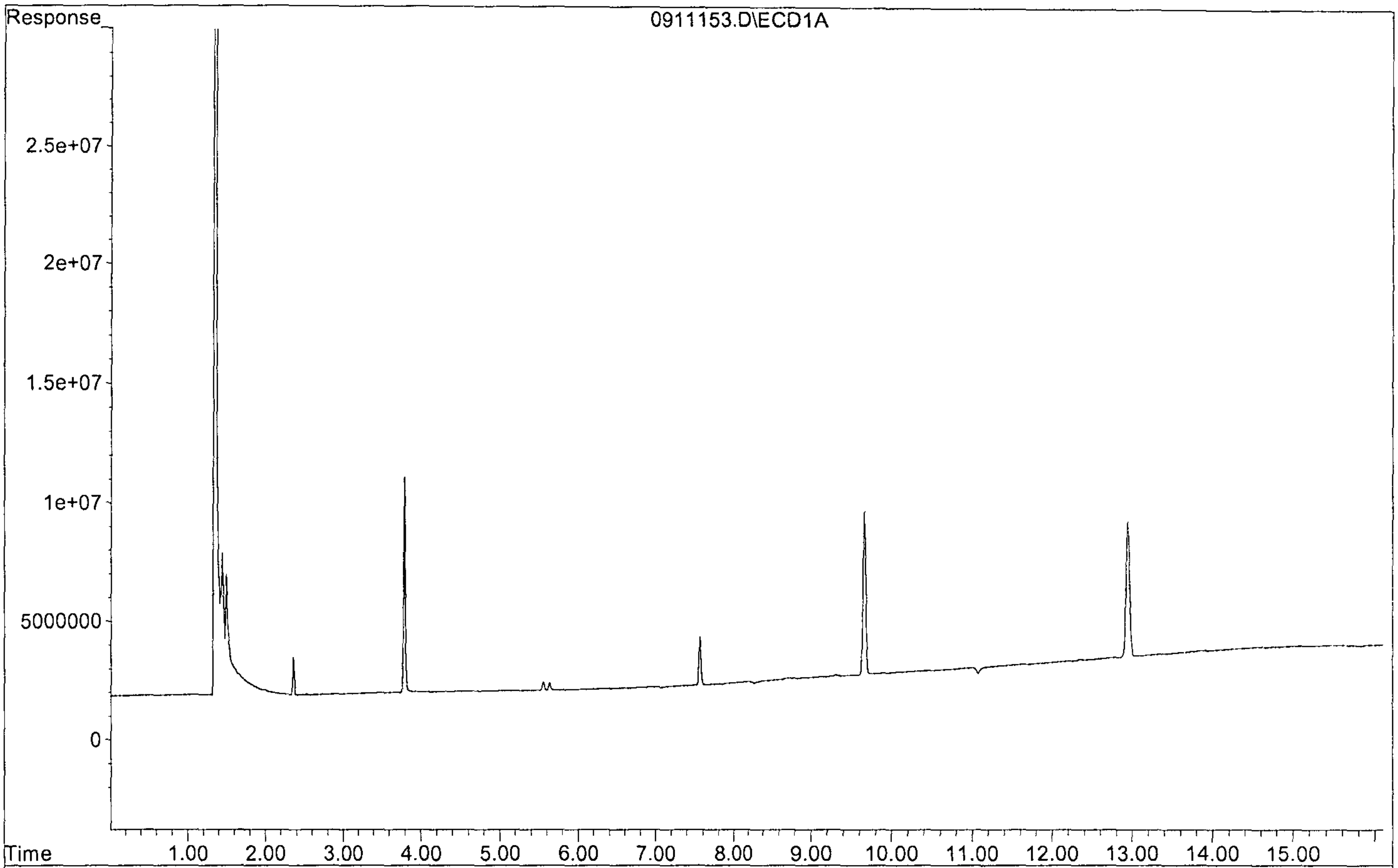
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

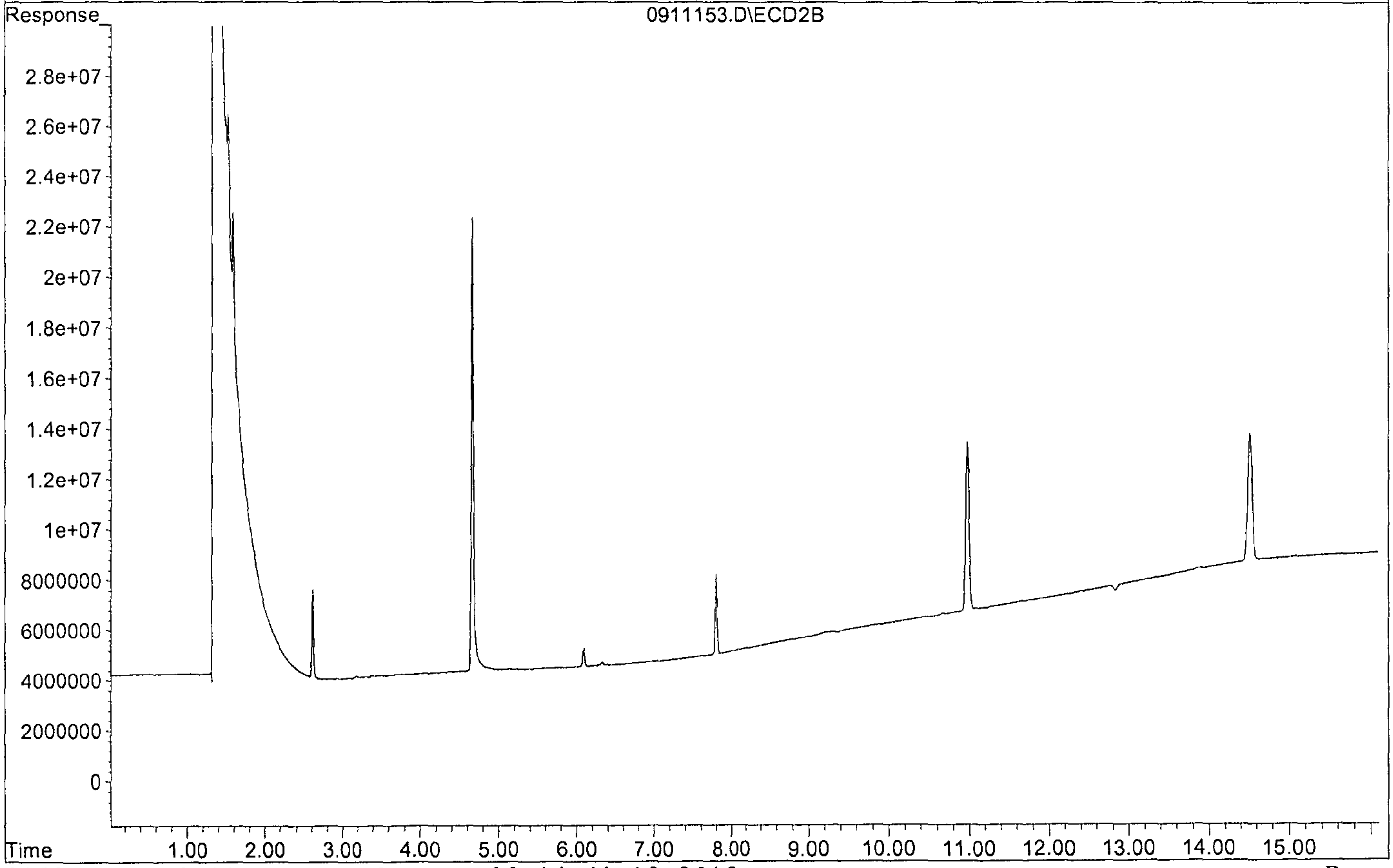
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911153.D
Acq On : 9-14-18 12:13:42
Sample : 180912A BLK 5X1/0.05/30.12G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 53
Operator: MA
Inst : Ethel
Multiplr: 3320.05





Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911154.D\ECD1A.CH Vial: 54
Signal #2 : G:\ETHEL\DATA\180911\0911154.D\ECD2B.CH
Acq On : 9-14-18 12:32:41 Operator: MA
Sample : 180912A LCS-1 5X1/0.05/30.49G DF20 Inst : Ethel
Misc : soil Multiplr: 3279.76
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:35 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	9597315	18316030	311.2835	280.8459
Surrogate Spike 327.976			Recovery	=	94.91%	85.63%
23) S DBC	9.66	10.98	15783991	6556142	279.1509	304.5934
Surrogate Spike 327.976			Recovery	=	85.11%	92.87%
24) S DECA	12.95	14.51	18008725	4976173	311.4799	296.6667
Surrogate Spike 327.976			Recovery	=	94.97%	90.45%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.50	5.39	6184581	9919804	169.5176	164.2948
3) TM A-BHC	4.63	5.27	6765024	12685540	194.5646	170.9342
4) TM B-BHC	5.50	6.16	2890117	5530161	182.4110	176.8908
5) M G-BHC(LINDANE)	5.16	5.75	6240125	23065789	185.7419	170.3630
6) TM D-BHC	5.92	6.55	4079198	6583118	115.7507	106.0769
7) M HEPTACHLOR	5.68	6.61	5564667	8644934	182.4686	171.2933
8) M ALDRIN	6.14	7.10	5538419	8995401	187.6500	177.3303
9) TM HEPTACHLOR EPOXI	6.92	7.75	5262454	6721377	182.8731	142.8983
10) TM G-CHLORDANE	7.25	8.21	5486233	7008263	177.3061	163.1677
11) TM A-ENDOSULFAN	7.48	8.35	4705376	5918312	171.0565	155.8773
12) TM A-CHLORDANE	7.39	8.28	5006989	6277507	162.8467	154.7926
13) TM P,P-DDE	7.65	8.49	5702081	6773645	181.1124	159.2496
14) M DIELDRIN	7.89	8.75	5030436	6549989	178.2454	165.0604
15) M ENDRIN	8.36	9.14	4316743	5053116	166.0508	154.0264
16) TM B-ENDOSULFAN	8.76	9.59	4255609	5474001	173.4924	152.7633
17) TM P,P-DDD	8.50	9.34	4597306	5200396	181.0177	164.2444
18) TM ENDRIN ALDEHYDE	9.13	9.79	3185967	3430018	166.1340	155.6259
19) M P,P-DDT	8.93	9.87	4256812	4367502	168.1790	163.9641
20) TM ENDOSULFAN SULFA	9.46	10.31	3638422	4301343	156.6522	150.7159
21) TM ENDRIN KETONE	10.59	11.16	4277520	5512408	191.4575	164.3444
22) TM METHOXYCHLOR	10.09	10.68	2147035	2424536	185.4886	170.0240

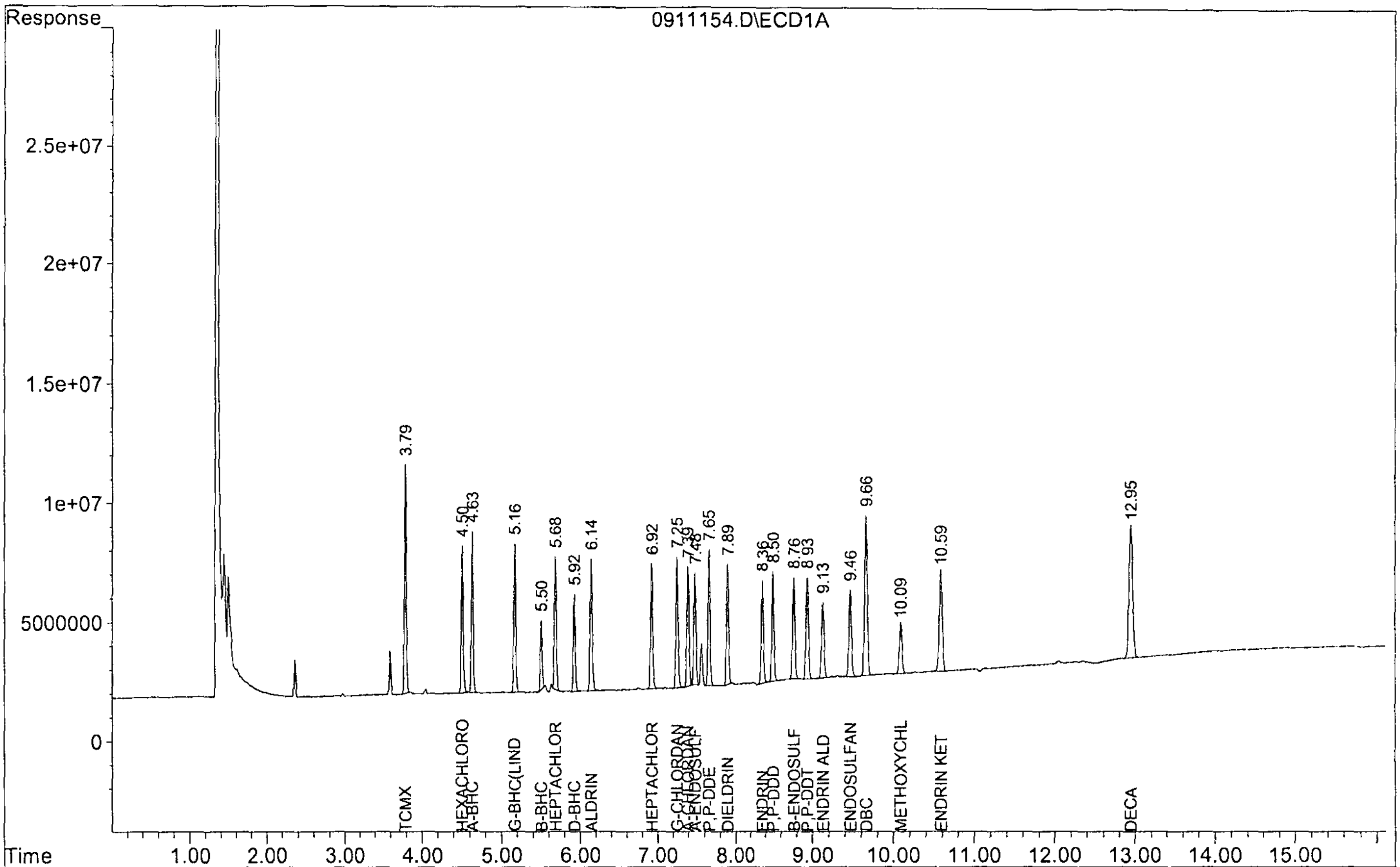
Target Compounds

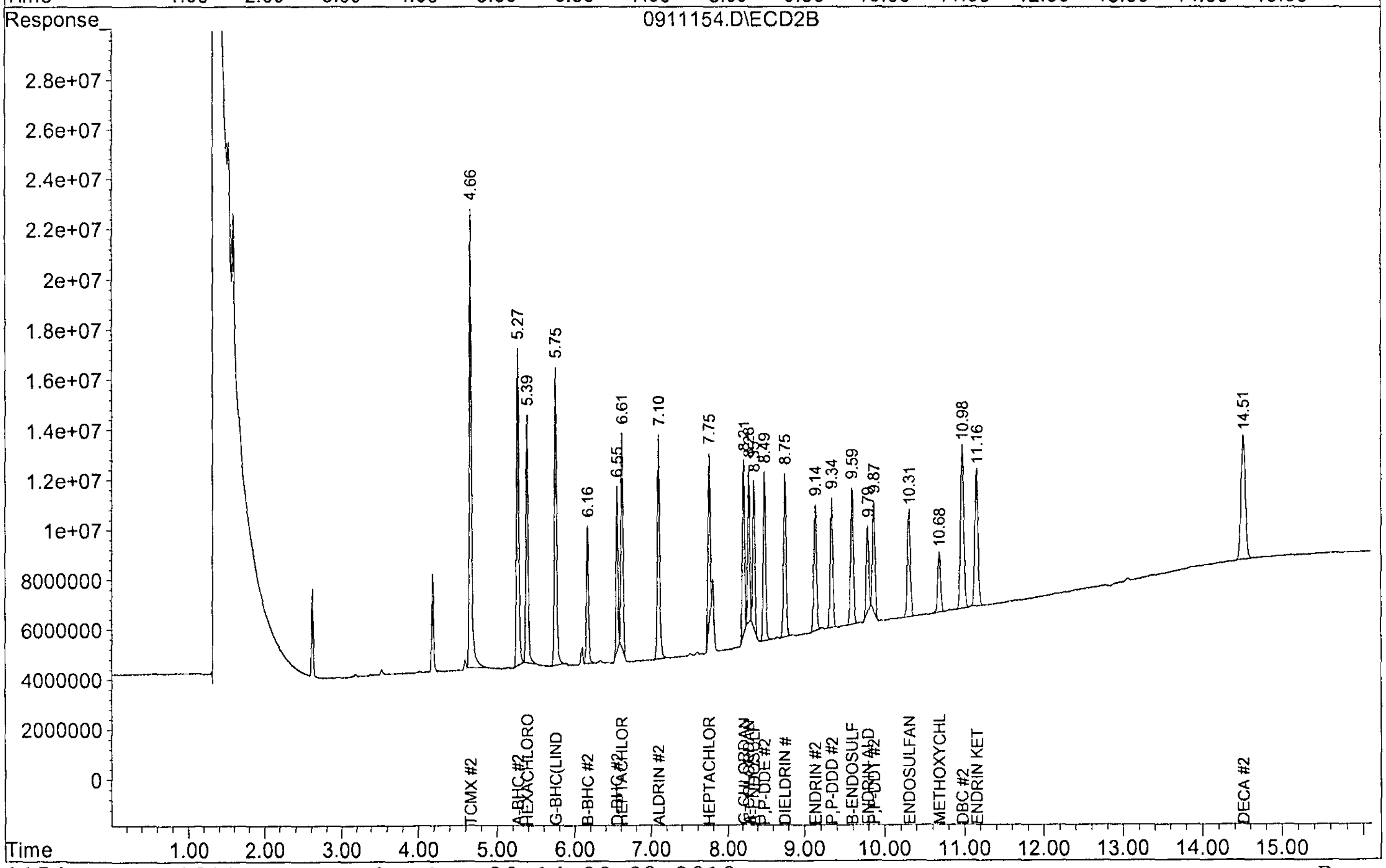
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911154.D
Acq On : 9-14-18 12:32:41
Sample : 180912A LCS-1 5X1/0.05/30.49G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 54
Operator: MA
Inst : Ethel
Multiplr: 3279.76





Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911155.D\ECD1A.CH Vial: 55
Signal #2 : G:\ETHEL\DATA\180911\0911155.D\ECD2B.CH
Acq On : 9-14-18 12:51:45 Operator: MA
Sample : 180912A LCS-2 5X1/0.05/30.62G DF20 Inst : Ethel
Misc : soil Multiplr: 3265.84
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 14:35 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

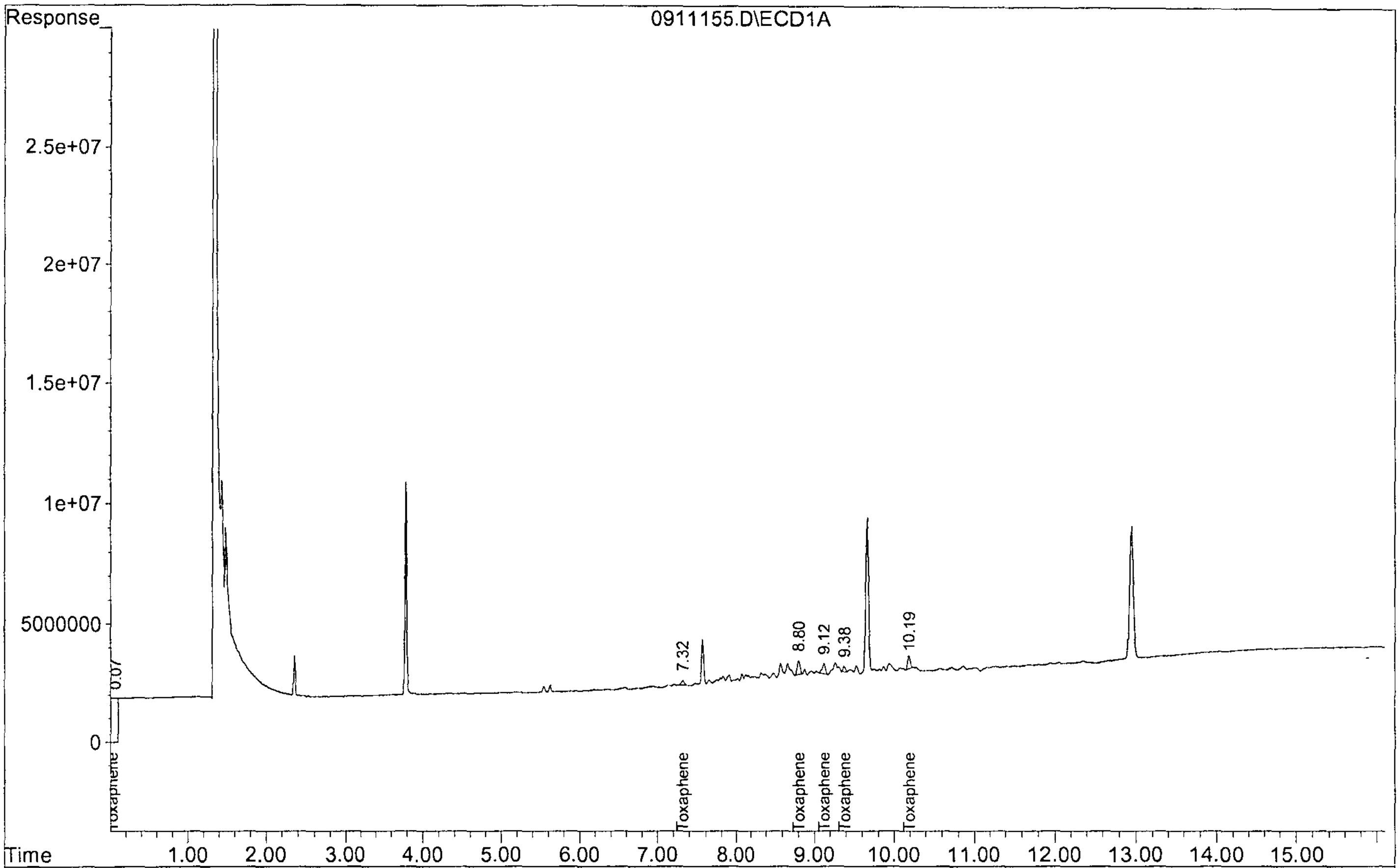
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

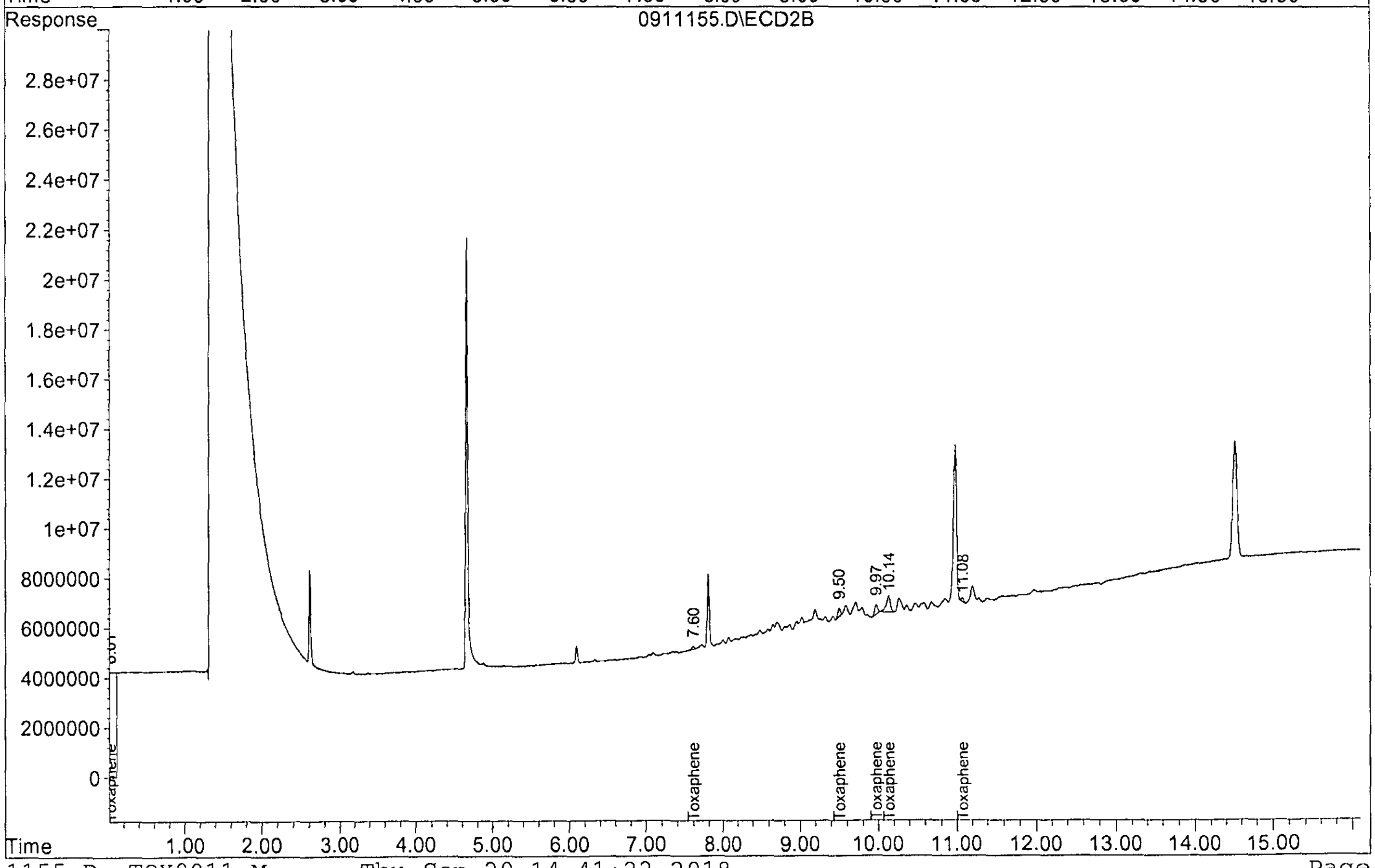
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	1975263	1634982	1738.3522m	1547.0683m	
2) L2AK Toxaphene	7.32	7.60	189554	115154	1808.9363	1456.3966	
3) L2AK Toxaphene {2}	8.80	9.51	586192	330601	1765.0598	1613.6481	
4) L2AK Toxaphene {3}	9.12	9.97	425681	377993	1748.8955	1708.1979	
5) L2AK Toxaphene {4}	9.38	10.14	229750	655324	1747.4718	1620.9939	
6) L2AK Toxaphene {5}	10.19	11.07	544085	155910	1676.6242	1058.2686	#
Sum Toxaphene			1975263	1634982	8746.9876	7457.5052	
Average Toxaphene					1749.398	1491.501	

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911155.D
Acq On : 9-14-18 12:51:45
Sample : 180912A LCS-2 5X1/0.05/30.62G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 55
Operator: MA
Inst : Ethel
Multiplr: 3265.84





Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911165.D\ECD1A.CH Vial: 65
Signal #2 : G:\ETHEL\DATA\180911\0911165.D\ECD2B.CH
Acq On : 9-14-18 16:01:42 Operator: MA
Sample : AZ79151S01 MS-1 5X1/0.05/25.15G DF20 Inst : Ethel
Misc : soil Multiplr: 3976.14
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:56 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	11038505	20592711	434.0464	382.7982
Surrogate Spike 397.614			Recovery	=	109.16%	96.27%
23) S DBC	9.66	10.98	16200914	7264045	347.3612	409.1384
Surrogate Spike 397.614			Recovery	=	87.36%	102.90%
24) S DECA	12.95	14.52	18422524	5400701	386.2921	390.3400
Surrogate Spike 397.614			Recovery	=	97.15%	98.17%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.50	5.39	6761870	11224292	224.6938	225.3717
3) TM A-BHC	4.63	5.27	7553481	14052937	263.3670	229.5655
4) TM B-BHC	5.50	6.17	3354715	5886183	256.6911	228.2553
5) M G-BHC(LINDANE)	5.17	5.75	6933982	25448900	250.2183	227.8745
6) TM D-BHC	5.92	6.55	4449610	7332727	153.0701	143.2433
7) M HEPTACHLOR	5.68	6.62	6016715	9796183	239.1818	235.3180
8) M ALDRIN	6.14	7.10	6027060	9506148	247.5642	227.1886
9) TM HEPTACHLOR EPOXI	6.92	7.75	5744107	7508366	241.9935	193.5236
10) TM G-CHLORDANE	7.25	8.21	5773348	7819435	226.2022	220.7084
11) TM A-ENDOSULFAN	7.48	8.35	5079980	6419157	223.8859	204.9664
12) TM A-CHLORDANE	7.39	8.28	5371383	6939746	211.7913	207.6415
13) TM P,P-DDE	7.65	8.49	5797113	7673098	223.2267	218.6987
14) M DIELDRIN	7.89	8.76	5201378	7086460	223.4348	216.4967
15) M ENDRIN	8.36	9.14	4601411	5853805	214.5830	216.5438
16) TM B-ENDOSULFAN	8.76	9.60	4536471	6018776	224.2107	203.7919
17) TM P,P-DDD	8.50	9.34	4669799	5023316	222.9130	192.3377
18) TM ENDRIN ALDEHYDE	9.13	9.79	3296260	3795931	208.3810	208.7966
19) M P,P-DDT	8.93	9.87	4291383	4648119	205.5437	211.5498
20) TM ENDOSULFAN SULFA	9.47	10.31	3776088	4782839	197.0994	203.1703
21) TM ENDRIN KETONE	10.59	11.16	4382131	6004240	237.7855	216.9886
22) TM METHOXYCHLOR	10.09	10.68	2145450	2665396	224.7067	226.6015

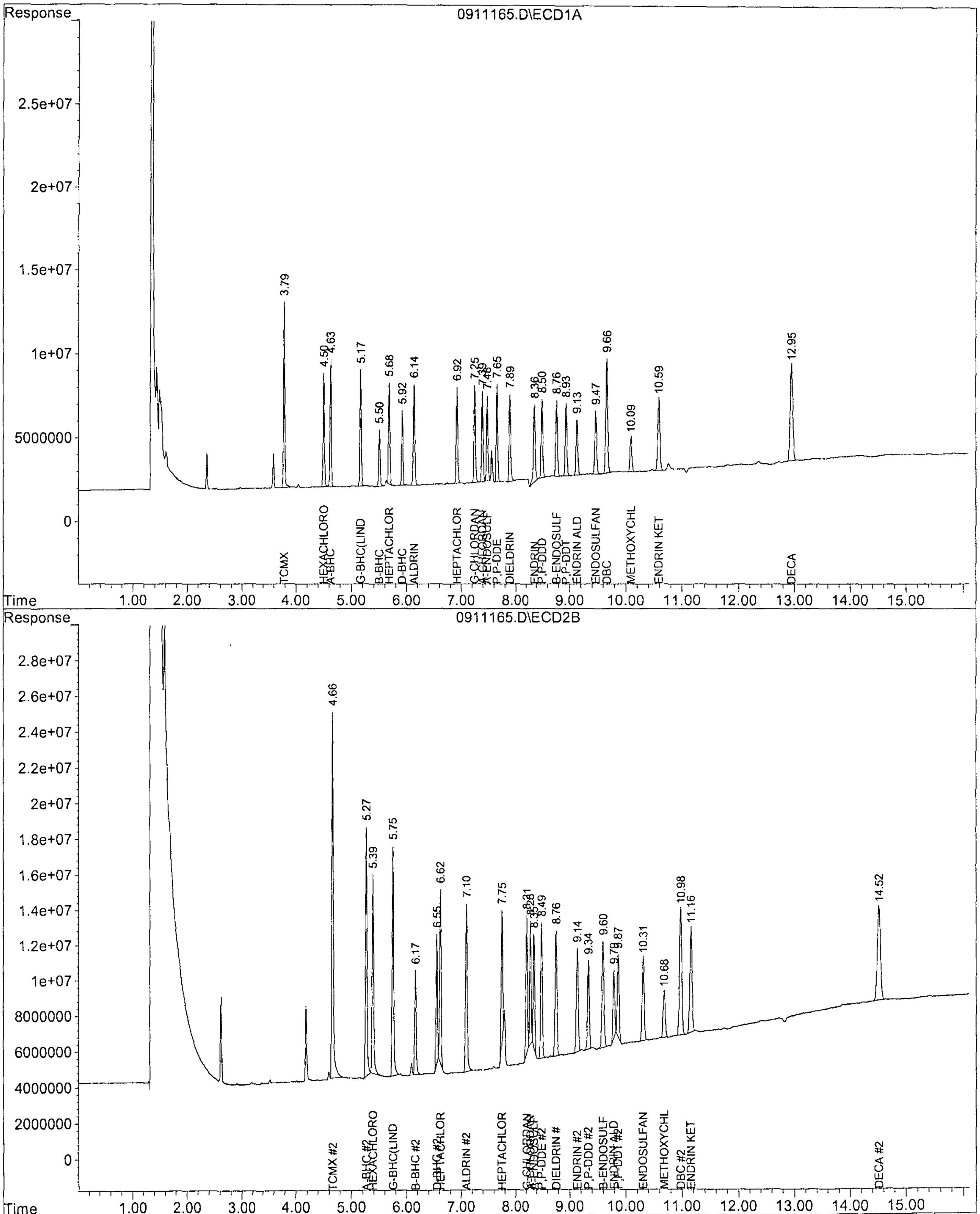
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911165.D
Acq On : 9-14-18 16:01:42
Sample : AZ79151S01 MS-1 5X1/0.05/25.15G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 65
Operator: MA
Inst : Ethel
Multiplr: 3976.14



Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911166.D\ECD1A.CH Vial: 66
Signal #2 : G:\ETHEL\DATA\180911\0911166.D\ECD2B.CH
Acq On : 9-14-18 16:20:40 Operator: MA
Sample : AZ79151S01 MSD-1 5X1/0.05/25.24G DF20 Inst : Ethel
Misc : soil Multiplr: 3961.97
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 17 14:56 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) S TCMX	3.79	4.66	10291746	19889947	403.2408	368.4169
Surrogate Spike 396.197			Recovery	=	101.78%	92.99%
23) S DBC	9.66	10.98	15671565	6878910	334.8140	386.0654
Surrogate Spike 396.197			Recovery	=	84.51%	97.44%
24) S DECA	12.95	14.51	17694954	5247001	369.7137	377.8797
Surrogate Spike 396.197			Recovery	=	93.32%	95.38%
Target Compounds						
2) TM HEXACHLOROBENZEN	4.50	5.39	6493979	10607969	215.0228	212.2375
3) TM A-BHC	4.63	5.27	6904854	13425419	239.8933	218.5330
4) TM B-BHC	5.50	6.16	3128251	5829373	238.5098	225.2468
5) M G-BHC(LINDANE)	5.17	5.75	6527173	24950387	234.6988	222.6145
6) TM D-BHC	5.92	6.55	4099916	7030901	140.5377	136.8577
7) M HEPTACHLOR	5.68	6.62	5599724	9359305	221.8119	224.0223
8) M ALDRIN	6.14	7.10	5600576	9447127	229.2263	224.9734
9) TM HEPTACHLOR EPOXI	6.92	7.75	5355858	7208431	224.8329	185.1308
10) TM G-CHLORDANE	7.25	8.21	5392637	7581772	210.5328	213.2376
11) TM A-ENDOSULFAN	7.48	8.35	4657557	6408458	204.5373	203.8956
12) TM A-CHLORDANE	7.39	8.28	5156529	6748267	202.5951	201.1444
13) TM P,P-DDE	7.65	8.49	5422705	7370844	208.0654	209.3352
14) M DIELDRIN	7.89	8.75	5015937	6810748	214.7010	207.3319
15) M ENDRIN	8.36	9.14	4380994	5730772	203.5759	211.2073
16) TM B-ENDOSULFAN	8.76	9.60	4366019	5853420	215.0173	197.4422
17) TM P,P-DDD	8.50	9.34	4248306	5051051	202.0703	192.7104
18) TM ENDRIN ALDEHYDE	9.13	9.79	3139622	3565571	197.7715	195.4267
19) M P,P-DDT	8.94	9.87	4098762	4473429	195.6181	202.8736
20) TM ENDOSULFAN SULFA	9.47	10.31	3541439	4578094	184.1927	193.7799
21) TM ENDRIN KETONE	10.59	11.16	4047843	5868415	218.8634	211.3311
22) TM METHOXYCHLOR	10.09	10.69	1983629	2481346	207.0178	210.2025

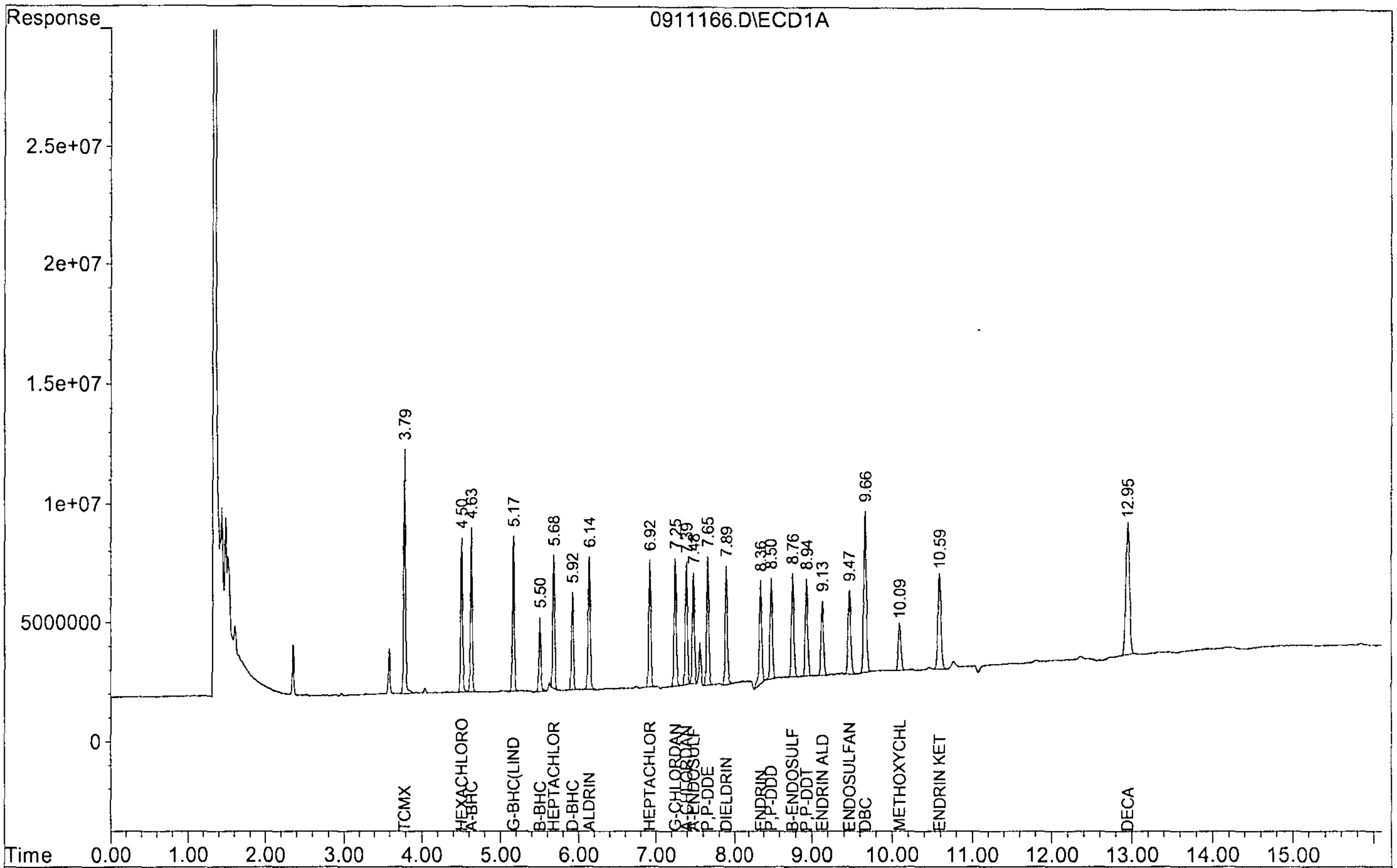
Target Compounds

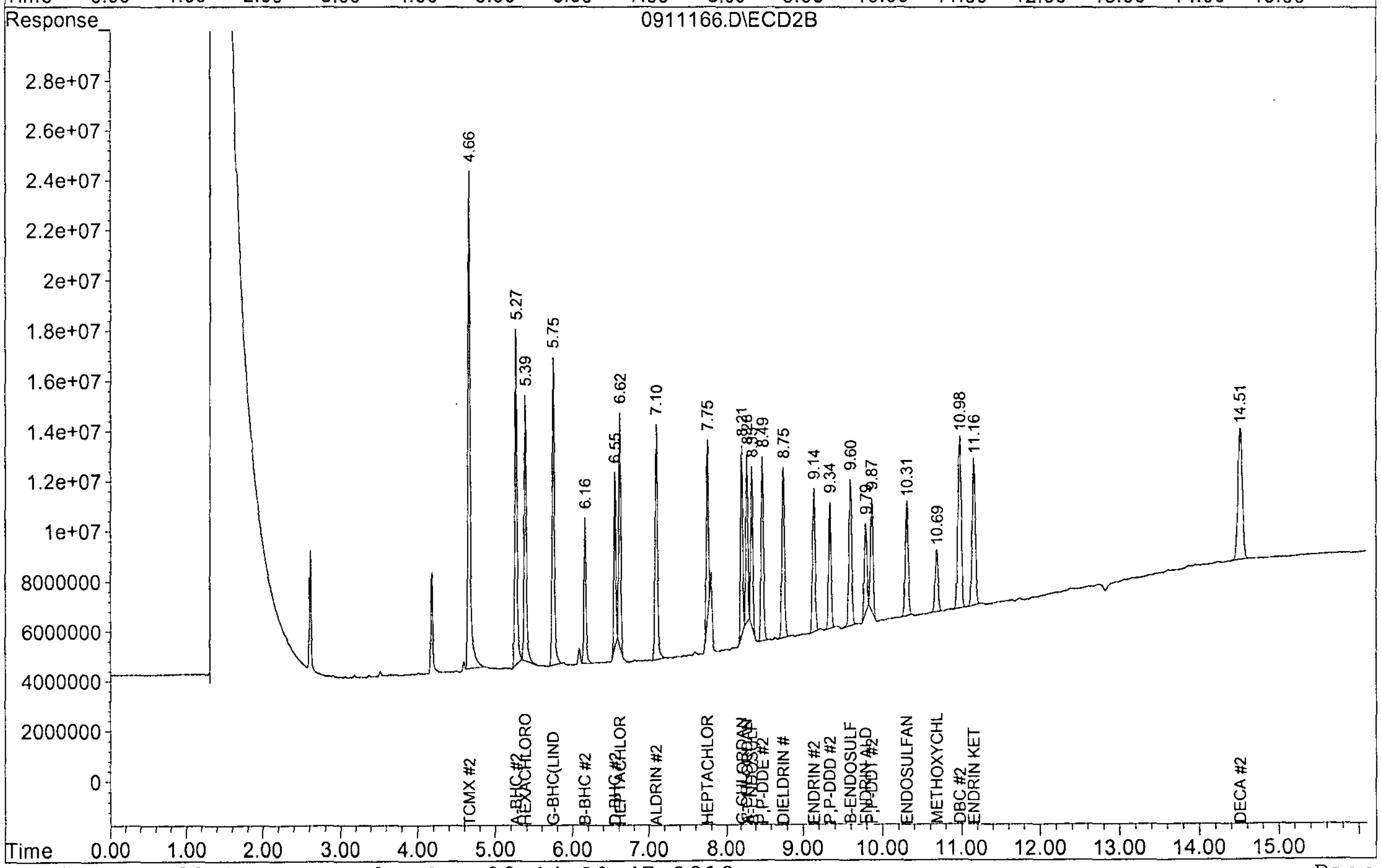
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911166.D
Acq On : 9-14-18 16:20:40
Sample : AZ79151S01 MSD-1 5X1/0.05/25.24G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 66
Operator: MA
Inst : Ethel
Multiplr: 3961.97





Quantitation Report   (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911167.D\ECD1A.CH   Vial: 67
Signal #2 : G:\ETHEL\DATA\180911\0911167.D\ECD2B.CH
Acq On : 9-14-18 16:39:46   Operator: MA
Sample : AZ79151S01 MS-2 5X1/0.05/25.20G DF20   Inst : Ethel
Misc : soil   Multiplr: 3968.25
IntFile Signal #1: events.e   IntFile Signal #2: events2.e
Quant Time: Sep 17 14:56 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

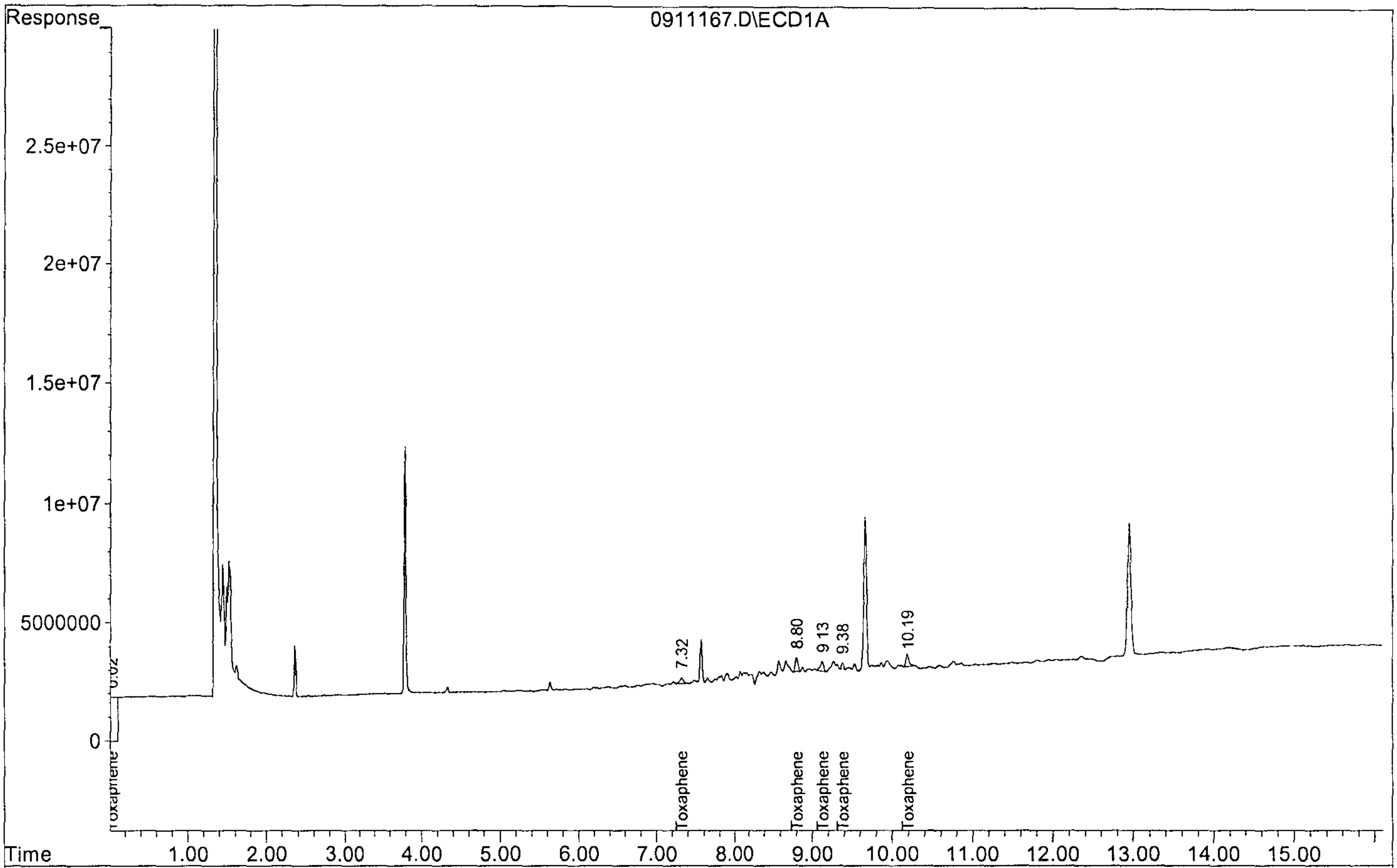
Volume Inj. : 2ul
Signal #1 Phase : DB-35ms   Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32   Signal #2 Info : 0.32

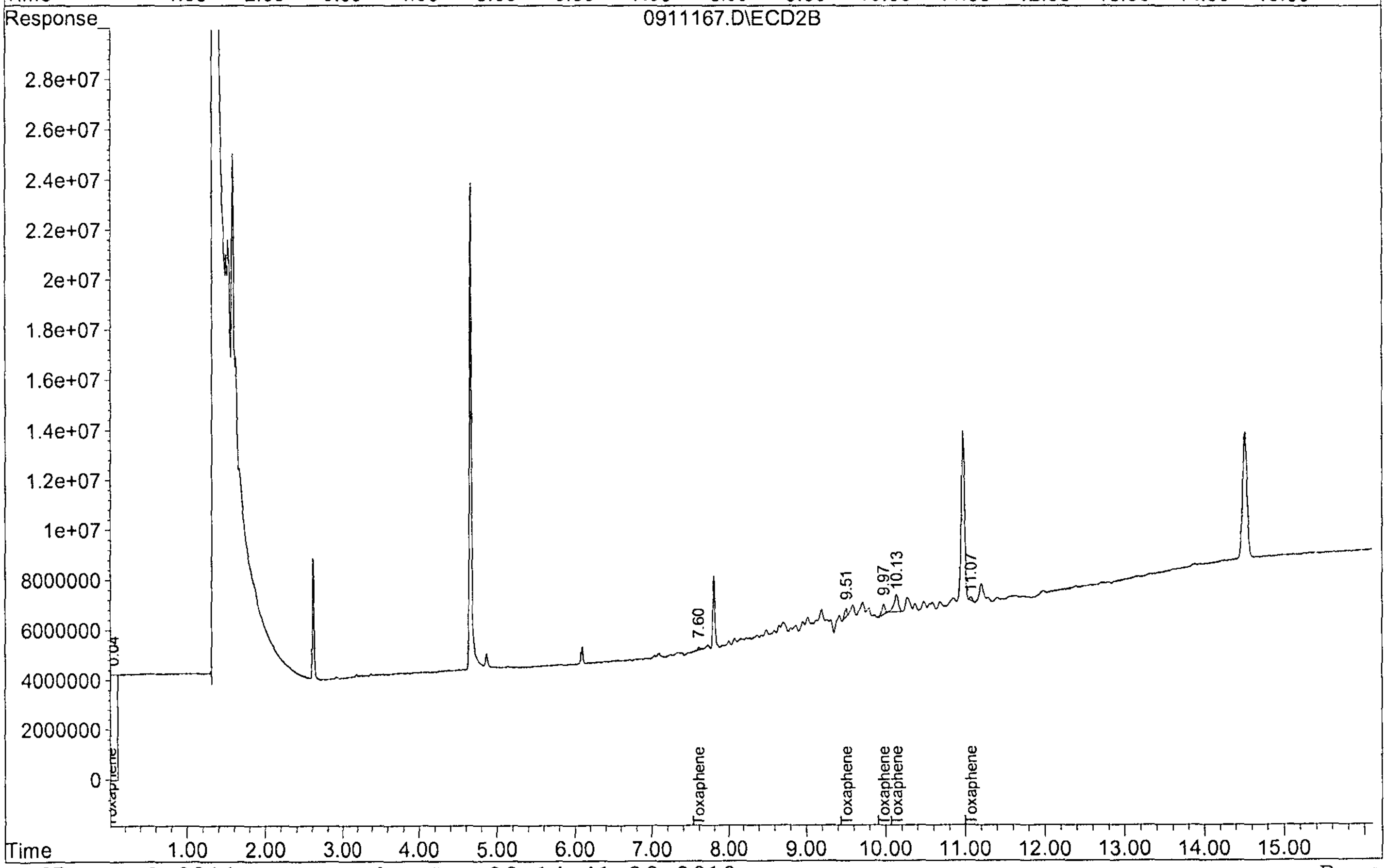
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	2039893	1688939	2181.3450m	1941.8452m	
2) L2AK Toxaphene	7.32	7.60	238740	110890	2768.3323	1704.1034	#
3) L2AK Toxaphene {2}	8.80	9.51	586204	323205	2144.7271	1916.8452	
4) L2AK Toxaphene {3}	9.13	9.98	424520	405807	2119.2467	2228.3233	
5) L2AK Toxaphene {4}	9.38	10.14	259052	693634	2394.1154	2084.7787	
6) L2AK Toxaphene {5}	10.19	11.07	531378	155403	1989.6498	1281.6965	#
Sum Toxaphene			2039893	1688939	11416.0713	9215.7471	
Average Toxaphene					2283.214	1843.149	

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911167.D
Acq On : 9-14-18 16:39:46
Sample : AZ79151S01 MS-2 5X1/0.05/25.20G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 67
Operator: MA
Inst : Ethel
Multiplr: 3968.25





Signal #1 : G:\ETHEL\DATA\180911\0911168.D\ECD1A.CH Vial: 68
Signal #2 : G:\ETHEL\DATA\180911\0911168.D\ECD2B.CH
Acq On : 9-14-18 16:58:44 Operator: MA
Sample : AZ79151S01 MSD-2 5X1/0.05/25.22G DF20 Inst : Ethel
Misc : soil Multiplr: 3965.11
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 14:56 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

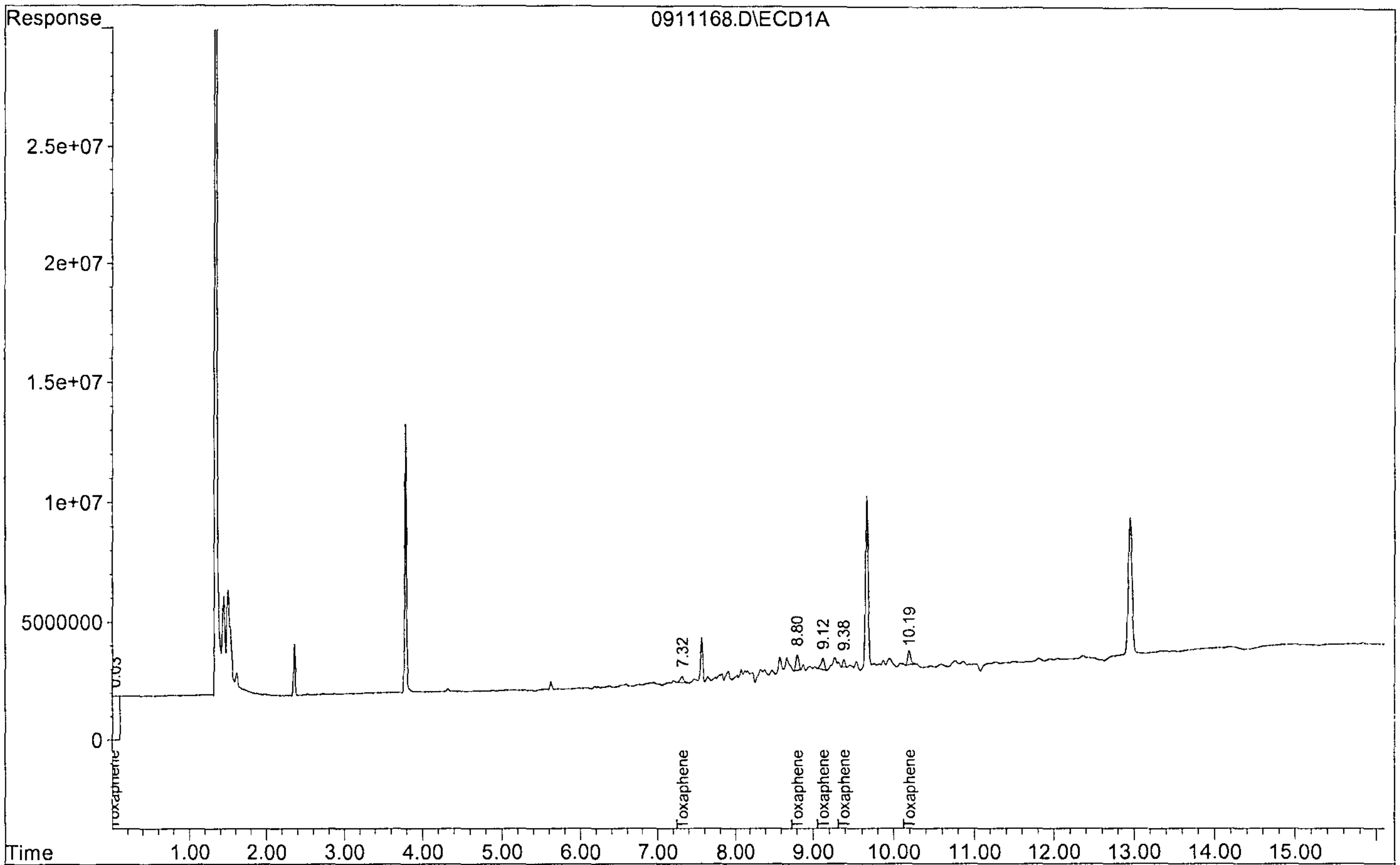
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
Target Compounds							
1) ANM Toxaphene Total	0.00	0.00	2294347	1965315	2451.5021m	2257.8184m	
2) L2AK Toxaphene	7.32	7.60	256448	125169	2971.3196	1922.0181	#
3) L2AK Toxaphene {2}	8.80	9.51	647008	366967	2365.3184	2174.6605	
4) L2AK Toxaphene {3}	9.12	9.97	480651	467808	2397.5590	2566.7416	
5) L2AK Toxaphene {4}	9.38	10.14	307548	815073	2840.0539	2447.8369	
6) L2AK Toxaphene {5}	10.19	11.07	602692	190298	2254.8882	1568.2560	#
Sum Toxaphene			2294347	1965315	12829.1391	10679.5132	
Average Toxaphene					2565.828	2135.903	

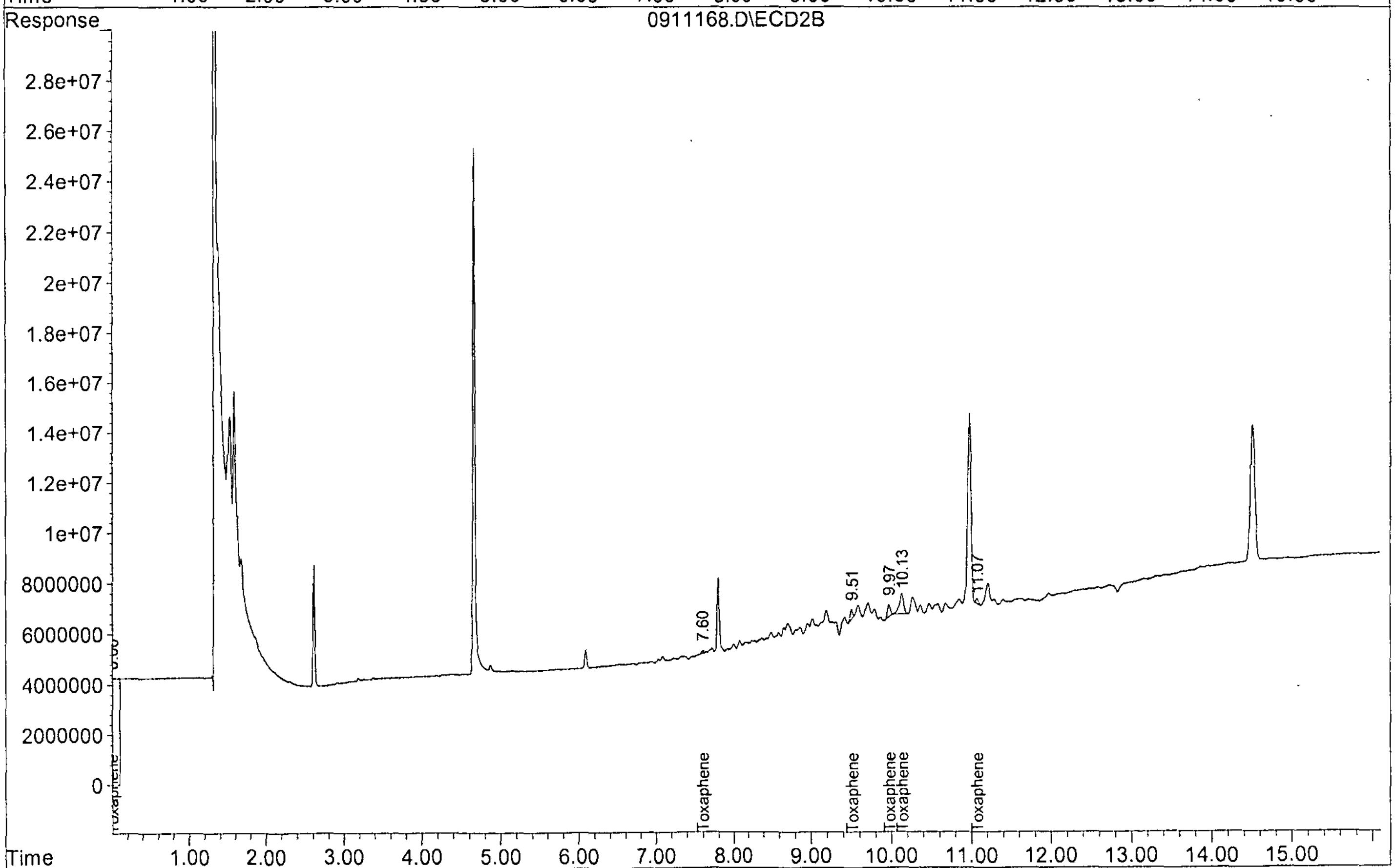
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911168.D
Acq On : 9-14-18 16:58:44
Sample : AZ79151S01 MSD-2 5X1/0.05/25.22G DF20
Misc : soil
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 68
Operator: MA
Inst : Ethel
Multiplr: 3965.11





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911033.D\ECD1A.CH Vial: 33
Signal #2 : G:\ETHEL\DATA\180911\0911033.D\ECD2B.CH
Acq On : 9-12-18 11:27:10 Operator: MA
Sample : 180907B BLK 1/500 DF5 Inst : Ethel
Misc : water Multiplr: 10.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 12 12:27 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

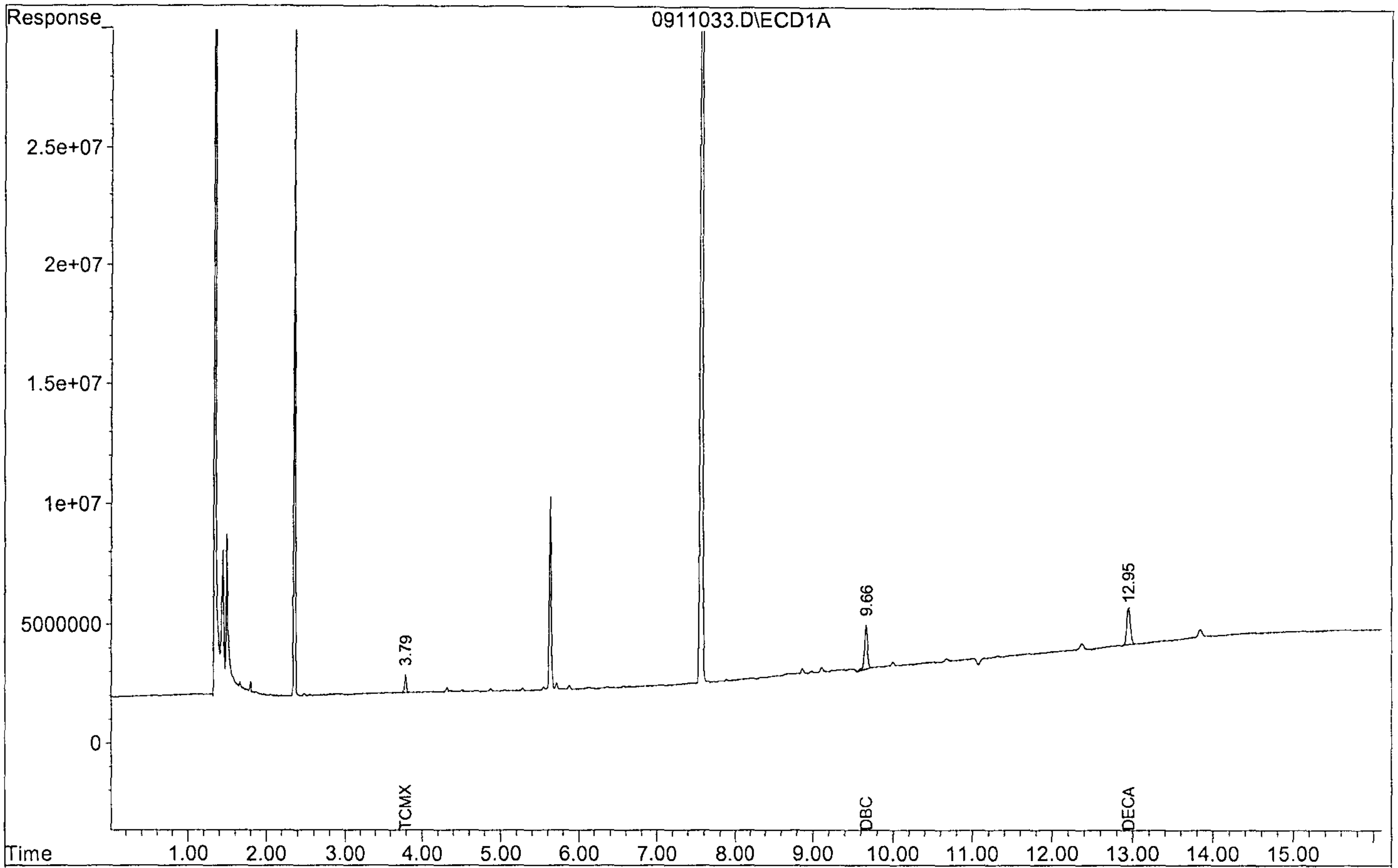
	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	System Monitoring Compounds						
1) S	TCMX	3.79	4.66	742987	1686072	0.0735	0.0788
	Surrogate Spike 0.300 Range 25 - 150			Recovery =		24.50%#	26.27%
23) S	DBC	9.66	10.98	4888218	1898899	0.2636	0.2690
	Surrogate Spike 0.300			Recovery =		87.87%	89.67%
24) S	DECA	12.95	14.52	4769945	1430334	0.2515	0.2600
	Surrogate Spike 0.300 Range 25 - 150			Recovery =		83.83%	86.67%
	Target Compounds						
	Target Compounds						
2) TM	HEXACHLOROBENZEN	0.00	0.00	0	0	N.D. d	N.D. d
3) TM	A-BHC	0.00	0.00	0	0	N.D. d	N.D. d
4) TM	B-BHC	0.00	0.00	0	0	N.D. d	N.D. d
5) M	G-BHC(LINDANE)	0.00	0.00	0	0	N.D. d	N.D. d
6) TM	D-BHC	0.00	0.00	0	0	N.D. d	N.D. d
7) M	HEPTACHLOR	0.00	0.00	0	0	N.D. d	N.D. d
8) M	ALDRIN	0.00	0.00	0	0	N.D. d	N.D. d
9) TM	HEPTACHLOR EPOXI	0.00	0.00	0	0	N.D. d	N.D. d
10) TM	G-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
11) TM	A-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
12) TM	A-CHLORDANE	0.00	0.00	0	0	N.D. d	N.D. d
13) TM	P,P-DDE	0.00	0.00	0	0	N.D. d	N.D. d
14) M	DIELDRIN	0.00	0.00	0	0	N.D. d	N.D. d
15) M	ENDRIN	0.00	0.00	0	0	N.D. d	N.D. d
16) TM	B-ENDOSULFAN	0.00	0.00	0	0	N.D. d	N.D. d
17) TM	P,P-DDD	0.00	0.00	0	0	N.D. d	N.D. d
18) TM	ENDRIN ALDEHYDE	0.00	0.00	0	0	N.D. d	N.D. d
19) M	P,P-DDT	0.00	0.00	0	0	N.D. d	N.D. d
20) TM	ENDOSULFAN SULFA	0.00	0.00	0	0	N.D. d	N.D. d
21) TM	ENDRIN KETONE	0.00	0.00	0	0	N.D. d	N.D. d
22) TM	METHOXYCHLOR	0.00	0.00	0	0	N.D. d	N.D. d

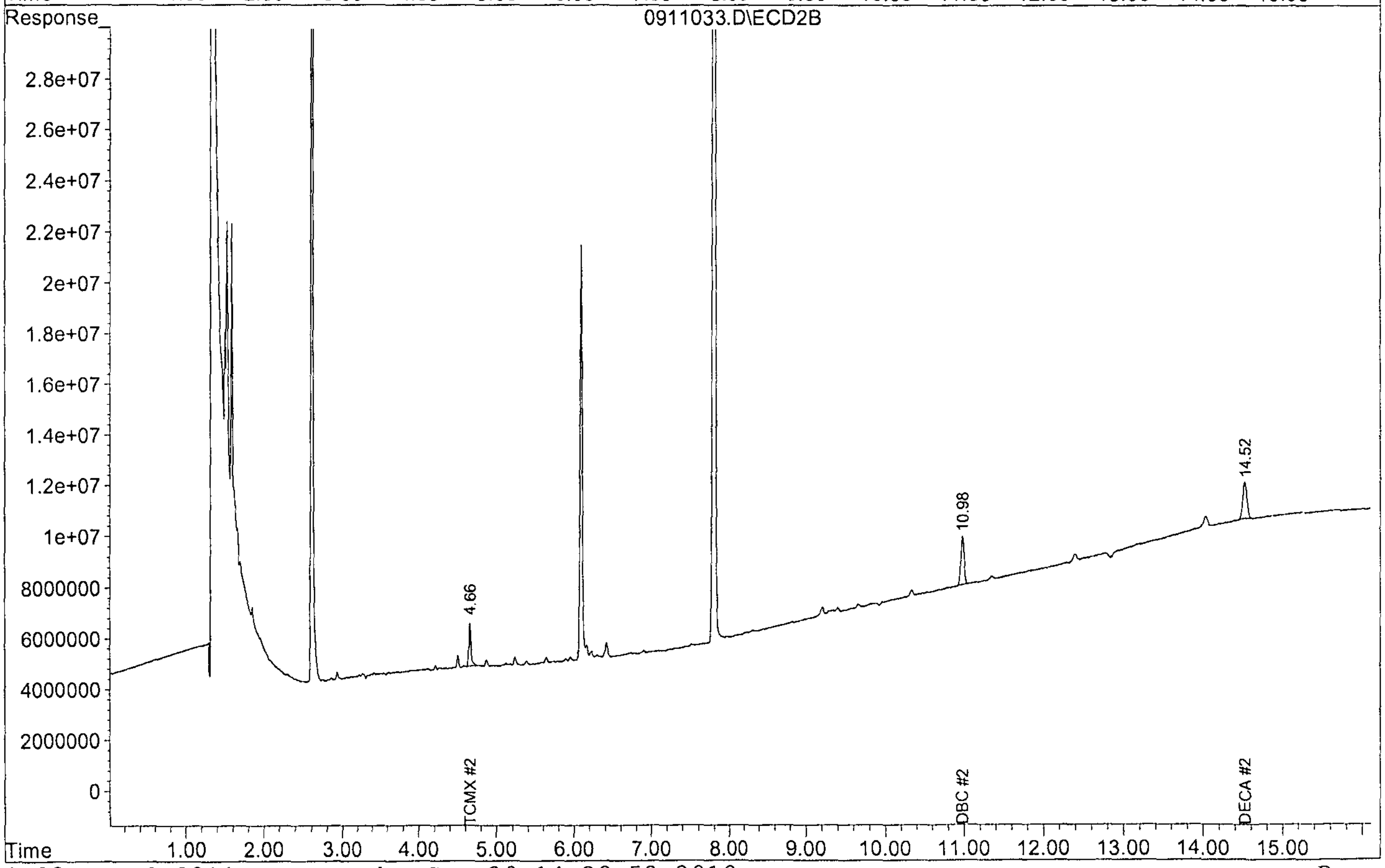
(f)=RT Delta > 1/2 Window (#)=Amounts differ by ≥ 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911033.D
Acq On : 9-12-18 11:27:10
Sample : 180907B BLK 1/500 DF5
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 33
Operator: MA
Inst : Ethel
Multiplr: 10.00





Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911033.D\ECD1A.CH Vial: 33
Signal #2 : G:\ETHEL\DATA\180911\0911033.D\ECD2B.CH
Acq On : 9-12-18 11:27:10 Operator: MA
Sample : 180907B BLK 1/500 DF5 Inst : Ethel
Misc : water Multiplr: 10.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 12:28 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

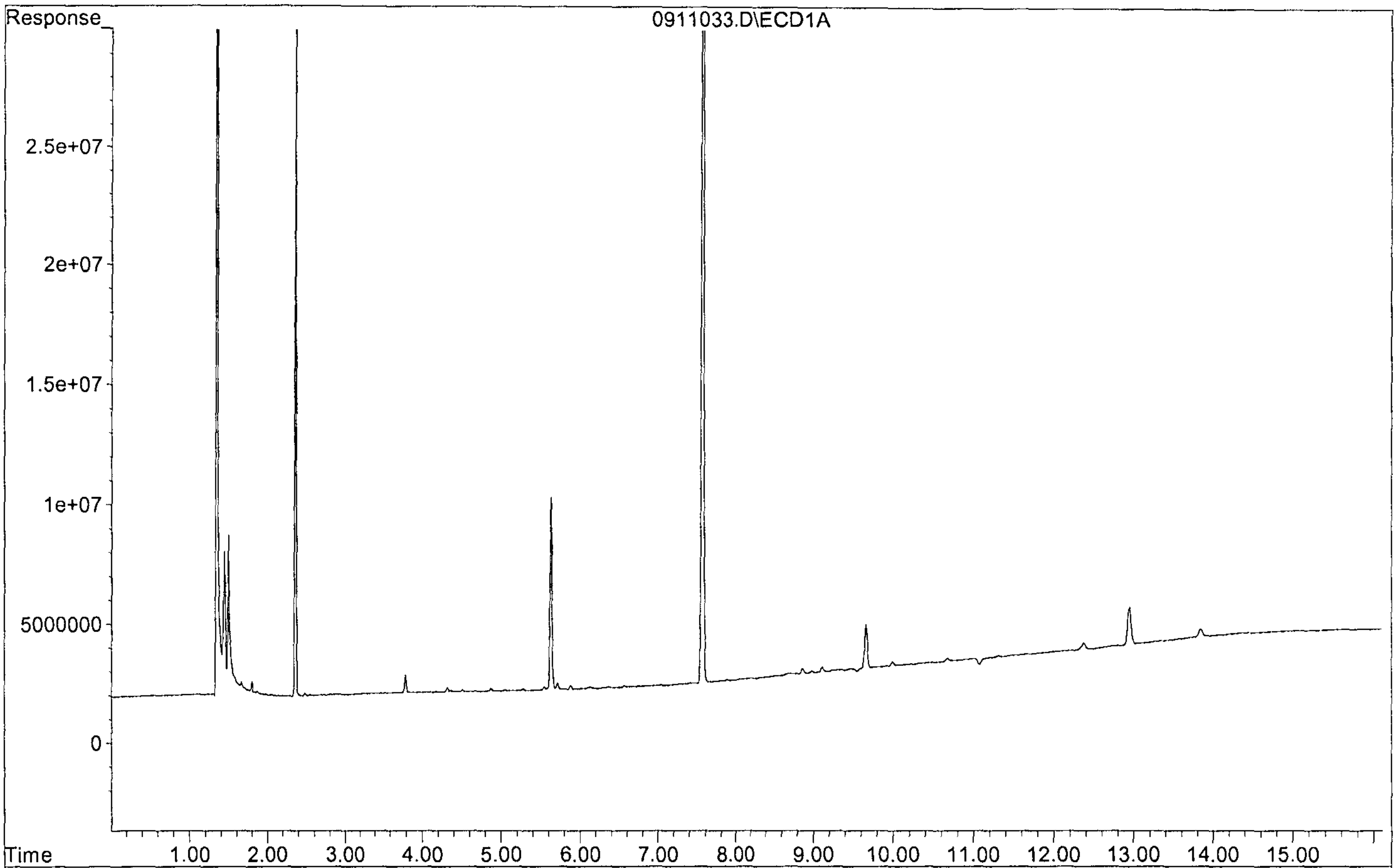
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
Sum Toxaphene			0	0	N.D.	N.D.
Average Toxaphene					0.000	0.000

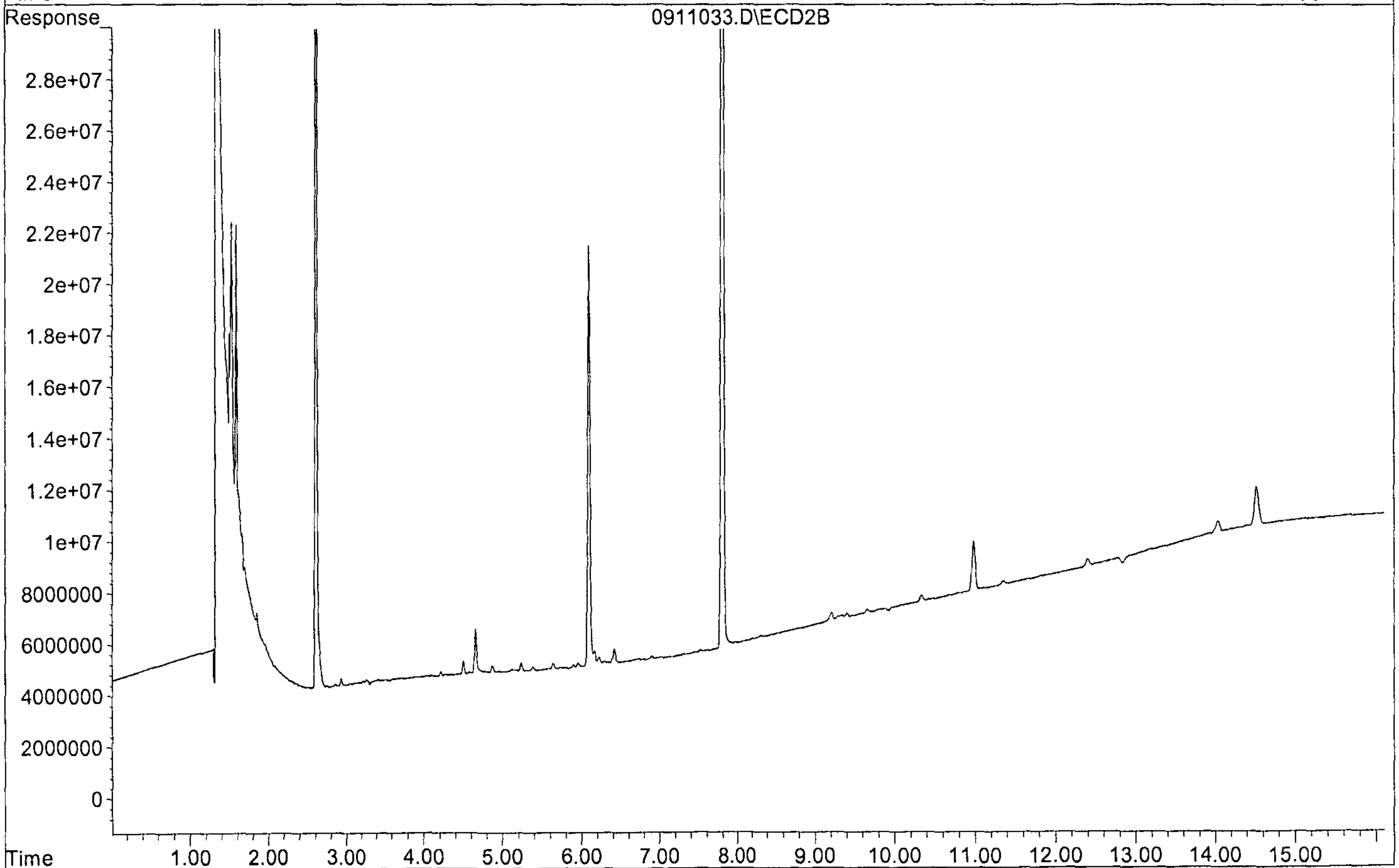
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911033.D
Acq On : 9-12-18 11:27:10
Sample : 180907B BLK 1/500 DF5
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 33
Operator: MA
Inst : Ethel
Multiplr: 10.00





Quantitation Report (Not Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911129.D\ECD1A.CH Vial: 29
Signal #2 : G:\ETHEL\DATA\180911\0911129.D\ECD2B.CH
Acq On : 9-13-18 18:30:57 Operator: MA
Sample : 180907B LCS-1 1/500 DF5 Inst : Ethel
Misc : water Multiplr: 10.00
IntFile Signal #1: rteint.p IntFile Signal #2: rteint2.p
Quant Time: Sep 14 13:30 2018 Quant Results File: OCL0911.RES

Quant Method : G:\ETHEL\DATA\180911\OCL0911.M (RTE Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:46:32 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
System Monitoring Compounds							
1) S TCMX	3.79	4.66	1045670	2153271	0.1034	0.1007	
Surrogate Spike 0.300 Range 25 - 150				Recovery =	34.47%	33.57%	
23) S DBC	9.66	10.97	4684058	1864839	0.2526	0.2642	
Surrogate Spike 0.300				Recovery =	84.20%	88.07%	
24) S DECA	12.95	14.52	5155480	1452611	0.2719	0.2640	
Surrogate Spike 0.300 Range 25 - 150				Recovery =	90.63%	88.00%	
Target Compounds							
2) TM HEXACHLOROBENZEN	4.50	5.38	1571773	2594626	0.1314	0.1310	
3) TM A-BHC	4.63	5.27	3052145	6231174	0.2676	0.2560	
4) TM B-BHC	5.50	6.16	1553699	2856005	0.2990	0.2785	
5) M G-BHC(LINDANE)	5.16	5.75	2990486	11842411	0.2714	0.2667	
6) TM D-BHC	5.92	6.55	2028575	3637415	0.1755	0.1787	
7) M HEPTACHLOR	5.68	6.62	1028288	2290870	0.1028	0.1384	#
8) M ALDRIN	6.13	7.10	1194295	1975923	0.1234	0.1188	
9) TM HEPTACHLOR EPOXI	6.92	7.79f	2495633	90432019	0.2644	5.8620	#
10) TM G-CHLORDANE	7.25	8.21	1953199	2726768	0.1925	0.1936	
11) TM A-ENDOSULFAN	7.48	8.35	2289560	3096577	0.2538	0.2487	
12) TM A-CHLORDANE	7.39	8.28	2112705	2676535	0.2095	0.1987	
13) TM P,P-DDE	7.65	8.49	2172987	2929596	0.2104	0.2100	
14) M DIELDRIN	7.89	8.75	2372583	3275598	0.2563	0.2517	
15) M ENDRIN	8.36	9.13	2117045	2658991	0.2483	0.2454	
16) TM B-ENDOSULFAN	8.76	9.59	2215318	3022598	0.2754	0.2554	
17) TM P,P-DDD	8.50	9.34	2213378	2678341	0.2657	0.2579	
18) TM ENDRIN ALDEHYDE	9.13	9.79	1590411	1797389	0.2529	0.2486	
19) M P,P-DDT	8.93	9.87	2095640	2310871	0.2524	0.2645	
20) TM ENDOSULFAN SULFA	9.46	10.31	1905620	2494477	0.2502	0.2665	
21) TM ENDRIN KETONE	10.59	11.15	2290230	3115877	0.3125	0.2836	
22) TM METHOXYCHLOR	10.09	10.68	1163253	1346911	0.3064	0.2880	

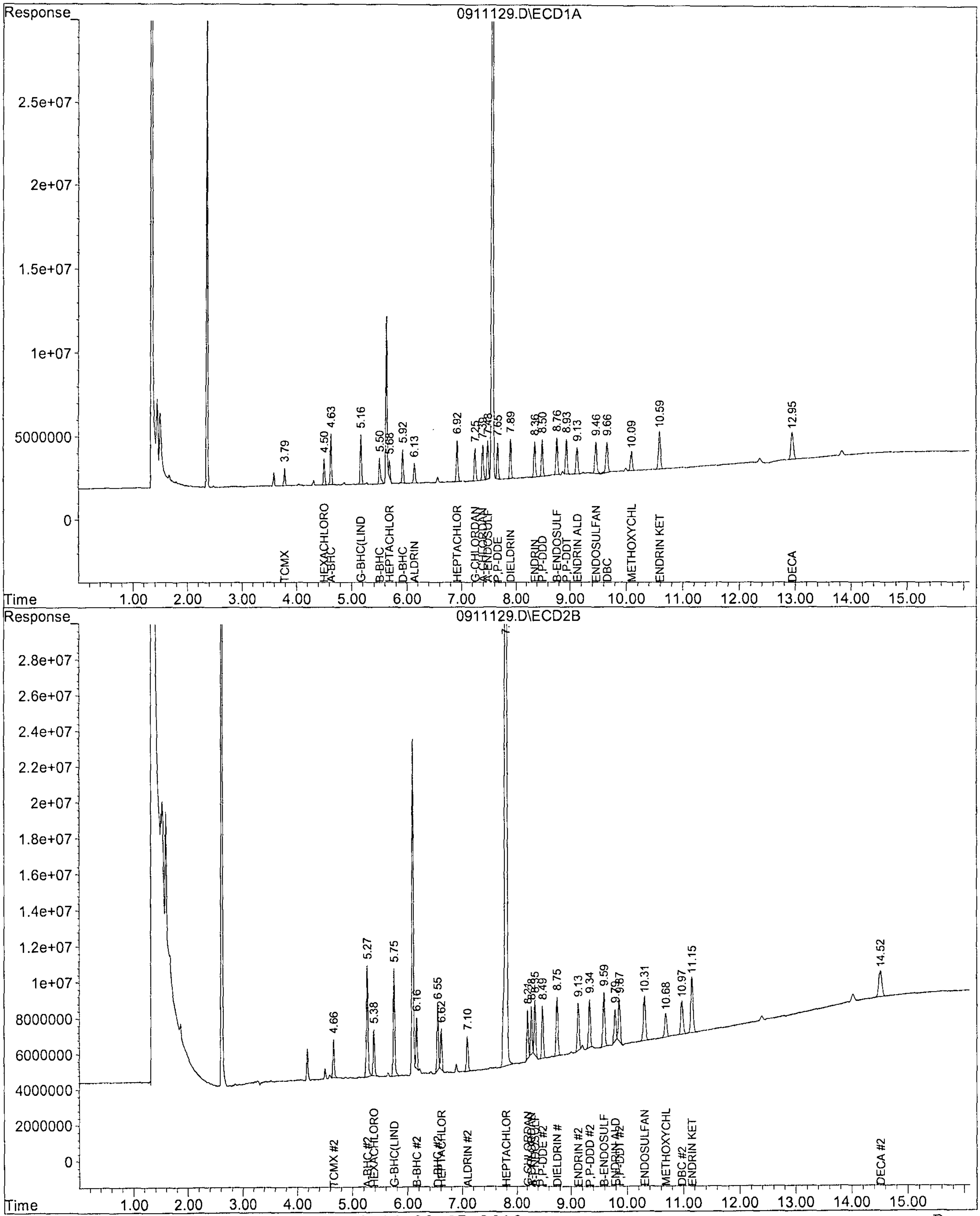
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\ETHEL\DATA\180911\0911129.D
Acq On : 9-13-18 18:30:57
Sample : 180907B LCS-1 1/500 DF5
Misc : water
Quant Method : G:\ETHEL\DATA\180911\OCL0911.M

Vial: 29
Operator: MA
Inst : Ethel
Multiplr: 10.00



Quantitation Report (QT Reviewed)

Signal #1 : G:\ETHEL\DATA\180911\0911035.D\ECD1A.CH Vial: 35
Signal #2 : G:\ETHEL\DATA\180911\0911035.D\ECD2B.CH
Acq On : 9-12-18 12:05:06 Operator: MA
Sample : 180907B LCS-2 1/500 DF5 Inst : Ethel
Misc : water Multiplr: 10.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 12:23 2018 Quant Results File: TOX0911.RES

Quant Method : G:\ETHEL\DATA\180911\TOX0911.M (Chemstation Integrator)
Title : 508/608/8081
Last Update : Wed Sep 12 09:38:45 2018
Response via : Multiple Level Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2ul
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

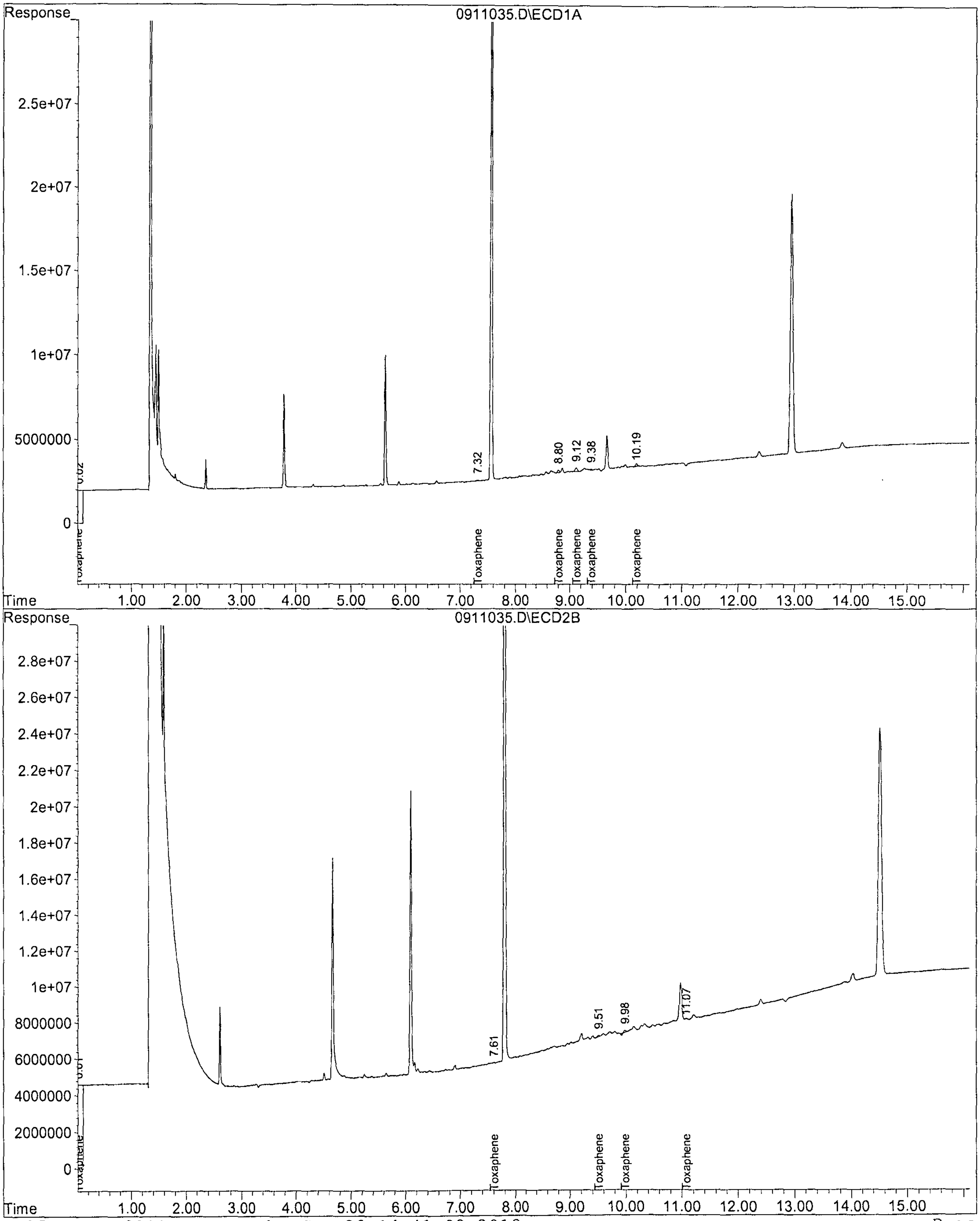
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) ANM Toxaphene Total	0.00	0.00	636681	213812	1.7157m	0.6195m#
2) L2AK Toxaphene	7.32	7.61	42376	9166	1.2383	0.3549 #
3) L2AK Toxaphene {2}	8.80	9.51	148064	80842	1.3651	1.2082
4) L2AK Toxaphene {3}	9.12	9.98	224785	102640	2.8278	1.4203 #
5) L2AK Toxaphene {4}	9.38	0.00	62272	0	1.4503	N.D. #
6) L2AK Toxaphene {5}	10.19	11.08	159183	21165	1.5020	0.4399 #
Sum Toxaphene			636681	213812	8.3835	3.4233
Average Toxaphene					1.677	0.856

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\ETHEL\DATA\180911\0911035.D
Acq On : 9-12-18 12:05:06
Sample : 180907B LCS-2 1/500 DF5
Misc : water
Quant Method : G:\ETHEL\DATA\180911\TOX0911.M

Vial: 35
Operator: MA
Inst : Ethel
Multiplr: 10.00



8081 Standard Prep

OCLHX Stock

Prepared: 12/20/17
Expires: 11/20/18
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
OCL Water Spike/Stock Sol.	O2SI	130015-09	100	298252G34-37823	12/11/18	02/07/19	1mL	10mL	Hexane	10
OCL Soil Surrogate	O2SI	130070-02	5,000	276464-38054	12/11/18	04/20/19	20uL	10mL	Hexane	10
Hexachlorobenzene	O2SI	030046-52	100	305116-38342	11/20/18	03/21/19	1mL	10mL	Hexane	10

OCLHX Calibration Curve

Prepared: 04/13/18
Expires: 10/12/18
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
OCLHX-2	O2SI	OCLHX-1B	0.05	Prepared 04/13/18	10/12/18	N/A	200uL	10mL	Hexane	0.001
OCLHX-2	O2SI	OCLHX-1A	0.05	Prepared 04/13/18	10/12/18	N/A	600uL	10mL	Hexane	0.003
OCLHX-2	O2SI	OCLHX-1	0.05	Prepared 04/13/18	10/12/18	N/A	1mL	10mL	Hexane	0.005
OCL Stock	O2SI	OCLHX-2	10	Prepared 12/20/17	11/20/18	N/A	250uL	50mL	Hexane	0.05
OCL Stock	O2SI	OCLHX-3	10	Prepared 12/20/17	11/20/18	N/A	500uL	50mL	Hexane	0.1
OCL Stock	O2SI	OCLHX-4	10	Prepared 12/20/17	11/20/18	N/A	150uL	10mL	Hexane	0.15
OCL Stock	O2SI	OCLHX-5	10	Prepared 12/20/17	11/20/18	N/A	200uL	10mL	Hexane	0.2
OCL Stock	O2SI	OCLHX-6	10	Prepared 12/20/17	11/20/18	N/A	250uL	10mL	Hexane	0.25

OCLHX Second Source Stock

Prepared: 03/30/18
Expires: 03/30/19
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Organochlorine Pest Soln 20 (SS)	O2SI	G34-130015-09 SS	100	G34-325154-38409	03/30/19	10/20/20	100uL	10mL	Hexane	1
Hexachlorobenzene	O2SI	G34-030046-52 SS	100	G34-325170-38318	03/30/19	04/28/20	100uL			1

OCLHX Second Source

Prepared: 03/30/18
Expires: 09/28/18
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
OCLHX SS Stock	O2SI	OCLHX SS STD	1	Prepared 03/30/18	03/30/19	N/A	1mL	10mL	Hexane	0.1

OCLHX Spike

Prepared: 12/11/17
Expires: 11/20/18
Acetone Lot No. 020817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Various	O2SI	130015-05	1,000	G34-298252-38538	11/20/18	03/21/19	500uL	100mL	Acetone	5
Hexachlorobenzene	O2SI	010046-15	1,000	329658-38637	12/11/18	03/21/19	500uL			5

OCL Degradation Check

Prepared: 09/09/18
Expires: 09/04/19
Hexane Lot No. 020817A

Prepared By (Initials): GA

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
OCL Degradation Check	O2SI	130109-01	100	287401-37036	09/04/19	09/04/19	250uL	50mL	Hexane	0.5

OCL-OP Soil Surrogate

Prepared: 07/24/18
Expires: 04/18/19
Acetone Lot. No. 030817A

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/mL)
Pesticide Surr. Soln, 5000mg/L	O2SI	130070-02	5,000	279464-39109	04/18/19	04/28/19	800uL	200mL	Acetone	20
Tributyl and Triphenyl phosphate	O2SI	130161-02	1,000	306115-37900/38590	04/26/2019 & 4/22/19	05/31/20	600uL / 400uL			5

OCL-OP Water Surrogate

Prepared: 05/30/18
Expires: 04/22/19
Acetone Lot No. 101717I

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Pesticide Surr. Soln, 5000mg/L	O2SI	130070-02	5,000	276464-39109	04/22/19	05/21/19	60uL	200mL	Acetone	1.5
Tributyl and Triphenyl phosphate	O2SI	130161-02	1,000	306115-38590/38591	05/30/19	05/21/19	1mL			5

Toxaphene Stock

Prepared: 07/23/18
Expires: 07/20/19
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Toxaphene Mix	O2SI	030279-31	5,000	283563-38420	07/23/19	07/20/19	200uL	10mL	Hexane	100

Toxaphene Calibration Curve

Prepared: 08/03/18
Expires: 02/01/19
Hexane Lot No. 56278

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Toxaphene Stock	O2SI	Toxaphene 1B	100	Prepared 07/23/18	07/20/19	N/A	250uL	10mL	Hexane	0.025
Toxaphene Stock	O2SI	Toxaphene 1A	100	Prepared 07/23/18	07/20/19	N/A	500uL	10mL	Hexane	0.05
Toxaphene Stock	O2SI	Toxaphene 1	100	Prepared 07/23/18	07/20/19	N/A	10uL	10mL	Hexane	0.1
Toxaphene Stock	O2SI	Toxaphene 2	100	Prepared 07/23/18	07/20/19	N/A	125uL	50mL	Hexane	0.25
Toxaphene Stock	O2SI	Toxaphene 3	100	Prepared 07/23/18	07/20/19	N/A	250uL	50mL	Hexane	0.5
Toxaphene Stock	O2SI	Toxaphene 4	100	Prepared 07/23/18	07/20/19	N/A	75uL	10mL	Hexane	0.75
Toxaphene Stock	O2SI	Toxaphene 5	100	Prepared 07/23/18	07/20/19	N/A	100uL	10mL	Hexane	1
Toxaphene Stock	O2SI	Toxaphene 6	100	Prepared 07/23/18	07/20/19	N/A	150uL	10mL	Hexane	1.5

Toxaphene Second Source Stock

Prepared: 01/04/18
Expires: 01/04/19
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)

Toxaphene Mix	O2SI	020179-31-SS	5,000	G34-326704-38491	01/04/19		50uL	25mL	Hexane	10

Toxaphene Second Source

Prepared: 07/23/18
Expires: 01/04/19
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Toxaphene SS Stock	O2SI	Toxaphene SS STD	10	Prepared 01/04/18	01/18/19	N/A	500uL	10mL	Hexane	0.5

Toxaphene Spike

Prepared: 07/09/18
Expires: 04/17/19
Acetone Lot No. 020817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Toxaphene Mix	O2SI	030279-31	5,000	283563-38421	04/17/19	05/31/23	1mL	100mL	Acetone	50

Organic Extraction Worksheet

Method	OCL OP/Triazine Sep Funnel Low 3510C	Extraction Set	180907B	Extraction Method	SEP025	Units	mL

Spiked ID 1	OCLHX Spike 12-11-17 EXP 11-20-18	Surrogate ID 1	OCL/OP Water Surrogate 5-30-18 EXP 5-30-19	
Spiked ID 2	TOX Spike 4-17-18 EXP 4-17-19	Surrogate ID 2		
Spiked ID 3	PCB Spike 7-6-18 EXP 1-6-19	Surrogate ID 3		
Spiked ID 4		Surrogate ID 4		
Spiked ID 5		Surrogate ID 5		
Spiked ID 6		Sufficient Vol for Matrix QC:	NO	
Spiked ID 7		Ext. Start Time:	09/07/18 14:32	
Spiked ID 8		Ext. End Time:	09/11/18 11:05	
		GC Requires Extract By:	**09/19/18 0:00**	
		pH1		Water Bath Temp Criteria 35,35,35 °
		pH2		
		pH3		

Spiked By: SS **Date** 09/07/18 **Witnessed By:** EL **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907B Blk				0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB3				
2	180907B LCS-1		0.030	1	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB3				
3	180907B LCS-2		0.020	2	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB1				
4	180907B LCS-3		0.040	3	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB2				
5	180907B LCSD-1		0.030	1	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB3				
6	180907B LCSD-2		0.020	2	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB1				
7	180907B LCSD-3		0.040	3	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB2				
8	AZ79179	AZ79179W06			0.100	1	490	1	7	09/07/18 14:32	86766
						equip	E-WB3				

Ky 9/11/18

Solvent and Lot#	
PH STRIPS	HC 727135
Dichloromethane	58059
Filter Paper	400138
B. Soduim Sulfate	18D105205
Hexane	111617A

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	DP
Date	9/12/18
Time	9:00
Refrigerator	Hobart 1

	Technician's Initials
Scanned By	FM
Sample Preparation	FM,SS,EL
Extraction	FM,SS,EL
Concentration	RB
Modified	09/11/18 1:17:41 PM

Reviewed By: Ky **Date** 9/11/18

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Organic Extraction Worksheet

Method	LOW LEVEL OCL/OP/Triaz So Ext 3550B MIS	Extraction Set	180912A	Extraction Method	SON002LLMIS	Units	mL

Spiked ID 1	OCLHX Spike 12-11-17 EXP 11-20-18		Surrogate ID 1	OCL/OP Soil Surrogate 8-30-18 EXP 2-22-19	
Spiked ID 2	TOX Spike 4-17-18 EXP 4-17-19		Surrogate ID 2		
Spiked ID 3	PCB Spike 7-6-18 EXP 1-6-19		Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	09/12/18 14:10	
Spiked ID 8			Ext. End Time:	09/13/18 14:30	
			GC Requires Extract By:	09/24/18 0:00	

pH1			Water Bath Temp Criteria	35,35,35 °
pH2				
pH3				

Spiked By: KY **Date** 09/12/18 **Witnessed By:** YL **Date** 09/12/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180912A Blk				0.5	1	30.12g	5x1/0.05	NA	09/12/18 14:10	*
						equip	E-S1.1 E-WB1				
2	180912A LCS-1		1	1	0.5	1	30.49g	5x1/0.05	NA	09/12/18 14:10	
						equip	E-S1.2 E-WB2				
3	180912A LCS-2		1	2	0.5	1	30.62g	5x1/0.05	NA	09/12/18 14:10	
						equip	E-S2 E-WB3				
4	180912A LCS-3		1	3	0.5	1	30.67g	5x1/0.05	NA	09/12/18 14:10	*
						equip	E-S6 E-WB1				
5	180912A LCSD-1		1	1	0.5	1	30.04g	5x1/0.05	NA	09/12/18 14:10	
						equip	E-S7 E-WB2				
6	180912A LCSD-2		1	2	0.5	1	30.08g	5x1/0.05	NA	09/12/18 14:10	
						equip	e-s8 E-WB3				
7	180912A LCSD-3		1	3	0.5	1	30.33g	5x1/0.05	NA	09/12/18 14:10	*
						equip	E-S1.1 E-WB1				
8	AZ79031	AZ79031S07			0.5	1	30.80g	5x1/0.05	NA	09/12/18 14:10	86752 *
						equip	E-S1.2 E-WB2				
9	AZ79146	AZ79146S01			0.5	1	30.41g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S2 E-WB3				
10	AZ79147	AZ79147S01			0.5	1	30.30g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S6 E-WB1				
11	AZ79148	AZ79148S01			0.5	1	30.23g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S7 E-WB2				
12	AZ79149	AZ79149S01			0.5	1	30.91g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	e-s8 E-WB3				
13	AZ79150	AZ79150S01			0.5	1	30.06g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.1 E-WB1				
14	AZ79151 MS-1	AZ79151S01	1	1	0.5	1	25.15g	5x1/0.05	NA	09/12/18 14:10	86766
						equip	E-S1.2 E-WB2				
15	AZ79151 MSD-1	AZ79151S01	1	1	0.5	1	25.24g	5x1/0.05	NA	09/12/18 14:10	86766
						equip	E-S2 E-WB3				
16	AZ79151 MS-2	AZ79151S01	1	2	0.5	1	25.20g	5x1/0.05	NA	09/12/18 14:10	86766
						equip	E-S6 E-WB1				

Solvent and Lot#	
BALANCE ID	EB1
SAND	18C025203
B.Na2S04	18D105205
DCM:Acetone MIX	9-11-18
FILTER PAPER	15751144
HEXANE	111617A
SULFURIC ACID (*)	177544

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	DP
Date	9/13/18
Time	5:06
Refrigerator	Hdow+1

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL,RB

Modified	09/13/18 4:18:31 PM

Reviewed By: Ky 717 **Date** 9/13/18

Organic Extraction Worksheet

Method	LOW LEVEL OCL/OP/Triaz So Ext 3550B MIS	Extraction Set	180912A	Extraction Method	SON002LLMIS	Units	mL

Spiked ID 1	OCLHX Spike 12-11-17 EXP 11-20-18	Surrogate ID 1	OCL/OP Soil Surrogate 8-30-18 EXP 2-22-19
Spiked ID 2	TOX Spike 4-17-18 EXP 4-17-19	Surrogate ID 2	
Spiked ID 3	PCB Spike 7-6-18 EXP 1-6-19	Surrogate ID 3	
Spiked ID 4		Surrogate ID 4	
Spiked ID 5		Surrogate ID 5	
Spiked ID 6		Sufficient Vol for Matrix QC:	NO
Spiked ID 7		Ext. Start Time:	09/12/18 14:10
Spiked ID 8		Ext. End Time:	09/13/18 14:30
		GC Requires Extract By:	09/24/18 0:00

pH1			Water Bath Temp Criteria 35,35,35 °
pH2			
pH3			

Spiked By: KY **Date** 09/12/18 **Witnessed By:** YL **Date** 09/12/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
17	AZ79151 MSD-2	AZ79151S01	1	2	0.5	1	25.22g	5x1/0.05	NA	09/12/18 14:10	86766
						equip	E-S7 E-WB2				
18	AZ79151	AZ79151S01			0.5	1	30.07g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	e-s8 E-WB2				
19	AZ79151 MS-3	AZ79151S01	1	3	0.5	1	25.29g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.1 E-WB1				
20	AZ79151 MSD-3	AZ79151S01	1	3	0.5	1	25.66g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.2 E-WB2				
21	AZ79152	AZ79152S01			0.5	1	30.22g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S2 E-WB3				
22	AZ79153	AZ79153S01			0.5	1	30.49g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S6 E-WB1				
23	AZ79154	AZ79154S01			0.5	1	30.94g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S7 E-WB2				
24	AZ79155	AZ79155S01			0.5	1	30.74g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	e-s8 E-WB3				
25	AZ79156	AZ79156S01			0.5	1	30.72g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.1 E-WB1				
26	AZ79157	AZ79157S01			0.5	1	30.63g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.2 E-WB2				
27	AZ79158	AZ79158S01			0.5	1	30.30g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S2 E-WB3				
28	AZ79159	AZ79159S01			0.5	1	30.22g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S6 E-WB1				
29	AZ79160	AZ79160S01			0.5	1	30.69g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S7 E-WB2				

KY 9/13/18

Solvent and Lot#	
BALANCE ID	EB1
SAND	18C025203
B.Na2S04	18D105205
DCM:Acetone MIX	9-11-18
FILTER PAPER	15751144
HEXANE	111617A
SULFURIC ACID (*)	177544

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL,RB
Modified	09/13/18 4:18:31 PM

Reviewed By: KY **Date** 9/13/18

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Injection Log

Directory: G:\ETHEL\DATA\180911\

Vial	FileName	Multiplier	SampleName	Misc Info	Injected
2	0911002.D	1	OCL Deg Check 1/15/18	water	9-11-18 13:36:46
3	0911003.D	1	OCLHX - 1B 4/13/18	water	9-11-18 13:55:43
4	0911004.D	1	OCLHX - 1A 4/13/18	water	9-11-18 14:14:41
5	0911005.D	1	OCLHX - 1 4/13/18	water	9-11-18 14:33:41
7	0911007.D	1	OCLHX - 3 4/13/18	water	9-11-18 15:11:45
8	0911008.D	1	OCLHX - 4 4/13/18	water	9-11-18 15:30:42
9	0911009.D	1	OCLHX - 5 4/13/18	water	9-11-18 15:49:41
10	0911010.D	1	OCLHX - 6 4/13/18	water	9-11-18 16:08:46
11	0911011.D	1	OCLHX - SS 3/30/18	water	9-11-18 16:27:44
12	0911012.D	1	TOX - 1B 8/3/18	water	9-11-18 16:46:39
13	0911013.D	1	TOX - 1A 8/3/18	water	9-11-18 17:05:35
14	0911014.D	1	TOX - 1 8/3/18	water	9-11-18 17:24:39
15	0911015.D	1	TOX - 2 8/3/18	water	9-11-18 17:43:37
16	0911016.D	1	TOX - 3 1/4/18	water	9-11-18 18:02:35
17	0911017.D	1	TOX - 4 8/3/18	water	9-11-18 18:21:32
18	0911018.D	1	TOX - 5 8/3/18	water	9-11-18 18:40:34
19	0911019.D	1	TOX - 6 8/3/18	water	9-11-18 18:59:35
20	0911020.D	1	TOX - SS 7/23/18	water	9-11-18 19:18:31
29	0911029.D	1	OCL Deg Check 1/15/18	water	9-12-18 10:11:12
30	0911030.D	1	OCLHX - 3 4/13/18	water	9-12-18 10:30:11
31	0911031.D	1	TOX - 2 8/3/18	water	9-12-18 10:49:09
33	0911033.D	10	180907B BLK 1/500 DF5	water	9-12-18 11:27:10
35	0911035.D	10	180907B LCS-2 1/500 DF5	water	9-12-18 12:05:06
38	0911038.D	10.2041	AZ79179W06 1/490 DF5	water	9-12-18 13:02:09
54	0911054.D	1	OCLHX - 3 4/13/18	water	9-12-18 18:46:57
55	0911055.D	1	TOX - 2 8/3/18	water	9-12-18 19:05:55
95	0911095.D	1	OCL Deg Check 1/15/18	water	9-13-18 7:46:51
15	0911115.D	1	OCLHX - 3 4/13/18	water	9-13-18 14:05:04
29	0911129.D	10	180907B LCS-1 1/500 DF5	water	9-13-18 18:30:57
39	0911139.D	1	OCLHX - 3 4/13/18	water	9-13-18 21:40:59
44	0911144.D	1	OCL Deg Check 1/15/18	water	9-14-18 9:02:53
51	0911151.D	1	OCLHX - 3 9/12/18	water	9-14-18 11:35:47
52	0911152.D	1	TOX - 2 8/3/18	water	9-14-18 11:54:45
53	0911153.D	3320.05	180912A BLK 5X1/0.05/30.12G DF20	soil	9-14-18 12:13:42
54	0911154.D	3279.76	180912A LCS-1 5X1/0.05/30.49G DF20	soil	9-14-18 12:32:41
55	0911155.D	3265.84	180912A LCS-2 5X1/0.05/30.62G DF20	soil	9-14-18 12:51:45
59	0911159.D	3288.39	AZ79146S01 5X1/0.05/30.41G DF20	soil	9-14-18 14:07:43
60	0911160.D	3300.33	AZ79147S01 5X1/0.05/30.30G DF20	soil	9-14-18 14:26:41
61	0911161.D	3307.97	AZ79148S01 5X1/0.05/30.23G DF20	soil	9-14-18 14:45:41
62	0911162.D	3235.2	AZ79149S01 5X1/0.05/30.91G DF20	soil	9-14-18 15:04:41
63	0911163.D	3326.68	AZ79150S01 5X1/0.05/30.06G DF20	soil	9-14-18 15:23:47
64	0911164.D	3325.57	AZ79151S01 5X1/0.05/30.07G DF20	soil	9-14-18 15:42:45
65	0911165.D	3976.14	AZ79151S01 MS-1 5X1/0.05/25.15G DF20	soil	9-14-18 16:01:42
66	0911166.D	3961.97	AZ79151S01 MSD-1 5X1/0.05/25.24G DF20	soil	9-14-18 16:20:40
67	0911167.D	3968.25	AZ79151S01 MS-2 5X1/0.05/25.20G DF20	soil	9-14-18 16:39:46
68	0911168.D	3965.11	AZ79151S01 MSD-2 5X1/0.05/25.22G DF20	soil	9-14-18 16:58:44
70	0911170.D	1	OCL Deg Check 1/15/18	soil	9-14-18 17:36:42
71	0911171.D	1	OCLHX - 3 9/12/18	soil	9-14-18 17:55:49
72	0911172.D	1	TOX - 2 8/3/18	soil	9-14-18 18:14:46
73	0911173.D	3309.07	AZ79152S01 5X1/0.05/30.22G DF20	soil	9-14-18 18:33:45
74	0911174.D	3279.76	AZ79153S01 5X1/0.05/30.49G DF20	soil	9-14-18 18:52:41

75	0911175.D	3232.06	AZ79154S01 5X1/0.05/30.94G DF20	soil	9-14-18 19:11:47
76	0911176.D	3253.09	AZ79155S01 5X1/0.05/30.74G DF20	soil	9-14-18 19:30:48
77	0911177.D	3255.21	AZ79156S01 5X1/0.05/30.72G DF20	soil	9-14-18 19:49:46
78	0911178.D	3264.77	AZ79157S01 5X1/0.05/30.63G DF20	soil	9-14-18 20:08:44
79	0911179.D	3300.33	AZ79158S01 5X1/0.05/30.30G DF20	soil	9-14-18 20:27:52
80	0911180.D	3309.07	AZ79159S01 5X1/0.05/30.22G DF20	soil	9-14-18 20:46:55
81	0911181.D	3258.39	AZ79160S01 5X1/0.05/30.69G DF20	soil	9-14-18 21:05:53
83	0911183.D	1	OCLHX - 3 9/12/18	soil	9-14-18 21:43:59
84	0911184.D	1	TOX - 2 8/3/18	soil	9-14-18 22:03:00

ORGANICS
Calibration Data

APPL, INC.

EPA 8082
PCB0907

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 09/07/18
Matrix: Water Instrument: Lucy Initials:

			0907005.D	0907006.D	0907007.D	0907008.D	0907009.D	0907004.D	0907003.D	0907002.D							
		Compound	1	2	3	4	5	1B	1C	1D			Avg	%RSD	Type	r^2	Q
1	SA	TCmX	310800404	303931322	312804238	303534025	321499713	328034576	310888900	322061877			314194382	2.8	SA		
2	SA	DBC	296515203	308227400	289072720	289254718	298428375	269426152	258968588	250635520			282566084	7.3	SA		
3	SA	DECA	203258723	213320770	194909757	196199892	204320605	213973966	195430068	234524555			206992292	6.5	SA		
4	BNMC	Total AR1016	42851443	41433192	42365645	41258493	42228395	48010721	48327312	53070827			44943253	9.6	BNMC		
5	L3BKC	AR 1016	8505073	8060046	7971535	7551078	7903980	10190632	10469279	13089736			9217670	21	L3BKC		
6	L3BKC	AR 1016 {2}	19031923	18091841	18688096	18477229	18856381	19950434	19965239	21373913			19304382	5.5	L3BKC		
7	L3BKC	AR 1016 {3}	3988079	3957177	3974858	3883062	3945165	4752035	5072710	5642606			4401962	15	L3BKC		
8	L3BKC	AR 1016 {4}	6034412	6190971	6429700	6009661	6127506	7547424	7504146	7867747			6713946	12	L3BKC		
9	L3BKC	AR 1016 {5}	5291955	5133156	5301455	5337463	5395363	5570195	5315937	5096826			5305294	2.8	L3BKC		
10	BNMC	Total AR1260	99284495	98554617	99330118	101364964	102175401	105568148	103585414	117544872			103426003	6.0	BNMC		
11	L9BKC	AR 1260	10812707	10616071	11142948	10921201	11136332	11425820	10053597	8995790			10638058	7.3	L9BKC		
12	L9BKC	AR 1260 {2}	16318413	16121634	16163141	15854742	16284292	16945262	17339699	21905326			17116564	12	L9BKC		
13	L9BKC	AR 1260 {3}	19277441	18933728	18144716	19420883	19122562	20618874	20741263	26042648			20287764	12	L9BKC		
14	L9BKC	AR 1260 {4}	32117670	31267472	32975413	32938976	33663827	34378113	33628138	36012554			33372771	4.3	L9BKC		
15	L9BKC	AR 1260 {5}	20758263	21615712	20903901	22229161	21968387	22200078	21822716	24588555			22010847	5.4	L9BKC		
16		Signal #2															
17	SA	TCmX #2	558004425	535156409	551881895	525218900	563338193	559550761	510724550	511576506			539431455	4.0	SA		
18	SA	DBC #2	320430942	329508242	342409845	344166215	339570544	328602667	324935781	358007045			335953910	3.7	SA		
19	SA	DECA #2	304933870	308385301	310247283	309114198	311456417	323275057	311255595	330363356			313628885	2.7	SA		
20	BNMC	Total AR1016 #2	42925145	40497936	41625149	39910389	41507245	44953431	47380032	47435508			43279354	6.9	BNMC		
21	L3BKC	AR 1016 #2	8307989	7617573	7949380	7446835	7710864	10380314	9790739	17315613			9564913	35	L3BKC		
22	L3BKC	AR 1016 {2} #2	10106892	9634575	9786454	9628990	9896317	8888473	7298396	9159979			9300010	9.7	L3BKC		
23	L3BKC	AR 1016 {3} #2	7669116	7272884	7493164	7067143	7453142	7750169	8196035	5512059			7301714	11	L3BKC		
24	L3BKC	AR 1016 {4} #2	7828527	7382031	7640919	7232229	7502506	8268835	11978413	7840135			8209199	19	L3BKC		
25	L3BKC	AR 1016 {5} #2	9012622	8590874	8755231	8535193	8944416	9665639	10116448	7607722			8903518	8.5	L3BKC		
26	BNMC	Total AR1260 #2	98443286	99386161	103172845	105575435	106180708	113045645	106376862	115227904			105926106	5.6	BNMC		
27	L9BKC	AR 1260 #2	24151652	24410967	24904359	25338097	25340217	27749259	27608518	28830305			26041672	6.8	L9BKC		
28	L9BKC	AR 1260 {2} #2	28546158	29156884	30220173	31172608	31983204	32812362	30796643	33490352			31022298	5.5	L9BKC		
29	L9BKC	AR 1260 {3} #2	16456337	16937929	17134840	17780574	17921622	19199896	17317868	18215585			17620581	4.9	L9BKC		
30	L9BKC	AR 1260 {4} #2	22602286	22256189	24104395	24435878	24293405	25495072	23595357	27570947			24294191	6.9	L9BKC		
31	L9BKC	AR 1260 {5} #2	6686853	6624192	6809079	6848278	6642260	7789056	7058476	7120715			6947363	5.6	L9BKC		
32																	
33																	
34																	
35																	

7.544546

```
Signal #1 : G:\LUCY\DATA\180907\0907002.D\ECD1A.CH        Vial: 2
Signal #2 : G:\LUCY\DATA\180907\0907002.D\ECD2B.CH
Acq On    : 9-7-18 10:44:28                             Operator: MA
Sample    : PCB - 1D 7/18/18                            Inst    : Lucy
Misc      : water                                       Multiplr: 1.00
IntFile Signal #1: events.e    IntFile Signal #2: events2.e
Quant Time: Sep  7 15:55 2018  Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2uL
Signal #1 Phase : DB-35MS          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
System Monitoring Compounds							
1) SA TCmX	2.55	2.92	1288248	2046306	0.002	0.002	
Spiked Amount 0.150			Recovery	=	1.33%	1.33%	
2) SA DBC	6.46	6.95	1002542	1432028	0.002	0.002	
Spiked Amount 0.150			Recovery	=	1.33%	1.33%	
3) SA DECA	8.58	9.17	938098	1321453	0.002	0.002	
Spiked Amount 0.150			Recovery	=	1.33%	1.33%	
Target Compounds							
4) BNMC Total AR1016	0.00	0.00	1061417	948710	0.012m	0.011m	
5) L3BKC AR 1016	3.39	3.25	261795	346312	0.014	0.018	#
6) L3BKC AR 1016 {2}	3.82	4.27	427478	183200	0.011	0.010	
7) L3BKC AR 1016 {3}	4.10	4.39	112852	110241	0.013	0.008	#
8) L3BKC AR 1016 {4}	4.36	4.43	157355	156803	0.012	0.010	
9) L3BKC AR 1016 {5}	4.50	4.58	101937	152154	0.010	0.009	
10) BNMC Total AR1260	0.00	0.00	2350897	2304558	0.011m	0.011m	
11) L9BKC AR 1260	5.33	5.75	179916	576606	0.008	0.011	#
12) L9BKC AR 1260 {2}	5.47	6.30	438107	669807	0.013	0.011	
13) L9BKC AR 1260 {3}	5.65	6.40	520853	364312	0.013	0.010	
14) L9BKC AR 1260 {4}	6.59	7.40	720251	551419	0.011	0.011	
15) L9BKC AR 1260 {5}	7.04	7.49	491771	142414	0.011	0.010	

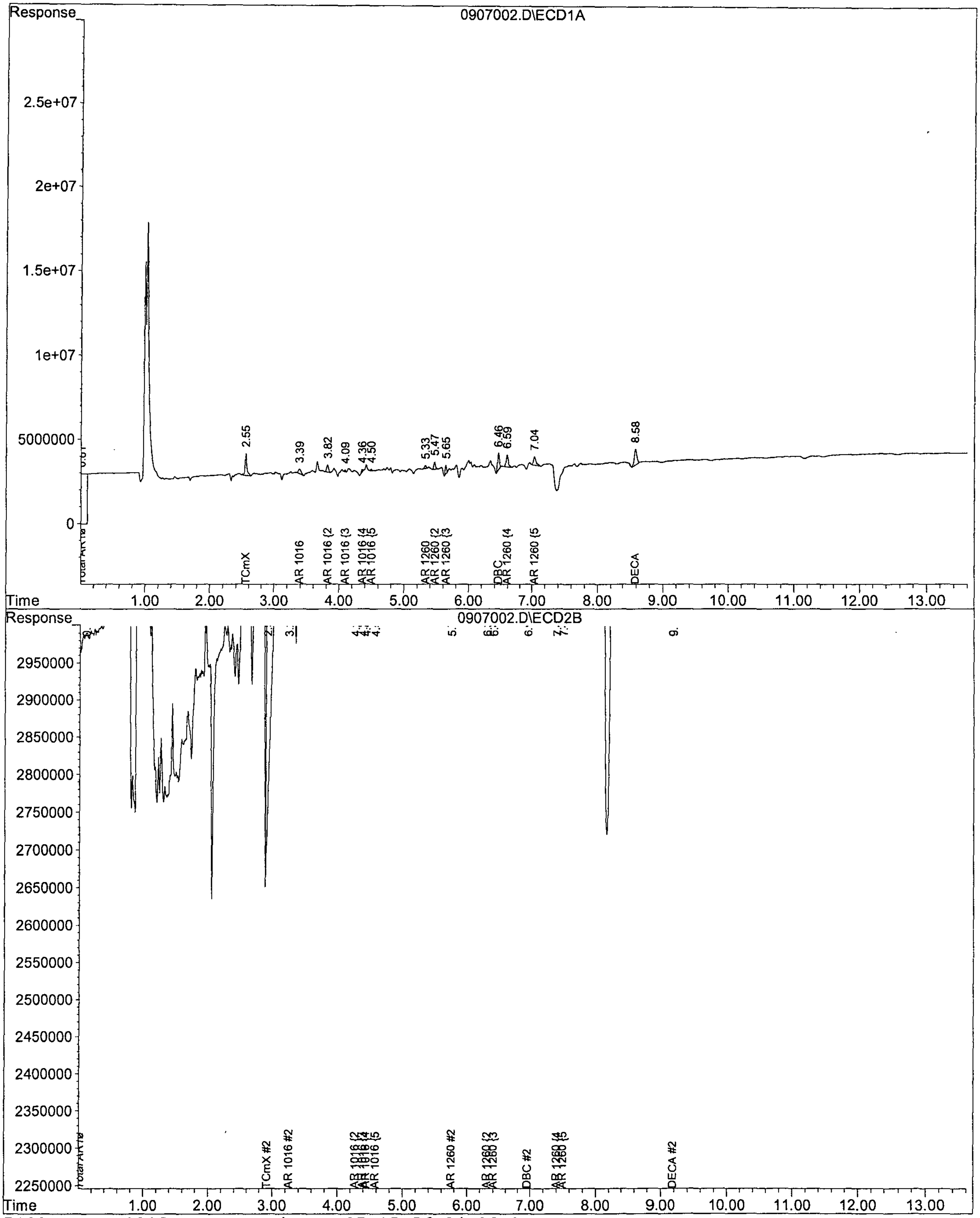
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907002.D
Acq On : 9-7-18 10:44:28
Sample : PCB - 1D 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 2
Operator: MA
Inst : Lucy
Multiplr: 1.00



Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907003.D\ECD1A.CH Vial: 3
Signal #2 : G:\LUCY\DATA\180907\0907003.D\ECD2B.CH
Acq On : 9-7-18 11:01:27 Operator: MA
Sample : PCB - 1C 7/18/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 15:55 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound		RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
System Monitoring Compounds								
1) SA TCmX		2.56	2.92	3108889	5107245	0.005	0.005	
Spiked Amount	0.150			Recovery	=	3.33%	3.33%	
2) SA DBC		6.46	6.95	2589686	3249358	0.005	0.005	
Spiked Amount	0.150			Recovery	=	3.33%	3.33%	
3) SA DECA		8.58	9.17	1954301	3112556	0.005	0.005	
Spiked Amount	0.150			Recovery	=	3.33%	3.33%	
Target Compounds								
4) BNMC Total AR1016		0.00	0.00	2416366	2369002	0.027m	0.027m	
5) L3BKC AR 1016		3.39	3.25	523464	489537	0.028	0.026	
6) L3BKC AR 1016 {2}		3.82	4.28	998262	364920	0.026	0.020	
7) L3BKC AR 1016 {3}		4.10	4.39	253636	409802	0.029	0.028	
8) L3BKC AR 1016 {4}		4.36	4.44	375207	598921	0.028	0.036	#
9) L3BKC AR 1016 {5}		4.50	4.58	265797	505822	0.025	0.028	
10) BNMC Total AR1260		0.00	0.00	5179271	5318843	0.025m	0.025m	
11) L9BKC AR 1260		5.33	5.75	502680	1380426	0.024	0.027	
12) L9BKC AR 1260 {2}		5.47	6.30	866985	1539832	0.025	0.025	
13) L9BKC AR 1260 {3}		5.65	6.40	1037063	865893	0.026	0.025	
14) L9BKC AR 1260 {4}		6.59	7.40	1681407	1179768	0.025	0.024	
15) L9BKC AR 1260 {5}		7.04	7.50	1091136	352924	0.025	0.025	

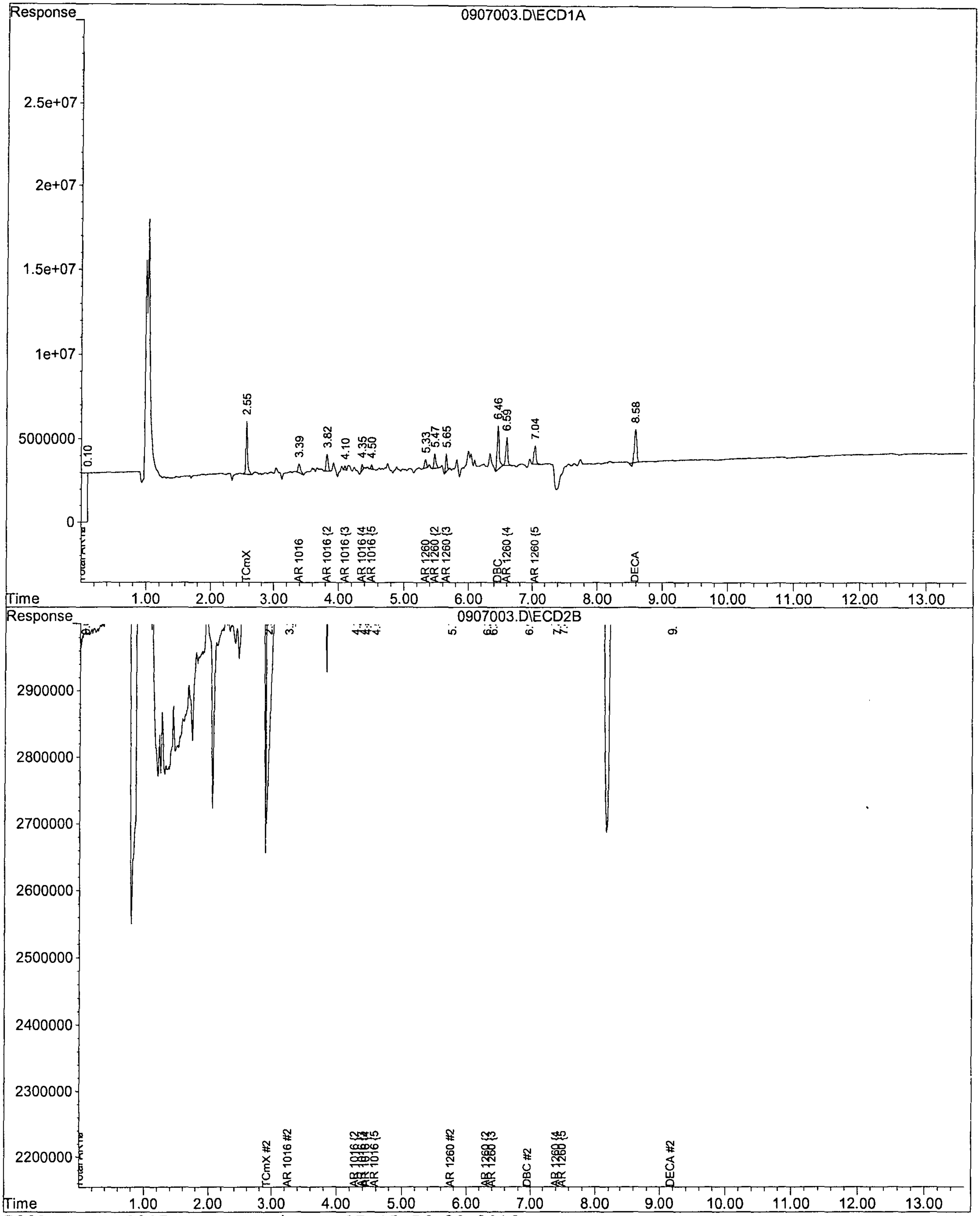
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907003.D
Acq On : 9-7-18 11:01:27
Sample : PCB - 1C 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 3
Operator: MA
Inst : Lucy
Multiplr: 1.00



Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907004.D\ECD1A.CH Vial: 4
Signal #2 : G:\LUCY\DATA\180907\0907004.D\ECD2B.CH
Acq On : 9-7-18 11:18:20 Operator: MA
Sample : PCB - 1B 7/18/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 15:56 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

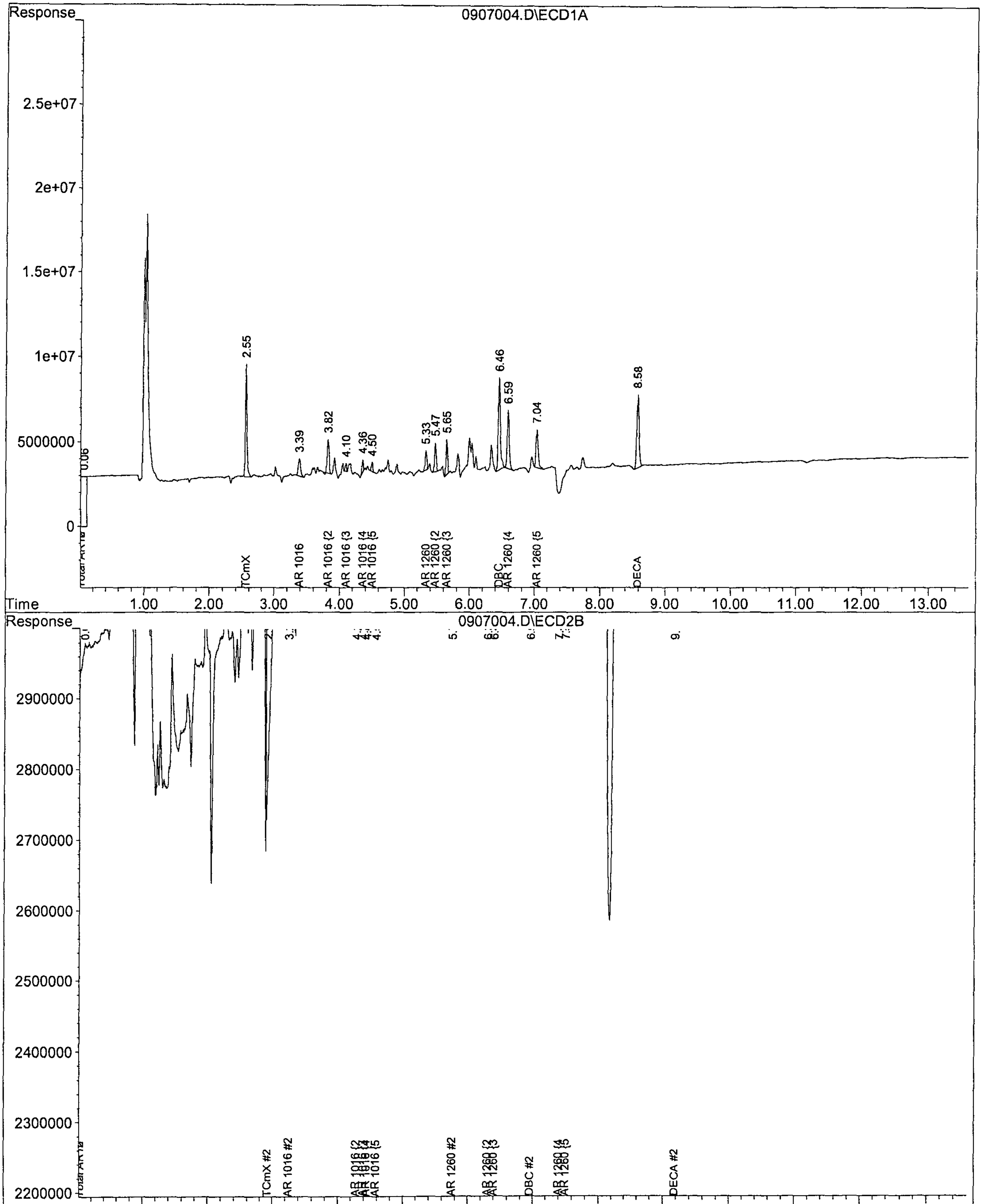
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	6560692	11191015	0.010	0.010
Spiked Amount 0.150			Recovery =		6.67%	6.67%
2) SA DBC	6.46	6.96	5388523	6572053	0.010	0.010
Spiked Amount 0.150			Recovery =		6.67%	6.67%
3) SA DECA	8.58	9.17	4279479	6465501	0.010	0.010
Spiked Amount 0.150			Recovery =		6.67%	6.67%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	4801072	4495343	0.053m	0.052m
5) L3BKC AR 1016	3.39	3.25	1019063	1038031	0.055	0.054
6) L3BKC AR 1016 {2}	3.82	4.28	1995043	888847	0.052	0.048
7) L3BKC AR 1016 {3}	4.10	4.39	475204	775017	0.054	0.053
8) L3BKC AR 1016 {4}	4.36	4.44	754742	826884	0.056	0.050
9) L3BKC AR 1016 {5}	4.50	4.58	557019	966564	0.052	0.054
10) BNMC Total AR1260	0.00	0.00	10556815	11304565	0.051m	0.053m
11) L9BKC AR 1260	5.33	5.75	1142582	2774926	0.054	0.053
12) L9BKC AR 1260 {2}	5.47	6.30	1694526	3281236	0.049	0.053
13) L9BKC AR 1260 {3}	5.65	6.40	2061887	1919990	0.051	0.054
14) L9BKC AR 1260 {4}	6.59	7.40	3437811	2549507	0.052	0.052
15) L9BKC AR 1260 {5}	7.04	7.50	2220008	778906	0.050	0.056

Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907004.D
Acq On : 9-7-18 11:18:20
Sample : PCB - 1B 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 4
Operator: MA
Inst : Lucy
Multiplr: 1.00



Quantitation Report (Not Reviewed)

```
Signal #1 : G:\LUCY\DATA\180907\0907005.D\ECD1A.CH        Vial: 5
Signal #2 : G:\LUCY\DATA\180907\0907005.D\ECD2B.CH
Acq On    : 9-7-18 11:35:15                              Operator: MA
Sample    : PCB - 1 7/18/18                              Inst     : Lucy
Misc      : water                                        Multiplr: 1.00
IntFile Signal #1: events.e      IntFile Signal #2: events2.e
Quant Time: Sep  7 15:56 2018  Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2uL
Signal #1 Phase : DB-35MS            Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32               Signal #2 Info : 0.32
```

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	12432016	22320177	0.020	0.021
Spiked Amount 0.150			Recovery =		13.33%	14.00%
2) SA DBC	6.46	6.96	11860608	12817238	0.021	0.019
Spiked Amount 0.150			Recovery =		14.00%	12.67%
3) SA DECA	8.58	9.17	8130349	12197355	0.020	0.019
Spiked Amount 0.150			Recovery =		13.33%	12.67%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	8570289	8585029	0.095m	0.099m
5) L3BKC AR 1016	3.39	3.25	1701015	1661598	0.092	0.087
6) L3BKC AR 1016 {2}	3.82	4.28	3806385	2021378	0.099	0.109
7) L3BKC AR 1016 {3}	4.10	4.39	797616	1533823	0.091	0.105
8) L3BKC AR 1016 {4}	4.36	4.44	1206882	1565705	0.090	0.095
9) L3BKC AR 1016 {5}	4.50	4.58	1058391	1802524	0.100	0.101
10) BNMC Total AR1260	0.00	0.00	19856899	19688657	0.096m	0.093m
11) L9BKC AR 1260	5.33	5.75	2162541	4830330	0.102	0.093
12) L9BKC AR 1260 {2}	5.47	6.30	3263683	5709232	0.095	0.092
13) L9BKC AR 1260 {3}	5.65	6.40	3855488	3291267	0.095	0.093
14) L9BKC AR 1260 {4}	6.59	7.40	6423534	4520457	0.096	0.093
15) L9BKC AR 1260 {5}	7.04	7.50	4151653	1337371	0.094	0.096

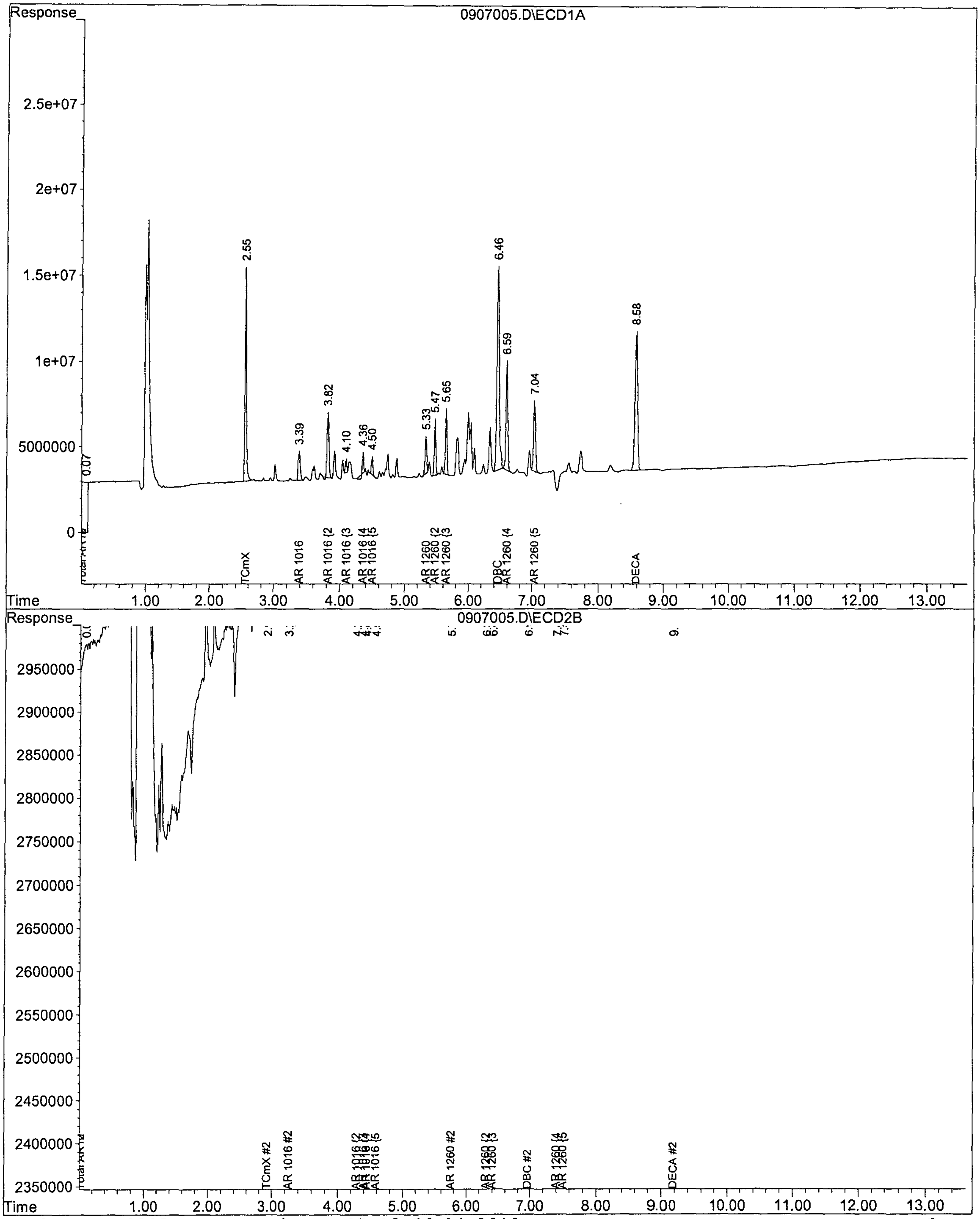
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907005.D
Acq On : 9-7-18 11:35:15
Sample : PCB - 1 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 5
Operator: MA
Inst : Lucy
Multiplr: 1.00



Quantitation Report (Not Reviewed)

```
Signal #1 : G:\LUCY\DATA\180907\0907006.D\ECD1A.CH       Vial: 6
Signal #2 : G:\LUCY\DATA\180907\0907006.D\ECD2B.CH
Acq On    : 9-7-18 11:52:10                          Operator: MA
Sample    : PCB - 2 7/18/18                          Inst    : Lucy
Misc      : water                                    Multiplr: 1.00
IntFile Signal #1: events.e    IntFile Signal #2: events2.e
Quant Time: Sep  7 15:56 2018  Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2uL
Signal #1 Phase : DB-35MS           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

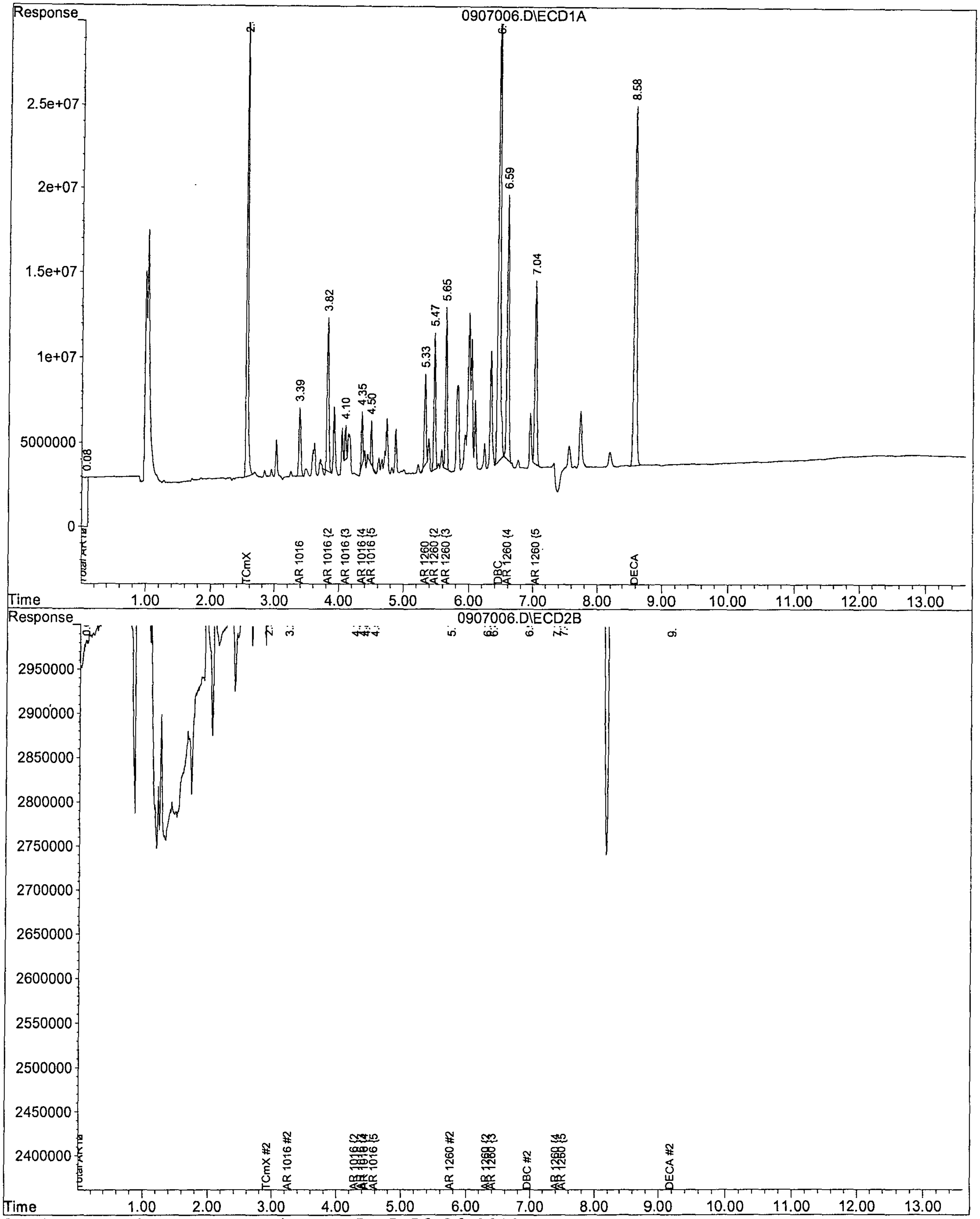
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	30393132	53515641	0.048	0.050
Spiked Amount 0.150			Recovery =		32.00%	33.33%
2) SA DBC	6.46	6.96	30822740	32950824	0.055	0.049
Spiked Amount 0.150			Recovery =		36.67%	32.67%
3) SA DECA	8.58	9.17	21332077	30838530	0.052	0.049
Spiked Amount 0.150			Recovery =		34.67%	32.67%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	20716596	20248968	0.230m	0.234m
5) L3BKC AR 1016	3.39	3.25	4030023	3808787	0.219	0.199
6) L3BKC AR 1016 {2}	3.82	4.28	9045921	4817288	0.234	0.259
7) L3BKC AR 1016 {3}	4.10	4.39	1978589	3636442	0.225	0.249
8) L3BKC AR 1016 {4}	4.36	4.44	3095486	3691015	0.231	0.225
9) L3BKC AR 1016 {5}	4.50	4.58	2566578	4295437	0.242	0.241
10) BNMC Total AR1260	0.00	0.00	49277309	49693081	0.238m	0.235m
11) L9BKC AR 1260	5.33	5.75	5308036	12205483	0.249	0.234
12) L9BKC AR 1260 {2}	5.47	6.30	8060817	14578442	0.235	0.235
13) L9BKC AR 1260 {3}	5.65	6.40	9466864	8468964	0.233	0.240
14) L9BKC AR 1260 {4}	6.59	7.40	15633736	11128095	0.234	0.229
15) L9BKC AR 1260 {5}	7.04	7.50	10807856	3312096	0.246	0.238

Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907006.D
Acq On : 9-7-18 11:52:10
Sample : PCB - 2 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 6
Operator: MA
Inst : Lucy
Multiplr: 1.00



Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907007.D\ECD1A.CH Vial: 7
Signal #2 : G:\LUCY\DATA\180907\0907007.D\ECD2B.CH
Acq On : 9-7-18 12:09:10 Operator: MA
Sample : PCB - 3 7/18/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 15:56 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound		RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds							
1) SA TCmX		2.56	2.92	62560848	110.4E6	0.100	0.102
Spiked Amount	0.150			Recovery	=	66.67%	68.00%
2) SA DBC		6.46	6.96	57814544	68481969	0.102	0.102
Spiked Amount	0.150			Recovery	=	68.00%	68.00%
3) SA DECA		8.58	9.17	38981951	62049457	0.094	0.099
Spiked Amount	0.150			Recovery	=	62.67%	66.00%
Target Compounds							
4) BNMC Total AR1016		0.00	0.00	42365645	41625149	0.471m	0.481m
5) L3BKC AR 1016		3.39	3.25	7971535	7949380	0.432	0.416
6) L3BKC AR 1016 {2}		3.82	4.28	18688096	9786454	0.484	0.526
7) L3BKC AR 1016 {3}		4.10	4.39	3974858	7493164	0.451	0.513
8) L3BKC AR 1016 {4}		4.36	4.44	6429700	7640919	0.479	0.465
9) L3BKC AR 1016 {5}		4.50	4.58	5301455	8755231	0.500	0.492
10) BNMC Total AR1260		0.00	0.00	99330118	103.2E6	0.480m	0.487m
11) L9BKC AR 1260		5.33	5.75	11142948	24904359	0.524	0.478
12) L9BKC AR 1260 {2}		5.47	6.30	16163141	30220173	0.472	0.487
13) L9BKC AR 1260 {3}		5.65	6.40	18144716	17134840	0.447	0.486
14) L9BKC AR 1260 {4}		6.59	7.40	32975413	24104395	0.494	0.496
15) L9BKC AR 1260 {5}		7.04	7.50	20903901	6809079	0.475	0.490

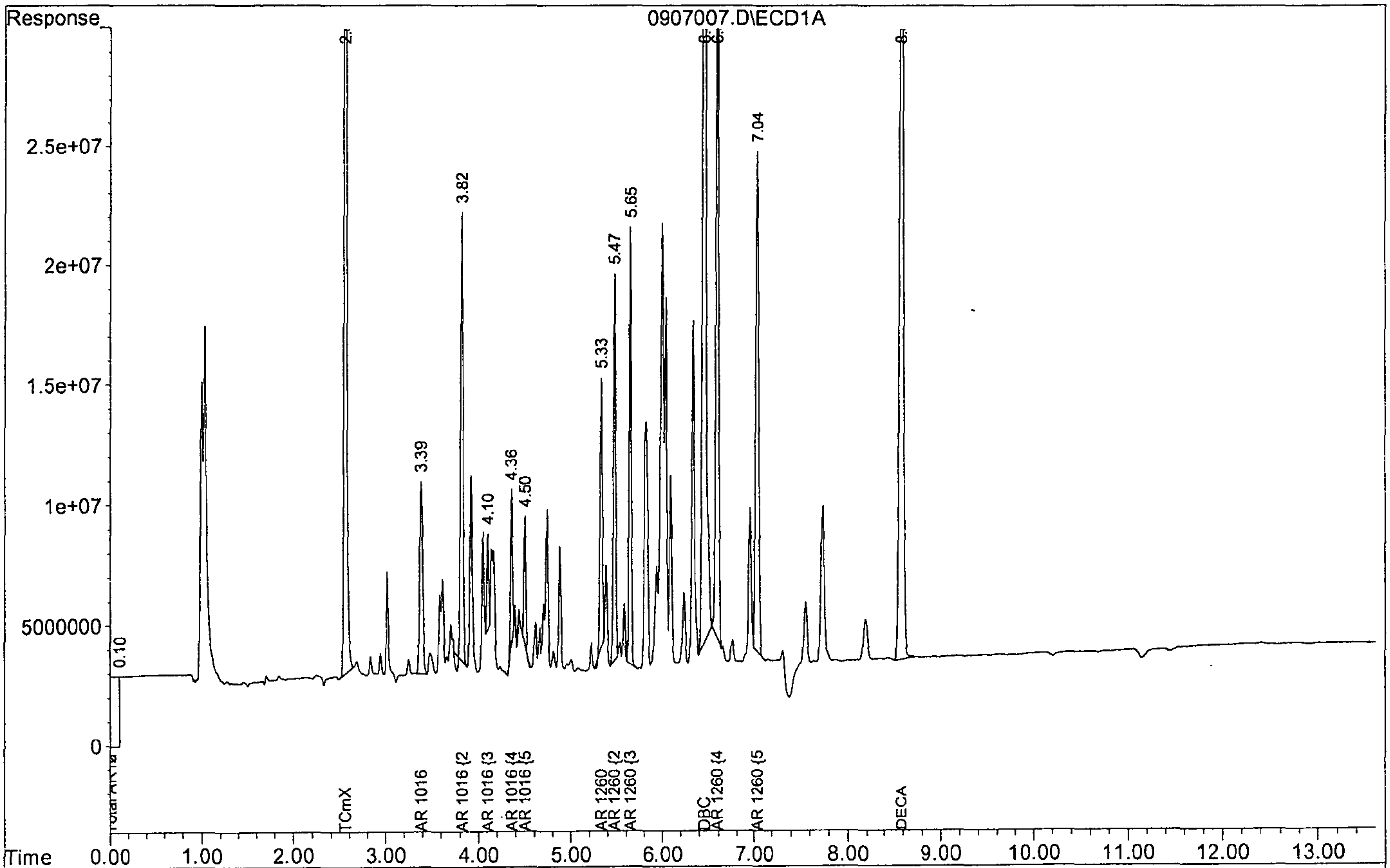
Target Compounds

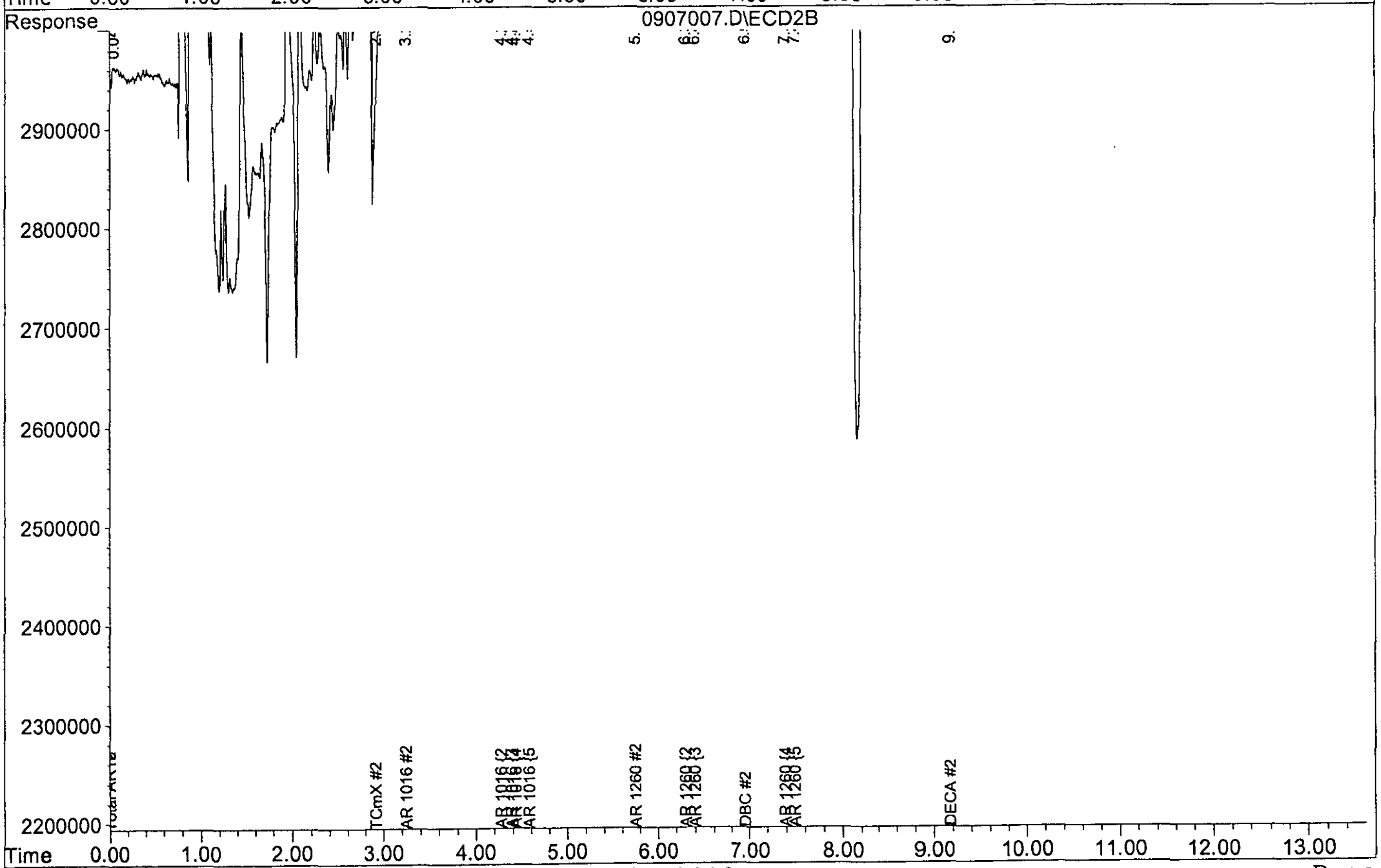
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907007.D
Acq On : 9-7-18 12:09:10
Sample : PCB - 3 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 7
Operator: MA
Inst : Lucy
Multiplr: 1.00





Signal #1 : G:\LUCY\DATA\180907\0907008.D\ECD1A.CH Vial: 8
Signal #2 : G:\LUCY\DATA\180907\0907008.D\ECD2B.CH
Acq On : 9-7-18 12:26:02 Operator: MA
Sample : PCB - 4 7/18/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 15:56 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	91060207	157.6E6	0.145	0.146
Spiked Amount 0.150			Recovery =		96.67%	97.33%
2) SA DBC	6.46	6.96	86776415	103.2E6	0.154	0.154
Spiked Amount 0.150			Recovery =		102.67%	102.67%
3) SA DECA	8.59	9.17	58859968	92734260	0.142	0.148
Spiked Amount 0.150			Recovery =		94.67%	98.67%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	61887739	59865583	0.689m	0.692m
5) L3BKC AR 1016	3.39	3.25	11326616	11170253	0.614	0.584
6) L3BKC AR 1016 {2}	3.82	4.28	27715844	14443485	0.718	0.777
7) L3BKC AR 1016 {3}	4.10	4.39	5824593	10600714	0.662	0.726
8) L3BKC AR 1016 {4}	4.36	4.44	9014491	10848343	0.671	0.661
9) L3BKC AR 1016 {5}	4.50	4.58	8006195	12802789	0.755	0.719
10) BNMC Total AR1260	0.00	0.00	152.0E6	158.4E6	0.735m	0.748m
11) L9BKC AR 1260	5.33	5.75	16381802	38007145	0.770	0.730
12) L9BKC AR 1260 {2}	5.48	6.30	23782113	46758912	0.695	0.754
13) L9BKC AR 1260 {3}	5.65	6.40	29131325	26670861	0.718	0.757
14) L9BKC AR 1260 {4}	6.59	7.40	49408464	36653817	0.740	0.754
15) L9BKC AR 1260 {5}	7.04	7.49	33343741	10272417	0.757	0.739

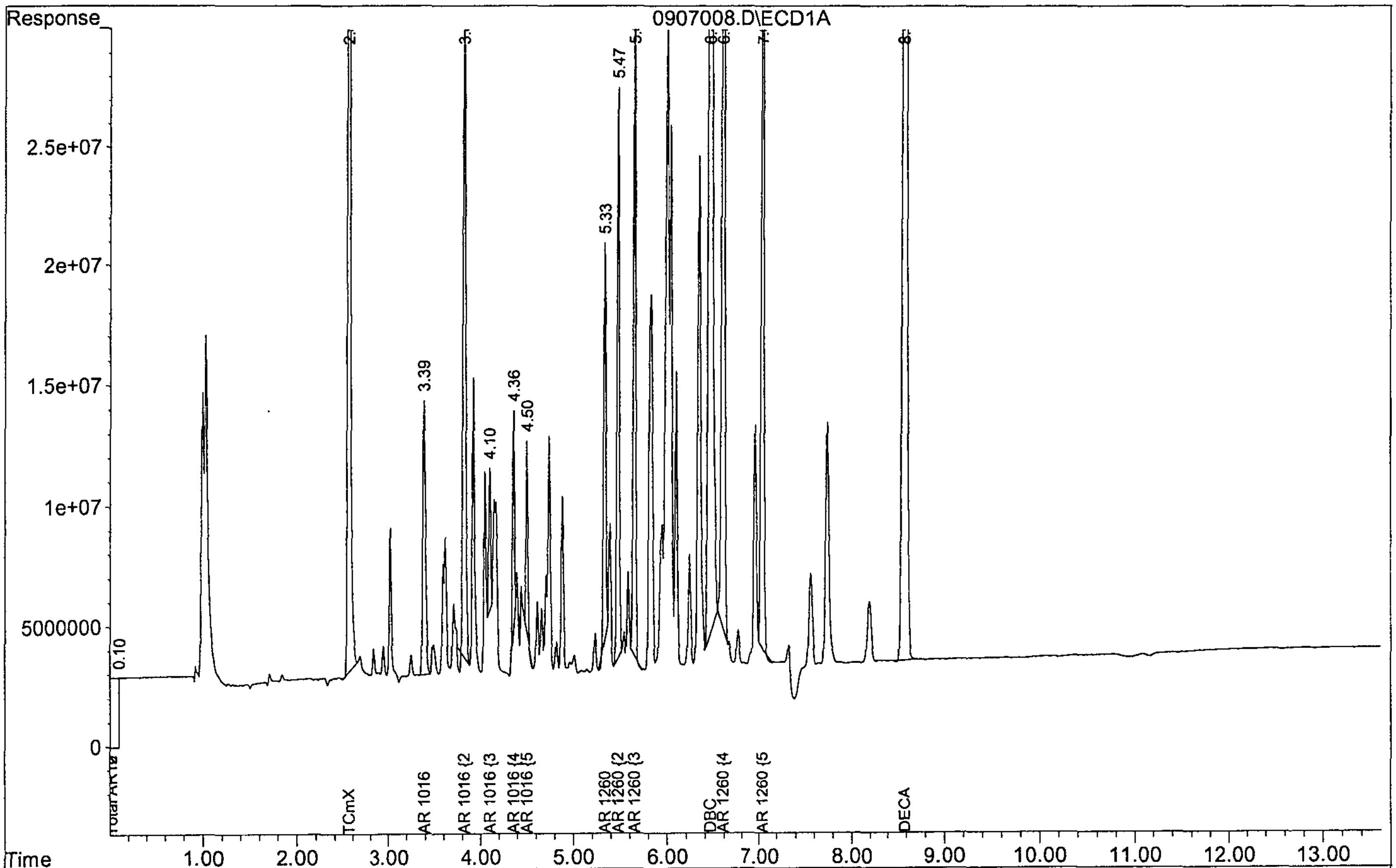
Target Compounds

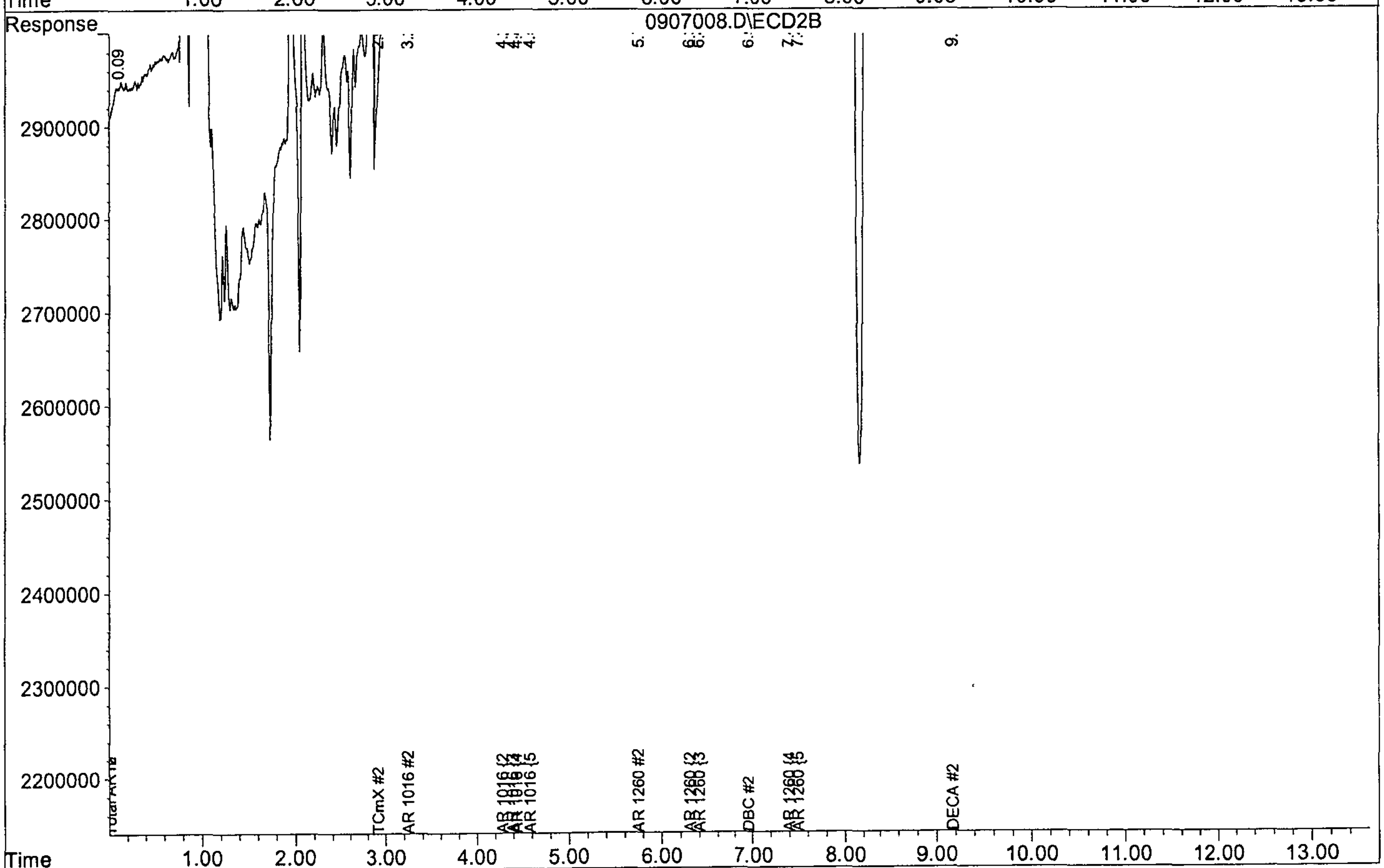
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907008.D
Acq On : 9-7-18 12:26:02
Sample : PCB - 4 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 8
Operator: MA
Inst : Lucy
Multiplr: 1.00





Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907009.D\ECD1A.CH Vial: 9
Signal #2 : G:\LUCY\DATA\180907\0907009.D\ECD2B.CH
Acq On : 9-7-18 12:42:58 Operator: MA
Sample : PCB - 5 7/18/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 15:56 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	128.6E6	225.3E6	0.205	0.209
Spiked Amount 0.150			Recovery	=	136.67%	139.33%
2) SA DBC	6.46	6.96	119.4E6	135.8E6	0.211	0.202
Spiked Amount 0.150			Recovery	=	140.67%	134.67%
3) SA DECA	8.58	9.17	81728242	124.6E6	0.197	0.199
Spiked Amount 0.150			Recovery	=	131.33%	132.67%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	84456791	83014490	0.940m	0.959m
5) L3BKC AR 1016	3.39	3.25	15807960	15421728	0.857	0.806
6) L3BKC AR 1016 {2}	3.82	4.28	37712762	19792635	0.977	1.064
7) L3BKC AR 1016 {3}	4.10	4.39	7890329	14906283	0.896	1.021
8) L3BKC AR 1016 {4}	4.36	4.44	12255012	15005012	0.913	0.914
9) L3BKC AR 1016 {5}	4.50	4.58	10790727	17888832	1.017	1.005
10) BNMC Total AR1260	0.00	0.00	204.4E6	212.4E6	0.988m	1.002m
11) L9BKC AR 1260	5.33	5.75	22272665	50680435	1.047	0.973
12) L9BKC AR 1260 {2}	5.48	6.30	32568585	63966408	0.951	1.031
13) L9BKC AR 1260 {3}	5.65	6.40	38245123	35843243	0.943	1.017
14) L9BKC AR 1260 {4}	6.59	7.40	67327655	48586811	1.009	1.000
15) L9BKC AR 1260 {5}	7.04	7.49	43936775	13284519	0.998	0.956

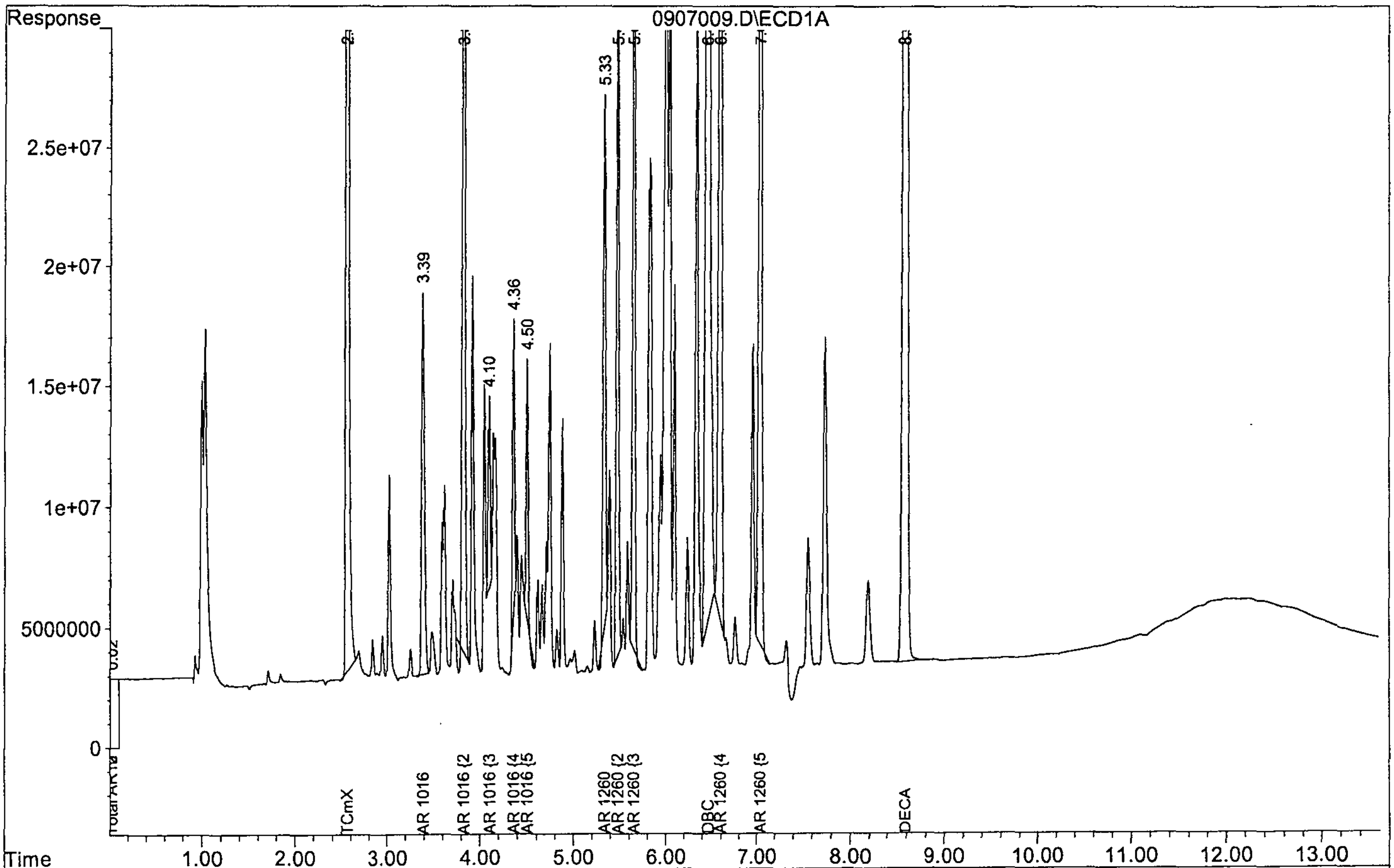
Target Compounds

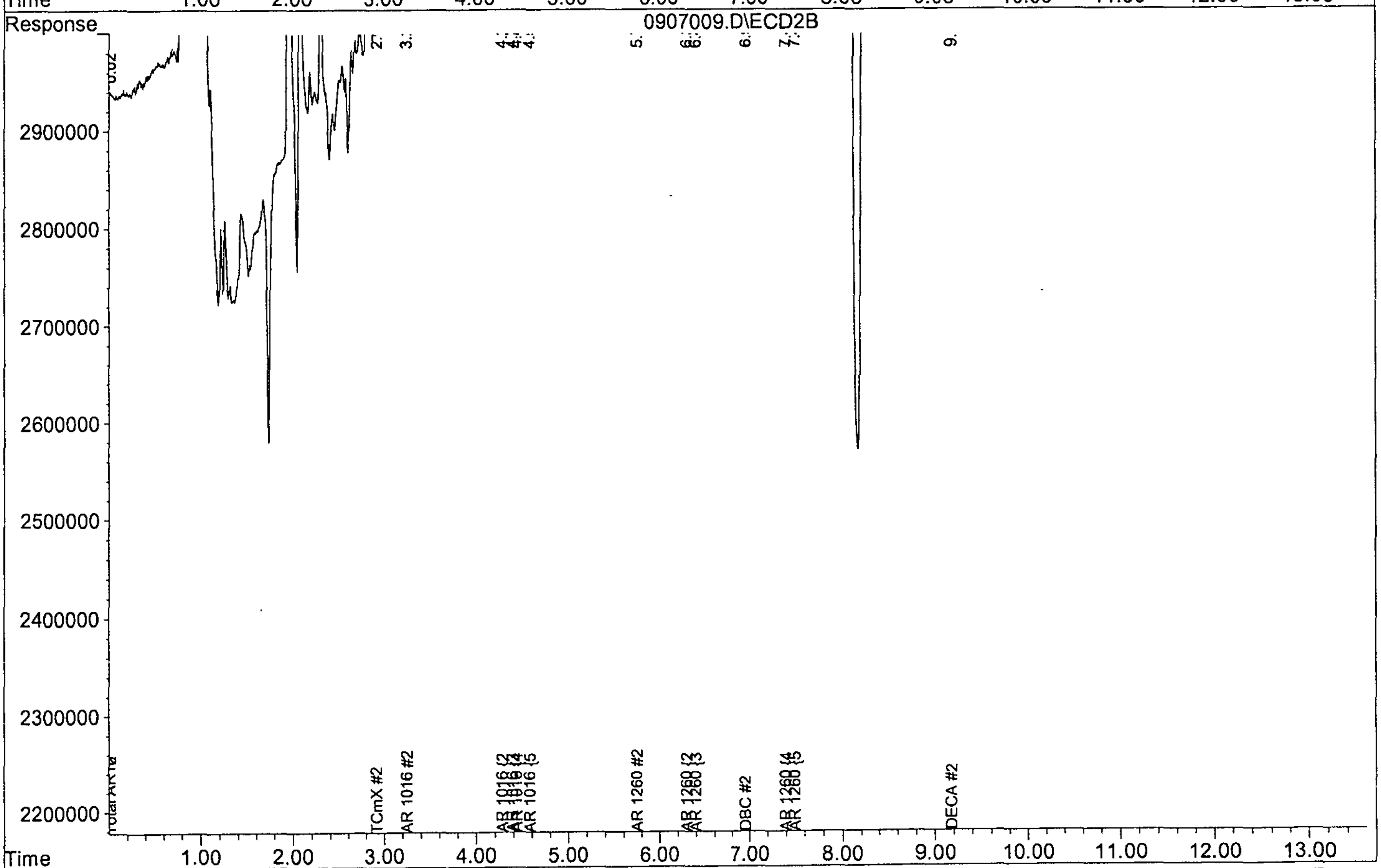
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907009.D
Acq On : 9-7-18 12:42:58
Sample : PCB - 5 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 9
Operator: MA
Inst : Lucy
Multiplr: 1.00





EPA 8082
PCB0907

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/07/18
Instrument: Lucy
Initial Cal. Date: 09/07/18
Data File: 0907010.D

		Compound	MEAN	CCRF	%D		%Drift
1	BNMC	Total AR1016	44943300	49098400	9.2	BNMC	
2	L3BKC	AR 1016	9217670	9237010	0.21	L3BKC	
3	L3BKC	AR 1016 {2}	19304400	22639100	17	L3BKC	
4	L3BKC	AR 1016 {3}	4401960	4456930	1.2	L3BKC	
5	L3BKC	AR 1016 {4}	6713950	7079700	5.4	L3BKC	
6	L3BKC	AR 1016 {5}	5305290	5685640	7.2	L3BKC	
7	BNMC	Total AR1260	103426000	107067000	3.5	BNMC	
8	L9BKC	AR 1260	10638100	11961800	12	L9BKC	
9	L9BKC	AR 1260 {2}	17116600	16588000	3.1	L9BKC	
10	L9BKC	AR 1260 {3}	20287800	22085000	8.9	L9BKC	
11	L9BKC	AR 1260 {4}	33372800	33048200	0.97	L9BKC	
12	L9BKC	AR 1260 {5}	22010800	23384300	6.2	L9BKC	
13							
14							
15							
16							
17							
18							
19							
20							
21							
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32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			6.2		

EPA 8082
PCB0907

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/07/18
Instrument: Lucy
Cal. Date: 09/07/18
Data File: 0907010.D

		Compound	MEAN	CCRF	%D		%Drift
41	BNMC	Total AR1016	43279400	48468000	12	BNMC	
42	L3BKC	AR 1016	9564910	8920130	6.7	L3BKC	
43	L3BKC	AR 1016 {2}	9300010	12003400	29	L3BKC	
44	L3BKC	AR 1016 {3}	7301710	8498460	16	L3BKC	
45	L3BKC	AR 1016 {4}	8209200	9054250	10	L3BKC	
46	L3BKC	AR 1016 {5}	8903520	9991720	12	L3BKC	
47	BNMC	Total AR1260	105926000	107011000	1.0	BNMC	
48	L9BKC	AR 1260	26041700	26013500	0.11	L9BKC	
49	L9BKC	AR 1260 {2}	31022300	34932700	13	L9BKC	
50	L9BKC	AR 1260 {3}	17620600	16564700	6.0	L9BKC	
51	L9BKC	AR 1260 {4}	24294200	23506100	3.2	L9BKC	
52	L9BKC	AR 1260 {5}	6947360	5993820	14	L9BKC	
53							
54							
55							
56							
57							
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73							
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75							
76							
77							
78							
79							
80							
		Average			10.3		

Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907010.D\ECD1A.CH Vial: 10
Signal #2 : G:\LUCY\DATA\180907\0907010.D\ECD2B.CH
Acq On : 9-7-18 12:59:54 Operator: MA
Sample : PCB - SS 7/12/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 15:56 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

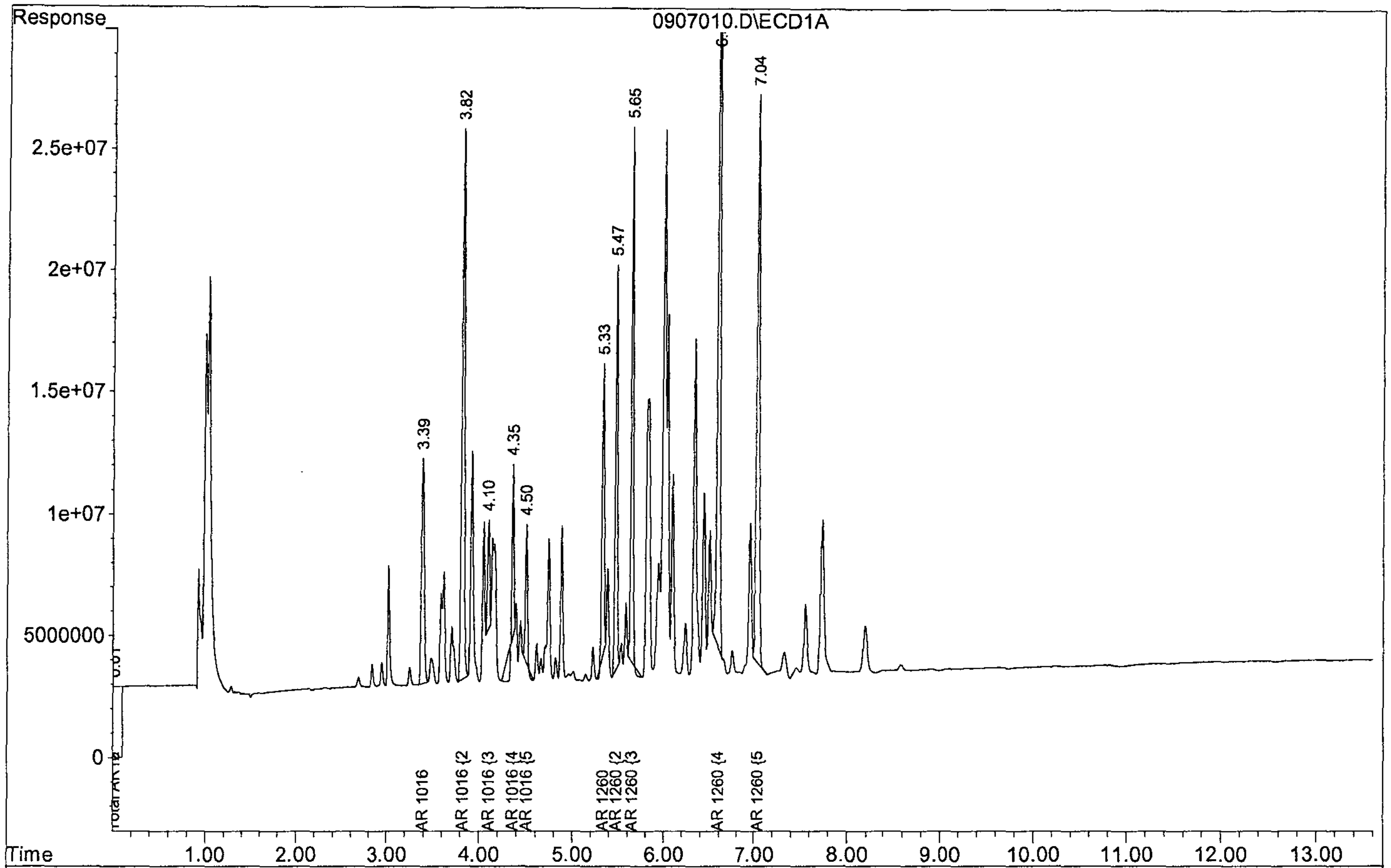
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	0.00	0.00	0	0	N.D. d	N.D. d
Spiked Amount 0.150			Recovery	=	0.00%	0.00%
2) SA DBC	0.00	0.00	0	0	N.D. d	N.D. d
Spiked Amount 0.150			Recovery	=	0.00%	0.00%
3) SA DECA	0.00	0.00	0	0	N.D. d	N.D. d
Spiked Amount 0.150			Recovery	=	0.00%	0.00%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	49098377	48467951	0.546m	0.560m
5) L3BKC AR 1016	3.39	3.25	9237010	8920126	0.501	0.466
6) L3BKC AR 1016 {2}	3.82	4.28	22639089	12003397	0.586	0.645
7) L3BKC AR 1016 {3}	4.10	4.39	4456931	8498461	0.506	0.582
8) L3BKC AR 1016 {4}	4.36	4.44	7079703	9054248	0.527	0.551
9) L3BKC AR 1016 {5}	4.50	4.58	5685644	9991719	0.536	0.561
10) BNMC Total AR1260	0.00	0.00	107.1E6	107.0E6	0.518m	0.505m
11) L9BKC AR 1260	5.33	5.75	11961804	26013504	0.562	0.499
12) L9BKC AR 1260 {2}	5.47	6.30	16588025	34932674	0.485	0.563
13) L9BKC AR 1260 {3}	5.65	6.40	22084980	16564668	0.544	0.470
14) L9BKC AR 1260 {4}	6.59	7.40	33048239	23506078	0.495	0.484
15) L9BKC AR 1260 {5}	7.04	7.50	23384272	5993823	0.531	0.431

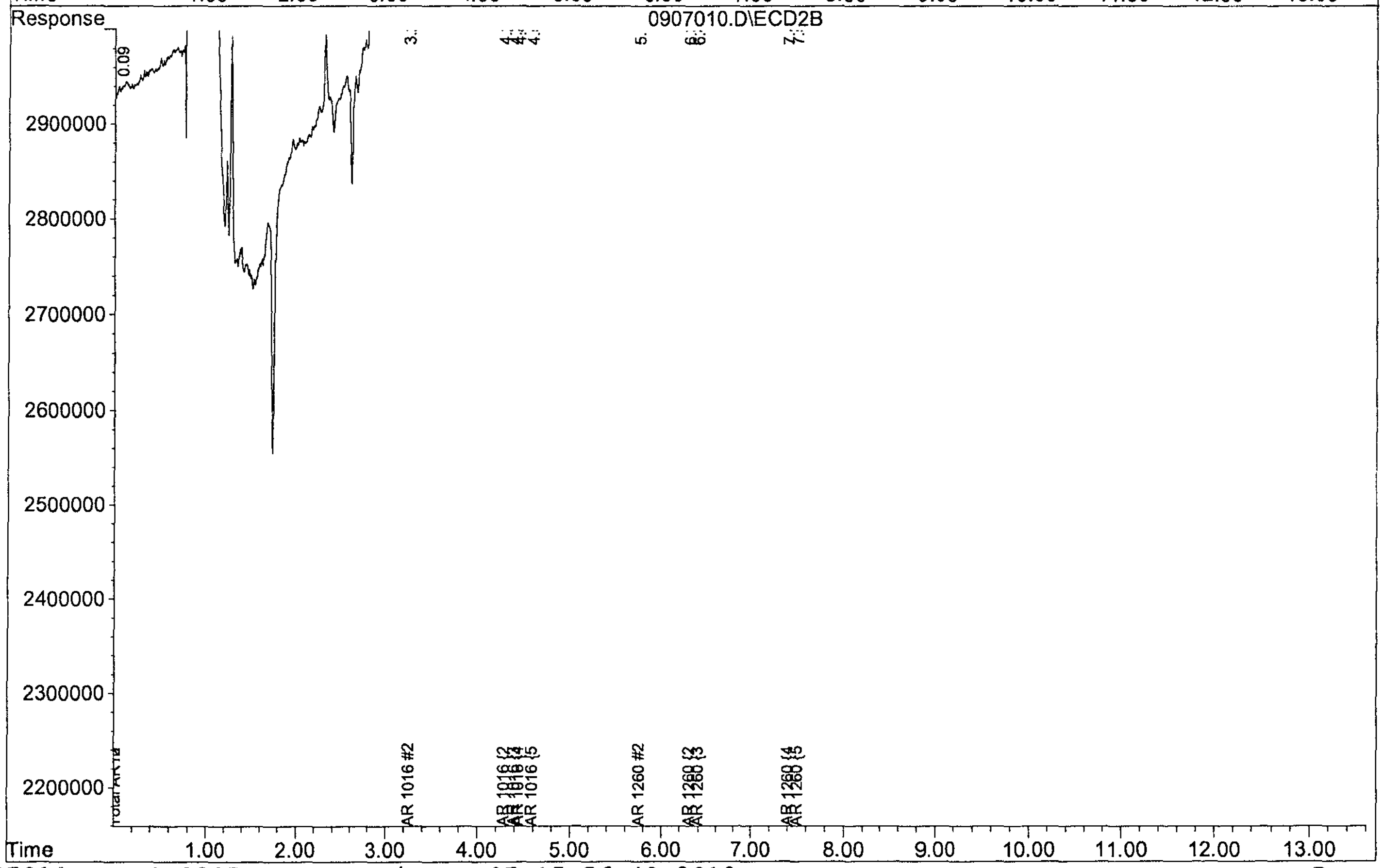
Target Compounds

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907010.D
Acq On : 9-7-18 12:59:54
Sample : PCB - SS 7/12/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 10
Operator: MA
Inst : Lucy
Multiplr: 1.00





Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907011.D\ECD1A.CH Vial: 11
Signal #2 : G:\LUCY\DATA\180907\0907011.D\ECD2B.CH
Acq On : 9-7-18 13:16:53 Operator: MA
Sample : AR1221 1ug/mL 8/3/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 14:12 2018 Quant Results File: AR1221.RES

Quant Method : G:\LUCY\DATA\180907\AR1221.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 14:12:45 2018
Response via : Continuing Cal File: G:\LUCY\DATA\180907\0907011.D
DataAcq Meth : EPA8081N.M

Volume Inj. : 1uL
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) BNMC Total AR1221	0.00	0.00	13275045	21527137	1.000m	1.000m
2) L3BKC AR 1221	2.17	2.31	2340175	4835405	1.000	1.000
3) L3BKC AR 1221 {2}	2.84	2.82	4460760	2498631	1.000	1.000
4) L3BKC AR 1221 {3}	2.95	3.08	2806566	6218877	1.000	1.000
5) L3BKC AR 1221 {4}	3.39	3.16	1586784	4473986	1.000	1.000
6) L3BKC AR 1221 {5}	3.82	3.79	2080760	3500238	1.000	1.000

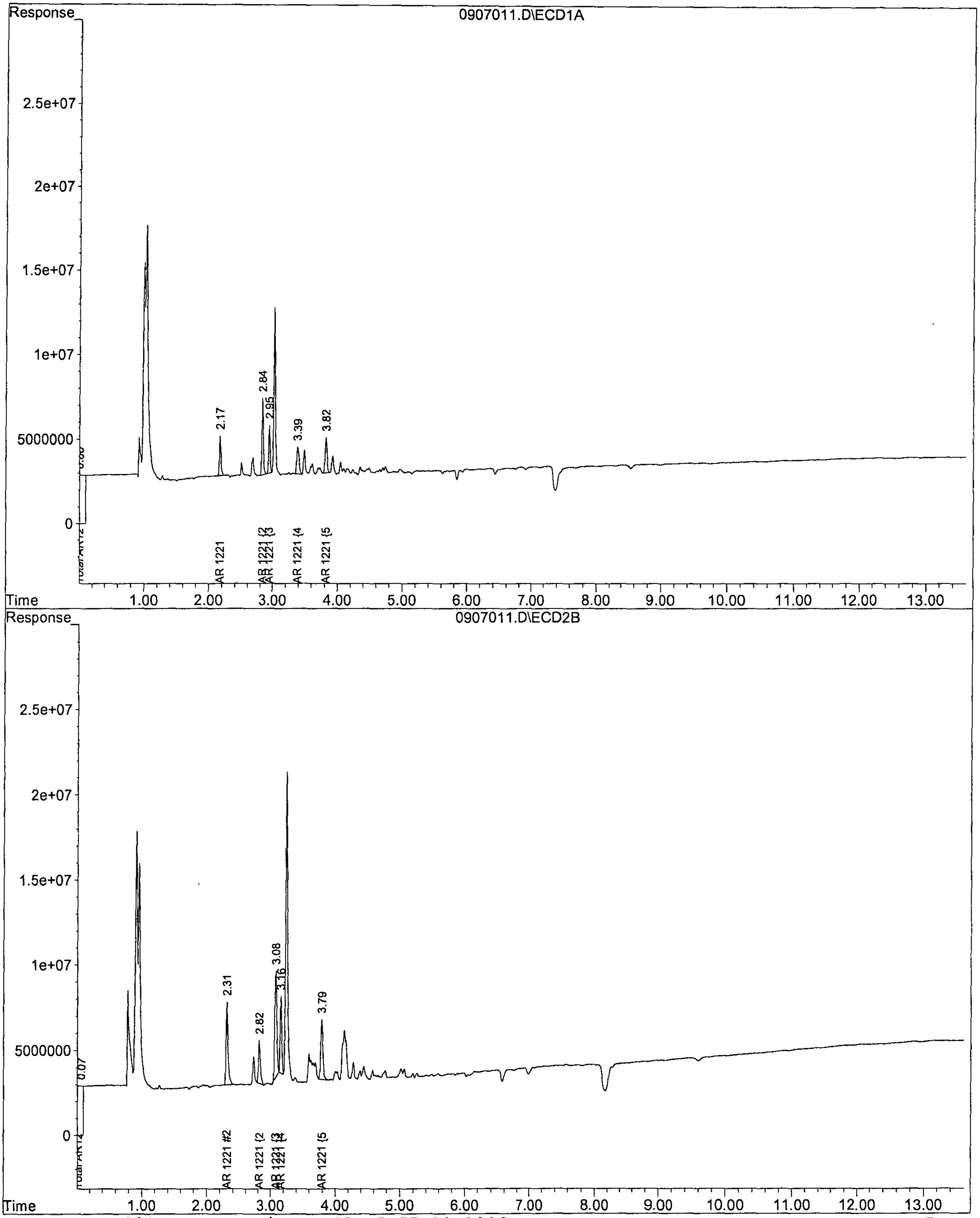
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907011.D
Acq On : 9-7-18 13:16:53
Sample : AR1221 1ug/mL 8/3/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\AR1221.M

Vial: 11
Operator: MA
Inst : Lucy
Multiplr: 1.00



Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907012.D\ECD1A.CH Vial: 12
Signal #2 : G:\LUCY\DATA\180907\0907012.D\ECD2B.CH
Acq On : 9-7-18 13:33:45 Operator: MA
Sample : AR1232 1ug/mL 8/3/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 14:13 2018 Quant Results File: AR1232.RES

Quant Method : G:\LUCY\DATA\180907\AR1232.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 14:13:35 2018
Response via : Continuing Cal File: G:\LUCY\DATA\180907\0907012.D
DataAcq Meth : EPA8081N.M

Volume Inj. : 1uL
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) BNMC Total AR1232	0.00	0.00	21846841	29789581	1.000m	1.000m
2) L3BKC AR 1232	3.39	3.08	6533391	4488131	1.000	1.000
3) L3BKC AR 1232 {2}	4.05	4.28	3690465	7219070	1.000	1.000
4) L3BKC AR 1232 {3}	4.10	4.44	2575986	5178764	1.000	1.000
5) L3BKC AR 1232 {4}	4.36	4.58	4446042	6057550	1.000	1.000
6) L3BKC AR 1232 {5}	4.75	5.02	4600958	6846065	1.000	1.000

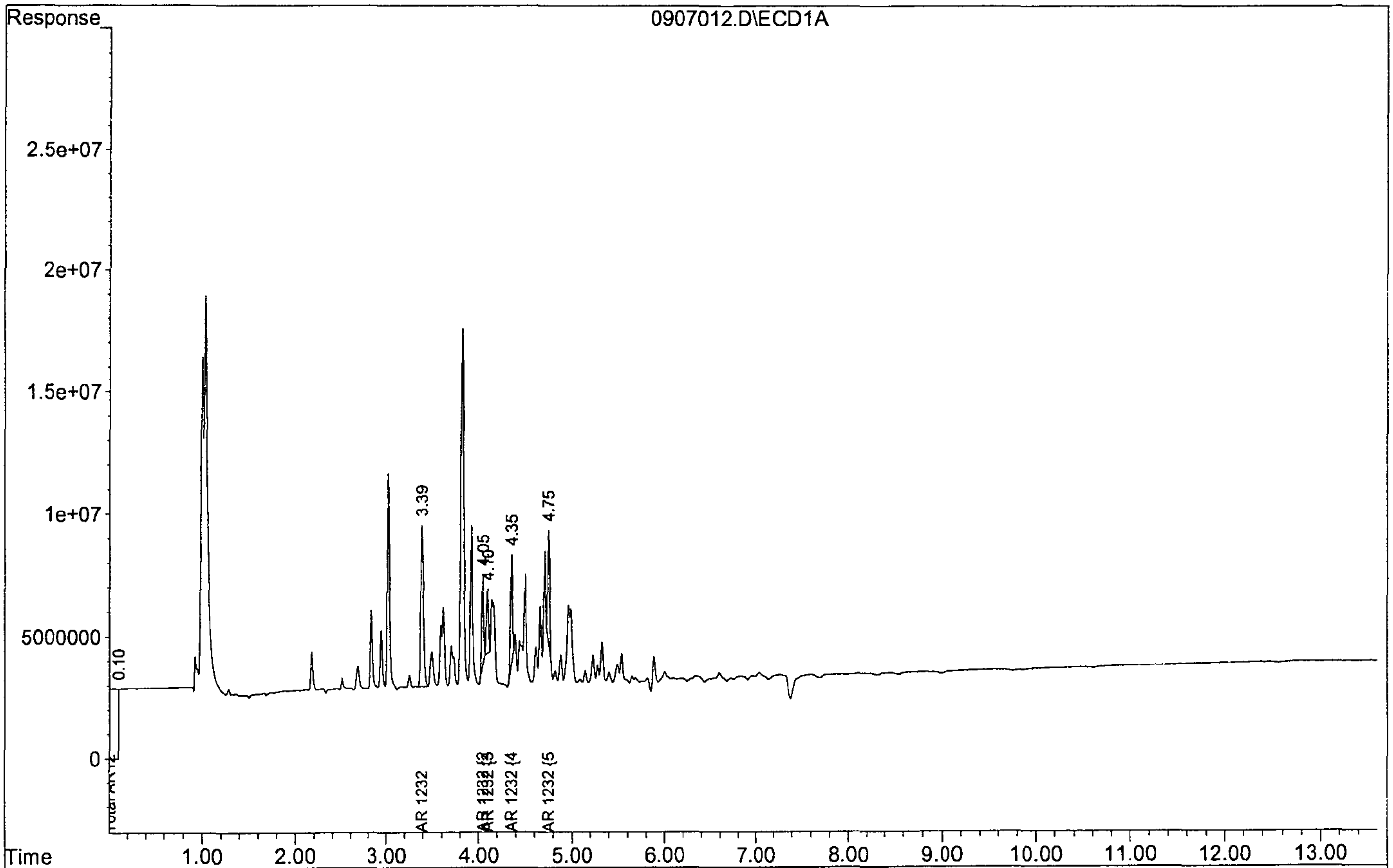
Target Compounds

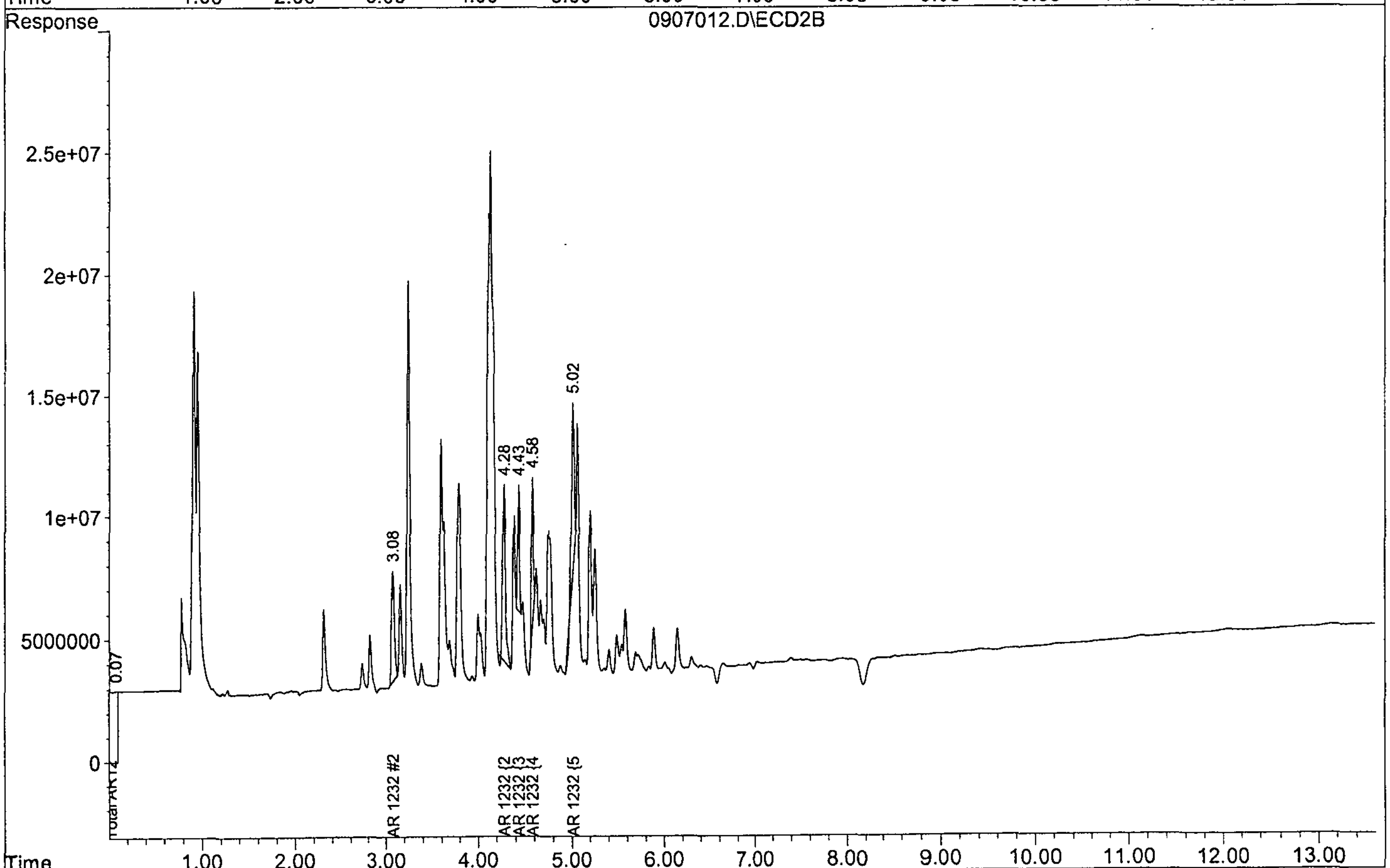
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907012.D
Acq On : 9-7-18 13:33:45
Sample : AR1232 1ug/mL 8/3/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\AR1232.M

Vial: 12
Operator: MA
Inst : Lucy
Multiplr: 1.00





Quantitation Report (Not Reviewed)

```
Signal #1 : G:\LUCY\DATA\180907\0907013.D\ECD1A.CH       Vial: 13
Signal #2 : G:\LUCY\DATA\180907\0907013.D\ECD2B.CH
Acq On    : 9-7-18 13:50:37                          Operator: MA
Sample    : AR1242 1ug/mL 8/3/18                     Inst     : Lucy
Misc      : water                                    Multiplr: 1.00
IntFile Signal #1: events.e    IntFile Signal #2: events2.e
Quant Time: Sep  7 14:15 2018  Quant Results File: AR1242.RES

Quant Method : G:\LUCY\DATA\180907\AR1242.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 14:14:55 2018
Response via : Continuing Cal File: G:\LUCY\DATA\180907\0907013.D
DataAcq Meth : EPA8081N.M

Volume Inj.     : 1uL
Signal #1 Phase : DB-35ms           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

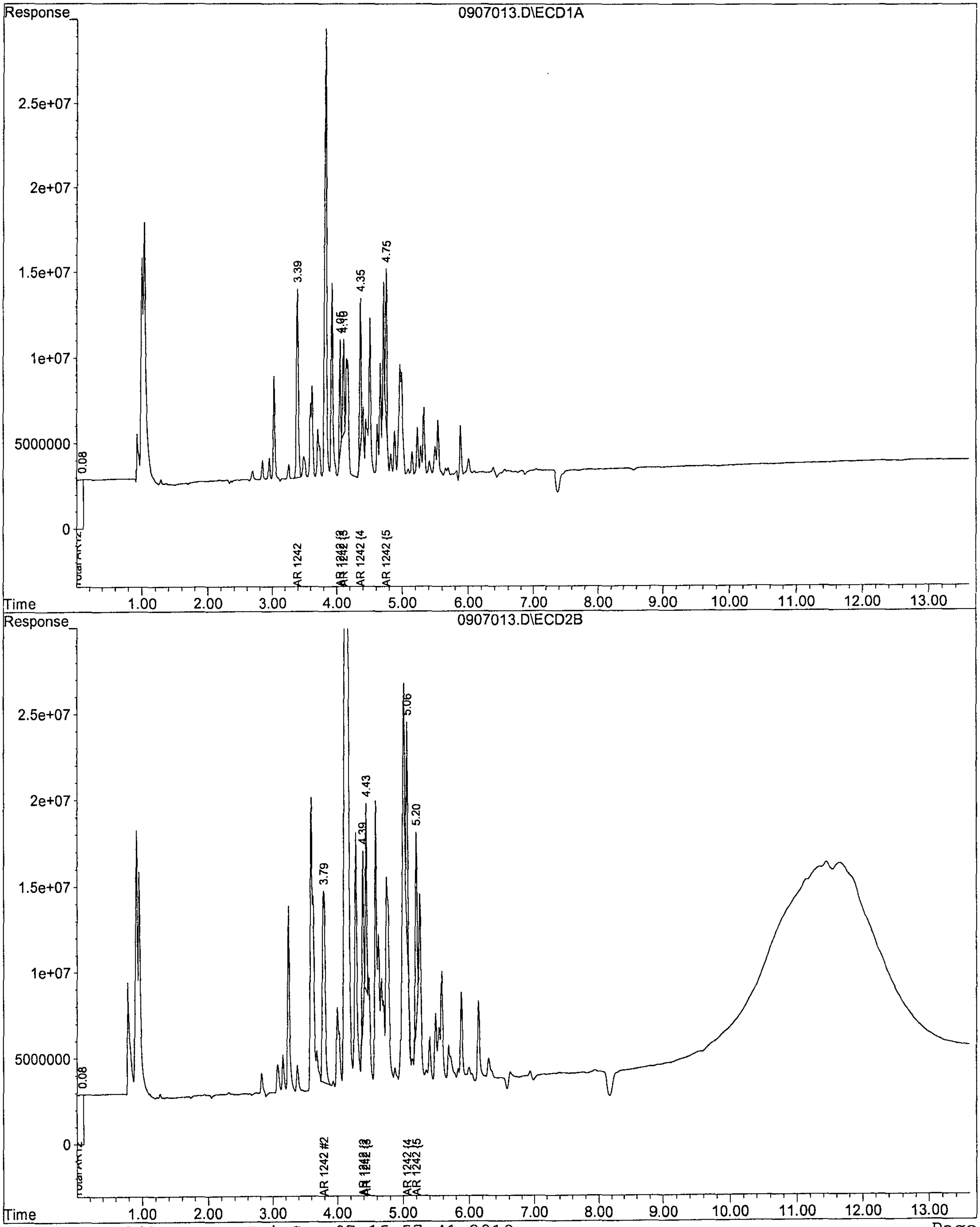
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) BNMC Total AR1242	0.00	0.00	40505025	55269709	1.000m	1.000m
2) L3BKC AR 1242	3.39	3.79	11017286	11157704	1.000	1.000
3) L3BKC AR 1242 {2}	4.05	4.39	6513017	9811569	1.000	1.000
4) L3BKC AR 1242 {3}	4.10	4.44	5568520	10773340	1.000	1.000
5) L3BKC AR 1242 {4}	4.36	5.06	8671374	12458086	1.000	1.000
6) L3BKC AR 1242 {5}	4.75	5.20	8734829	11069010	1.000	1.000

Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Data File : G:\LUCY\DATA\180907\0907013.D
Acq On : 9-7-18 13:50:37
Sample : AR1242 1ug/mL 8/3/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\AR1242.M

Vial: 13
Operator: MA
Inst : Lucy
Multiplr: 1.00



Signal #1 : G:\LUCY\DATA\180907\0907014.D\ECD1A.CH Vial: 14
Signal #2 : G:\LUCY\DATA\180907\0907014.D\ECD2B.CH
Acq On : 9-7-18 14:07:30 Operator: MA
Sample : AR1248 1ug/mL 7/20/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 14:22 2018 Quant Results File: AR1248.RES

Quant Method : G:\LUCY\DATA\180907\AR1248.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 14:22:02 2018
Response via : Continuing Cal File: G:\LUCY\DATA\180907\0907014.D
DataAcq Meth : EPA8081N.M

Volume Inj. : 1uL
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

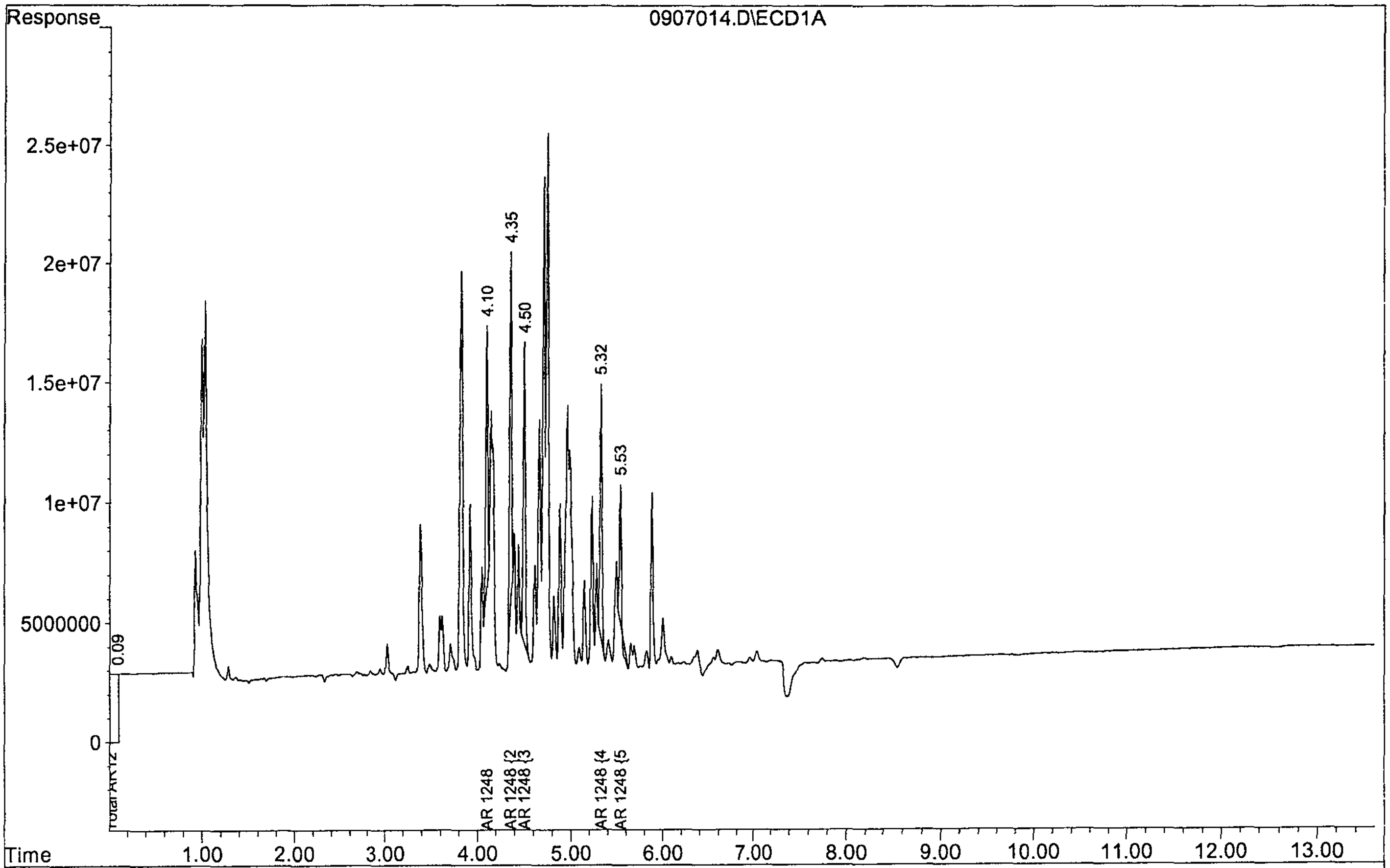
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) BNMC Total AR1248	0.00	0.00	54766509	86998617	1.000m	1.000m
2) L3BKC AR 1248	4.10	4.39	10935816	19344002	1.000	1.000
3) L3BKC AR 1248 {2}	4.36	4.58	14911567	22230813	1.000	1.000
4) L3BKC AR 1248 {3}	4.50	5.06	12575347	19089295	1.000	1.000
5) L3BKC AR 1248 {4}	5.33	5.26	10657018	11678467	1.000	1.000
6) L3BKC AR 1248 {5}	5.53	5.58	5686762	14656039	1.000	1.000

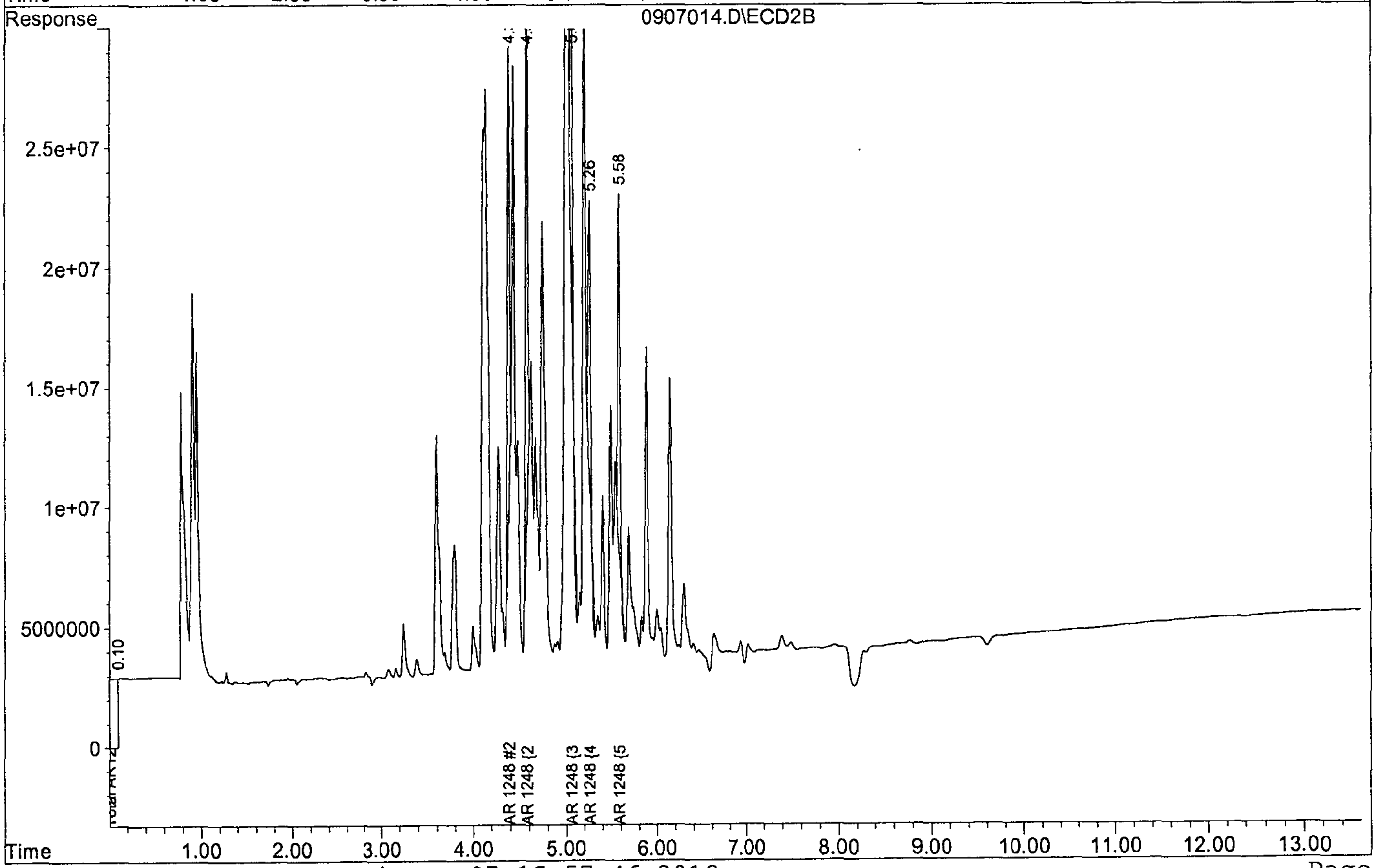
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report   (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907014.D   Vial: 14
Acq On : 9-7-18 14:07:30   Operator: MA
Sample : AR1248 1ug/mL 7/20/18   Inst : Lucy
Misc : water   Multiplr: 1.00
Quant Method : G:\LUCY\DATA\180907\AR1248.M





```
Signal #1 : G:\LUCY\DATA\180907\0907015.D\ECD1A.CH       Vial: 15
Signal #2 : G:\LUCY\DATA\180907\0907015.D\ECD2B.CH
Acq On    : 9-7-18 14:24:30                          Operator: MA
Sample    : AR1254 1ug/mL 6/28/18                    Inst    : Lucy
Misc      : water                                    Multiplr: 1.00
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep  7 14:39 2018  Quant Results File: AR1254.RES

Quant Method : G:\LUCY\DATA\180907\AR1254.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 14:38:55 2018
Response via : Continuing Cal File: G:\LUCY\DATA\180907\0907015.D
DataAcq Meth : EPA8081N.M

Volume Inj.     : 1uL
Signal #1 Phase : DB-35ms           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	Target Compounds						
1)	BNMC Total AR1254	0.00	0.00	109.2E6	186.1E6	1.000m	1.000m
2)	L3BKC AR 1254	4.88	5.21	23663359	40311534	1.000	1.000
3)	L3BKC AR 1254 {2}	5.23	5.49	18887749	23670054	1.000	1.000
4)	L3BKC AR 1254 {3}	5.53	5.58	23617945	53222646	1.000	1.000
5)	L3BKC AR 1254 {4}	5.88	5.88	14457386	41987260	1.000	1.000
6)	L3BKC AR 1254 {5}	6.00	6.14	28611994	26872679	1.000	1.000

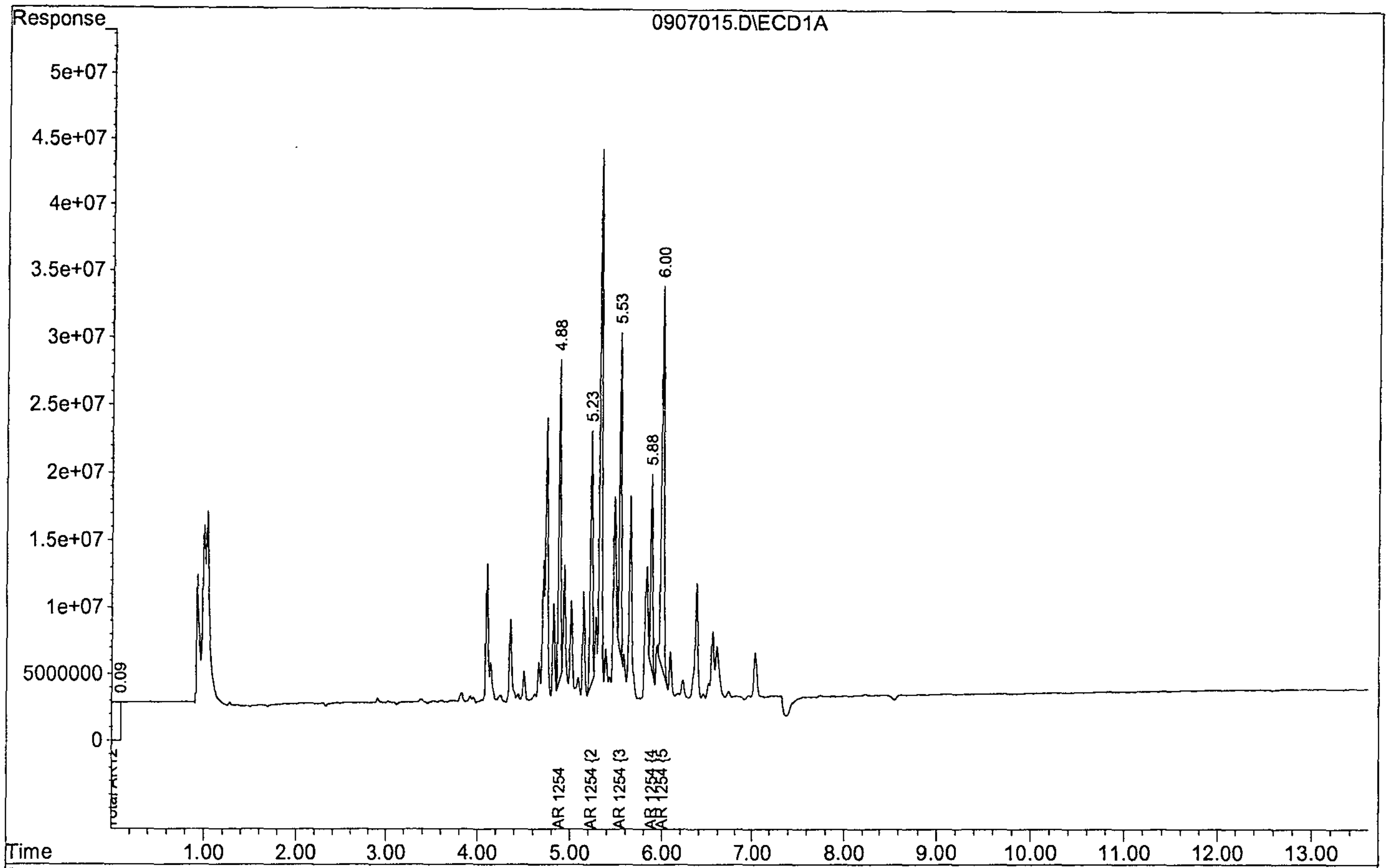
Target Compounds

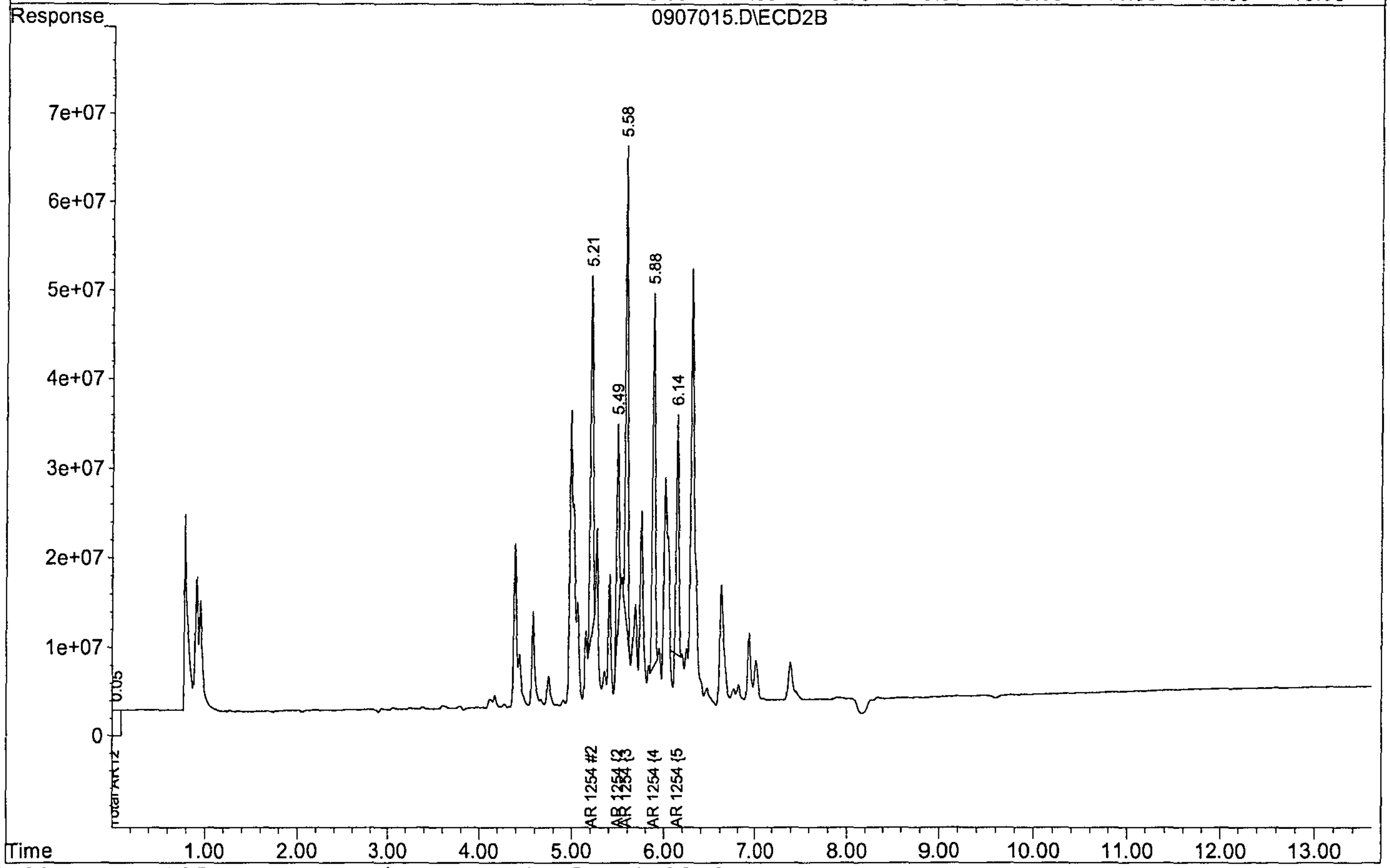
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907015.D
Acq On : 9-7-18 14:24:30
Sample : AR1254 1ug/mL 6/28/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\AR1254.M

Vial: 15
Operator: MA
Inst : Lucy
Multiplr: 1.00





```
Signal #1 : G:\LUCY\DATA\180907\0907016.D\ECD1A.CH       Vial: 16
Signal #2 : G:\LUCY\DATA\180907\0907016.D\ECD2B.CH
Acq On    : 9-7-18 14:41:22                           Operator: MA
Sample    : AR1262 1ug/mL 8/3/18                      Inst    : Lucy
Misc      : water                                     Multiplr: 1.00
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep  7 15:13 2018  Quant Results File: AR1262.RES

Quant Method : G:\LUCY\DATA\180907\AR1262.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 15:12:25 2018
Response via : Continuing Cal File: G:\LUCY\DATA\180907\0907016.D
DataAcq Meth : EPA8081N.M

Volume Inj.     : 1uL
Signal #1 Phase : DB-35ms            Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32               Signal #2 Info : 0.32
```

	Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
	Target Compounds						
1)	BNMC Total AR1262	0.00	0.00	147.3E6	214.8E6	1.000m	1.000m
2)	L3BKC AR 1262	5.65	6.01	26224252	41131308	1.000	1.000
3)	L3BKC AR 1262 {2}	6.04	6.40	30780488	51650201	1.000	1.000
4)	L3BKC AR 1262 {3}	6.34	6.64	30034150	42553349	1.000	1.000
5)	L3BKC AR 1262 {4}	7.04	7.40	42293564	52927967	1.000	1.000
6)	L3BKC AR 1262 {5}	7.74	8.27	17931246	26522546	1.000	1.000

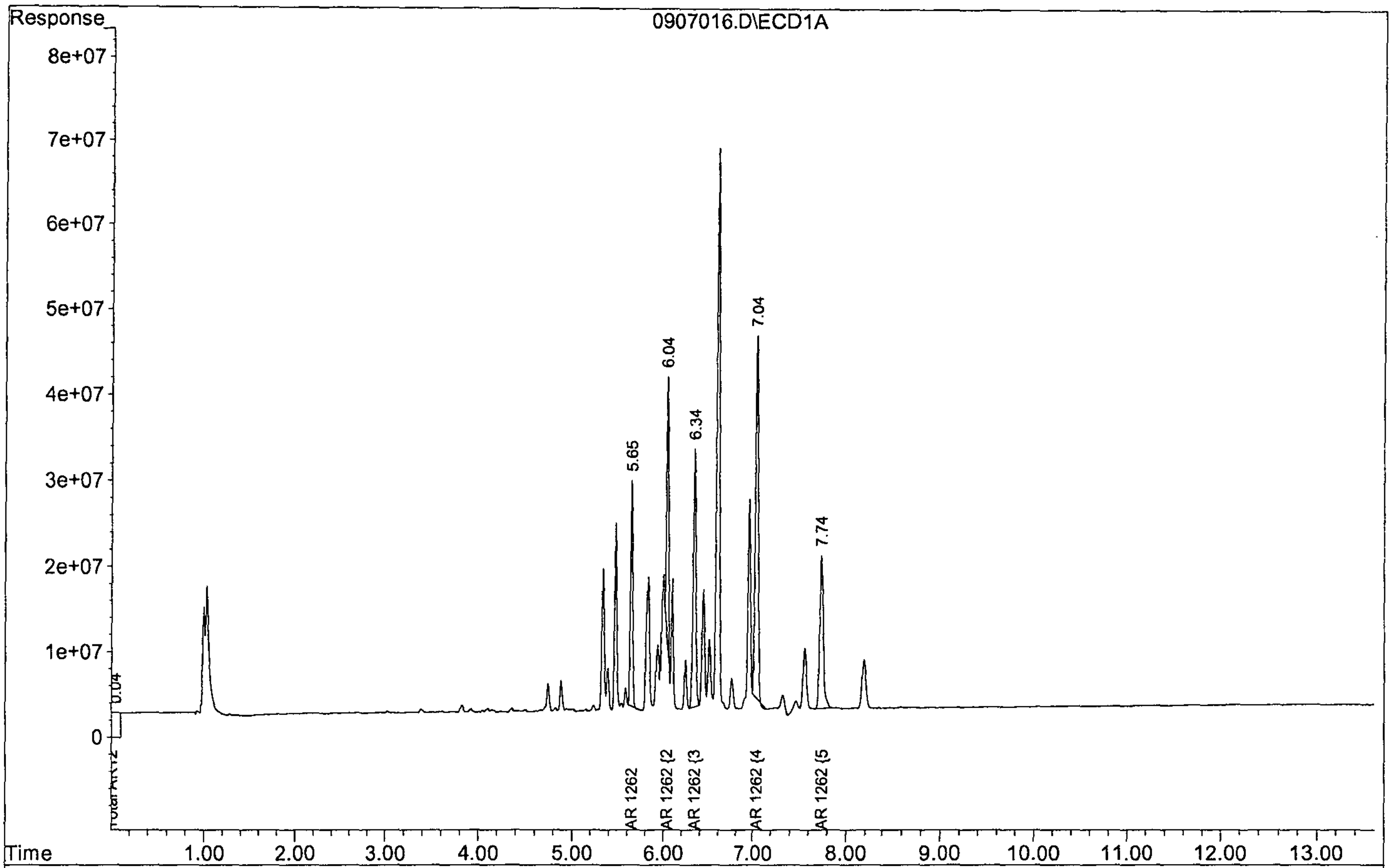
Target Compounds

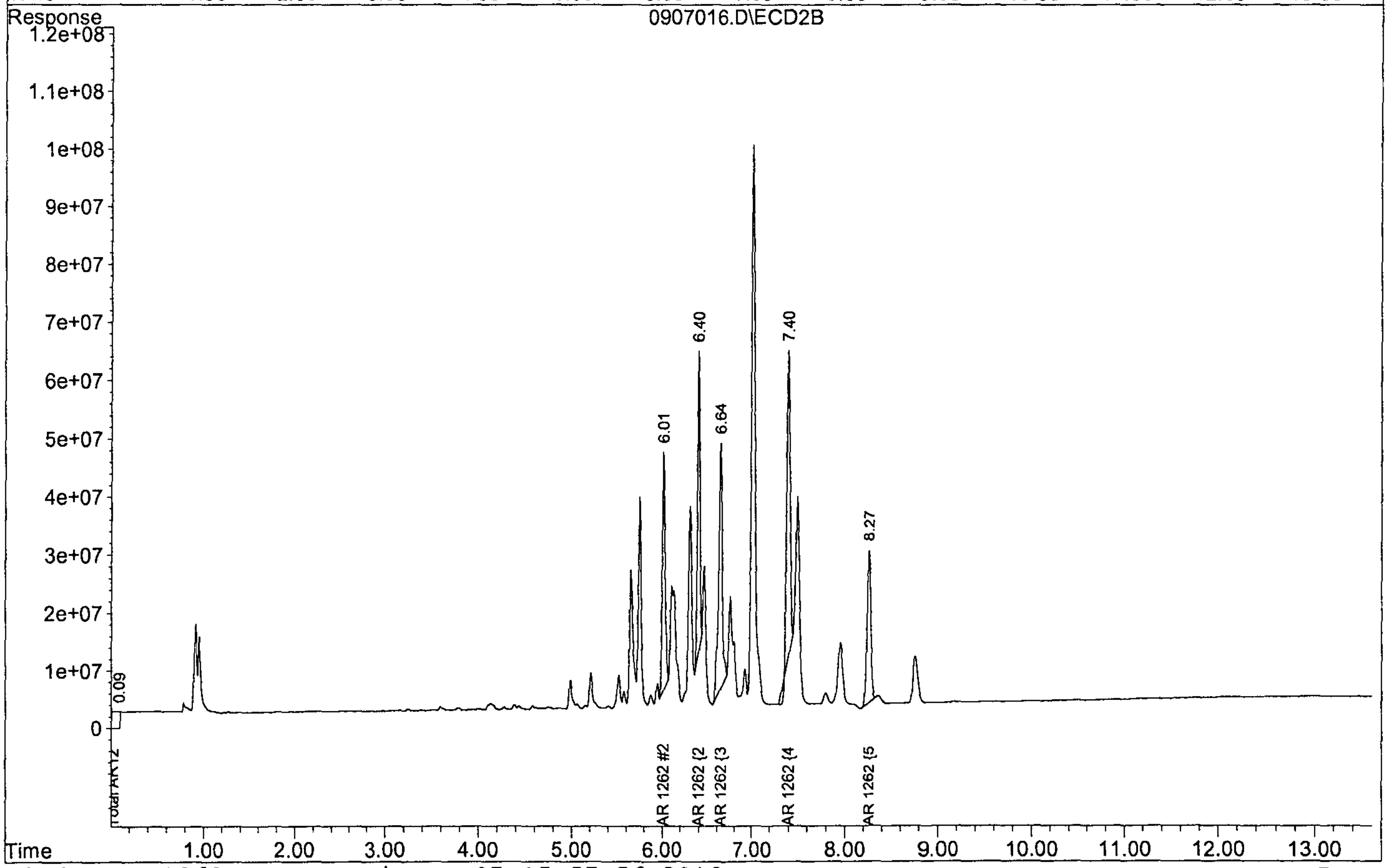
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907016.D
Acq On : 9-7-18 14:41:22
Sample : AR1262 1ug/mL 8/3/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\AR1262.M

Vial: 16
Operator: MA
Inst : Lucy
Multiplr: 1.00





Signal #1 : G:\LUCY\DATA\180907\0907017.D\ECD1A.CH Vial: 17
Signal #2 : G:\LUCY\DATA\180907\0907017.D\ECD2B.CH
Acq On : 9-7-18 14:58:14 Operator: MA
Sample : AR1268 1ug/mL 8/3/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 7 15:15 2018 Quant Results File: AR1268.RES

Quant Method : G:\LUCY\DATA\180907\AR1268.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 15:15:06 2018
Response via : Continuing Cal File: G:\LUCY\DATA\180907\0907017.D
DataAcq Meth : EPA8081N.M

Volume Inj. : 1uL
Signal #1 Phase : DB-35ms Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

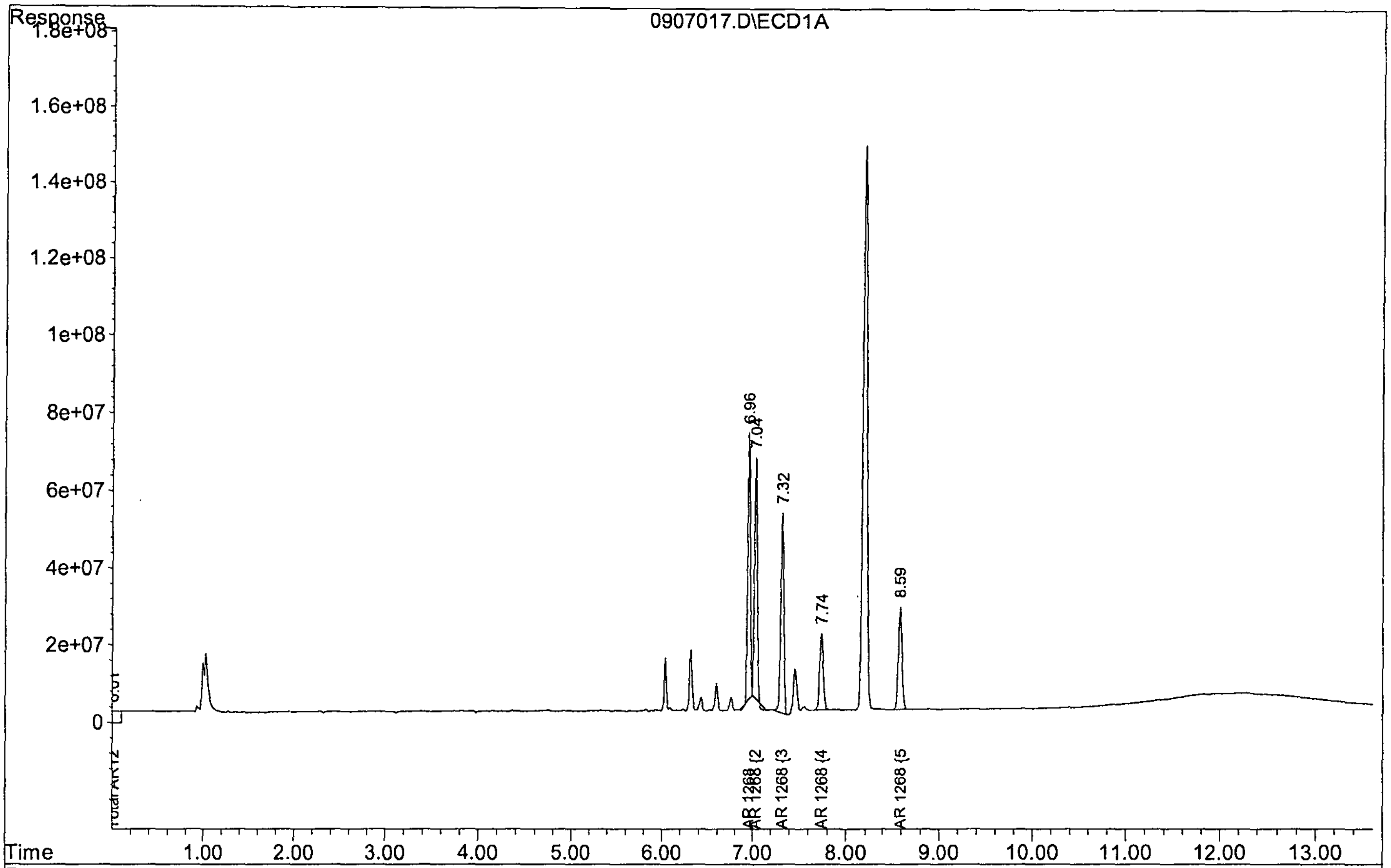
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
Target Compounds						
1) BNMC Total AR1268	0.00	0.00	229.7E6	330.5E6	1.000m	1.000m
2) L3BKC AR 1268	6.96	7.40	68834827	102.2E6	1.000	1.000
3) L3BKC AR 1268 {2}	7.04	7.50	62359620	85313986	1.000	1.000
4) L3BKC AR 1268 {3}	7.33	7.80	52012839	74474115	1.000	1.000
5) L3BKC AR 1268 {4}	7.74	8.27	19785123	29409139	1.000	1.000
6) L3BKC AR 1268 {5}	8.59	9.17	26679916	39114572	1.000	1.000

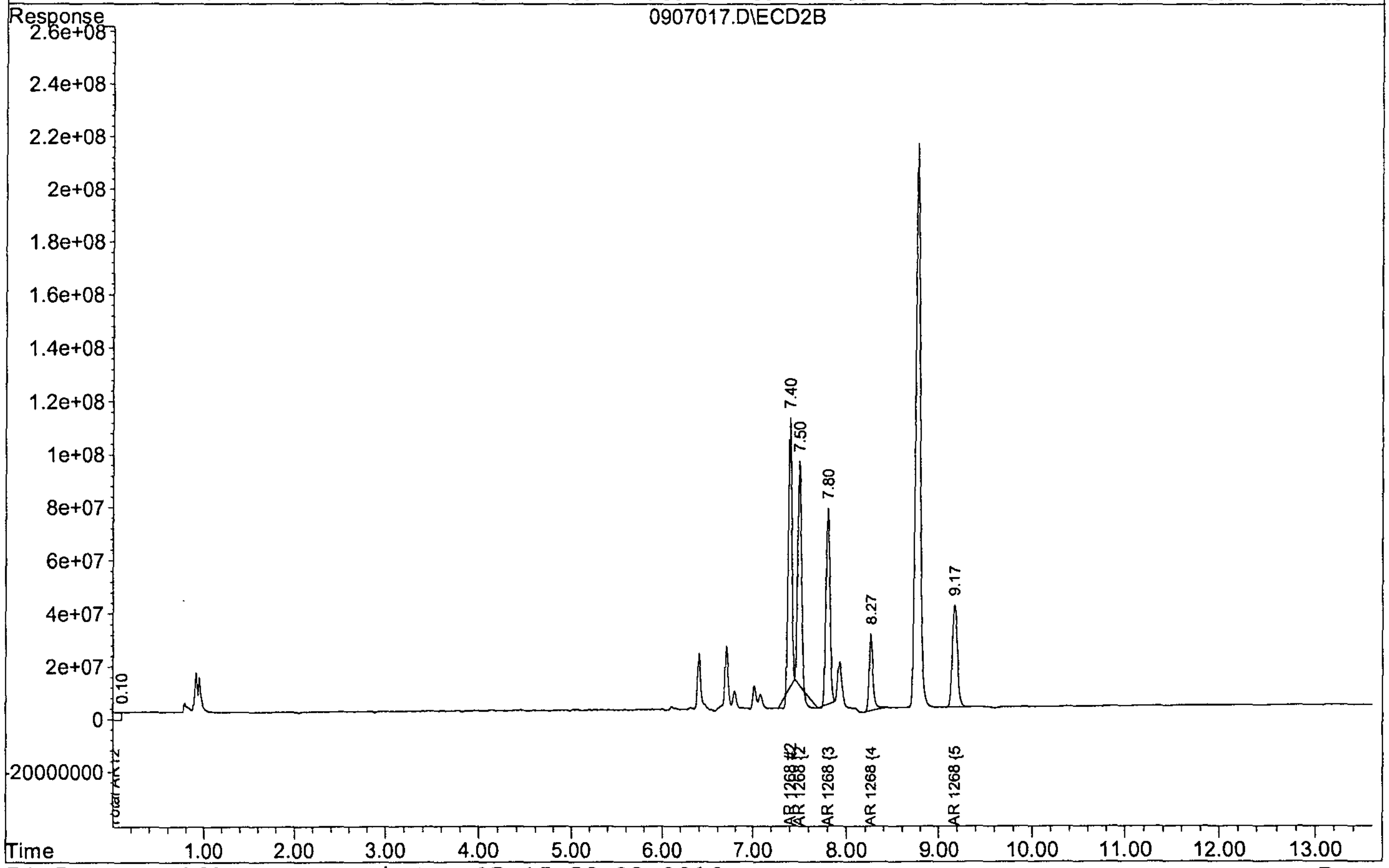
Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907017.D
Acq On : 9-7-18 14:58:14
Sample : AR1268 1ug/mL 8/3/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\AR1268.M

Vial: 17
Operator: MA
Inst : Lucy
Multiplr: 1.00





EPA 8082
PCB0907

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/11/18
Instrument: Lucy
Initial Cal. Date: 09/07/18
Data File: 0907051.D

		Compound	MEAN	CCRF	%D		%Drift	
1	SA	TCmX	314194000	391410000	25	SA		* NT
2	SA	DBC	282566000	316951000	12	SA		
3	SA	DECA	206992000	194819000	5.9	SA		
4	BNMC	Total AR1016	44943300	48890900	8.8	BNMC		
5	L3BKC	AR 1016	9217670	9793240	6.2	L3BKC		
6	L3BKC	AR 1016 {2}	19304400	21816300	13	L3BKC		
7	L3BKC	AR 1016 {3}	4401960	4485740	1.9	L3BKC		
8	L3BKC	AR 1016 {4}	6713950	7016040	4.5	L3BKC		
9	L3BKC	AR 1016 {5}	5305290	5779580	8.9	L3BKC		
10	BNMC	Total AR1260	103426000	102735000	0.67	BNMC		
11	L9BKC	AR 1260	10638100	11309200	6.3	L9BKC		
12	L9BKC	AR 1260 {2}	17116600	16078900	6.1	L9BKC		
13	L9BKC	AR 1260 {3}	20287800	20605600	1.6	L9BKC		
14	L9BKC	AR 1260 {4}	33372800	33086400	0.86	L9BKC		
15	L9BKC	AR 1260 {5}	22010800	21655400	1.6	L9BKC		
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39								
40								
		Average			6.9			

EPA 8082
PCB0907

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/11/18
Instrument: Lucy
Cal. Date: 09/07/18
Data File: 0907051.D

		Compound	MEAN	CCRF	%D		%Drift
41	SA	TCmX	539431000	696907000	29	SA	*
42	SA	DBC	335954000	340862000	1.5	SA	
43	SA	DECA	313629000	333005000	6.2	SA	
44	BNMC	Total AR1016	43279400	48204700	11	BNMC	
45	L3BKC	AR 1016	9564910	9829940	2.8	L3BKC	
46	L3BKC	AR 1016 {2}	9300010	11561200	24	L3BKC	
47	L3BKC	AR 1016 {3}	7301710	8492200	16	L3BKC	
48	L3BKC	AR 1016 {4}	8209200	8739780	6.5	L3BKC	
49	L3BKC	AR 1016 {5}	8903520	9581590	7.6	L3BKC	
50	BNMC	Total AR1260	105926000	102106000	3.6	BNMC	
51	L9BKC	AR 1260	26041700	25518000	2.0	L9BKC	
52	L9BKC	AR 1260 {2}	31022300	31085400	0.20	L9BKC	
53	L9BKC	AR 1260 {3}	17620600	17329300	1.7	L9BKC	
54	L9BKC	AR 1260 {4}	24294200	21470600	12	L9BKC	
55	L9BKC	AR 1260 {5}	6947360	6702260	3.5	L9BKC	
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80							
		Average			8.5		

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907051.D\ECD1A.CH Vial: 51
Acq On : 9-11-18 14:19:30 Operator: MA
Sample : PCB - 2 7/18/18 Inst : Lucy
Misc : soil Multiplr: 1.00
IntFile : events.e

Data File : G:\LUCY\DATA\180907\0907051.D\ECD2B.CH Vial: 51
Acq On : 9-11-18 14:19:29 Operator: MA
Sample : PCB - 2 7/18/18 Inst : Lucy
Misc : soil Multiplr: 1.00
IntFile : events2.e
Quant Time: Sep 11 16:12 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	39140963	69690670	0.062	0.065
Spiked Amount 0.100			Recovery	=	62.00%	65.00%
2) SA DBC	6.46	6.96	31695149	34086196	0.056	0.051
Spiked Amount 0.100			Recovery	=	56.00%	51.00%
3) SA DECA	8.59	9.17	19481852	33300470	0.047	0.053
Spiked Amount 0.100			Recovery	=	47.00%	53.00%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	24445439	24102358	0.272m	0.278m
5) L3BKC AR 1016	3.39	3.25	4896621	4914970	0.266	0.257
6) L3BKC AR 1016 {2}	3.82	4.28	10908133	5780602	0.283	0.311
7) L3BKC AR 1016 {3}	4.10	4.39	2242872	4246102	0.255	0.291
8) L3BKC AR 1016 {4}	4.36	4.44	3508022	4369891	0.261	0.266
9) L3BKC AR 1016 {5}	4.50	4.58	2889791	4790793	0.272	0.269
10) BNMC Total AR1260	0.00	0.00	51367727	51052764	0.248m	0.241m
11) L9BKC AR 1260	5.33	5.75	5654612	12758993	0.266	0.245
12) L9BKC AR 1260 {2}	5.48	6.30	8039460	15542710	0.235	0.251
13) L9BKC AR 1260 {3}	5.65	6.40	10302779	8664632	0.254	0.246
14) L9BKC AR 1260 {4}	6.59	7.40	16543175	10735298	0.248	0.221
15) L9BKC AR 1260 {5}	7.04	7.50	10827701	3351132	0.246	0.241

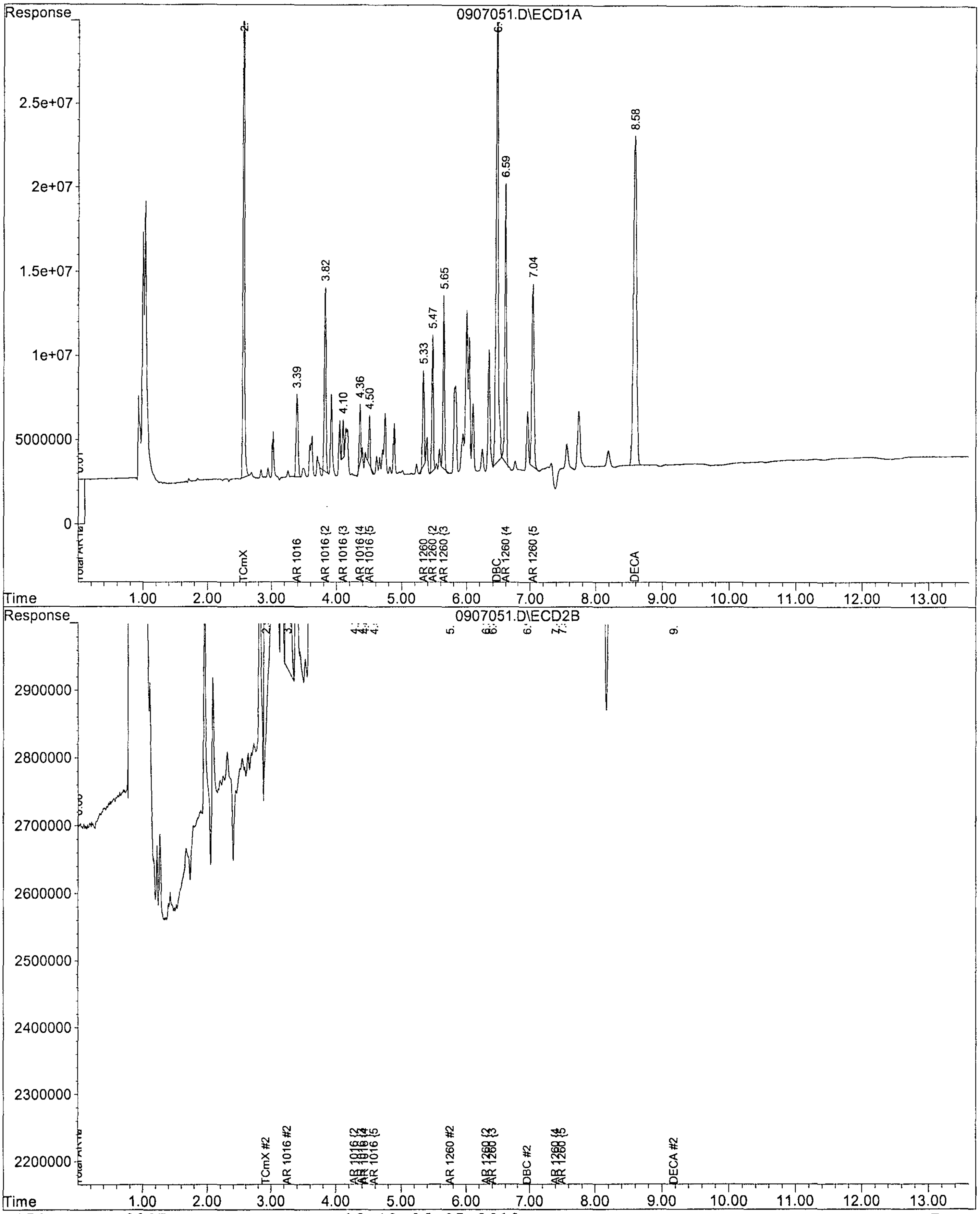
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907051.D
Acq On : 9-11-18 14:19:30
Sample : PCB - 2 7/18/18
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 51
Operator: MA
Inst : Lucy
Multiplr: 1.00



EPA 8082
PCB0907

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/11/18
Instrument: Lucy
Initial Cal. Date: 09/07/18
Data File: 0907066.D

		Compound	MEAN	CCRF	%D		%Drift
1	SA	TCmX	314194000	346659000	10	SA	
2	SA	DBC	282566000	340752000	21	SA	
3	SA	DECA	206992000	223457000	8.0	SA	
4	BNMC	Total AR1016	44943300	47166000	4.9	BNMC	
5	L3BKC	AR 1016	9217670	9233420	0.17	L3BKC	
6	L3BKC	AR 1016 {2}	19304400	20170900	4.5	L3BKC	
7	L3BKC	AR 1016 {3}	4401960	4621800	5.0	L3BKC	
8	L3BKC	AR 1016 {4}	6713950	7025520	4.6	L3BKC	
9	L3BKC	AR 1016 {5}	5305290	6114360	15	L3BKC	
10	BNMC	Total AR1260	103426000	111924000	8.2	BNMC	
11	L9BKC	AR 1260	10638100	11951500	12	L9BKC	
12	L9BKC	AR 1260 {2}	17116600	18324300	7.1	L9BKC	
13	L9BKC	AR 1260 {3}	20287800	21750000	7.2	L9BKC	
14	L9BKC	AR 1260 {4}	33372800	36110300	8.2	L9BKC	
15	L9BKC	AR 1260 {5}	22010800	23787800	8.1	L9BKC	
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		Average			8.3		

* NT

EPA 8082
PCB0907

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Water

SDG No:
Date Analyzed: 09/11/18
Instrument: Lucy
Cal. Date: 09/07/18
Data File: 0907066.D

		Compound	MEAN	CCRF	%D		%Drift
41	SA	TCmX	539431000	620021000	15	SA	
42	SA	DBC	335954000	353853000	5.3	SA	
43	SA	DECA	313629000	326809000	4.2	SA	
44	BNMC	Total AR1016	43279400	46443900	7.3	BNMC	
45	L3BKC	AR 1016	9564910	8871320	7.3	L3BKC	
46	L3BKC	AR 1016 {2}	9300010	10996200	18	L3BKC	
47	L3BKC	AR 1016 {3}	7301710	8178080	12	L3BKC	
48	L3BKC	AR 1016 {4}	8209200	8506240	3.6	L3BKC	
49	L3BKC	AR 1016 {5}	8903520	9892030	11	L3BKC	
50	BNMC	Total AR1260	105926000	113418000	7.1	BNMC	
51	L9BKC	AR 1260	26041700	28082100	7.8	L9BKC	
52	L9BKC	AR 1260 {2}	31022300	33334300	7.5	L9BKC	
53	L9BKC	AR 1260 {3}	17620600	19129200	8.6	L9BKC	
54	L9BKC	AR 1260 {4}	24294200	25088700	3.3	L9BKC	
55	L9BKC	AR 1260 {5}	6947360	7783880	12	L9BKC	
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80							
		Average			8.7		

Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907066.D\ECD1A.CH Vial: 66
Signal #2 : G:\LUCY\DATA\180907\0907066.D\ECD2B.CH
Acq On : 9-11-18 20:12:17 Operator: MA
Sample : PCB - 2 7/18/18 Inst : Lucy
Misc : water Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 8:45 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

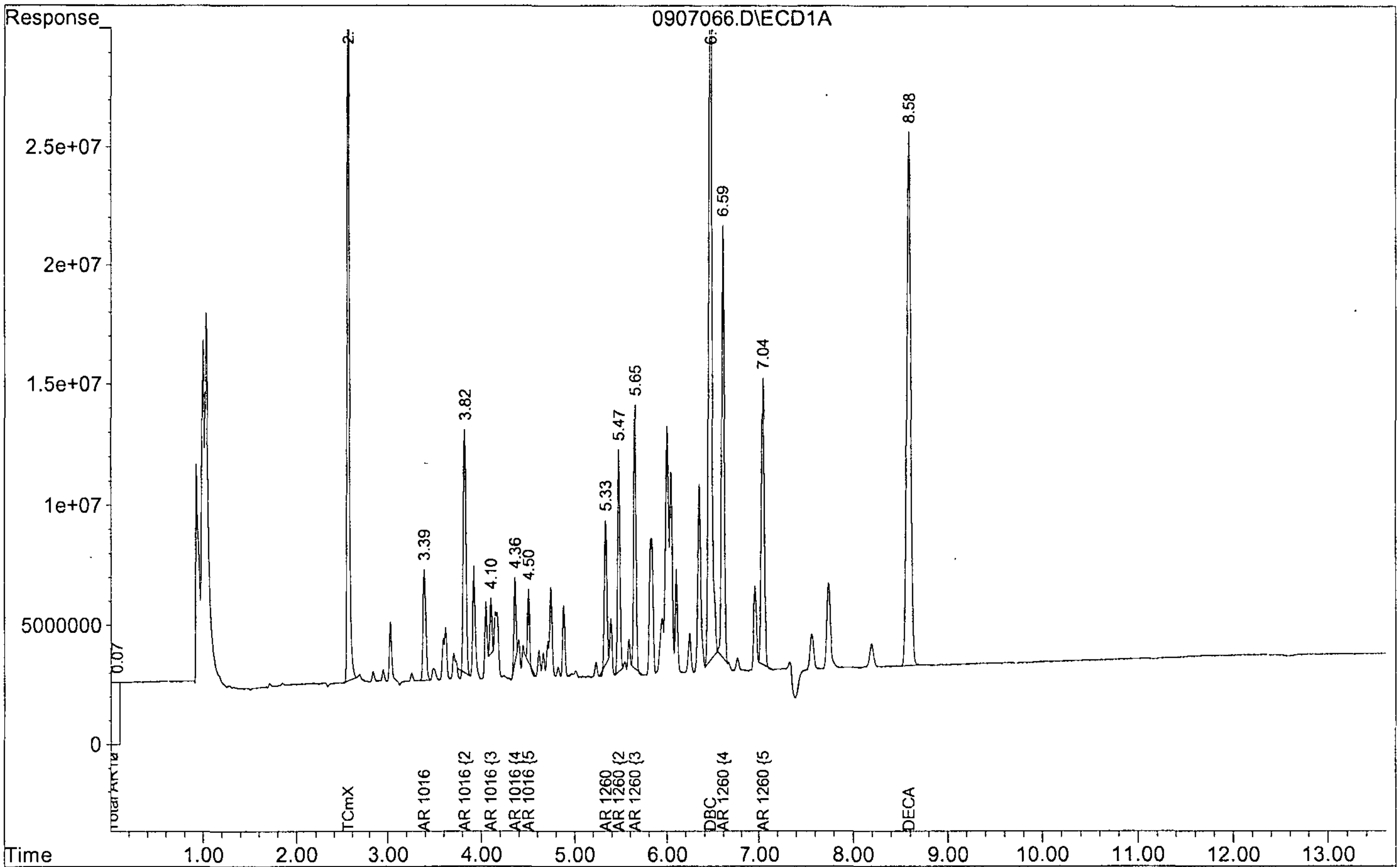
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.55	2.92	34665875	62002092	0.055	0.057
Spiked Amount 0.150			Recovery	=	36.67%	38.00%
2) SA DBC	6.46	6.96	34075195	35385264	0.060	0.053
Spiked Amount 0.150			Recovery	=	40.00%	35.33%
3) SA DECA	8.59	9.18	22345674	32680895	0.054	0.052
Spiked Amount 0.150			Recovery	=	36.00%	34.67%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	23582999	23221935	0.262m	0.268m
5) L3BKC AR 1016	3.39	3.25	4616711	4435660	0.250	0.232
6) L3BKC AR 1016 {2}	3.82	4.28	10085446	5498094	0.261	0.296
7) L3BKC AR 1016 {3}	4.10	4.39	2310902	4089042	0.262	0.280
8) L3BKC AR 1016 {4}	4.36	4.44	3512761	4253122	0.262	0.259
9) L3BKC AR 1016 {5}	4.50	4.58	3057180	4946017	0.288	0.278
10) BNMC Total AR1260	0.00	0.00	55961976	56709099	0.271m	0.268m
11) L9BKC AR 1260	5.33	5.75	5975764	14041051	0.281	0.270
12) L9BKC AR 1260 {2}	5.47	6.31	9162171	16667175	0.268	0.269
13) L9BKC AR 1260 {3}	5.65	6.40	10874979	9564607	0.268	0.271
14) L9BKC AR 1260 {4}	6.59	7.40	18055171	12544326	0.271	0.258
15) L9BKC AR 1260 {5}	7.04	7.50	11893892	3891940	0.270	0.280

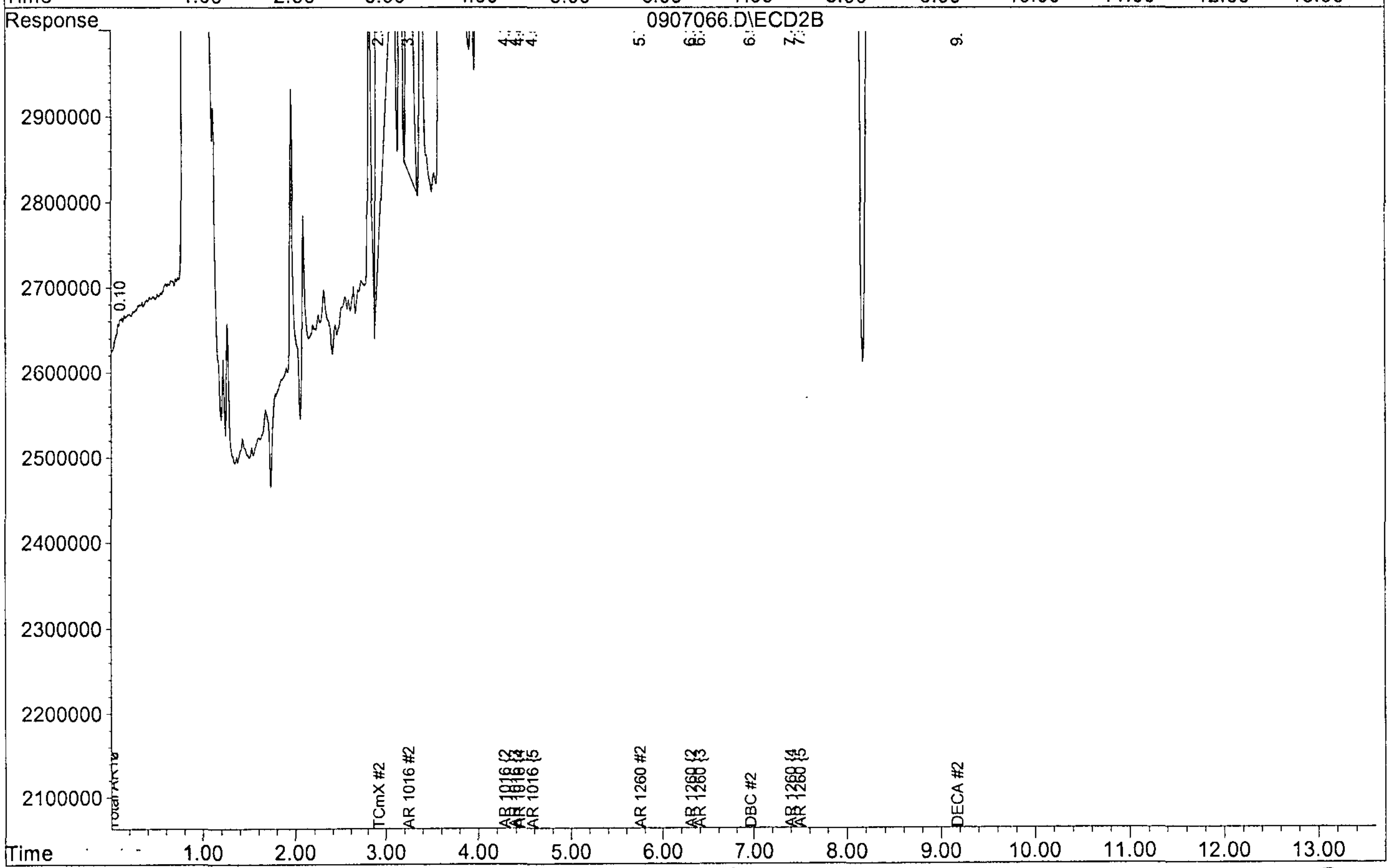
Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907066.D
Acq On : 9-11-18 20:12:17
Sample : PCB - 2 7/18/18
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 66
Operator: MA
Inst : Lucy
Multiplr: 1.00





EPA 8082
PCB0907

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Lucy
Initial Cal. Date: 09/07/18
Data File: 0907149.D

		Compound	MEAN	CCRF	%D		%Drift
1	SA	TCmX	314194000	345225000	9.9	SA	
2	SA	DBC	282566000	320676000	13	SA	
3	SA	DECA	206992000	209255000	1.1	SA	
4	BNMC	Total AR1016	44943300	47375400	5.4	BNMC	
5	L3BKC	AR 1016	9217670	9081100	1.5	L3BKC	
6	L3BKC	AR 1016 {2}	19304400	20432600	5.8	L3BKC	
7	L3BKC	AR 1016 {3}	4401960	4595810	4.4	L3BKC	
8	L3BKC	AR 1016 {4}	6713950	7093630	5.7	L3BKC	
9	L3BKC	AR 1016 {5}	5305290	6172250	16	L3BKC	
10	BNMC	Total AR1260	103426000	108164000	4.6	BNMC	
11	L9BKC	AR 1260	10638100	12123400	14	L9BKC	
12	L9BKC	AR 1260 {2}	17116600	17974000	5.0	L9BKC	
13	L9BKC	AR 1260 {3}	20287800	21608600	6.5	L9BKC	
14	L9BKC	AR 1260 {4}	33372800	33902900	1.6	L9BKC	
15	L9BKC	AR 1260 {5}	22010800	22555200	2.5	L9BKC	
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		Average			6.5		

EPA 8082
PCB0907

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Lucy
Cal. Date: 09/07/18
Data File: 0907149.D

		Compound	MEAN	CCRF	%D		%Drift
41	SA	TCmX	539431000	614776000	14	SA	
42	SA	DBC	335954000	365541000	8.8	SA	
43	SA	DECA	313629000	339280000	8.2	SA	
44	BNMC	Total AR1016	43279400	46675900	7.8	BNMC	
45	L3BKC	AR 1016	9564910	8771980	8.3	L3BKC	
46	L3BKC	AR 1016 {2}	9300010	10811600	16	L3BKC	
47	L3BKC	AR 1016 {3}	7301710	8565400	17	L3BKC	
48	L3BKC	AR 1016 {4}	8209200	8755790	6.7	L3BKC	
49	L3BKC	AR 1016 {5}	8903520	9771150	9.7	L3BKC	
50	BNMC	Total AR1260	105926000	111433000	5.2	BNMC	
51	L9BKC	AR 1260	26041700	27897000	7.1	L9BKC	
52	L9BKC	AR 1260 {2}	31022300	34258600	10	L9BKC	
53	L9BKC	AR 1260 {3}	17620600	18860200	7.0	L9BKC	
54	L9BKC	AR 1260 {4}	24294200	23655900	2.6	L9BKC	
55	L9BKC	AR 1260 {5}	6947360	6760820	2.7	L9BKC	
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		Average			8.7		

Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907149.D\ECD1A.CH Vial: 49
Signal #2 : G:\LUCY\DATA\180907\0907149.D\ECD2B.CH
Acq On : 9-14-18 15:48:03 Operator: MA
Sample : PCB - 2 7/18/18 Inst : Lucy
Misc : soil Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 8:55 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	34522456	61477573	0.055	0.057
Spiked Amount 0.100			Recovery	=	55.00%	57.00%
2) SA DBC	6.46	6.96	32067593	36554144	0.057	0.054
Spiked Amount 0.100			Recovery	=	57.00%	54.00%
3) SA DECA	8.58	9.18	20925539	33928042	0.051	0.054
Spiked Amount 0.100			Recovery	=	51.00%	54.00%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	23687686	23337962	0.264m	0.270m
5) L3BKC AR 1016	3.39	3.25	4540549	4385989	0.246	0.229
6) L3BKC AR 1016 {2}	3.82	4.28	10216294	5405801	0.265	0.291
7) L3BKC AR 1016 {3}	4.10	4.39	2297906	4282702	0.261	0.293
8) L3BKC AR 1016 {4}	4.36	4.44	3546813	4377895	0.264	0.267
9) L3BKC AR 1016 {5}	4.50	4.58	3086125	4885575	0.291	0.274
10) BNMC Total AR1260	0.00	0.00	54082069	55716278	0.261m	0.263m
11) L9BKC AR 1260	5.33	5.75	6061700	13948516	0.285	0.268
12) L9BKC AR 1260 {2}	5.48	6.30	8987004	17129291	0.263	0.276
13) L9BKC AR 1260 {3}	5.65	6.40	10804314	9430103	0.266	0.268
14) L9BKC AR 1260 {4}	6.59	7.40	16951426	11827958	0.254	0.243
15) L9BKC AR 1260 {5}	7.04	7.50	11277625	3380410	0.256	0.243

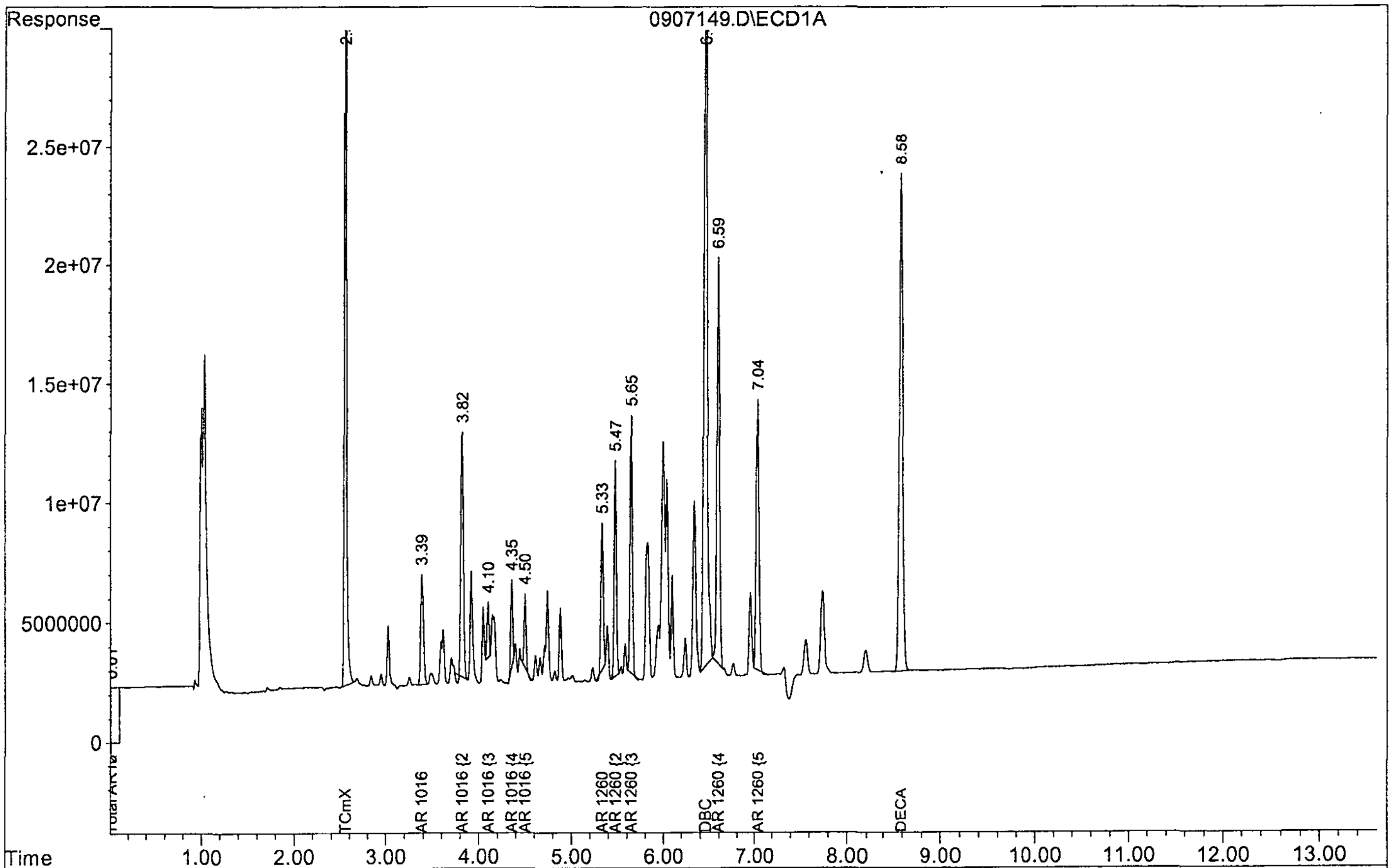
Target Compounds

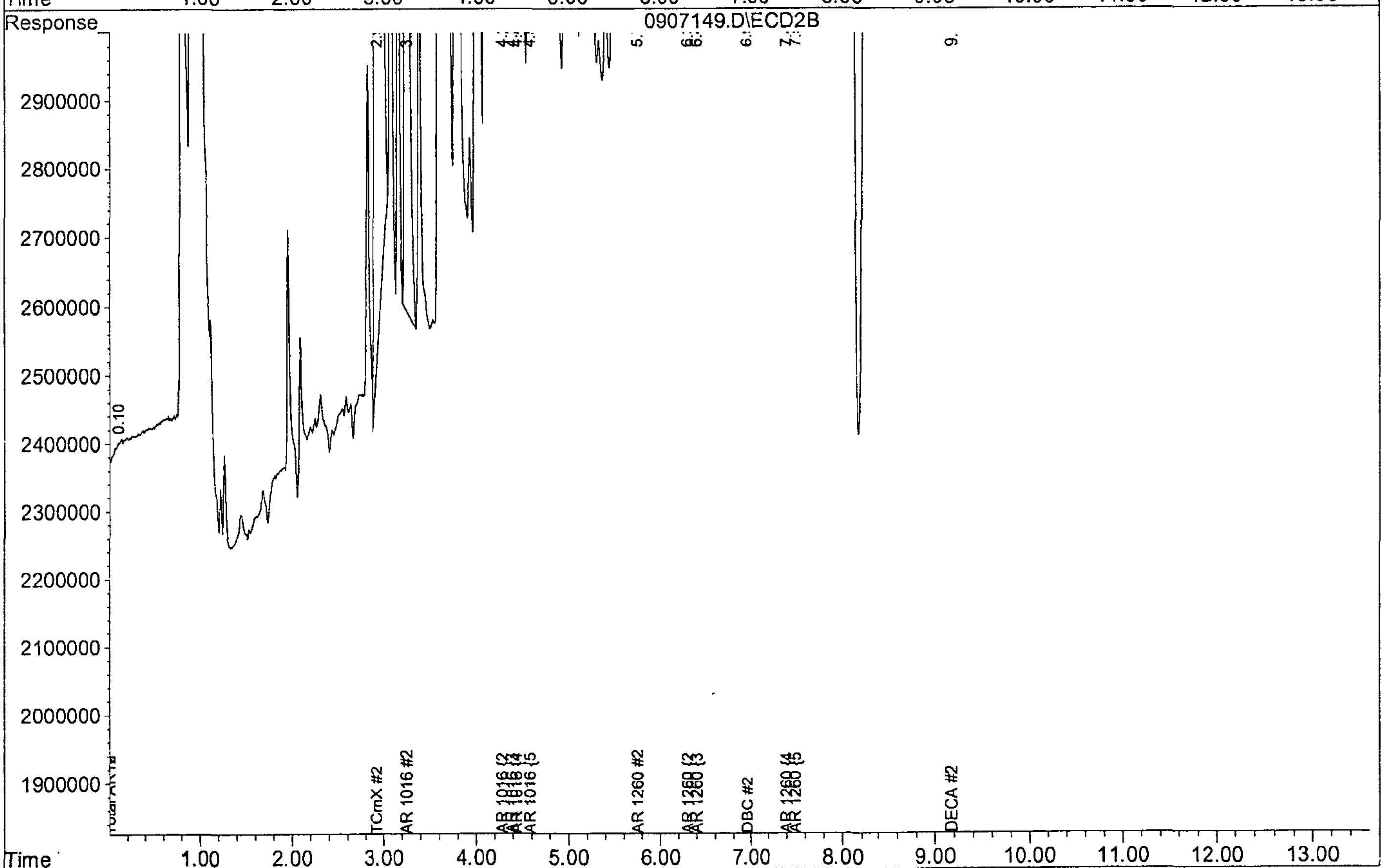
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907149.D
Acq On : 9-14-18 15:48:03
Sample : PCB - 2 7/18/18
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 49
Operator: MA
Inst : Lucy
Multiplr: 1.00





EPA 8082
PCB0907

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Lucy
Initial Cal. Date: 09/07/18
Data File: 0907164.D

		Compound	MEAN	CCRF	%D		%Drift
1	SA	TCmX	314194000	353489000	13	SA	
2	SA	DBC	282566000	304539000	7.8	SA	
3	SA	DECA	206992000	194843000	5.9	SA	
4	BNMC	Total AR1016	44943300	47038000	4.7	BNMC	
5	L3BKC	AR 1016	9217670	9298240	0.87	L3BKC	
6	L3BKC	AR 1016 {2}	19304400	20442100	5.9	L3BKC	
7	L3BKC	AR 1016 {3}	4401960	4650970	5.7	L3BKC	
8	L3BKC	AR 1016 {4}	6713950	6956840	3.6	L3BKC	
9	L3BKC	AR 1016 {5}	5305290	5689820	7.2	L3BKC	
10	BNMC	Total AR1260	103426000	100062000	3.3	BNMC	
11	L9BKC	AR 1260	10638100	11588700	8.9	L9BKC	
12	L9BKC	AR 1260 {2}	17116600	16536200	3.4	L9BKC	
13	L9BKC	AR 1260 {3}	20287800	19533500	3.7	L9BKC	
14	L9BKC	AR 1260 {4}	33372800	31677000	5.1	L9BKC	
15	L9BKC	AR 1260 {5}	22010800	20726300	5.8	L9BKC	
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		Average			5.7		

EPA 8082
PCB0907

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Lucy
Cal. Date: 09/07/18
Data File: 0907164.D

		Compound	MEAN	CCRF	%D		%Drift
41	SA	TCmX	539431000	633734000	17	SA	
42	SA	DBC	335954000	328218000	2.3	SA	
43	SA	DECA	313629000	323573000	3.2	SA	
44	BNMC	Total AR1016	43279400	47383100	9.5	BNMC	
45	L3BKC	AR 1016	9564910	9062860	5.2	L3BKC	
46	L3BKC	AR 1016 {2}	9300010	11134000	20	L3BKC	
47	L3BKC	AR 1016 {3}	7301710	8411810	15	L3BKC	
48	L3BKC	AR 1016 {4}	8209200	8731870	6.4	L3BKC	
49	L3BKC	AR 1016 {5}	8903520	10042600	13	L3BKC	
50	BNMC	Total AR1260	105926000	101903000	3.8	BNMC	
51	L9BKC	AR 1260	26041700	26456600	1.6	L9BKC	
52	L9BKC	AR 1260 {2}	31022300	31933300	2.9	L9BKC	
53	L9BKC	AR 1260 {3}	17620600	17404000	1.2	L9BKC	
54	L9BKC	AR 1260 {4}	24294200	19688600	19	L9BKC	
55	L9BKC	AR 1260 {5}	6947360	6420430	7.6	L9BKC	
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		Average			8.5		

Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907164.D\ECD1A.CH Vial: 64
Signal #2 : G:\LUCY\DATA\180907\0907164.D\ECD2B.CH
Acq On : 9-14-18 20:02:14 Operator: MA
Sample : PCB - 2 7/18/18 Inst : Lucy
Misc : soil Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 8:54 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

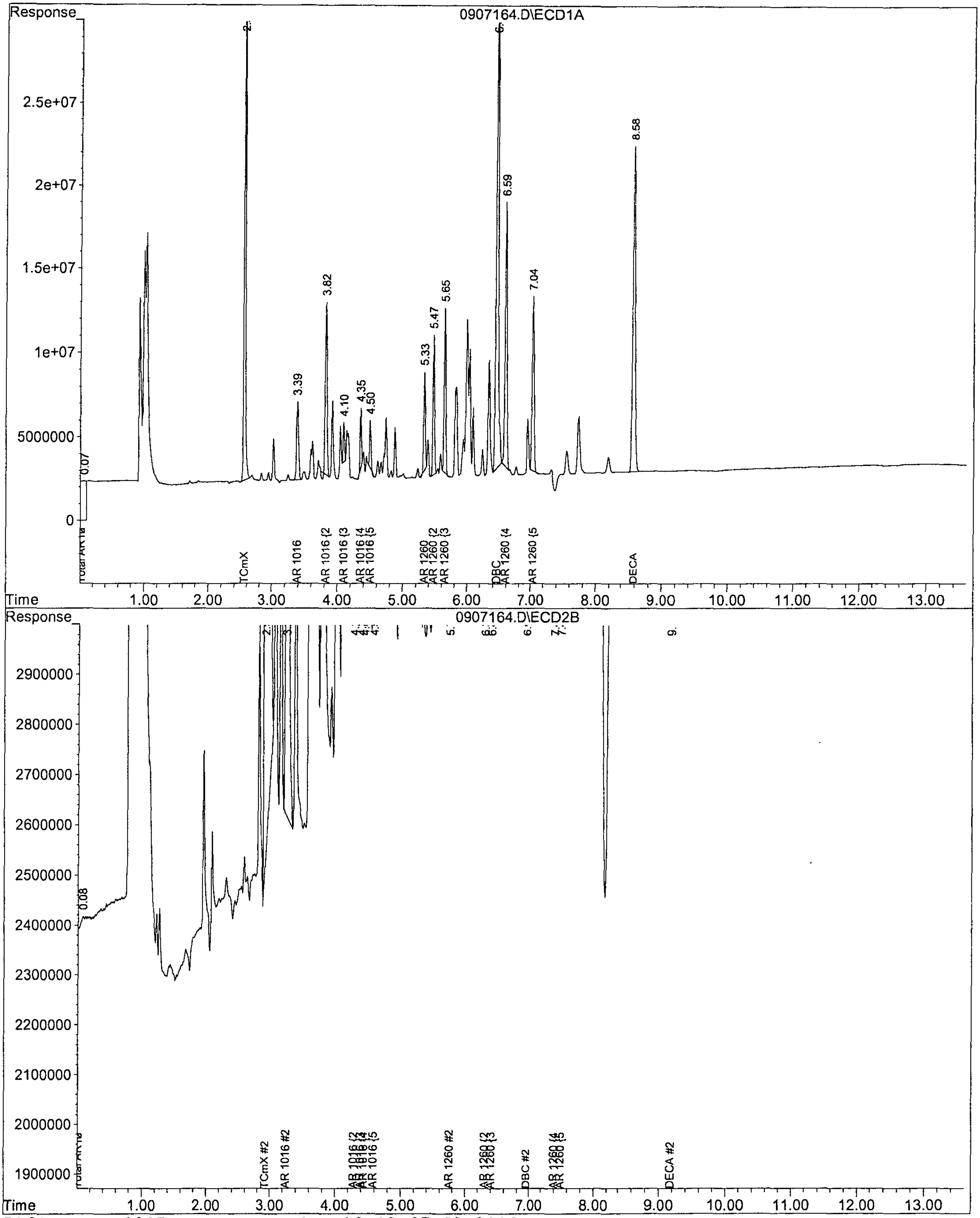
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	35348883	63373400	0.056	0.059
Spiked Amount 0.100			Recovery =		56.00%	59.00%
2) SA DBC	6.46	6.96	30453926	32821813	0.054	0.049
Spiked Amount 0.100			Recovery =		54.00%	49.00%
3) SA DECA	8.58	9.17	19484321	32357291	0.047	0.052
Spiked Amount 0.100			Recovery =		47.00%	52.00%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	23518998	23691563	0.262m	0.274m
5) L3BKC AR 1016	3.39	3.25	4649118	4531430	0.252	0.237
6) L3BKC AR 1016 {2}	3.82	4.28	10221062	5566997	0.265	0.299
7) L3BKC AR 1016 {3}	4.10	4.39	2325486	4205905	0.264	0.288
8) L3BKC AR 1016 {4}	4.36	4.44	3478420	4365936	0.259	0.266
9) L3BKC AR 1016 {5}	4.50	4.58	2844911	5021295	0.268	0.282
10) BNMC Total AR1260	0.00	0.00	50030879	50951457	0.242m	0.241m
11) L9BKC AR 1260	5.33	5.75	5794374	13228323	0.272	0.254
12) L9BKC AR 1260 {2}	5.47	6.30	8268113	15966644	0.242	0.257
13) L9BKC AR 1260 {3}	5.65	6.40	9766747	8701997	0.241	0.247
14) L9BKC AR 1260 {4}	6.59	7.40	15838491	9844277	0.237	0.203
15) L9BKC AR 1260 {5}	7.04	7.50	10363154	3210216	0.235	0.231

Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907164.D
Acq On : 9-14-18 20:02:14
Sample : PCB - 2 7/18/18
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 64
Operator: MA
Inst : Lucy
Multiplr: 1.00



EPA 8082
PCB0907

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Lucy
Initial Cal. Date: 09/07/18
Data File: 0907174.D

		Compound	MEAN	CCRF	%D		%Drift
1	SA	TCmX	314194000	349602000	11	SA	
2	SA	DBC	282566000	327398000	16	SA	
3	SA	DECA	206992000	215793000	4.3	SA	
4	BNMC	Total AR1016	44943300	48391200	7.7	BNMC	
5	L3BKC	AR 1016	9217670	9168370	0.53	L3BKC	
6	L3BKC	AR 1016 {2}	19304400	21478300	11	L3BKC	
7	L3BKC	AR 1016 {3}	4401960	4489360	2.0	L3BKC	
8	L3BKC	AR 1016 {4}	6713950	7375570	9.9	L3BKC	
9	L3BKC	AR 1016 {5}	5305290	5879620	11	L3BKC	
10	BNMC	Total AR1260	103426000	108855000	5.2	BNMC	
11	L9BKC	AR 1260	10638100	11949200	12	L9BKC	
12	L9BKC	AR 1260 {2}	17116600	17864200	4.4	L9BKC	
13	L9BKC	AR 1260 {3}	20287800	21607200	6.5	L9BKC	
14	L9BKC	AR 1260 {4}	33372800	34720400	4.0	L9BKC	
15	L9BKC	AR 1260 {5}	22010800	22713600	3.2	L9BKC	
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40							
		Average			7.2		

EPA 8082
PCB0907

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: Soil

SDG No:
Date Analyzed: 09/14/18
Instrument: Lucy
Cal. Date: 09/07/18
Data File: 0907174.D

		Compound	MEAN	CCRF	%D		%Drift
41	SA	TCmX	539431000	632867000	17	SA	
42	SA	DBC	335954000	354889000	5.6	SA	
43	SA	DECA	313629000	335092000	6.8	SA	
44	BNMC	Total AR1016	43279400	46112100	6.5	BNMC	
45	L3BKC	AR 1016	9564910	8976680	6.1	L3BKC	
46	L3BKC	AR 1016 {2}	9300010	10341500	11	L3BKC	
47	L3BKC	AR 1016 {3}	7301710	8565560	17	L3BKC	
48	L3BKC	AR 1016 {4}	8209200	8306100	1.2	L3BKC	
49	L3BKC	AR 1016 {5}	8903520	9922280	11	L3BKC	
50	BNMC	Total AR1260	105926000	115225000	8.8	BNMC	
51	L9BKC	AR 1260	26041700	28126100	8.0	L9BKC	
52	L9BKC	AR 1260 {2}	31022300	34508700	11	L9BKC	
53	L9BKC	AR 1260 {3}	17620600	20042500	14	L9BKC	
54	L9BKC	AR 1260 {4}	24294200	24765600	1.9	L9BKC	
55	L9BKC	AR 1260 {5}	6947360	7781920	12	L9BKC	
56							
57							
58							
59							
60							
61							
62							
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64							
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68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
		Average			9.2		

Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907174.D\ECD1A.CH Vial: 74
Signal #2 : G:\LUCY\DATA\180907\0907174.D\ECD2B.CH
Acq On : 9-14-18 22:51:40 Operator: MA
Sample : PCB - 2 7/18/18 Inst : Lucy
Misc : soil Multiplr: 1.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 8:54 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.55	2.92	34960164	63286665	0.056	0.059
Spiked Amount 0.100			Recovery	=	56.00%	59.00%
2) SA DBC	6.45	6.96	32739840	35488871	0.058	0.053
Spiked Amount 0.100			Recovery	=	58.00%	53.00%
3) SA DECA	8.58	9.17	21579288	33509186	0.052	0.053
Spiked Amount 0.100			Recovery	=	52.00%	53.00%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	24195611	23056068	0.269m	0.266m
5) L3BKC AR 1016	3.39	3.25	4584184	4488339	0.249	0.235
6) L3BKC AR 1016 {2}	3.82	4.28	10739148	5170761	0.278	0.278
7) L3BKC AR 1016 {3}	4.10	4.39	2244680	4282781	0.255	0.293
8) L3BKC AR 1016 {4}	4.36	4.44	3687787	4153048	0.275	0.253
9) L3BKC AR 1016 {5}	4.50	4.58	2939811	4961139	0.277	0.279
10) BNMC Total AR1260	0.00	0.00	54427287	57612383	0.263m	0.272m
11) L9BKC AR 1260	5.33	5.75	5974611	14063047	0.281	0.270
12) L9BKC AR 1260 {2}	5.47	6.30	8932091	17254365	0.261	0.278
13) L9BKC AR 1260 {3}	5.65	6.40	10803608	10021232	0.266	0.284
14) L9BKC AR 1260 {4}	6.59	7.40	17360176	12382781	0.260	0.255
15) L9BKC AR 1260 {5}	7.04	7.49	11356802	3890959	0.258	0.280

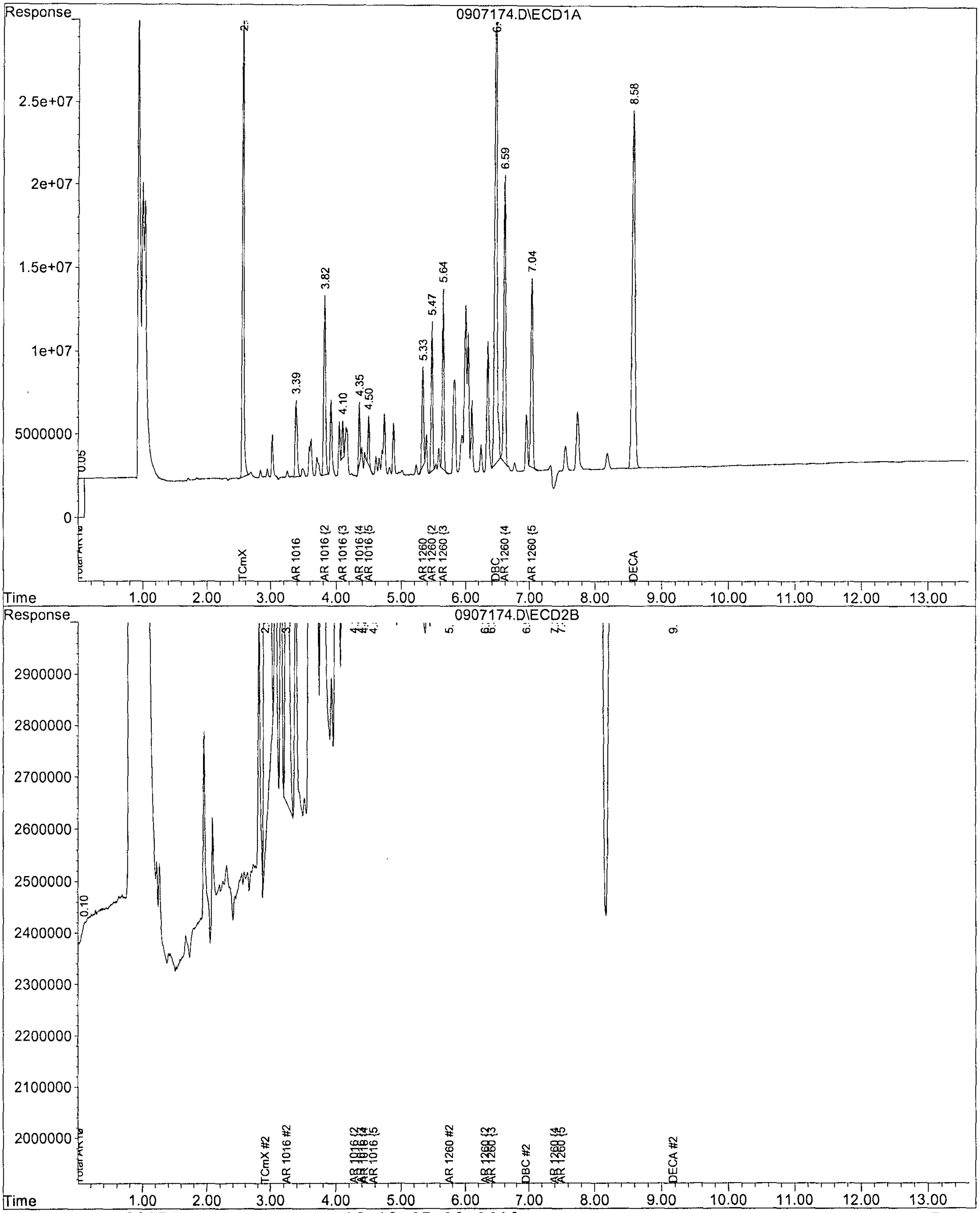
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907174.D
Acq On : 9-14-18 22:51:40
Sample : PCB - 2 7/18/18
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 74
Operator: MA
Inst : Lucy
Multiplr: 1.00



ORGANICS
Raw Data

APPL, INC.

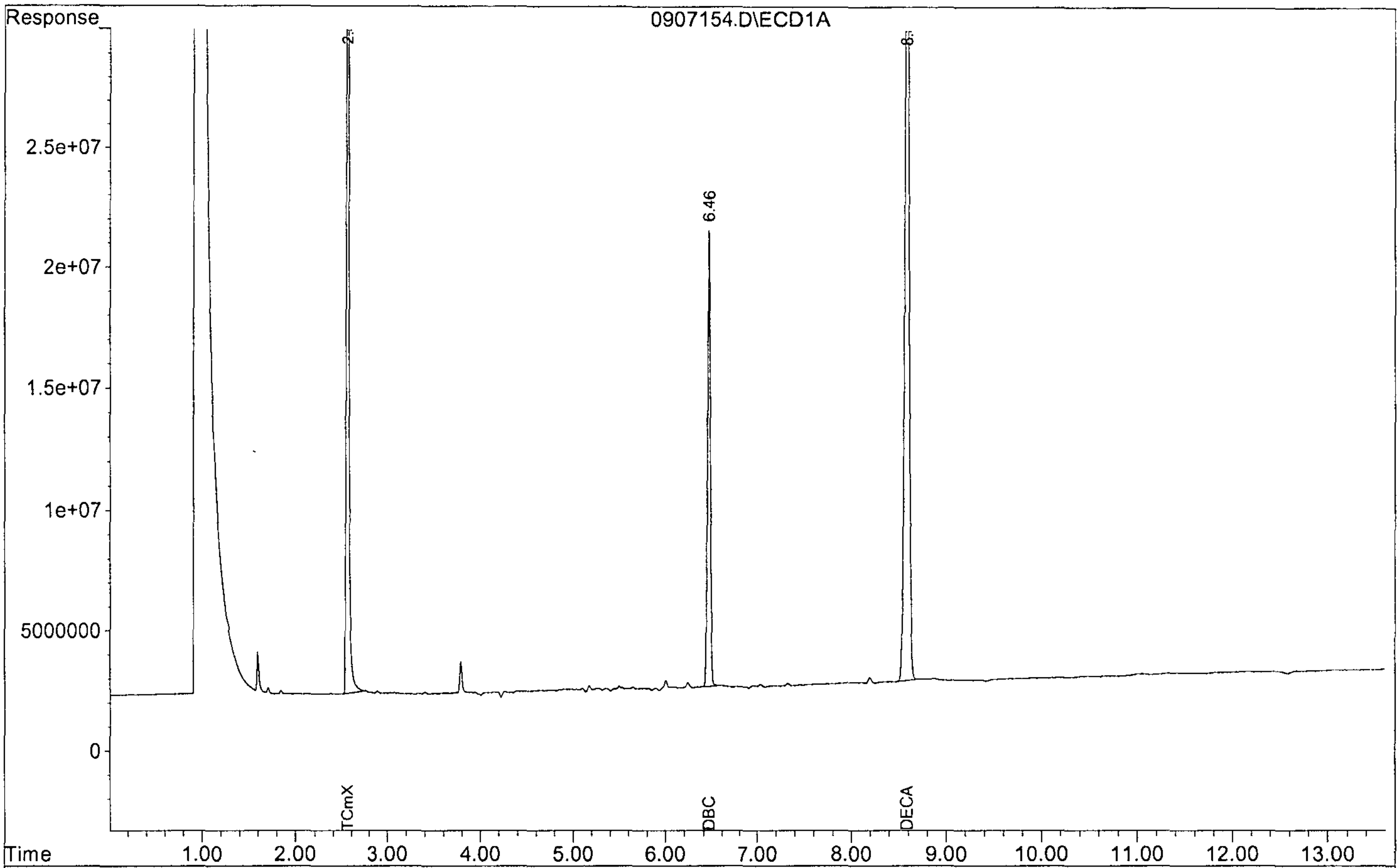
Quantitation Report (QT Reviewed)

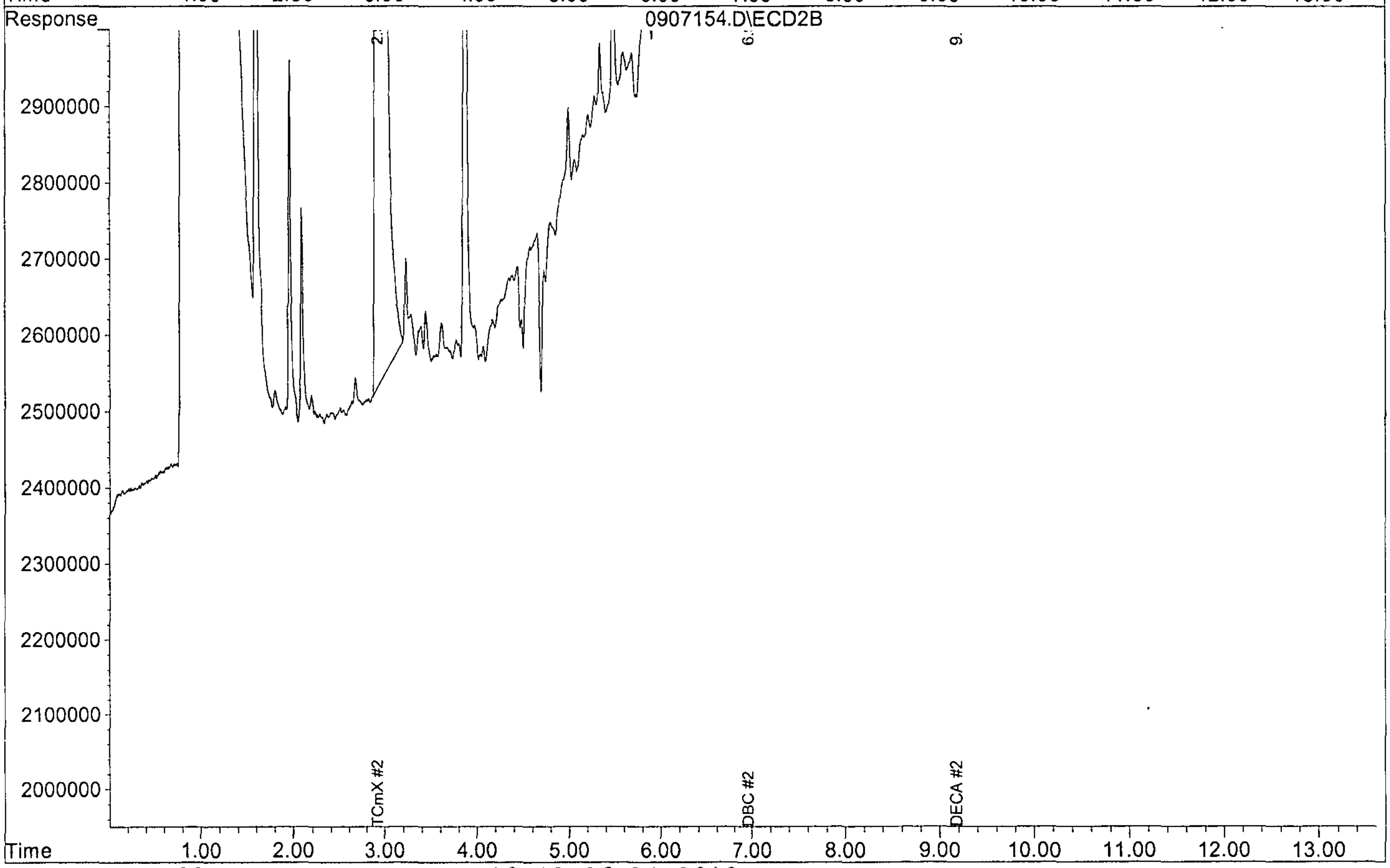
```
Signal #1 : G:\LUCY\DATA\180907\0907154.D\ECD1A.CH        Vial: 54
Signal #2 : G:\LUCY\DATA\180907\0907154.D\ECD2B.CH
Acq On    : 9-14-18 17:12:41                              Operator: MA
Sample    : AZ79146S01 5X1/0.05/30.41G DF10 AC            Inst    : Lucy
Misc      : soil                                          Multiplr: 3288.39
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 10:58 2018  Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2uL
Signal #1 Phase : DB-35MS          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32

   Compound            RT#1   RT#2    Resp#1    Resp#2      ppb        ppb
---------------------------------------------------------------------------

  System Monitoring Compounds
 1) SA  TCmX              2.55   2.92  59401470  106.7E6  310.851   325.187
 Spiked Amount   328.839                Recovery     =    94.53%    98.89%
 2) SA  DBC               6.46   6.96  18816941 28789528  109.492   140.899 #
 Spiked Amount   328.839                Recovery     =    33.30%    42.85%
 3) SA  DECA              8.59   9.18  33994208 54997752  270.025   288.325
 Spiked Amount   328.839                Recovery     =    82.11%    87.68%

  Target Compounds

  Target Compounds
 4) BNMC Total AR1016      0.00   0.00         0         0    N.D. d    N.D. d
 5) L3BKC AR 1016           0.00   0.00         0         0    N.D. d    N.D. d
 6) L3BKC AR 1016 {2}       0.00   0.00         0         0    N.D. d    N.D. d
 7) L3BKC AR 1016 {3}       0.00   0.00         0         0    N.D. d    N.D. d
 8) L3BKC AR 1016 {4}       0.00   0.00         0         0    N.D. d    N.D. d
 9) L3BKC AR 1016 {5}       0.00   0.00         0         0    N.D. d    N.D. d
10) BNMC Total AR1260      0.00   0.00         0         0    N.D. d    N.D. d
11) L9BKC AR 1260           0.00   0.00         0         0    N.D. d    N.D. d
12) L9BKC AR 1260 {2}       0.00   0.00         0         0    N.D. d    N.D. d
13) L9BKC AR 1260 {3}       0.00   0.00         0         0    N.D. d    N.D. d
14) L9BKC AR 1260 {4}       0.00   0.00         0         0    N.D. d    N.D. d
15) L9BKC AR 1260 {5}       0.00   0.00         0         0    N.D. d    N.D. d
```

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907154.D
Acq On : 9-14-18 17:12:41
Sample : AZ79146S01 5X1/0.05/30.41G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 54
Operator: MA
Inst : Lucy
Multiplr: 3288.39





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907155.D\ECD1A.CH Vial: 55
Signal #2 : G:\LUCY\DATA\180907\0907155.D\ECD2B.CH
Acq On : 9-14-18 17:29:35 Operator: MA
Sample : AZ79147S01 5X1/0.05/30.30G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3300.33
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 10:58 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

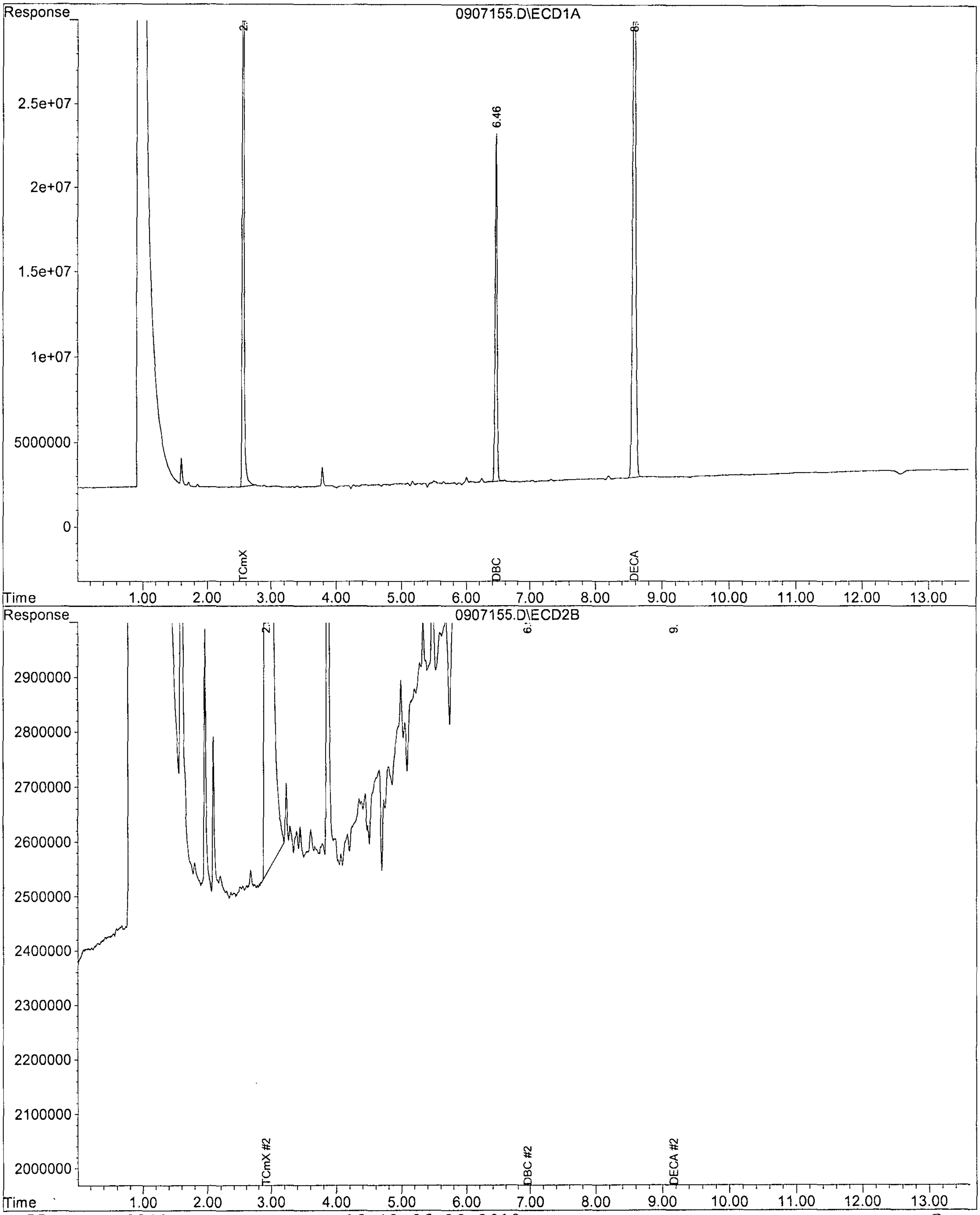
Compound		RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds							
1) SA TCmX		2.56	2.92	57571880	104.8E6	302.370	320.454
Spiked Amount	330.033			Recovery	=	91.62%	97.10%
2) SA DBC		6.46	6.96	20463183	31099072	119.503	152.755 #
Spiked Amount	330.033			Recovery	=	36.21%	46.28%
3) SA DECA		8.58	9.17	36454729	58978091	290.621	310.314
Spiked Amount	330.033			Recovery	=	88.06%	94.03%
Target Compounds							
Target Compounds							
4) BNMC Total AR1016		0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016		0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}		0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}		0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}		0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}		0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260		0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260		0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}		0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}		0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}		0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}		0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907155.D
Acq On : 9-14-18 17:29:35
Sample : AZ79147S01 5X1/0.05/30.30G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 55
Operator: MA
Inst : Lucy
Multiplr: 3300.33



Quantitation Report (QT Reviewed)

```
Signal #1 : G:\LUCY\DATA\180907\0907156.D\ECD1A.CH          Vial: 56
Signal #2 : G:\LUCY\DATA\180907\0907156.D\ECD2B.CH
Acq On    : 9-14-18 17:46:37                            Operator: MA
Sample    : AZ79148S01 5X1/0.05/30.23G DF10 AC          Inst    : Lucy
Misc      : soil                                        Multiplr: 3307.97
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 10:58 2018  Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2uL
Signal #1 Phase : DB-35MS           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

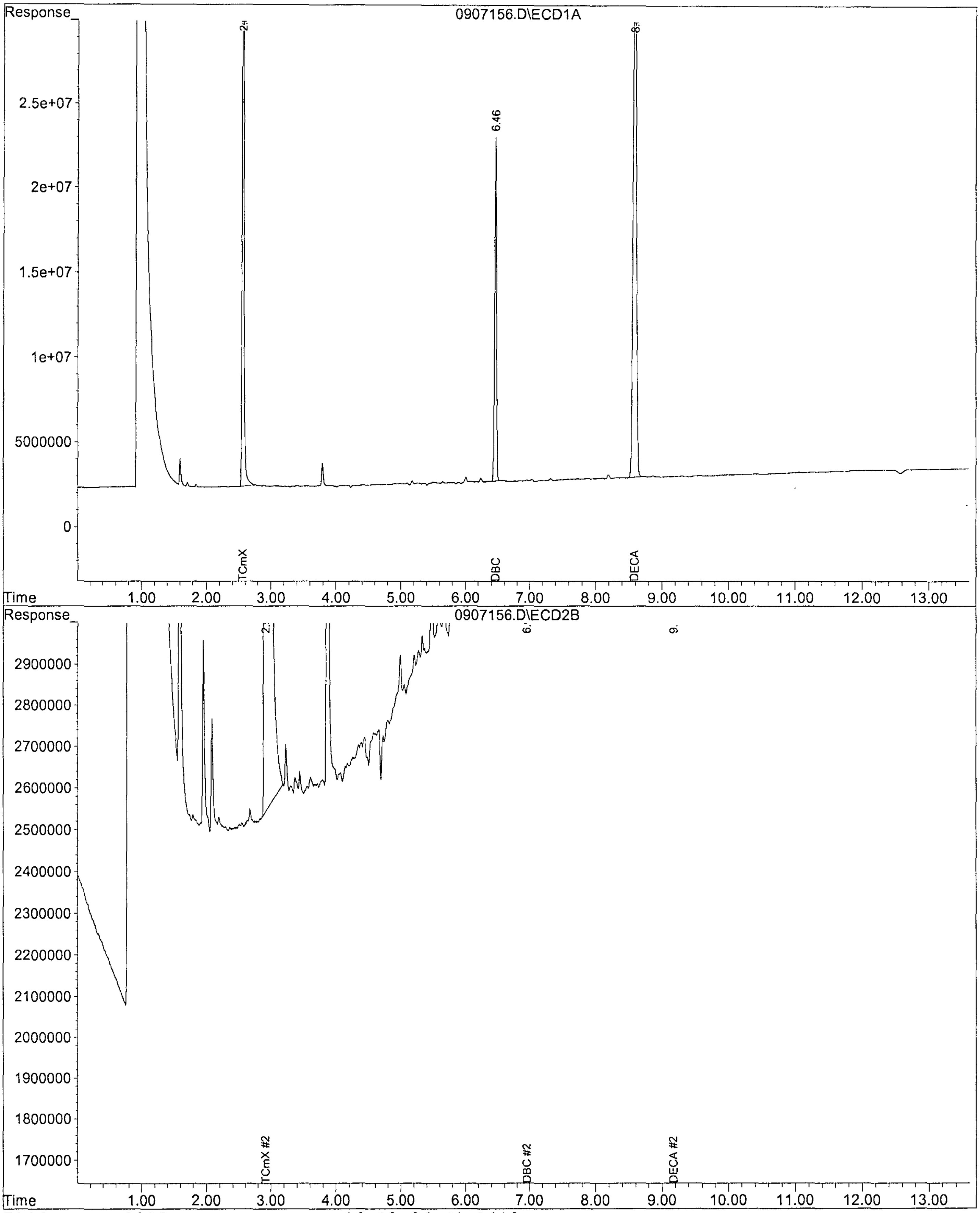
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	57403253	101.6E6	302.183	311.521
Spiked Amount 330.797			Recovery	=	91.35%	94.17%
2) SA DBC	6.46	6.96	20196659	30200650	118.220	148.685 #
Spiked Amount 330.797			Recovery	=	35.74%	44.95%
3) SA DECA	8.58	9.17	36623256	54805964	292.640	289.030
Spiked Amount 330.797			Recovery	=	88.47%	87.37%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907156.D
Acq On : 9-14-18 17:46:37
Sample : AZ79148S01 5X1/0.05/30.23G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 56
Operator: MA
Inst : Lucy
Multiplr: 3307.97



Quantitation Report (QT Reviewed)

```
Signal #1 : G:\LUCY\DATA\180907\0907157.D\ECD1A.CH       Vial: 57
Signal #2 : G:\LUCY\DATA\180907\0907157.D\ECD2B.CH
Acq On    : 9-14-18 18:03:34                          Operator: MA
Sample    : AZ79149S01 5X1/0.05/30.91G DF10 AC        Inst    : Lucy
Misc      : soil                                      Multiplr: 3235.20
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 10:58 2018  Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2uL
Signal #1 Phase : DB-35MS          Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32             Signal #2 Info : 0.32
```

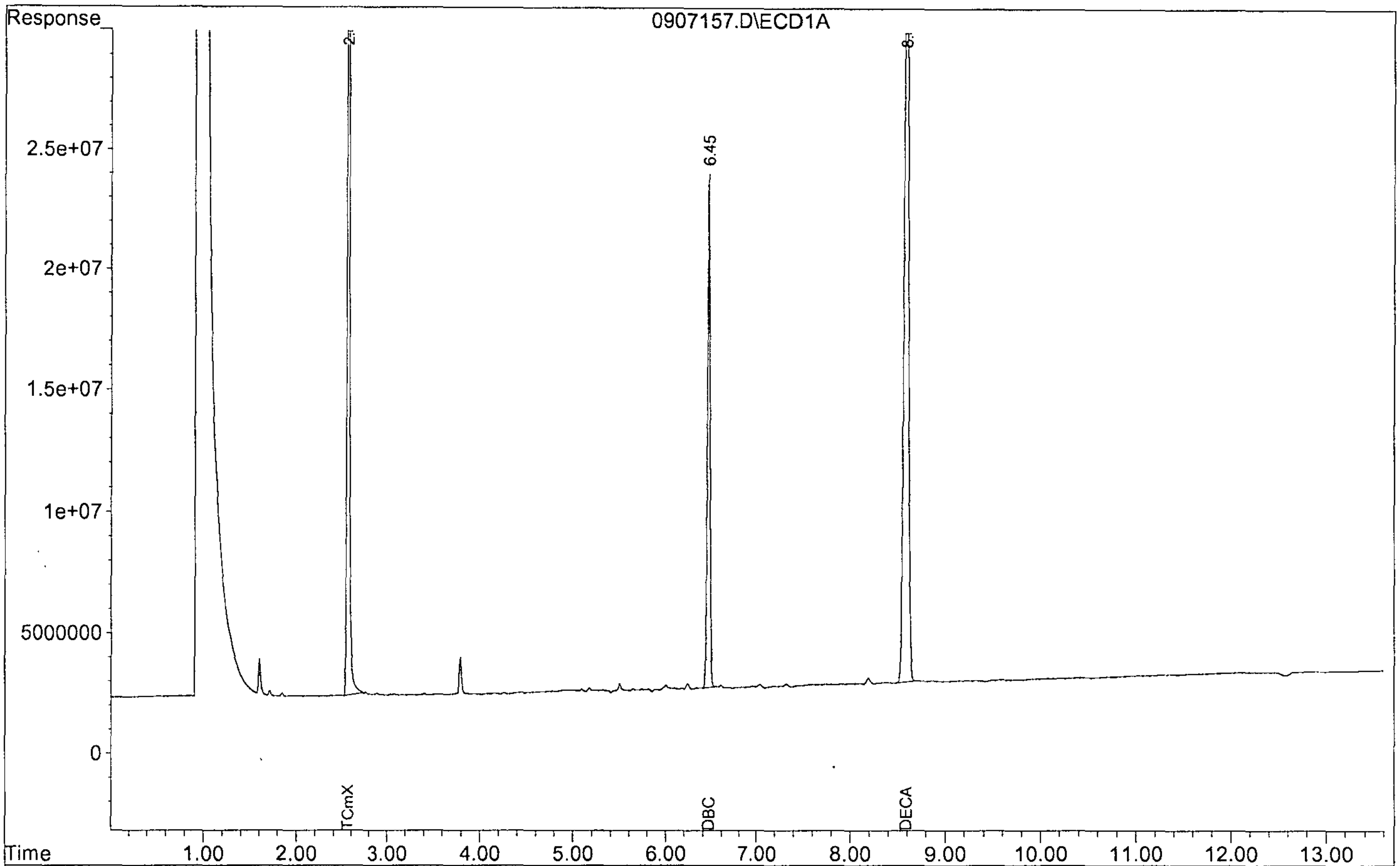
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	58295076	103.5E6	300.127	310.252
Spiked Amount 323.520			Recovery	=	92.77%	95.90%
2) SA DBC	6.46	6.96	21122084	31549498	120.917	151.909 #
Spiked Amount 323.520			Recovery	=	37.38%	46.96%
3) SA DECA	8.58	9.17	36658969	57423775	286.482	296.174
Spiked Amount 323.520			Recovery	=	88.55%	91.55%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

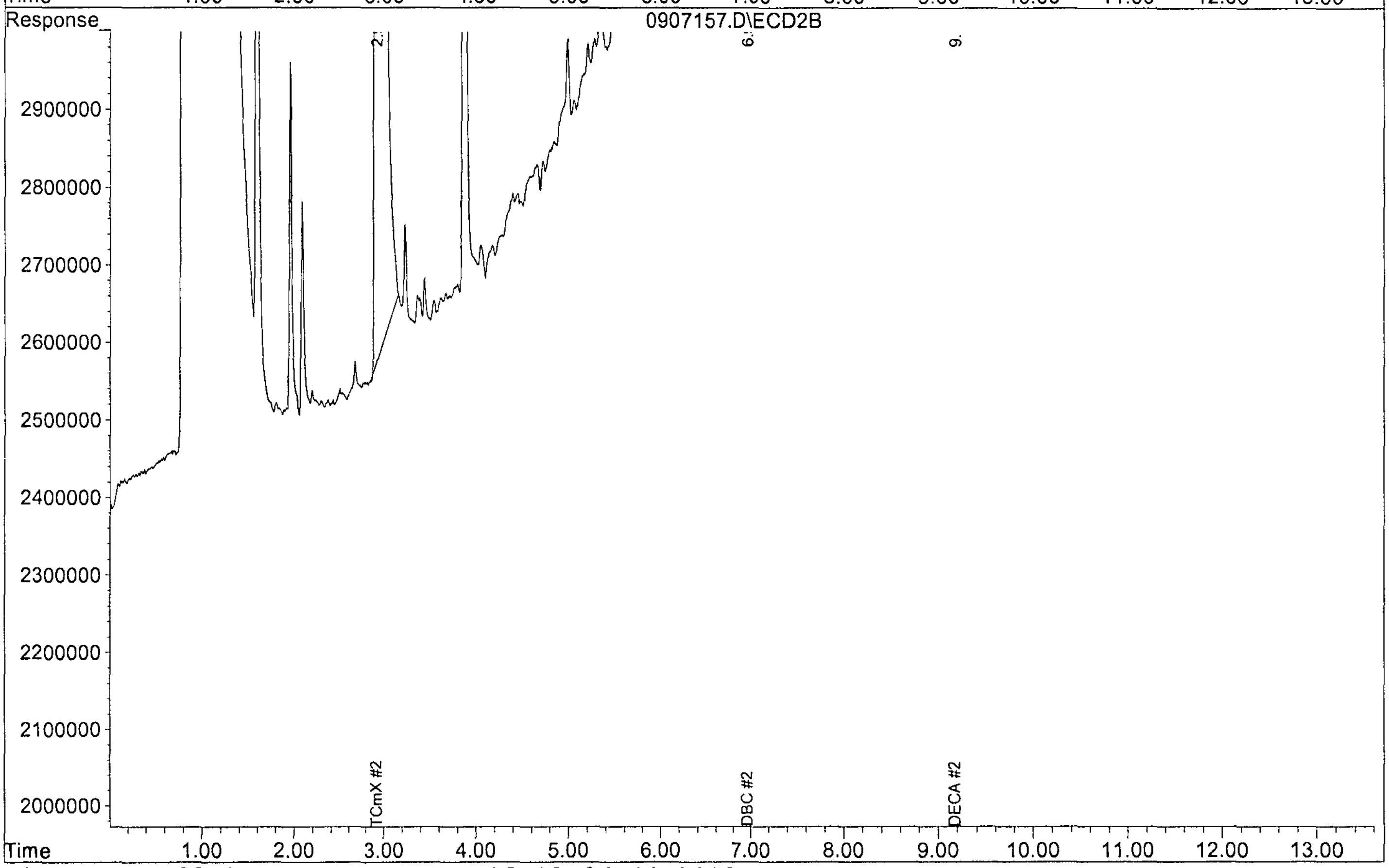
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907157.D
Acq On : 9-14-18 18:03:34
Sample : AZ79149S01 5X1/0.05/30.91G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 57
Operator: MA
Inst : Lucy
Multiplr: 3235.20





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907158.D\ECD1A.CH Vial: 58
Signal #2 : G:\LUCY\DATA\180907\0907158.D\ECD2B.CH
Acq On : 9-14-18 18:20:27 Operator: MA
Sample : AZ79150S01 5X1/0.05/30.06G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3326.68
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 10:58 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

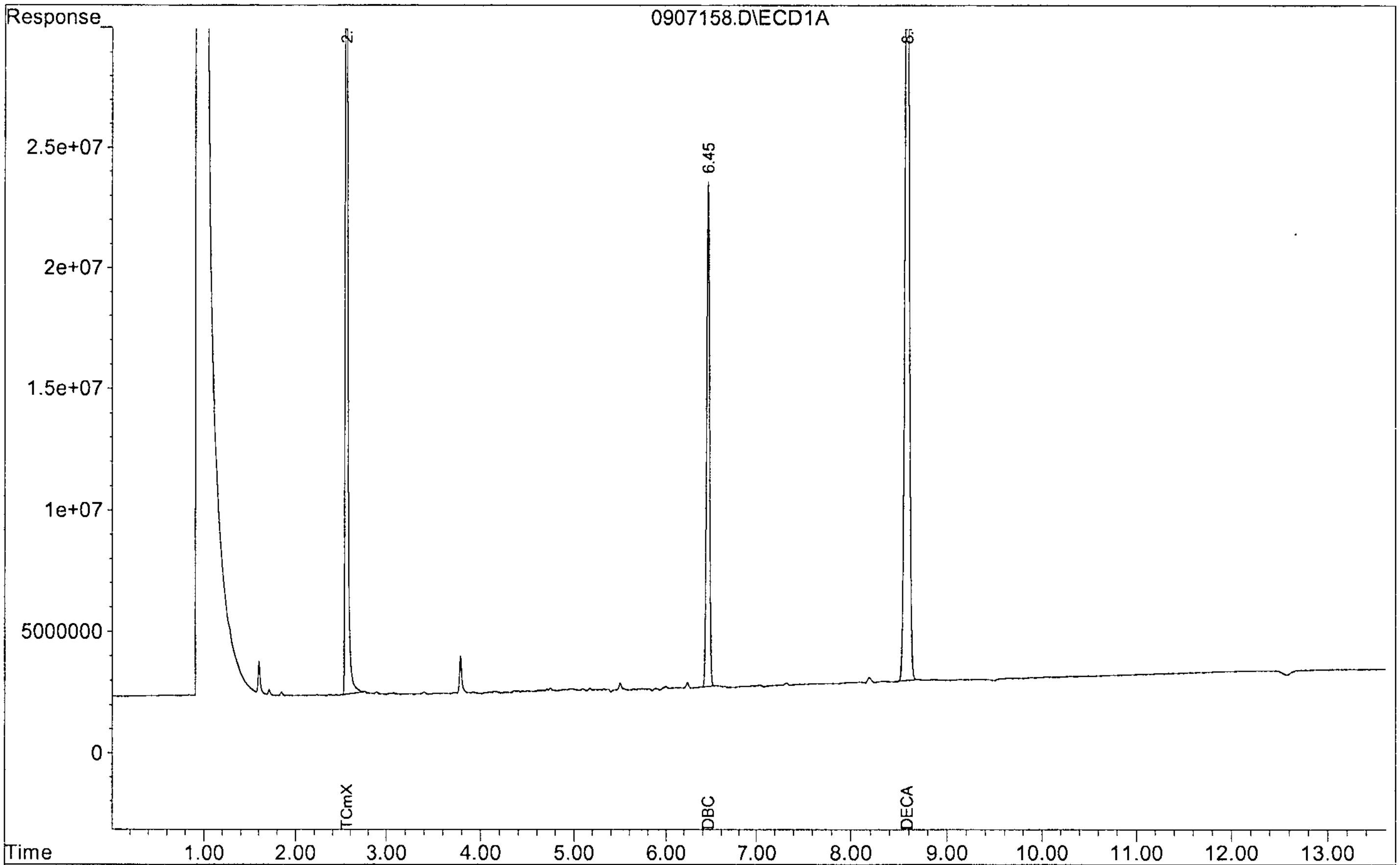
Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

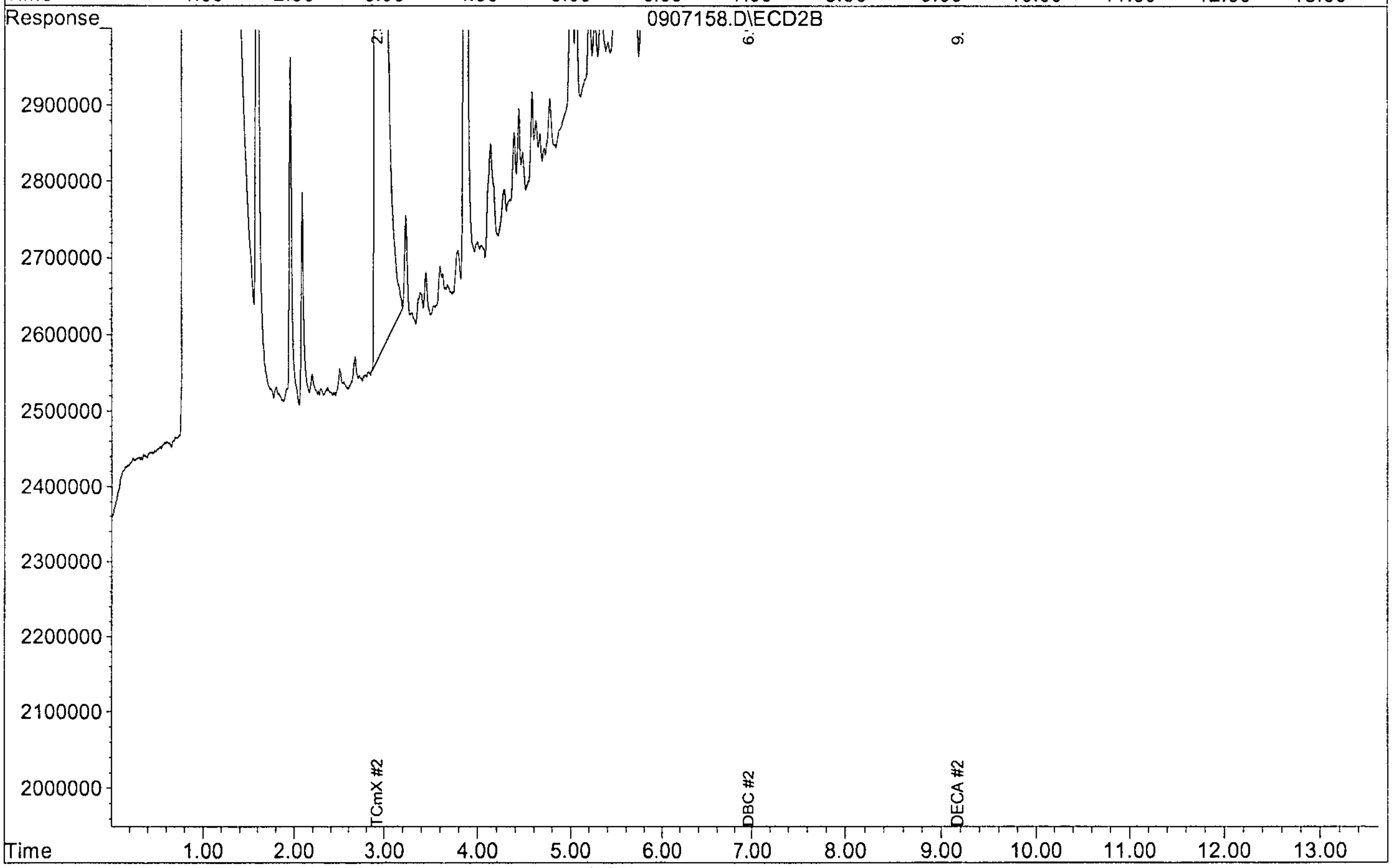
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	58239748	105.6E6	308.320	325.493
Spiked Amount 332.668			Recovery	=	92.68%	97.84%
2) SA DBC	6.46	6.96	20770506	31696524	122.267	156.933 #
Spiked Amount 332.668			Recovery	=	36.75%	47.17%
3) SA DECA	8.58	9.17	36154682	58792673	290.530	311.809
Spiked Amount 332.668			Recovery	=	87.33%	93.73%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907158.D Vial: 58
Acq On : 9-14-18 18:20:27 Operator: MA
Sample : AZ79150S01 5X1/0.05/30.06G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3326.68
Quant Method : G:\LUCY\DATA\180907\PCB0907.M





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907159.D\ECD1A.CH Vial: 59
Signal #2 : G:\LUCY\DATA\180907\0907159.D\ECD2B.CH
Acq On : 9-14-18 18:37:23 Operator: MA
Sample : AZ79151S01 5X1/0.05/30.07G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3325.57
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 10:59 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

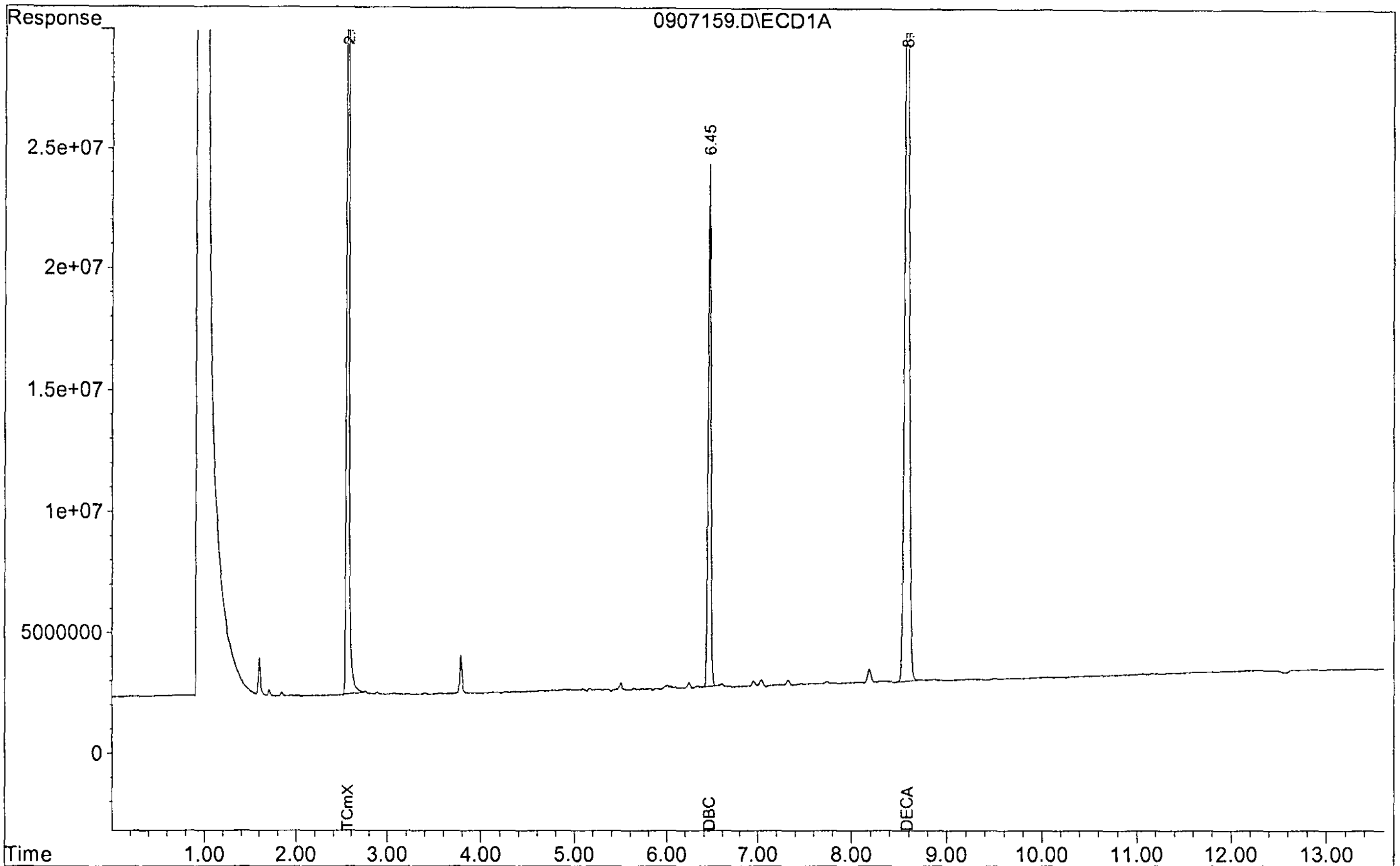
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	61150633	110.0E6	323.622	338.991
Spiked Amount 332.557			Recovery	=	97.31%	101.93%
2) SA DBC	6.46	6.96	21646934	31193474	127.383	154.390
Spiked Amount 332.557			Recovery	=	38.30%	46.43%
3) SA DECA	8.58	9.17	37282986	57733394	299.497	306.089
Spiked Amount 332.557			Recovery	=	90.06%	92.04%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

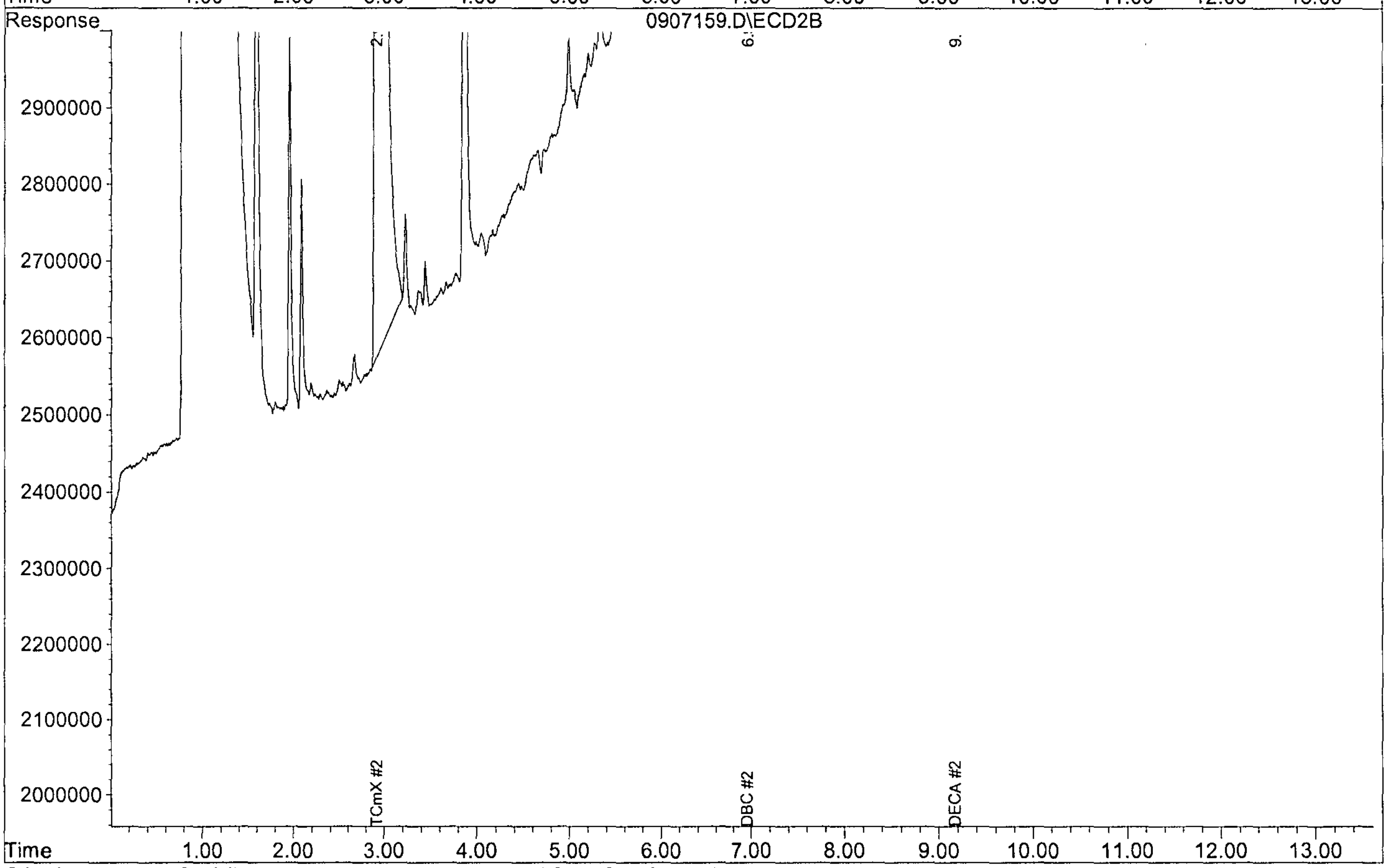
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907159.D
Acq On : 9-14-18 18:37:23
Sample : AZ79151S01 5X1/0.05/30.07G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 59
Operator: MA
Inst : Lucy
Multiplr: 3325.57





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907162.D\ECD1A.CH Vial: 62
Signal #2 : G:\LUCY\DATA\180907\0907162.D\ECD2B.CH
Acq On : 9-14-18 19:28:16 Operator: MA
Sample : AZ79152S01 5X1/0.05/30.22G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3309.07
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 10:59 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

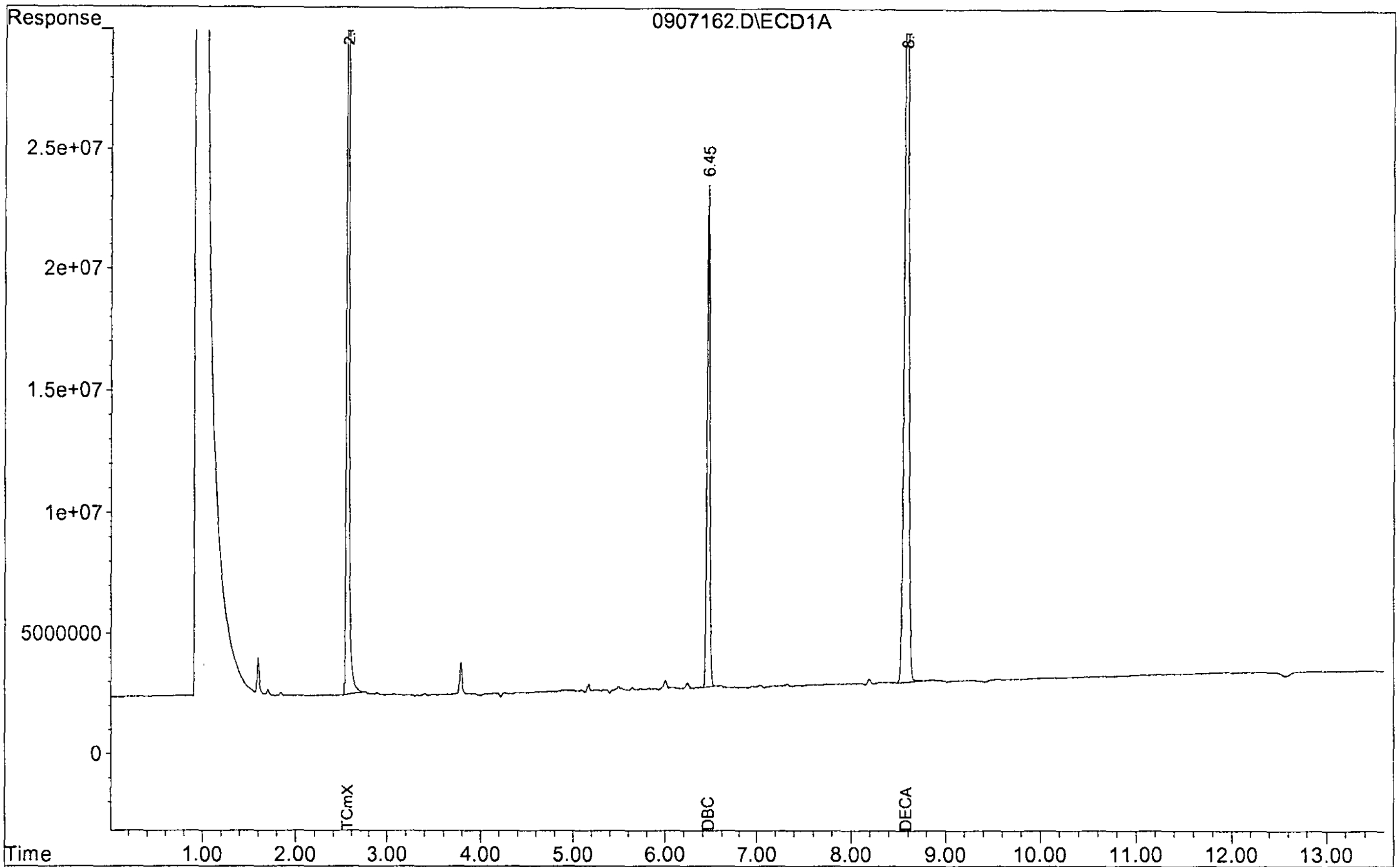
Compound		RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds							
1) SA TCmX		2.55	2.92	58262930	103.8E6	306.810	318.275
Spiked Amount	330.907			Recovery	=	92.72%	96.18%
2) SA DBC		6.45	6.96	20654567	30042051	120.941	147.954
Spiked Amount	330.907			Recovery	=	36.55%	44.71%
3) SA DECA		8.58	9.17	36154472	57150302	288.991	301.494
Spiked Amount	330.907			Recovery	=	87.33%	91.11%
Target Compounds							
Target Compounds							
4) BNMC Total AR1016		0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016		0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}		0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}		0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}		0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}		0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260		0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260		0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}		0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}		0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}		0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}		0.00	0.00	0	0	N.D. d	N.D. d

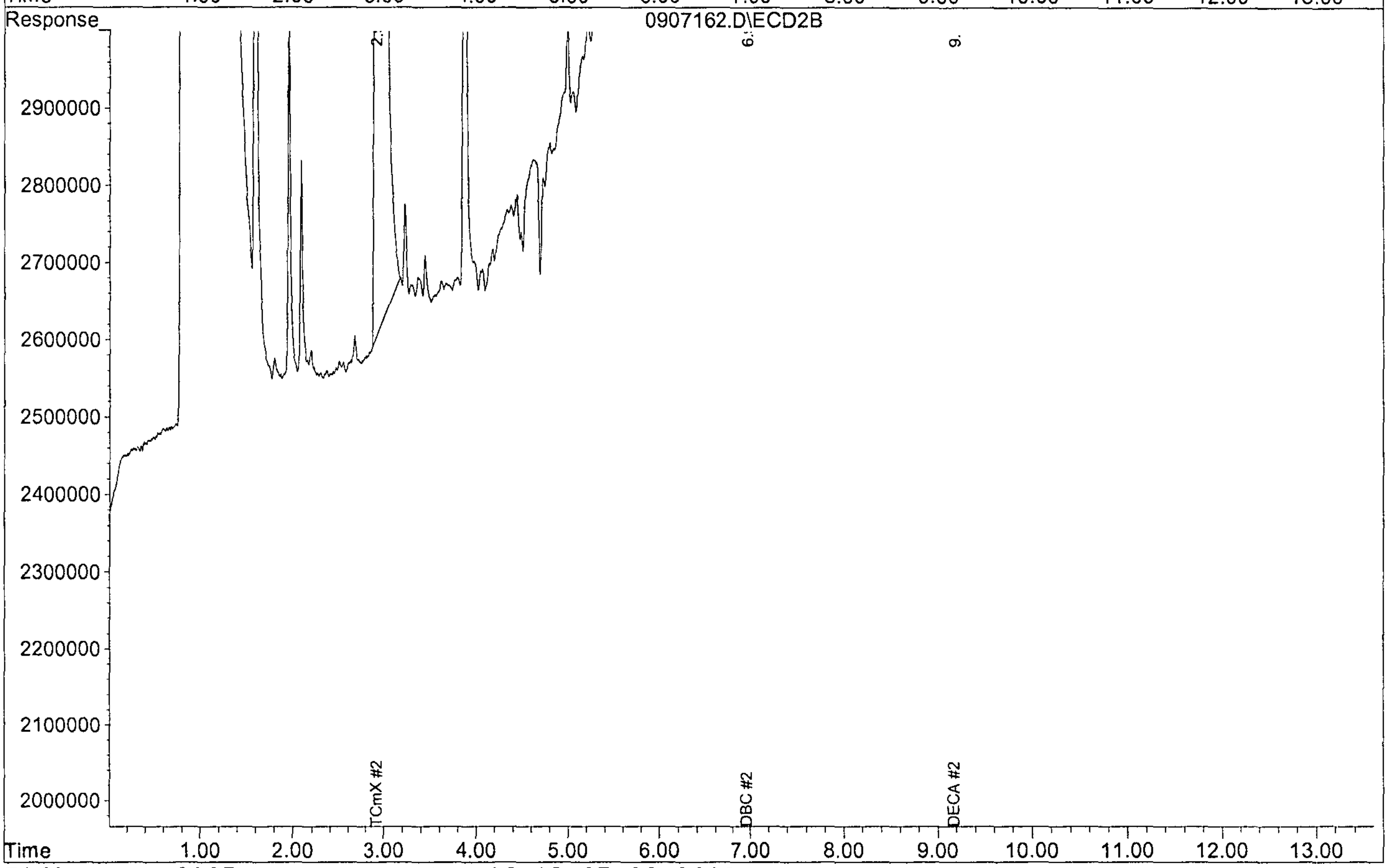
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907162.D
Acq On : 9-14-18 19:28:16
Sample : AZ79152S01 5X1/0.05/30.22G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 62
Operator: MA
Inst : Lucy
Multiplr: 3309.07





Quantitation Report (QT Reviewed)

```
Signal #1 : G:\LUCY\DATA\180907\0907165.D\ECD1A.CH        Vial: 65
Signal #2 : G:\LUCY\DATA\180907\0907165.D\ECD2B.CH
Acq On    : 9-14-18 20:19:07                           Operator: MA
Sample    : AZ79153S01 5X1/0.05/30.49G DF10 AC         Inst    : Lucy
Misc      : soil                                       Multiplr: 3279.76
IntFile Signal #1: events.e     IntFile Signal #2: events2.e
Quant Time: Sep 17 11:00 2018  Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.     : 2uL
Signal #1 Phase : DB-35MS           Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32              Signal #2 Info : 0.32
```

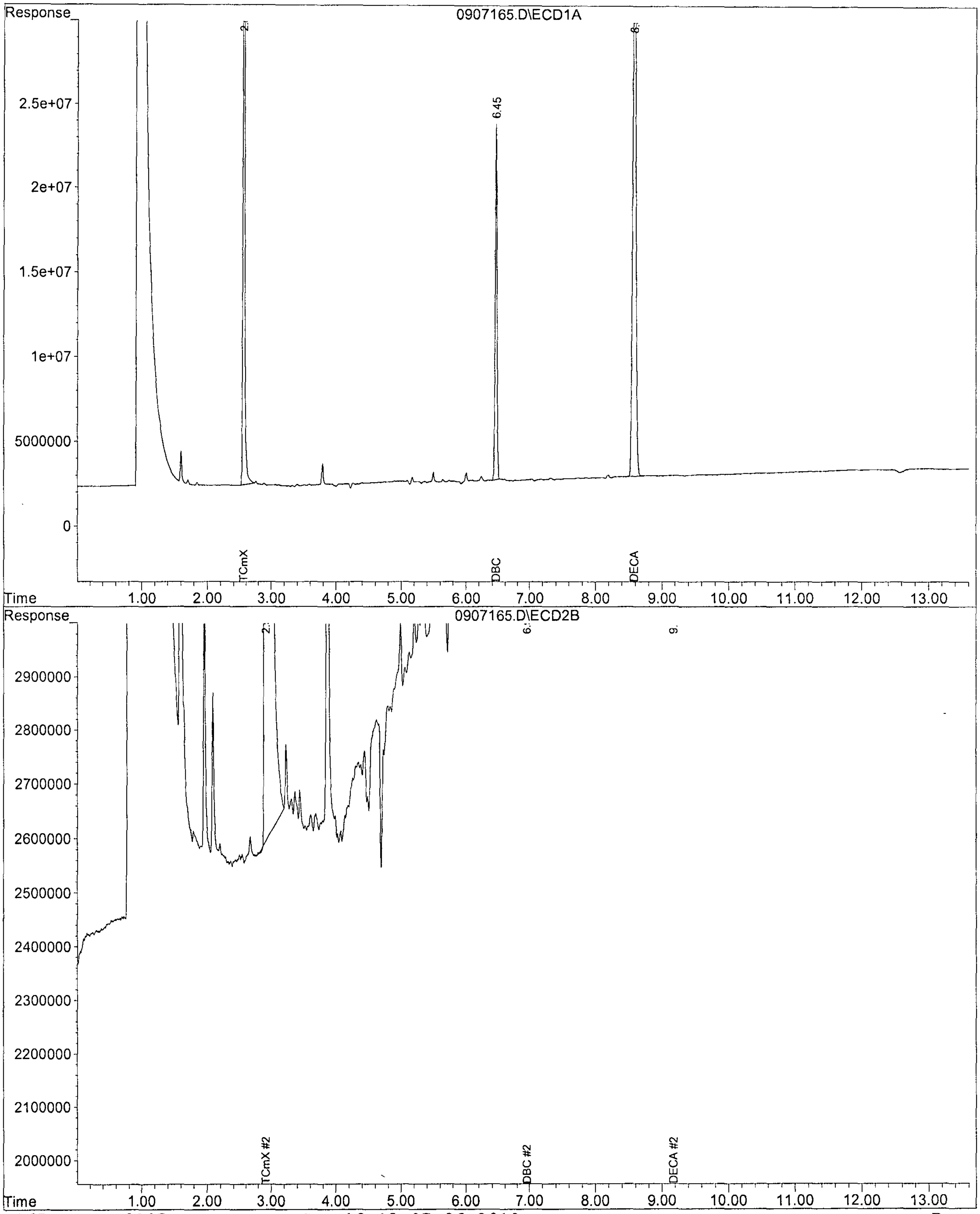
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.55	2.92	62946551	113.3E6	328.538	344.425
Spiked Amount 327.976			Recovery	=	100.17%	105.02%
2) SA DBC	6.46	6.96	21018213	32879337	121.980	160.493 #
Spiked Amount 327.976			Recovery	=	37.19%	48.93%
3) SA DECA	8.58	9.18	38570085	55977987	305.568	292.694
Spiked Amount 327.976			Recovery	=	93.17%	89.24%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907165.D
Acq On : 9-14-18 20:19:07
Sample : AZ79153S01 5X1/0.05/30.49G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 65
Operator: MA
Inst : Lucy
Multiplr: 3279.76



Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907166.D\ECD1A.CH Vial: 66
Signal #2 : G:\LUCY\DATA\180907\0907166.D\ECD2B.CH
Acq On : 9-14-18 20:36:03 Operator: MA
Sample : AZ79154S01 5X1/0.05/30.94G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3232.06
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 11:00 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

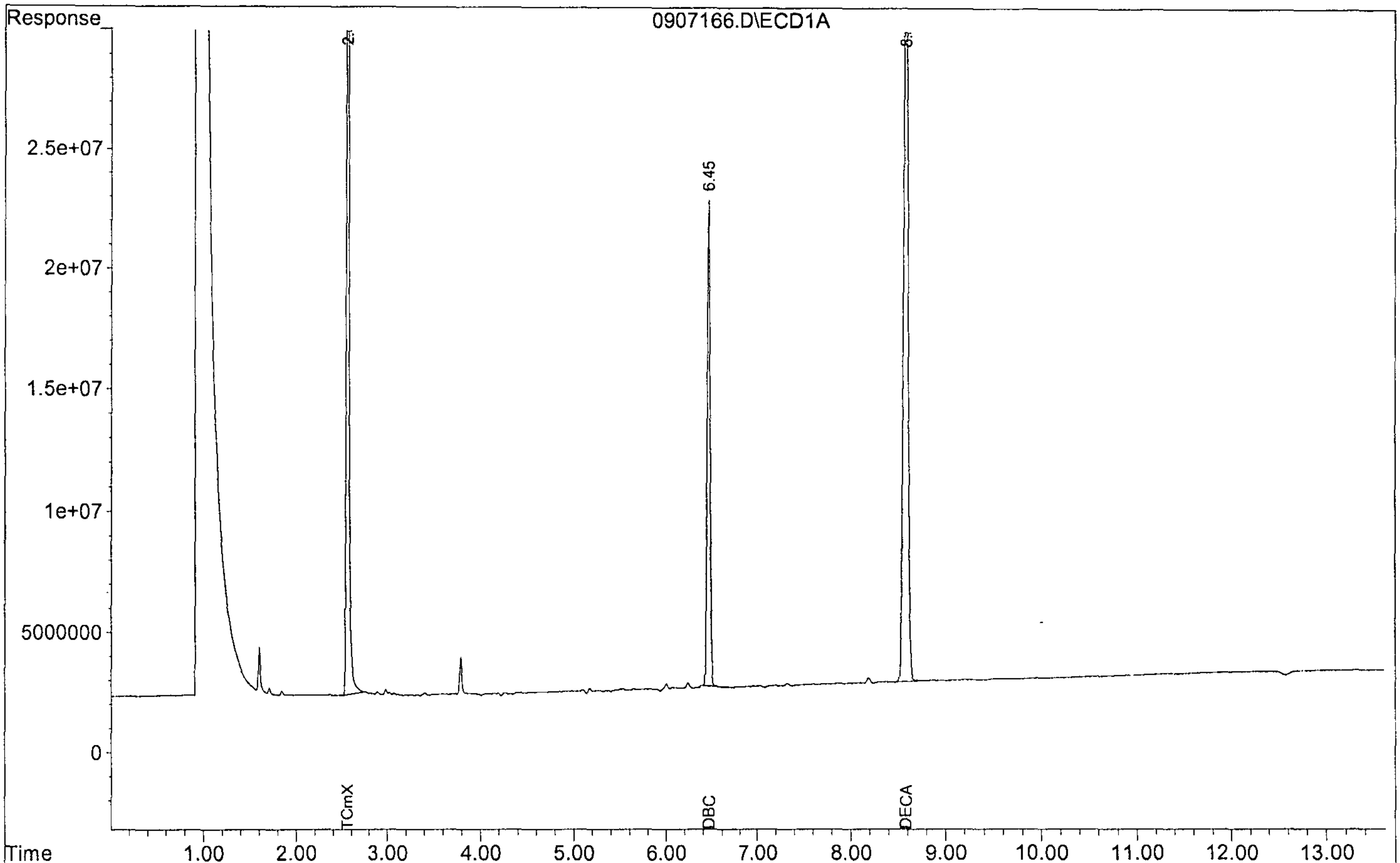
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.55	2.92	65397110	117.5E6	336.364	351.897
Spiked Amount 323.206			Recovery =		104.07%	108.88%
2) SA DBC	6.46	6.96	20118515	30281997	115.060	145.665 #
Spiked Amount 323.206			Recovery =		35.60%	45.07%
3) SA DECA	8.58	9.17	35376627	59150331	276.192	304.783
Spiked Amount 323.206			Recovery =		85.45%	94.30%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

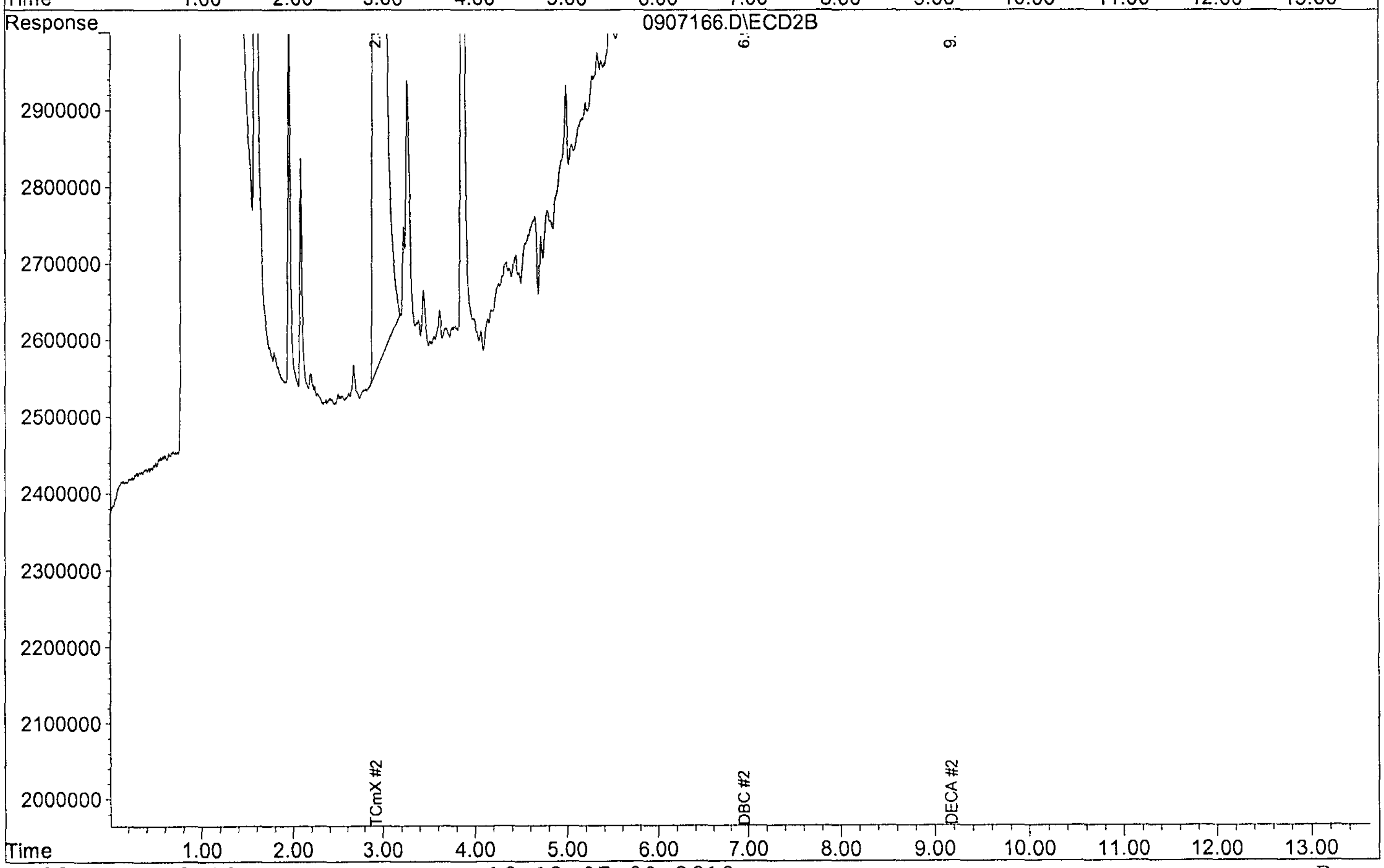
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907166.D
Acq On : 9-14-18 20:36:03
Sample : AZ79154S01 5X1/0.05/30.94G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 66
Operator: MA
Inst : Lucy
Multiplr: 3232.06





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907167.D\ECD1A.CH Vial: 67
Signal #2 : G:\LUCY\DATA\180907\0907167.D\ECD2B.CH
Acq On : 9-14-18 20:52:58 Operator: MA
Sample : AZ79155S01 5X1/0.05/30.74G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3253.09
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 11:00 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

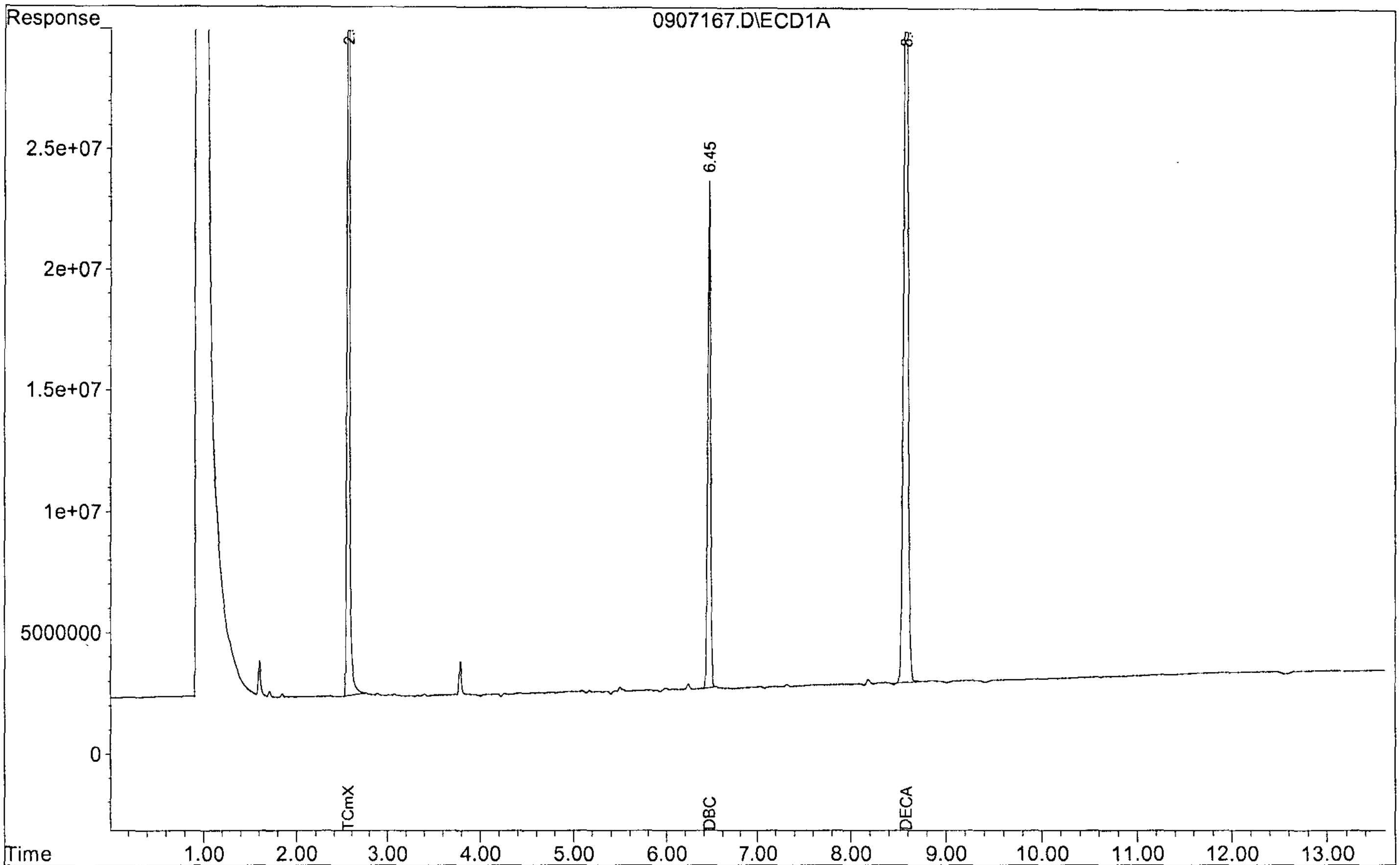
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	58852010	109.3E6	304.669	329.472
Spiked Amount 325.309			Recovery	=	93.66%	101.28%
2) SA DBC	6.46	6.96	20972193	30273361	120.723	146.571
Spiked Amount 325.309			Recovery	=	37.11%	45.06%
3) SA DECA	8.58	9.17	36997804	57208057	290.729	296.693
Spiked Amount 325.309			Recovery	=	89.37%	91.20%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

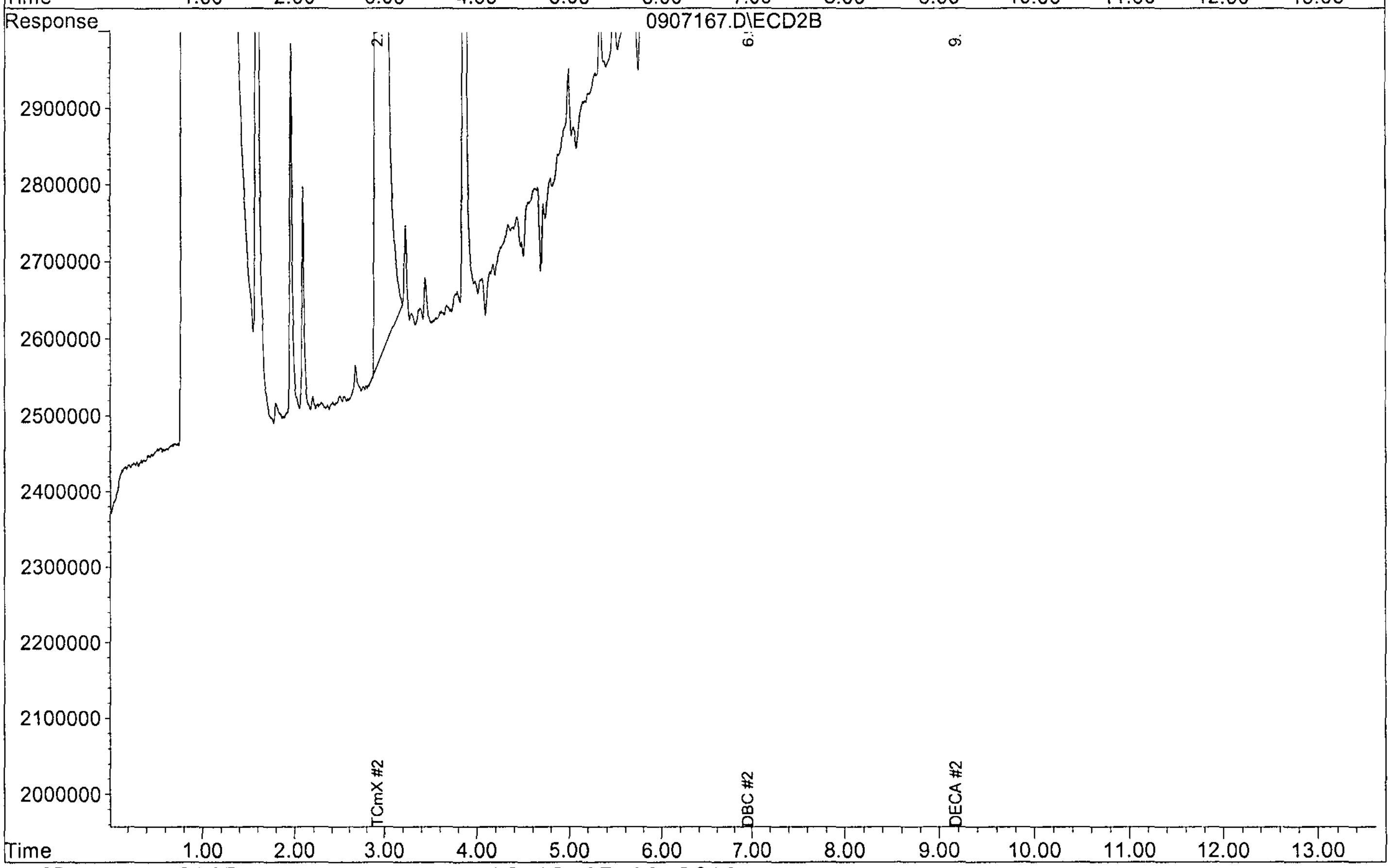
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907167.D
Acq On : 9-14-18 20:52:58
Sample : AZ79155S01 5X1/0.05/30.74G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 67
Operator: MA
Inst : Lucy
Multiplr: 3253.09





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907168.D\ECD1A.CH Vial: 68
Signal #2 : G:\LUCY\DATA\180907\0907168.D\ECD2B.CH
Acq On : 9-14-18 21:10:00 Operator: MA
Sample : AZ79156S01 5X1/0.05/30.72G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3255.21
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 11:00 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

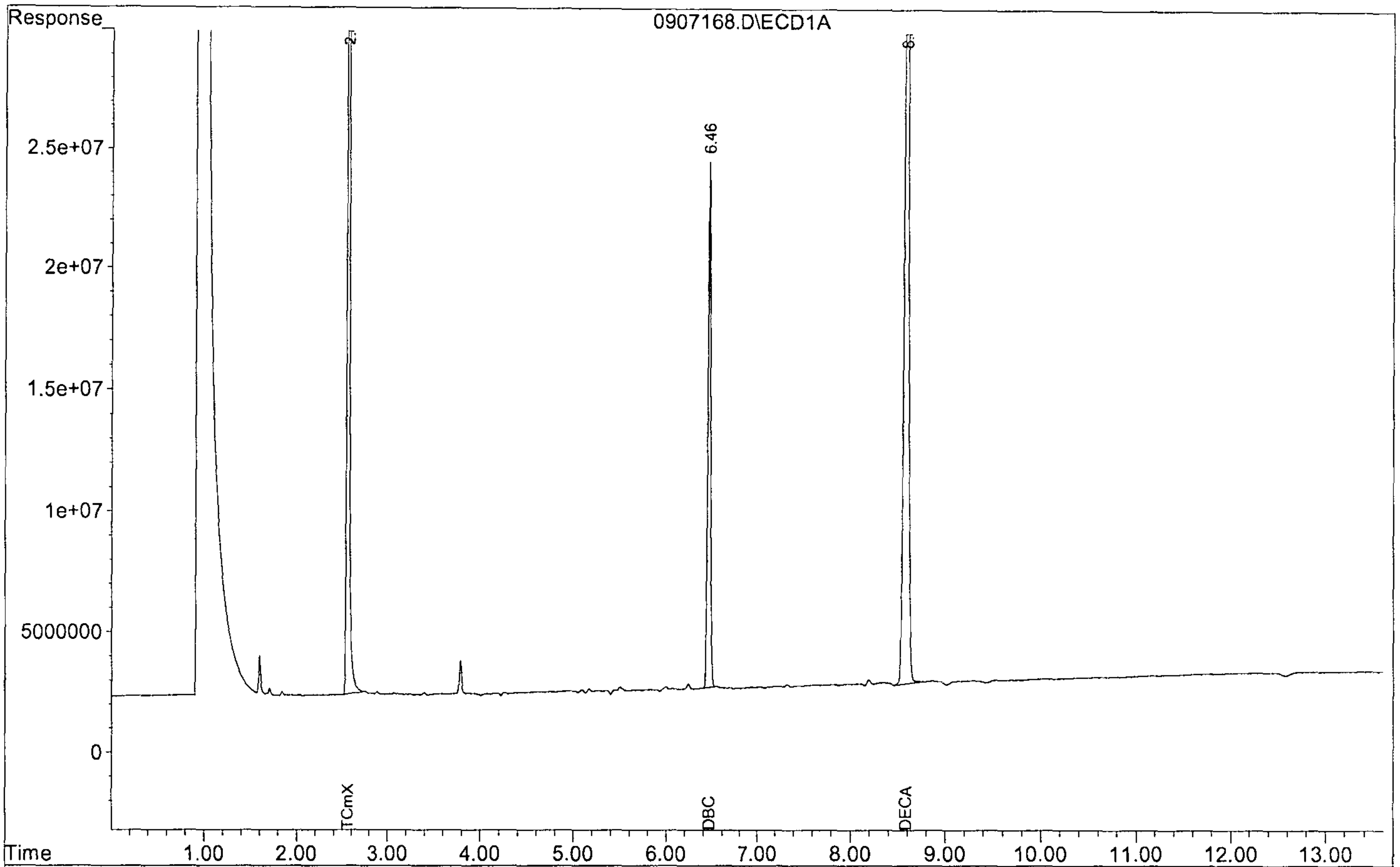
Compound		RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds							
1) SA TCmX		2.56	2.92	69116774	125.0E6	358.042	377.085
Spiked Amount	325.521			Recovery	=	109.99%	115.84%
2) SA DBC		6.46	6.96	21807652	33311964	125.614	161.387 #
Spiked Amount	325.521			Recovery	=	38.59%	49.58%
3) SA DECA		8.58	9.17	37280510	62176620	293.141	322.671
Spiked Amount	325.521			Recovery	=	90.05%	99.12%
Target Compounds							
Target Compounds							
4) BNMC Total AR1016		0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016		0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}		0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}		0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}		0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}		0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260		0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260		0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}		0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}		0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}		0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}		0.00	0.00	0	0	N.D. d	N.D. d

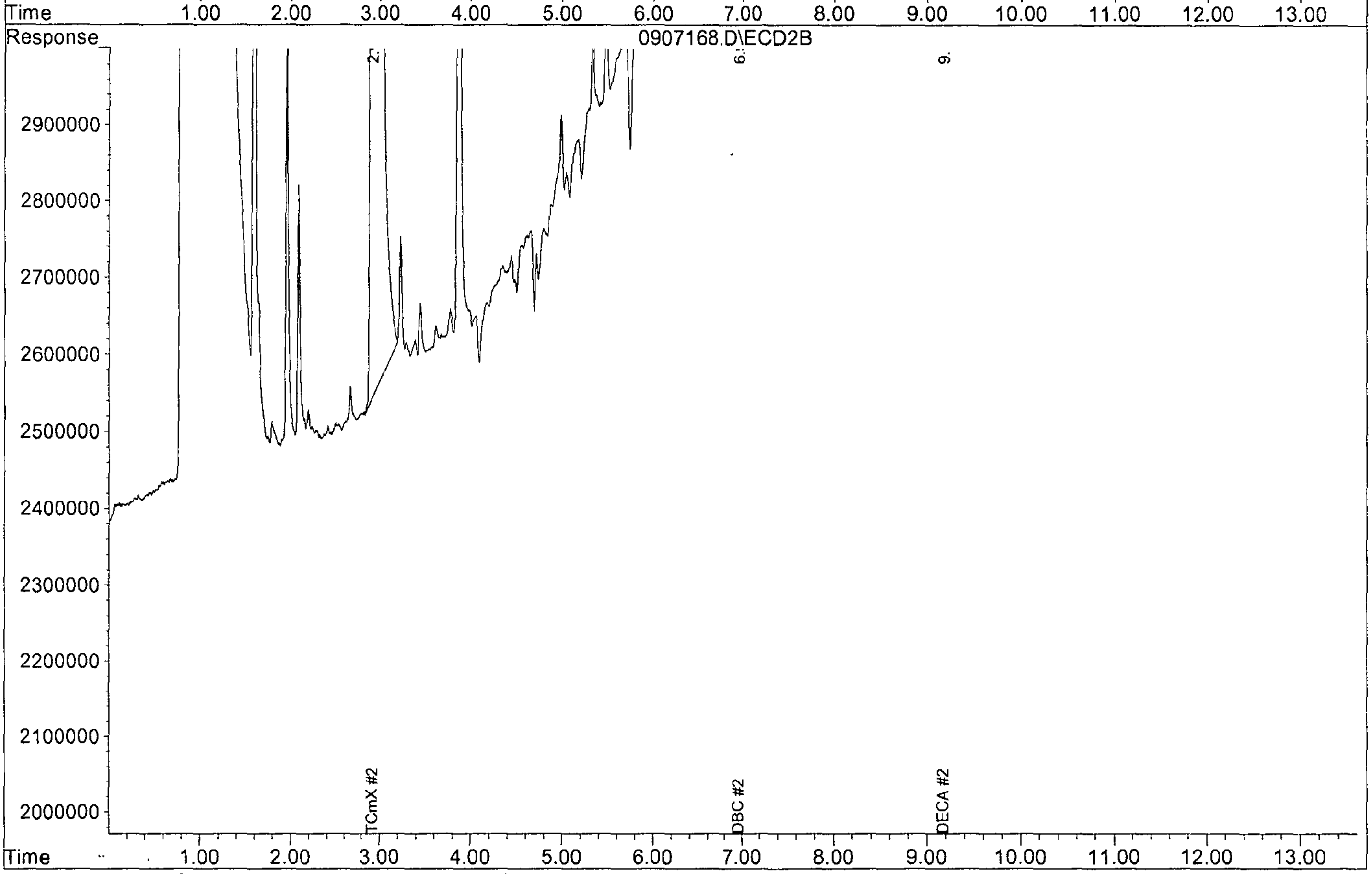
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907168.D
Acq On : 9-14-18 21:10:00
Sample : AZ79156S01 5X1/0.05/30.72G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 68
Operator: MA
Inst : Lucy
Multiplr: 3255.21





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907169.D\ECD1A.CH Vial: 69
Signal #2 : G:\LUCY\DATA\180907\0907169.D\ECD2B.CH
Acq On : 9-14-18 21:26:56 Operator: MA
Sample : AZ79157S01 5X1/0.05/30.63G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3264.77
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 11:00 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

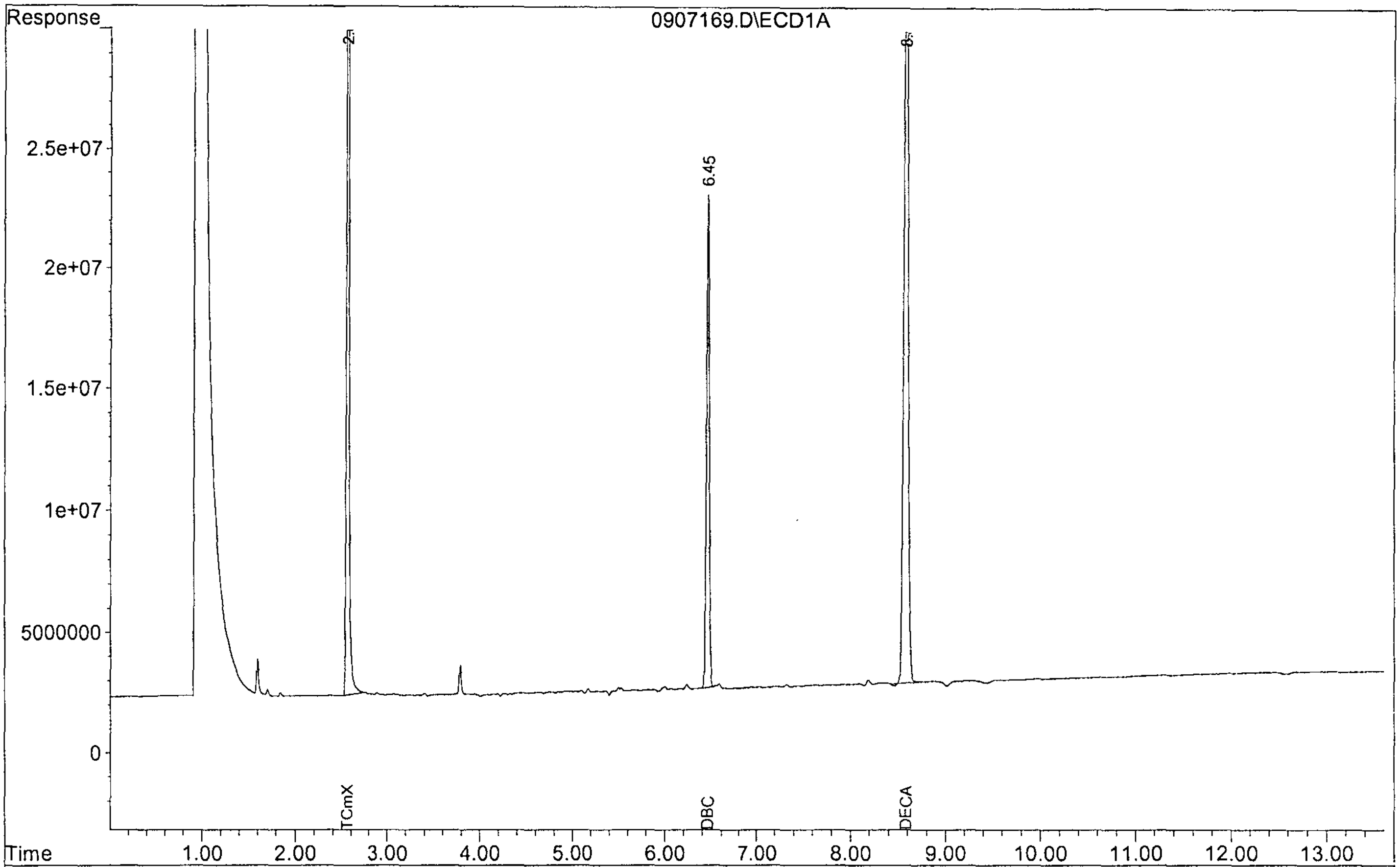
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.55	2.92	60946117	109.7E6	316.643	332.117
Spiked Amount 326.477			Recovery	=	96.99%	101.73%
2) SA DBC	6.46	6.96	20281015	29102784	117.163	141.409
Spiked Amount 326.477			Recovery	=	35.89%	43.31%
3) SA DECA	8.58	9.17	38221591	57678947	301.424	300.209
Spiked Amount 326.477			Recovery	=	92.33%	91.95%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

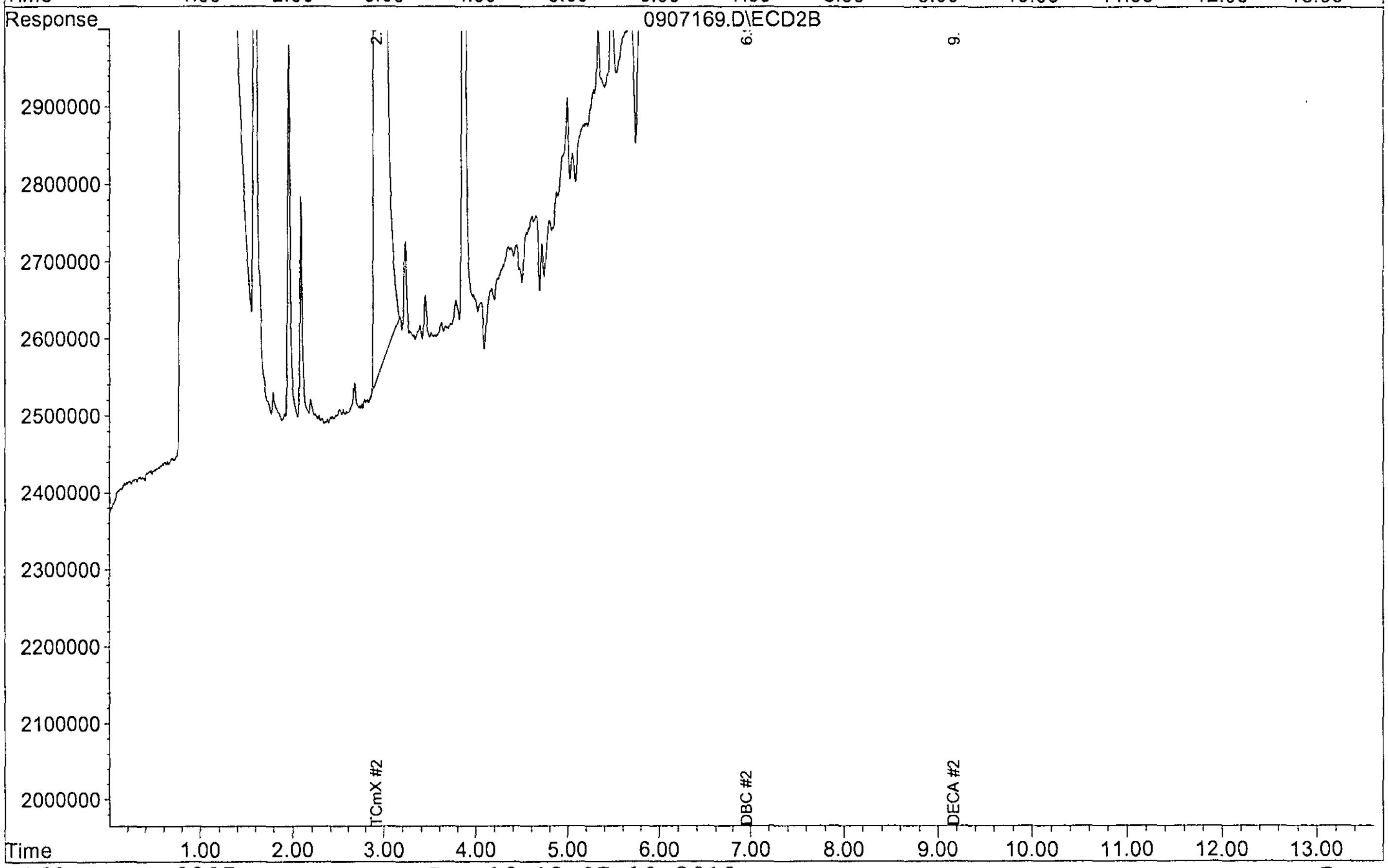
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907169.D
Acq On : 9-14-18 21:26:56
Sample : AZ79157S01 5X1/0.05/30.63G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 69
Operator: MA
Inst : Lucy
Multiplr: 3264.77





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907170.D\ECD1A.CH Vial: 70
Signal #2 : G:\LUCY\DATA\180907\0907170.D\ECD2B.CH
Acq On : 9-14-18 21:43:53 Operator: MA
Sample : AZ79158S01 5X1/0.05/30.30G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3300.33
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 11:01 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

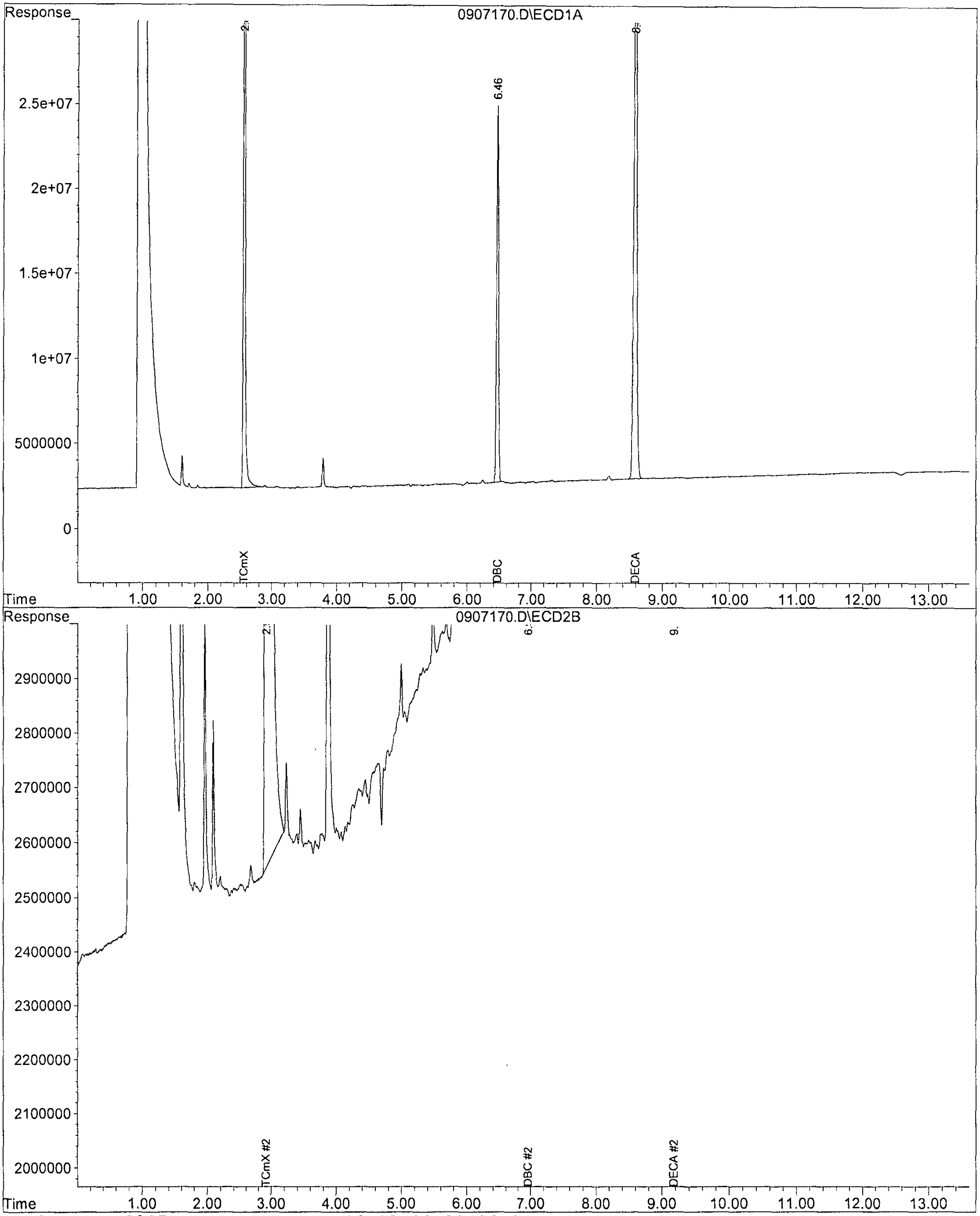
Compound		RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds							
1) SA TCmX		2.55	2.92	66171288	119.5E6	347.535	365.640
Spiked Amount	330.033			Recovery	=	105.30%	110.79%
2) SA DBC		6.46	6.96	22212581	33802092	129.720	166.032 #
Spiked Amount	330.033			Recovery	=	39.31%	50.31%
3) SA DECA		8.59	9.18	38379564	60884319	305.966	320.344
Spiked Amount	330.033			Recovery	=	92.71%	97.06%
Target Compounds							
Target Compounds							
4) BNMC Total AR1016		0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016		0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}		0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}		0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}		0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}		0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260		0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260		0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}		0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}		0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}		0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}		0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907170.D
Acq On : 9-14-18 21:43:53
Sample : AZ79158S01 5X1/0.05/30.30G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 70
Operator: MA
Inst : Lucy
Multiplr: 3300.33



Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907171.D\ECD1A.CH Vial: 71
Acq On : 9-14-18 22:00:46 Operator: MA
Sample : AZ79159S01 5X1/0.05/30.22G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3309.07
IntFile : events.e

Data File : G:\LUCY\DATA\180907\0907171.D\ECD2B.CH Vial: 71
Acq On : 9-14-18 22:00:47 Operator: MA
Sample : AZ79159S01 5X1/0.05/30.22G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3309.07
IntFile : events2.e
Quant Time: Sep 17 11:01 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

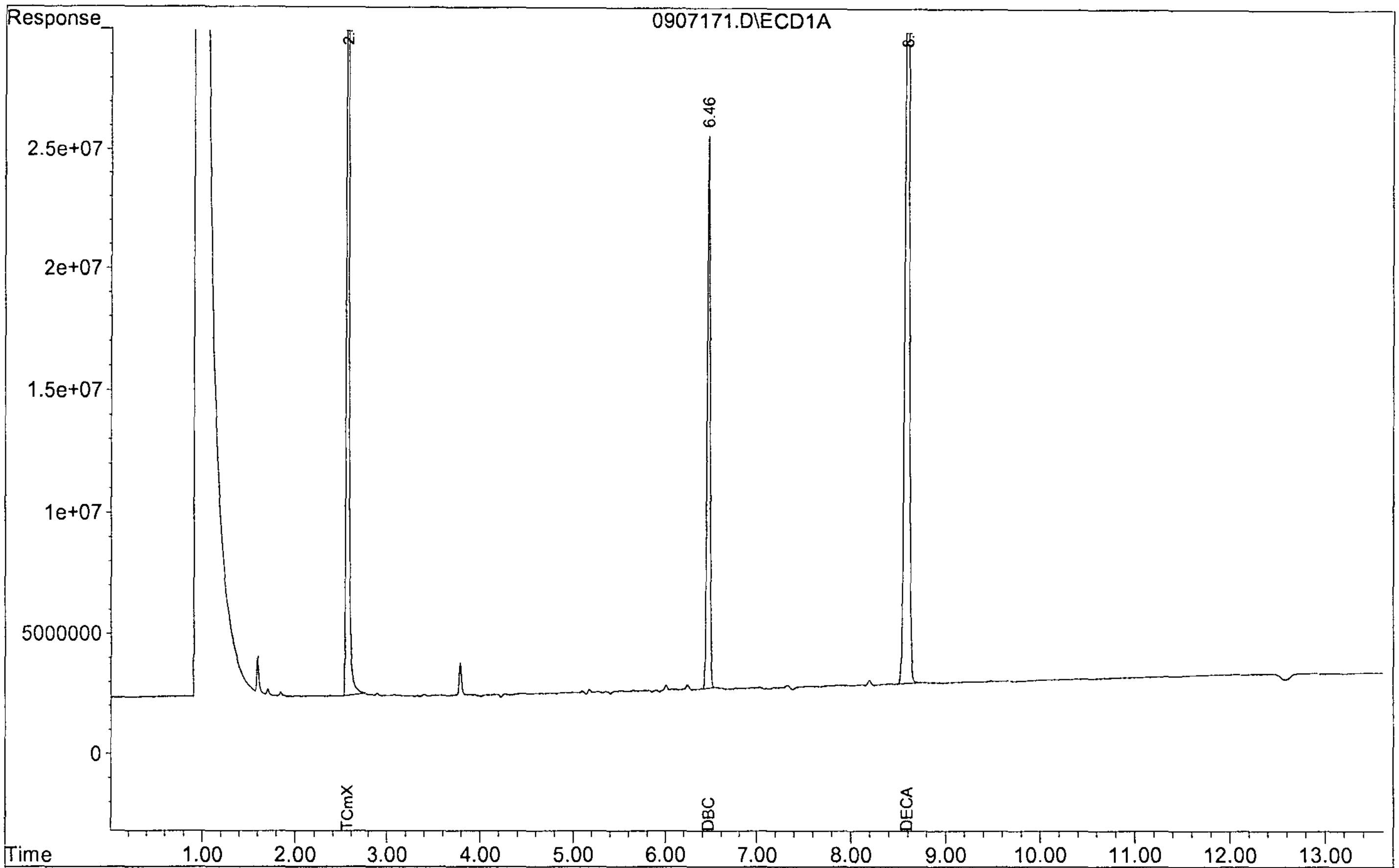
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.55	2.92	63663944	115.2E6	335.252	353.393
Spiked Amount 330.907			Recovery	=	101.31%	106.80%
2) SA DBC	6.46	6.96	22819782	34054559	133.619	167.715 #
Spiked Amount 330.907			Recovery	=	40.38%	50.68%
3) SA DECA	8.59	9.17	37743241	57069585	301.690	301.068
Spiked Amount 330.907			Recovery	=	91.17%	90.98%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

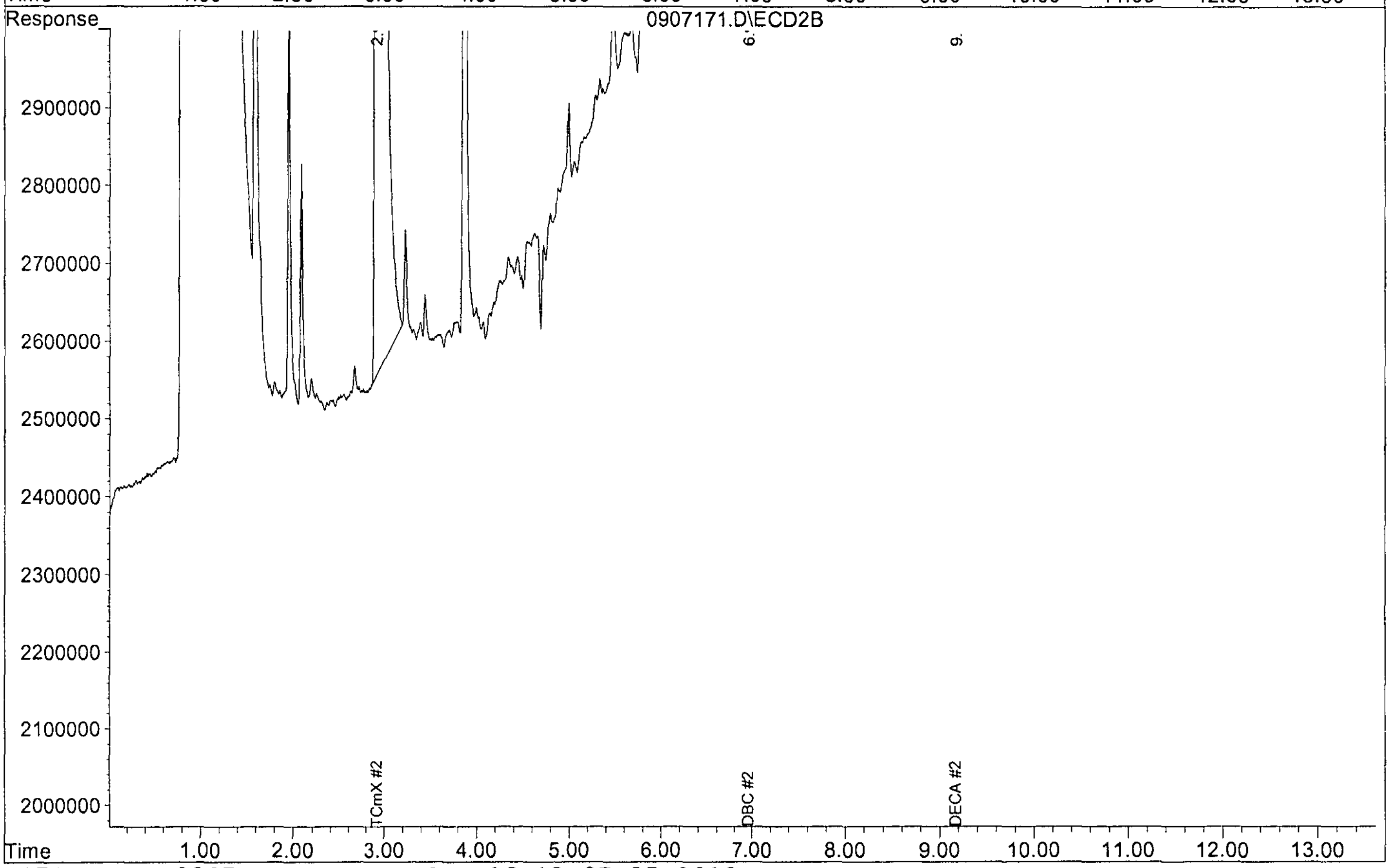
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907171.D
Acq On : 9-14-18 22:00:46
Sample : AZ79159S01 5X1/0.05/30.22G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 71
Operator: MA
Inst : Lucy
Multiplr: 3309.07





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907172.D\ECD1A.CH Vial: 72
Signal #2 : G:\LUCY\DATA\180907\0907172.D\ECD2B.CH
Acq On : 9-14-18 22:17:48 Operator: MA
Sample : AZ79160S01 5X1/0.05/30.69G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3258.39
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 11:01 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

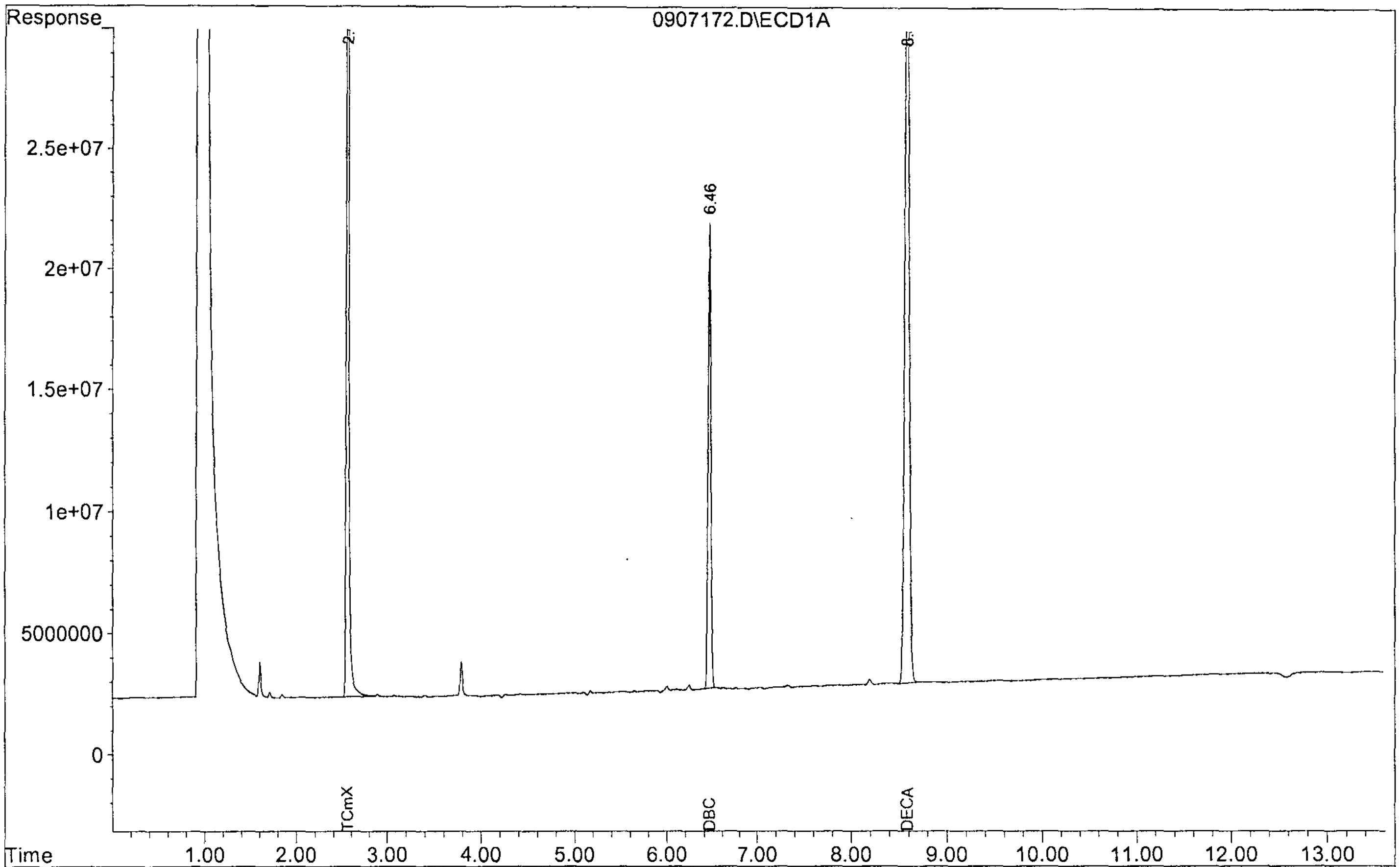
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	58534786	105.7E6	303.521	319.266
Spiked Amount 325.839			Recovery	=	93.15%	97.98%
2) SA DBC	6.46	6.96	19190212	29875645	110.645	144.881 #
Spiked Amount 325.839			Recovery	=	33.96%	44.46%
3) SA DECA	8.58	9.18	35765791	54926055	281.505	285.322
Spiked Amount 325.839			Recovery	=	86.39%	87.57%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

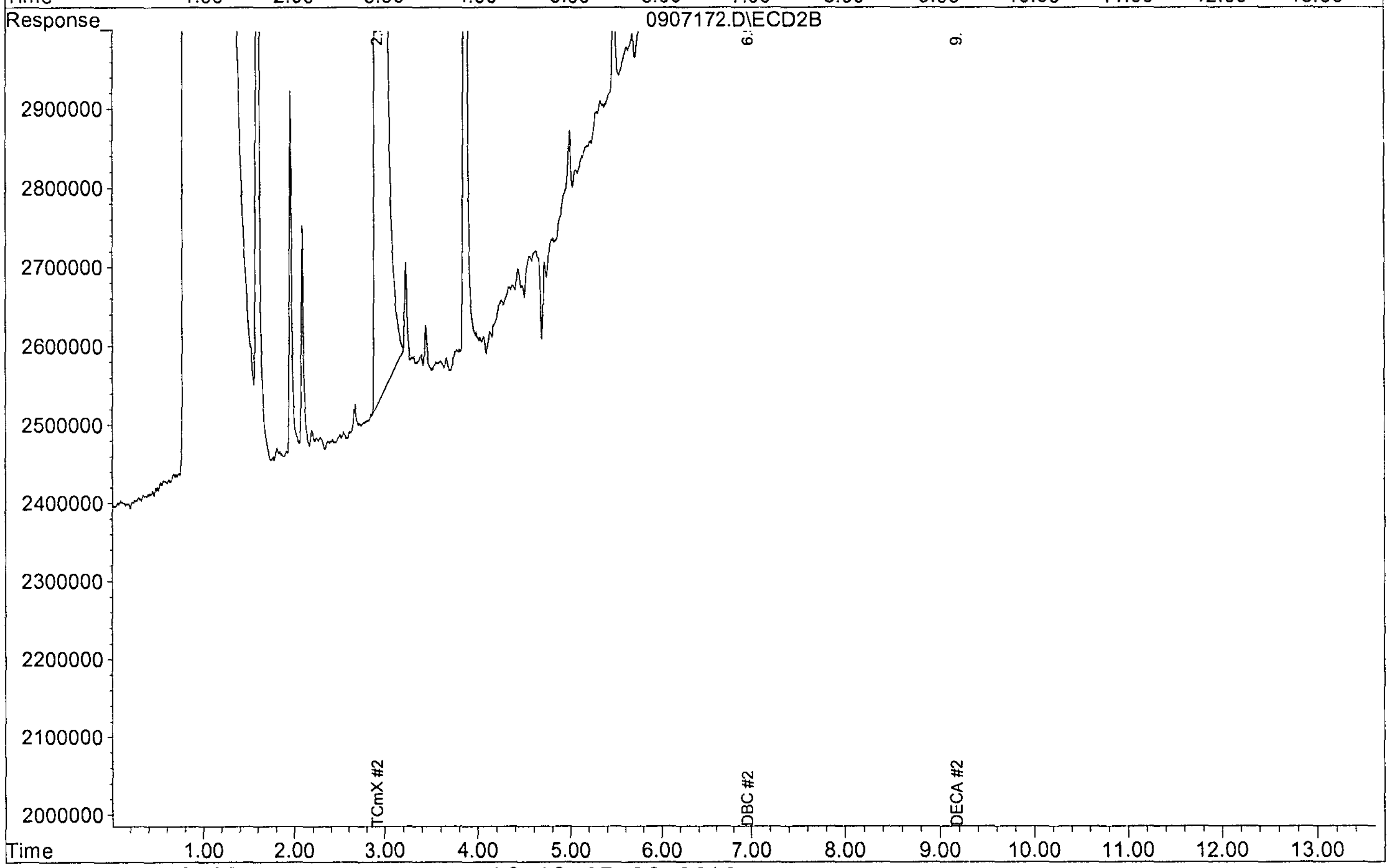
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907172.D
Acq On : 9-14-18 22:17:48
Sample : AZ79160S01 5X1/0.05/30.69G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 72
Operator: MA
Inst : Lucy
Multiplr: 3258.39





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907055.D\ECD1A.CH Vial: 55
Signal #2 : G:\LUCY\DATA\180907\0907055.D\ECD2B.CH
Acq On : 9-11-18 17:05:53 Operator: MA
Sample : AZ79179W06 1/490 DF5 Inst : Lucy
Misc : water Multiplr: 10.20
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 12 10:21 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

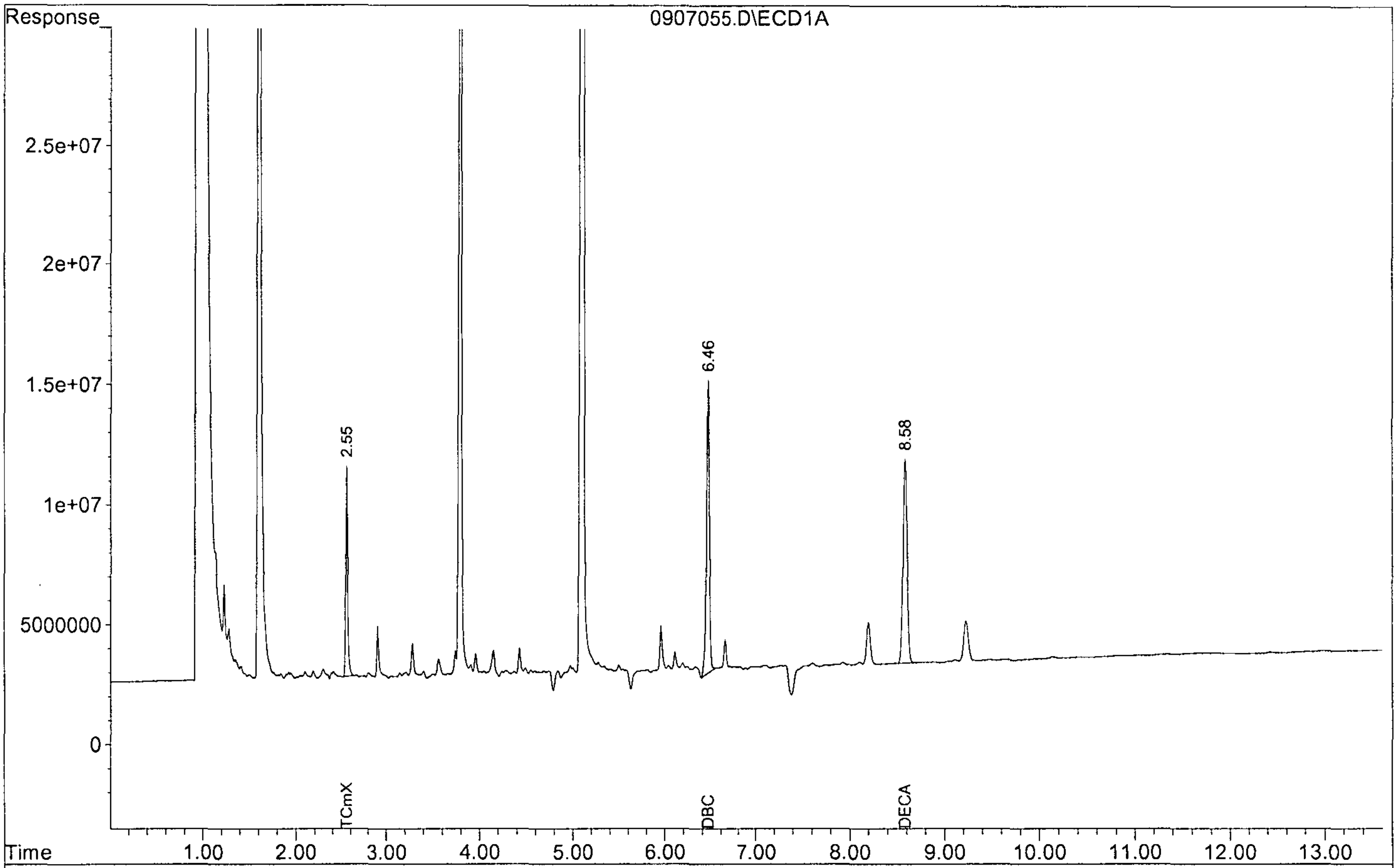
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	8736557	15362804	0.142	0.145
Spiked Amount 0.306			Recovery	=	46.39%	47.37%
2) SA DBC	6.46	6.96	12171526	17451425	0.220	0.265
Spiked Amount 0.306			Recovery	=	71.87%	86.57%
3) SA DECA	8.58	9.17	8493794	13583466	0.209	0.221
Spiked Amount 0.306			Recovery	=	68.27%	72.19%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

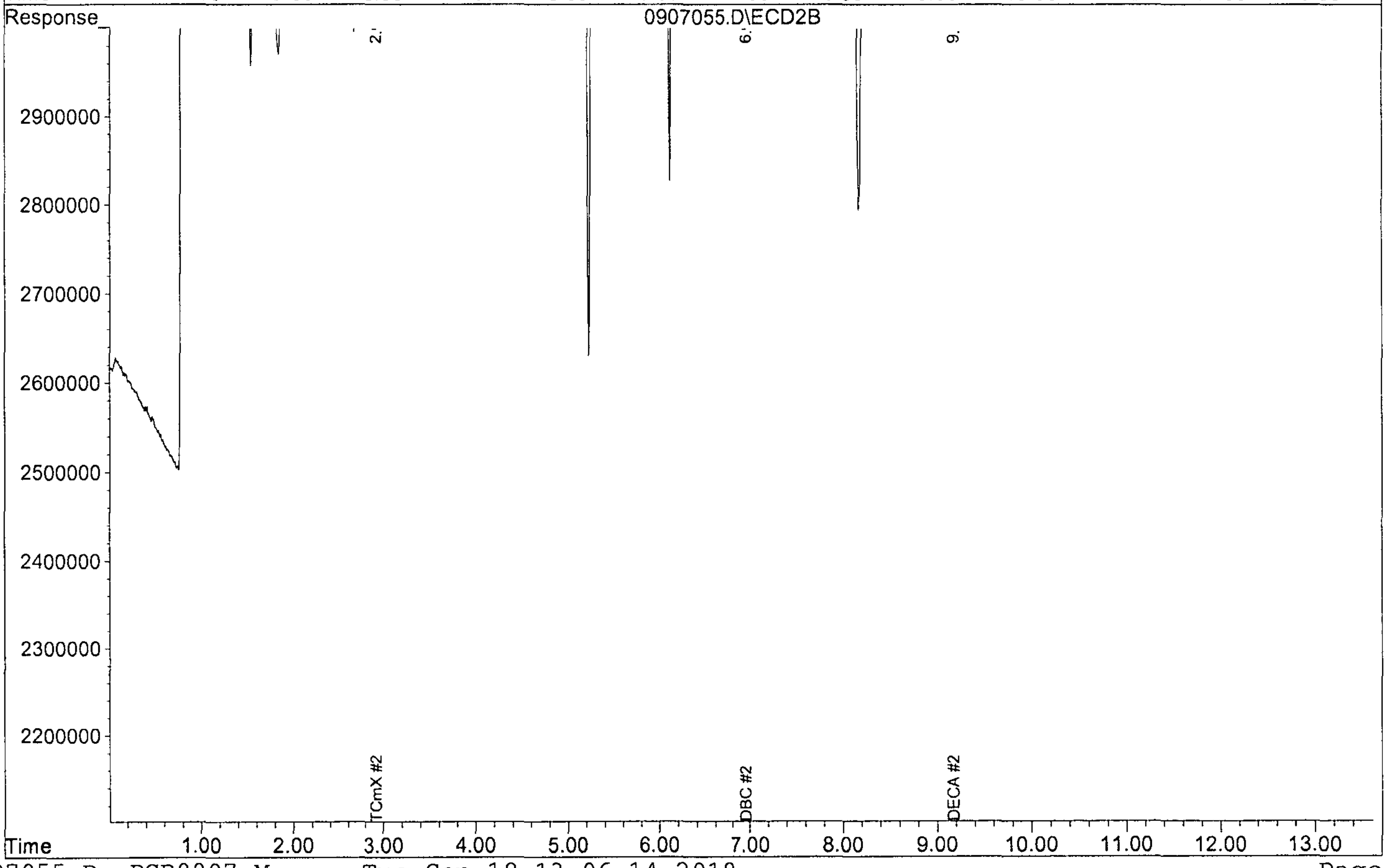
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907055.D
Acq On : 9-11-18 17:05:53
Sample : AZ79179W06 1/490 DF5
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 55
Operator: MA
Inst : Lucy
Multiplr: 10.20





Quantitation Report (QT Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907052.D\ECD1A.CH Vial: 52
Signal #2 : G:\LUCY\DATA\180907\0907052.D\ECD2B.CH
Acq On : 9-11-18 16:15:08 Operator: MA
Sample : 180907B BLK 1/500 DF5 Inst : Lucy
Misc : water Multiplr: 10.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 11 16:54 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

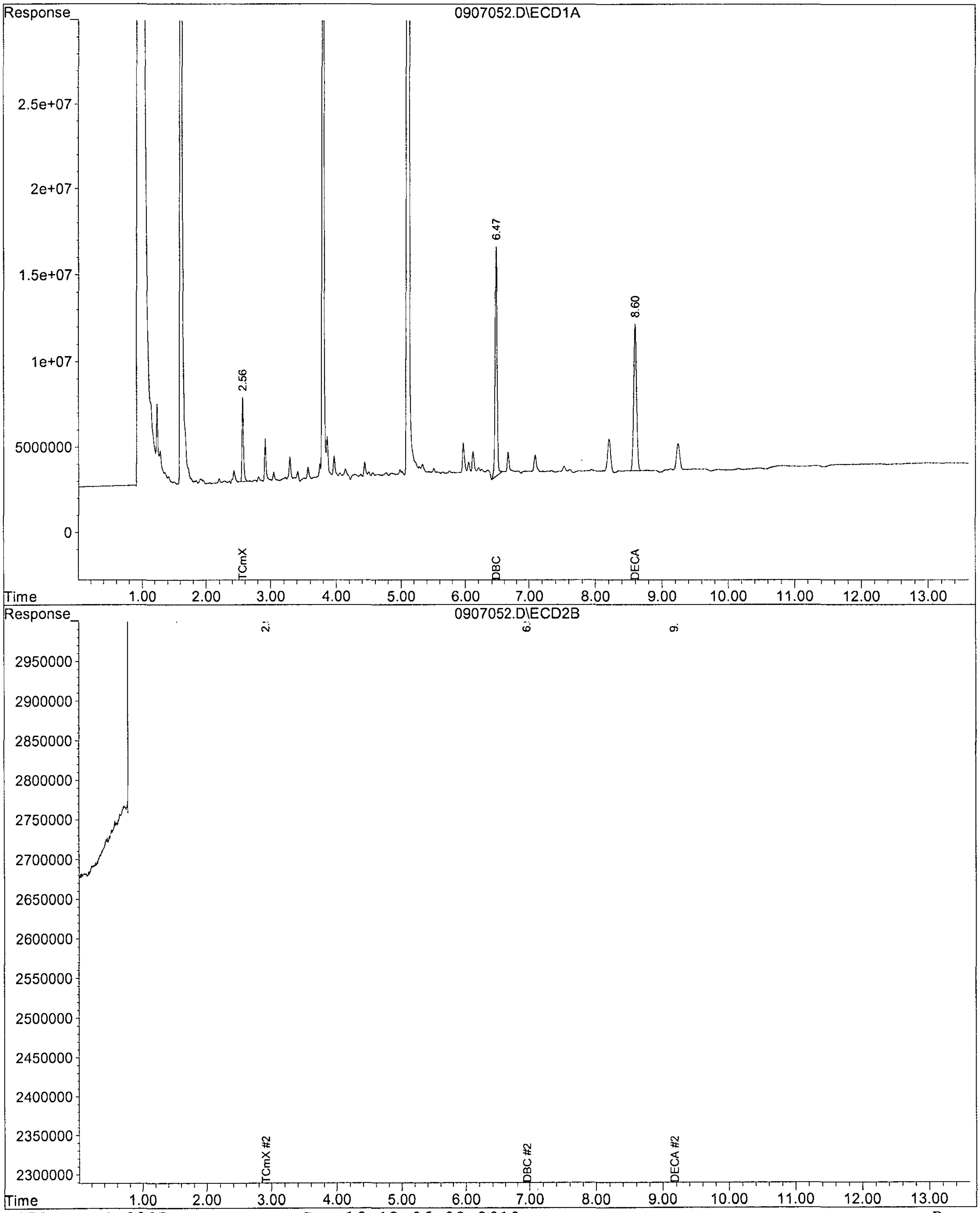
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	4910688	8248138	0.078	0.076
Spiked Amount 0.300			Recovery	=	26.00%	25.33%
2) SA DBC	6.47	6.96	13326063	19217212	0.236	0.286
Spiked Amount 0.300			Recovery	=	78.67%	95.33%
3) SA DECA	8.60	9.18	8577990	13001832	0.207	0.207
Spiked Amount 0.300			Recovery	=	69.00%	69.00%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (QT Reviewed)

Data File : G:\LUCY\DATA\180907\0907052.D
Acq On : 9-11-18 16:15:08
Sample : 180907B BLK 1/500 DF5
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 52
Operator: MA
Inst : Lucy
Multiplr: 10.00



Quantitation Report (QT Reviewed)

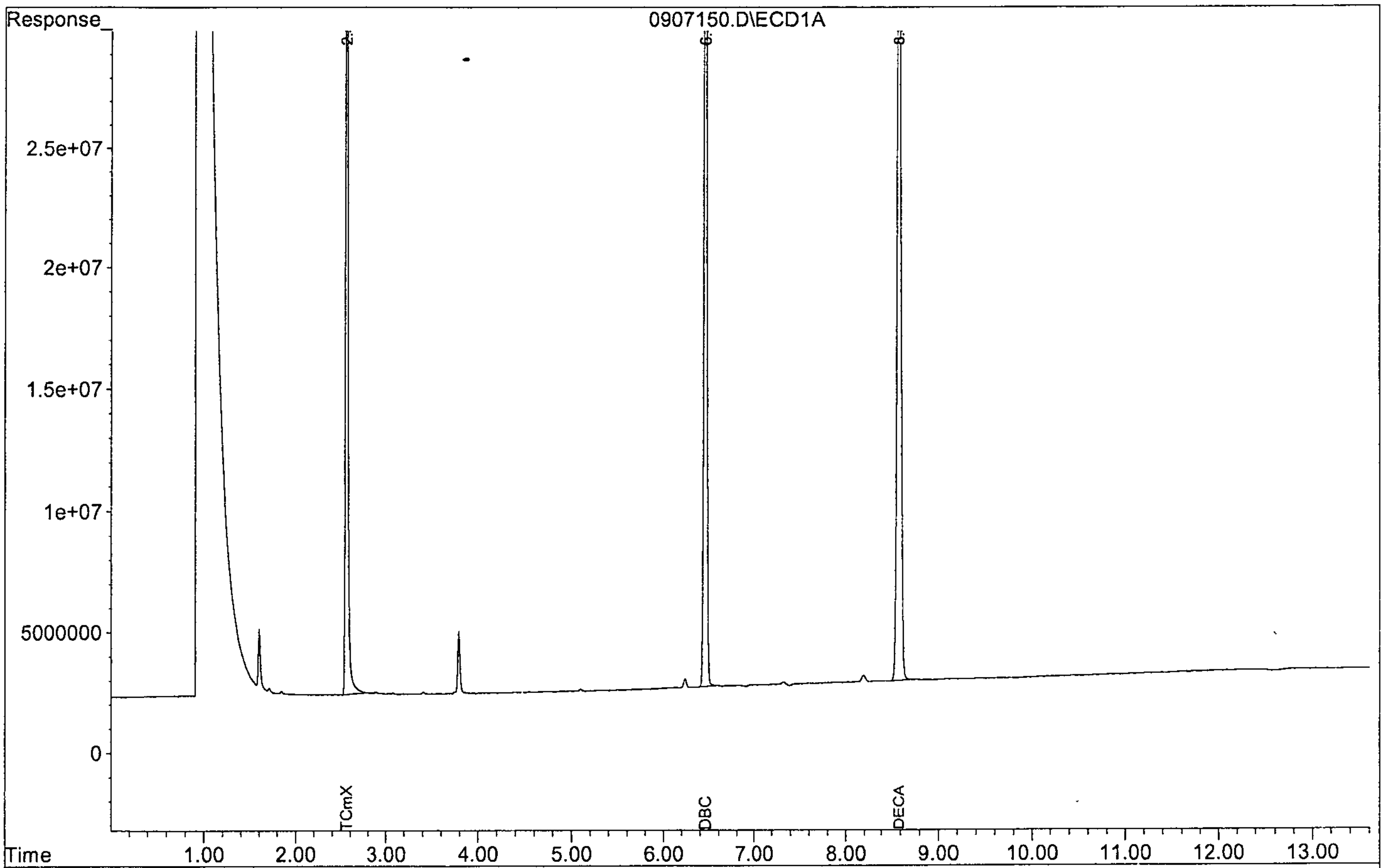
```
Signal #1 : G:\LUCY\DATA\180907\0907150.D\ECD1A.CH        Vial: 50
Signal #2 : G:\LUCY\DATA\180907\0907150.D\ECD2B.CH
Acq On    : 9-14-18 16:04:55                          Operator: MA
Sample    : 180912A BLK 5X1/0.05/30.12G DF10 AC       Inst    : Lucy
Misc      : soil                                      Multiplr: 3320.05
IntFile Signal #1: events.e    IntFile Signal #2: events2.e
Quant Time: Sep 17 10:55 2018  Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title        : 8082
Last Update  : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj.      : 2uL
Signal #1 Phase : DB-35MS         Signal #2 Phase: DB-XLB
Signal #1 Info  : 0.32            Signal #2 Info : 0.32
```

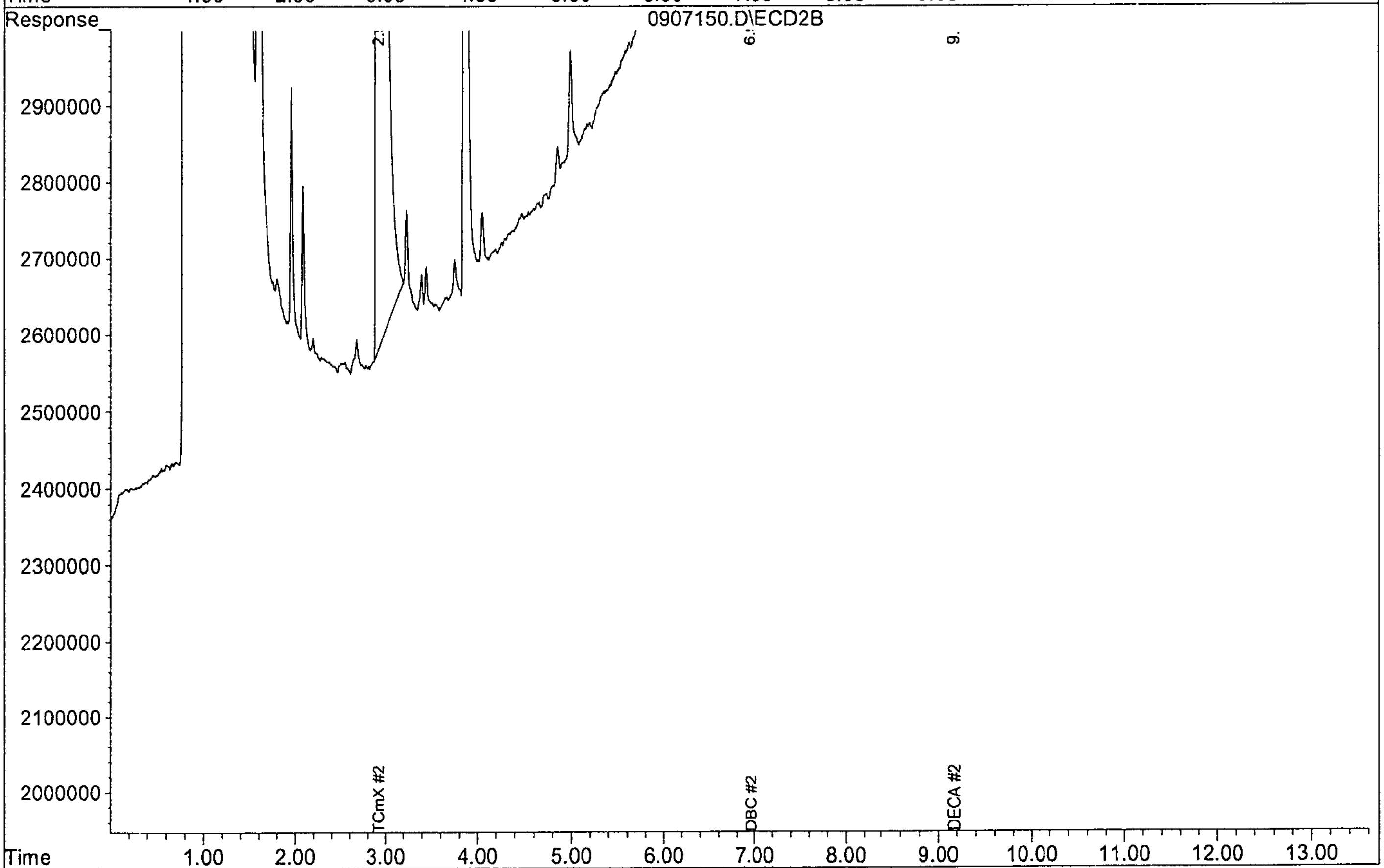
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	53904823	95842577	284.803	294.942
Spiked Amount 332.005			Recovery	=	85.78%	88.84%
2) SA DBC	6.46	6.96	47734177	72285255	280.430	357.178 #
Spiked Amount 332.005			Recovery	=	84.47%	107.58%
3) SA DECA	8.58	9.17	35250128	56804241	282.697	300.663
Spiked Amount 332.005			Recovery	=	85.15%	90.56%
Target Compounds						
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	0	0	N.D. d	N.D. d
5) L3BKC AR 1016	0.00	0.00	0	0	N.D. d	N.D. d
6) L3BKC AR 1016 {2}	0.00	0.00	0	0	N.D. d	N.D. d
7) L3BKC AR 1016 {3}	0.00	0.00	0	0	N.D. d	N.D. d
8) L3BKC AR 1016 {4}	0.00	0.00	0	0	N.D. d	N.D. d
9) L3BKC AR 1016 {5}	0.00	0.00	0	0	N.D. d	N.D. d
10) BNMC Total AR1260	0.00	0.00	0	0	N.D. d	N.D. d
11) L9BKC AR 1260	0.00	0.00	0	0	N.D. d	N.D. d
12) L9BKC AR 1260 {2}	0.00	0.00	0	0	N.D. d	N.D. d
13) L9BKC AR 1260 {3}	0.00	0.00	0	0	N.D. d	N.D. d
14) L9BKC AR 1260 {4}	0.00	0.00	0	0	N.D. d	N.D. d
15) L9BKC AR 1260 {5}	0.00	0.00	0	0	N.D. d	N.D. d

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Data File : G:\LUCY\DATA\180907\0907150.D
Acq On : 9-14-18 16:04:55
Sample : 180912A BLK 5X1/0.05/30.12G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 50
Operator: MA
Inst : Lucy
Multiplr: 3320.05





Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907053.D\ECD1A.CH Vial: 53
Signal #2 : G:\LUCY\DATA\180907\0907053.D\ECD2B.CH
Acq On : 9-11-18 16:32:04 Operator: MA
Sample : 180907B LCS-3 1/500 DF5 Inst : Lucy
Misc : water Multiplr: 10.00
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 11 16:54 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound		RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds							
1) SA TCmX		2.56	2.92	6899147	11733919	0.110	0.109
Spiked Amount	0.300			Recovery	=	36.67%	36.33%
2) SA DBC		6.46	6.96	13709626	14646744	0.243	0.218
Spiked Amount	0.300			Recovery	=	81.00%	72.67%
3) SA DECA		8.58	9.17	8276027	13650374	0.200	0.218
Spiked Amount	0.300			Recovery	=	66.67%	72.67%
Target Compounds							
4) BNMC Total AR1016		0.00	0.00	62635489	8144870	6.968m	0.941m#
5) L3BKC AR 1016		3.39	3.25	873674	973506	0.474	0.509
6) L3BKC AR 1016 {2}		3.79	4.28	59996160	1371392	15.540	0.737 #
7) L3BKC AR 1016 {3}		4.10	4.42	315549	2393310	0.358	1.639 #
8) L3BKC AR 1016 {4}		4.36	4.42	760043	2393310	0.566	1.458 #
9) L3BKC AR 1016 {5}		4.50	4.58	690064	1013353	0.650	0.569
10) BNMC Total AR1260		0.00	0.00	14348291	14744294	0.694m	0.696m
11) L9BKC AR 1260		5.33	5.75	1539583	3493611	0.724	0.671
12) L9BKC AR 1260 {2}		5.47	6.30	2298815	4111453	0.672	0.663
13) L9BKC AR 1260 {3}		5.65	6.40	2997599	2595797	0.739	0.737
14) L9BKC AR 1260 {4}		6.59	7.40	4396472	3344017	0.659	0.688
15) L9BKC AR 1260 {5}		7.04	7.49	3115822	1199417	0.708	0.863

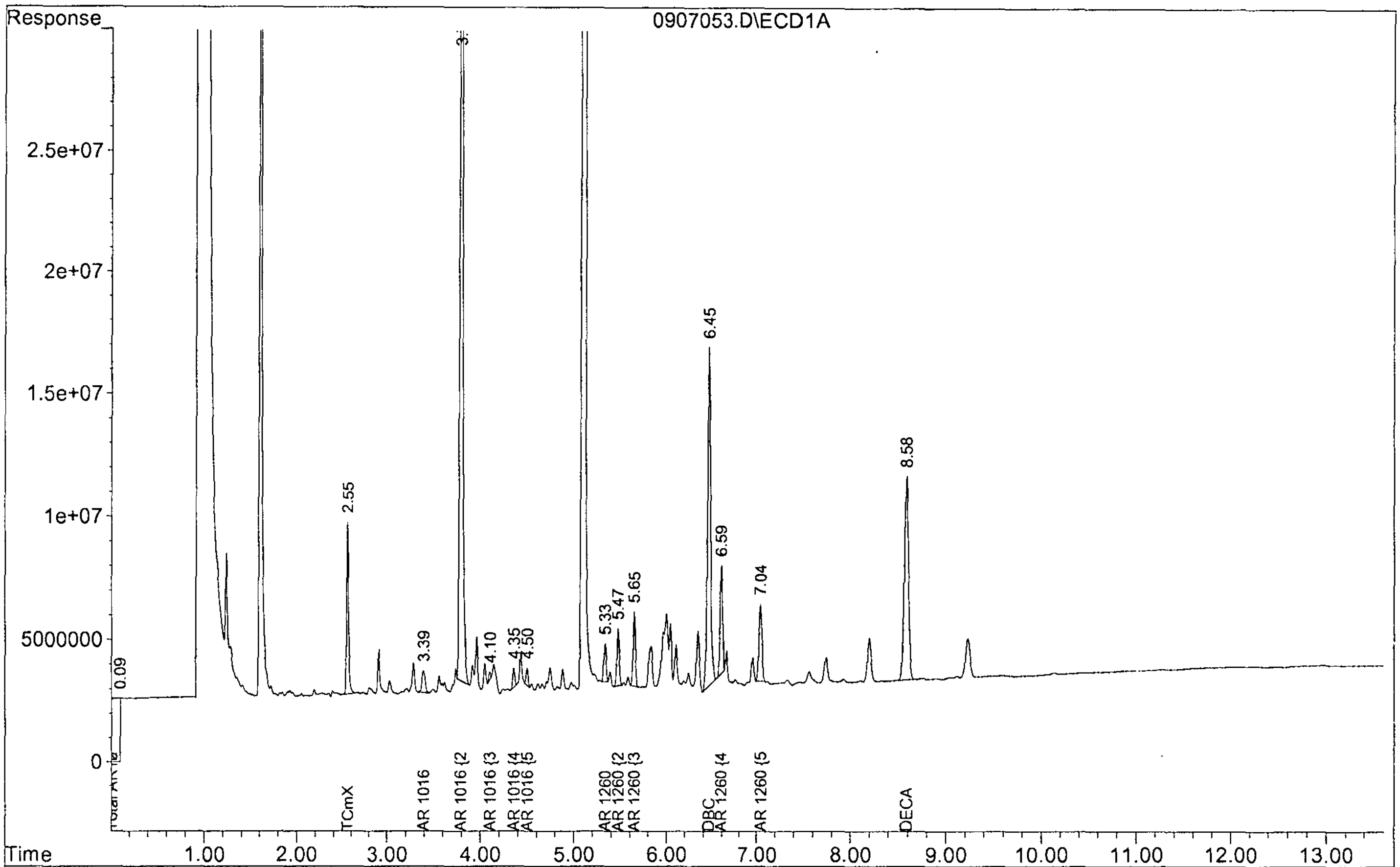
Target Compounds

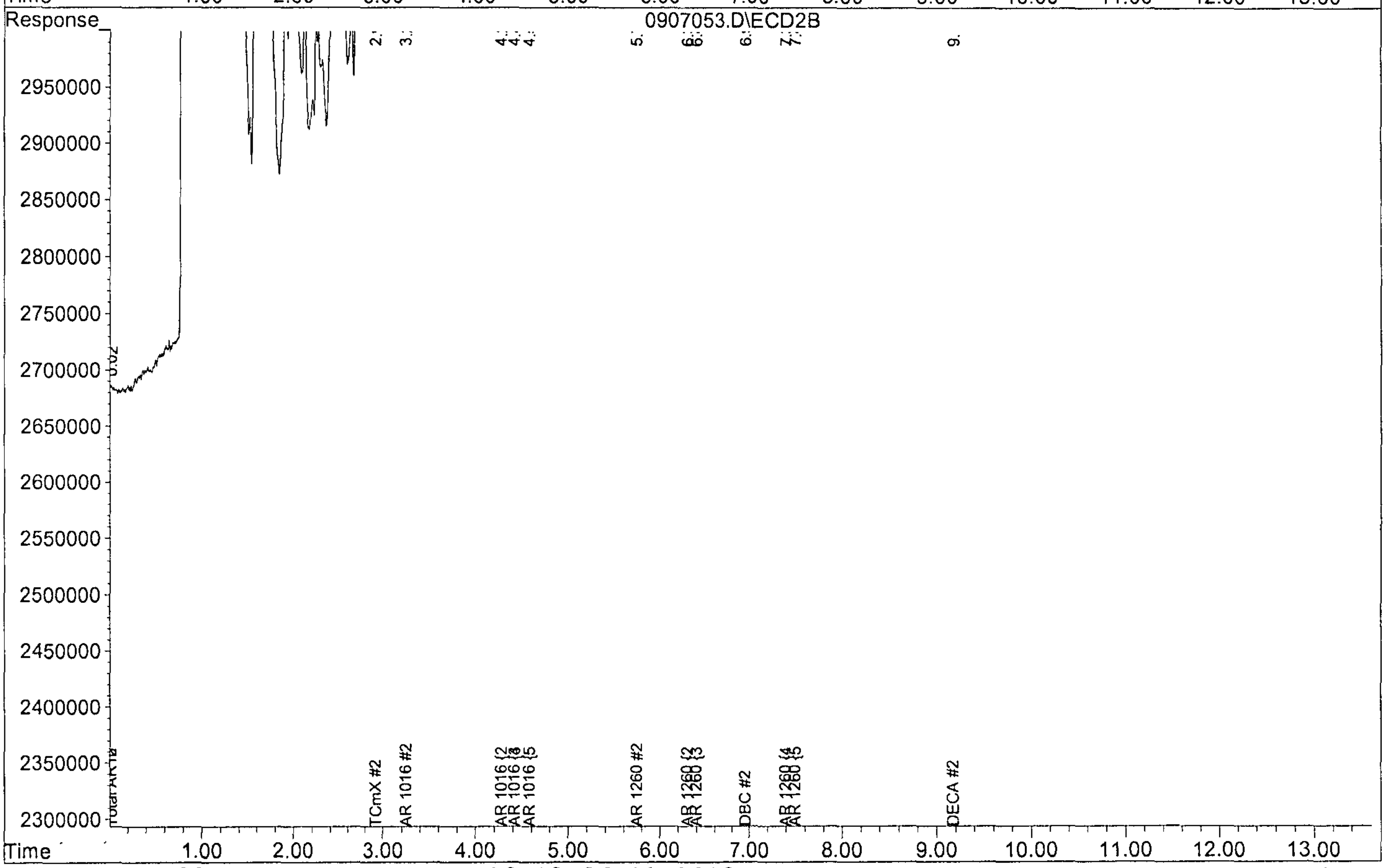
(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907053.D
Acq On : 9-11-18 16:32:04
Sample : 180907B LCS-3 1/500 DF5
Misc : water
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 53
Operator: MA
Inst : Lucy
Multiplr: 10.00





Signal #1 : G:\LUCY\DATA\180907\0907151.D\ECD1A.CH Vial: 51
Signal #2 : G:\LUCY\DATA\180907\0907151.D\ECD2B.CH
Acq On : 9-14-18 16:21:49 Operator: MA
Sample : 180912A LCS-3 5X1/0.05/30.67G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3260.52
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 10:55 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

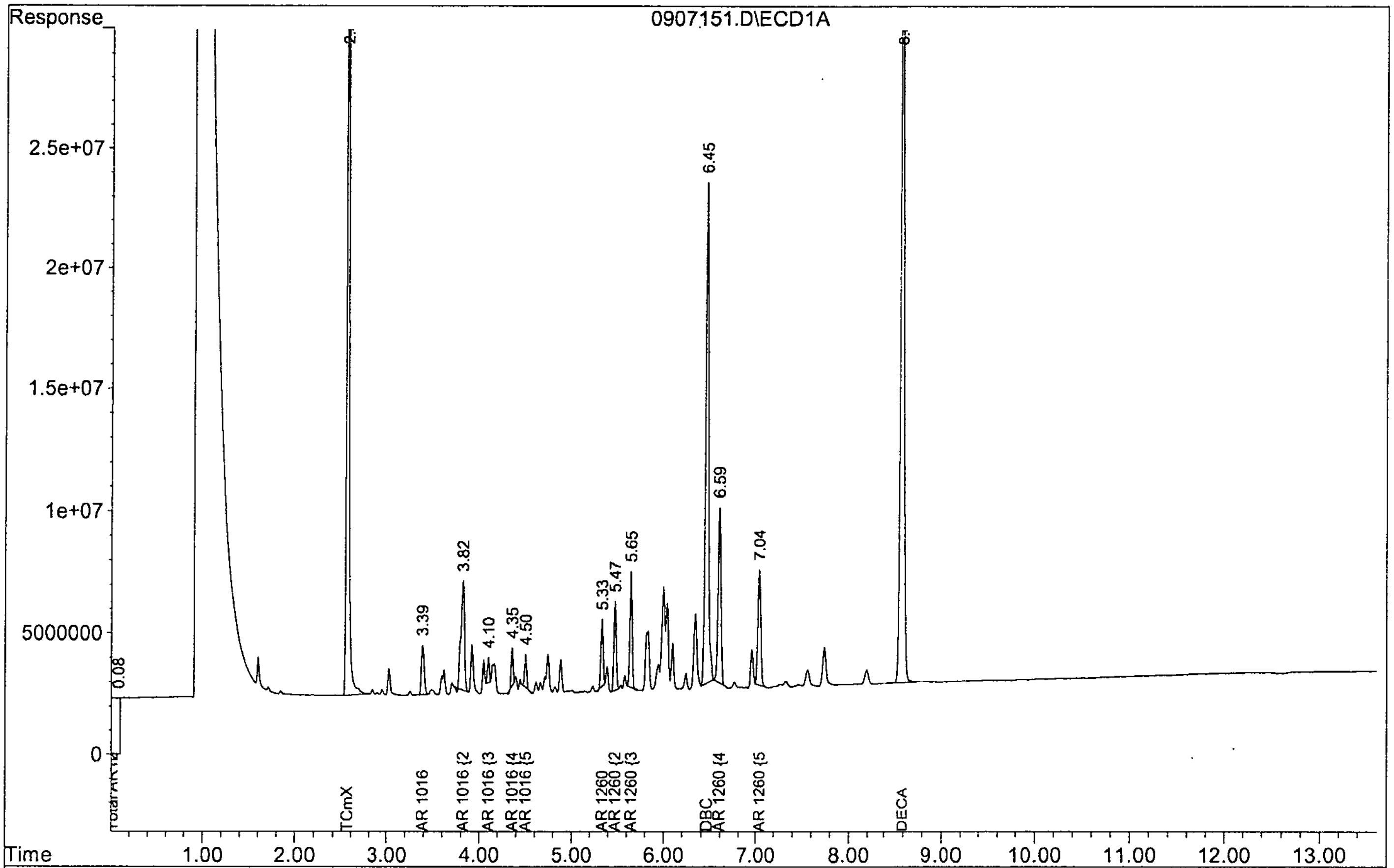
Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	52225571	91843776	270.983	277.569
Spiked Amount 326.052			Recovery	=	83.11%	85.13%
2) SA DBC	6.46	6.96	20637936	23788056	119.070	115.435
Spiked Amount 326.052			Recovery	=	36.52%	35.40%
3) SA DECA	8.58	9.17	32946369	50652579	259.484	263.295
Spiked Amount 326.052			Recovery	=	79.58%	80.75%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	10468865	10362585	379.745m	390.341m
5) L3BKC AR 1016	3.39	3.25	2023055	1994155	357.803	339.887
6) L3BKC AR 1016 {2}	3.82	4.28	4498544	2444125	379.903	428.447
7) L3BKC AR 1016 {3}	4.10	4.39	1039239	1884881	384.881	420.839
8) L3BKC AR 1016 {4}	4.36	4.44	1548403	1857060	375.979	368.792
9) L3BKC AR 1016 {5}	4.50	4.58	1359624	2182363	417.798	399.597
10) BNMC Total AR1260	0.00	0.00	23051964	24350098	363.358m	374.761m
11) L9BKC AR 1260	5.33	5.75	2749671	6007084	421.381	376.055
12) L9BKC AR 1260 {2}	5.47	6.30	3643309	7157564	347.005	376.139
13) L9BKC AR 1260 {3}	5.65	6.40	4744017	4153836	381.214	384.314
14) L9BKC AR 1260 {4}	6.59	7.40	7189022	5394491	351.184	361.997
15) L9BKC AR 1260 {5}	7.04	7.50	4725945	1637123	350.033	384.165

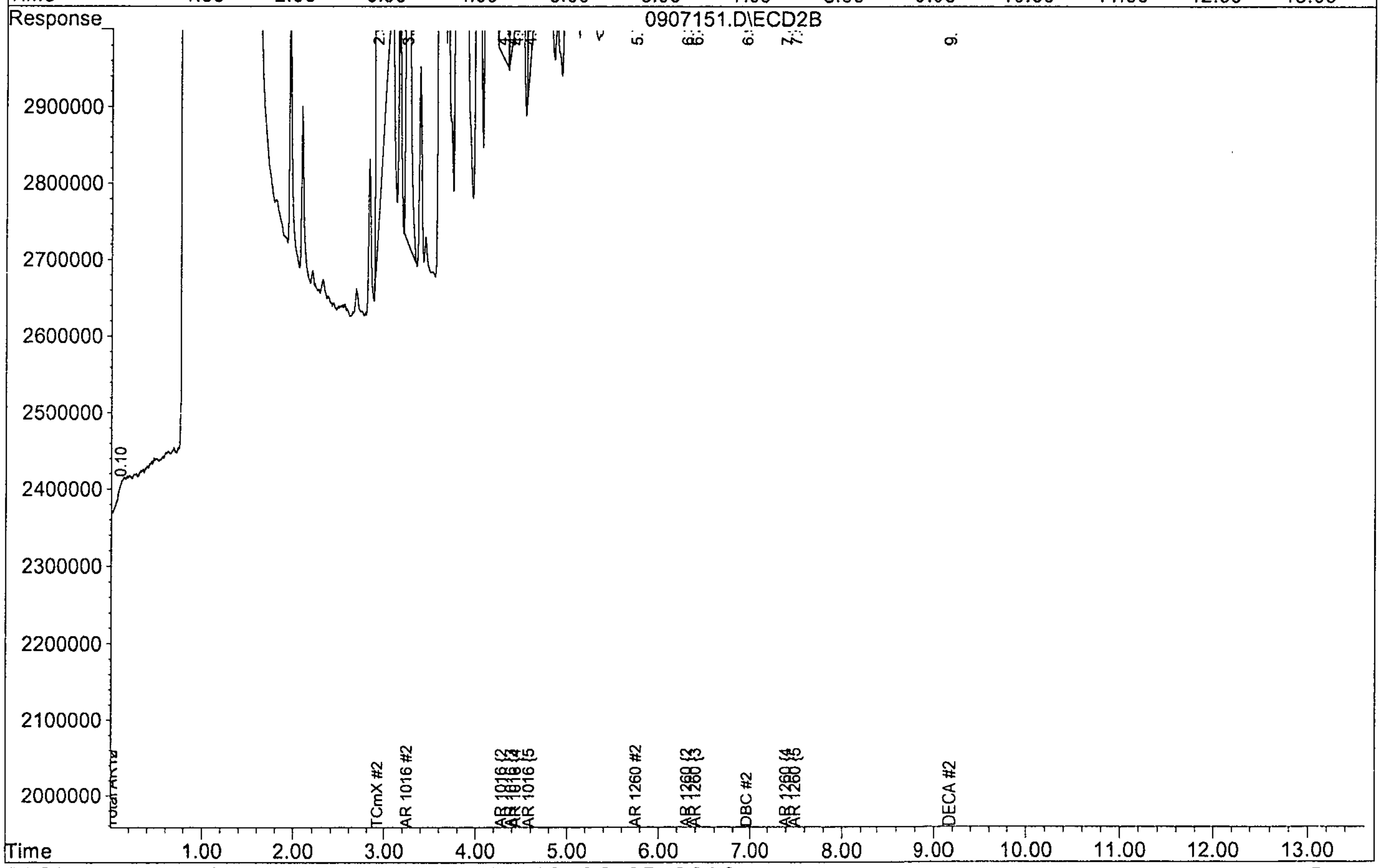
Target Compounds

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 25% (m)=manual int.

Data File : G:\LUCY\DATA\180907\0907151.D
Acq On : 9-14-18 16:21:49
Sample : 180912A LCS-3 5X1/0.05/30.67G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 51
Operator: MA
Inst : Lucy
Multiplr: 3260.52





Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907160.D\ECD1A.CH Vial: 60
Signal #2 : G:\LUCY\DATA\180907\0907160.D\ECD2B.CH
Acq On : 9-14-18 18:54:24 Operator: MA
Sample : AZ79151S01 MS-3 5X1/0.05/25.29G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3954.13
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 10:59 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

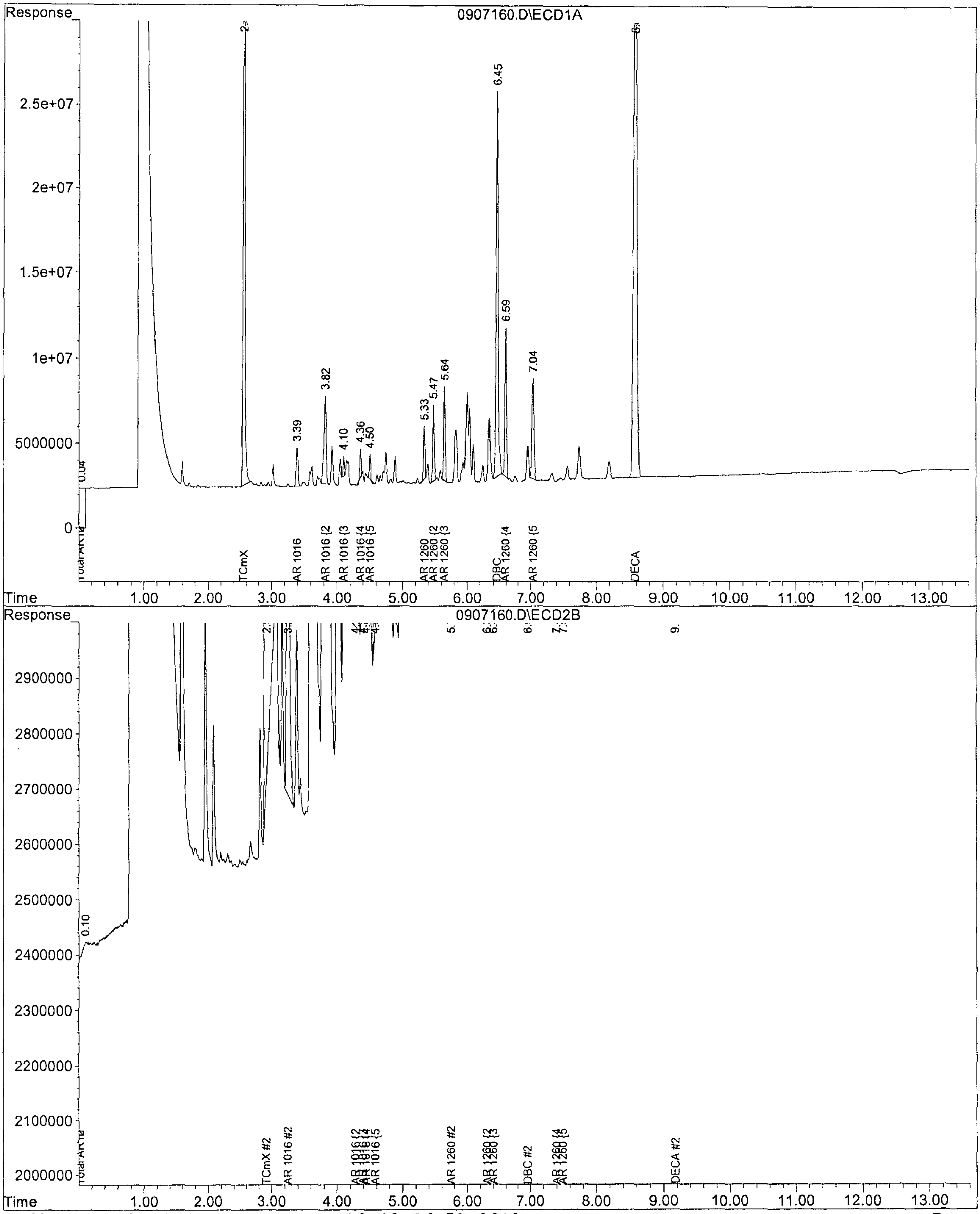
Compound		RT#1	RT#2	Resp#1	Resp#2	ppb	ppb	
System Monitoring Compounds								
1) SA TCmX		2.56	2.92	58285928	103.9E6	366.764	380.679	
Spiked Amount	395.413			Recovery	=	92.75%	96.27%	
2) SA DBC		6.46	6.96	22778289	25496908	159.376	150.047	
Spiked Amount	395.413			Recovery	=	40.31%	37.95%	
3) SA DECA		8.58	9.17	37466366	59179660	357.856	373.059	
Spiked Amount	395.413			Recovery	=	90.50%	94.35%	
Target Compounds								
4) BNMC Total AR1016		0.00	0.00	11842725	11653406	520.964m	532.345m	
5) L3BKC AR 1016		3.39	3.25	2257929	2233409	484.295	461.645	
6) L3BKC AR 1016 {2}		3.82	4.28	5199727	2806940	532.532	596.720	
7) L3BKC AR 1016 {3}		4.10	4.39	1185460	2106080	532.429	570.258	
8) L3BKC AR 1016 {4}		4.36	4.44	1726870	2115638	508.514	509.520	
9) L3BKC AR 1016 {5}		4.50	4.58	1472738	2391338	548.829	531.007	
10) BNMC Total AR1260		0.00	0.00	27771706	29341583	530.877m	547.648m	
11) L9BKC AR 1260		5.33	5.75	3126578	6697644	581.069	508.480	
12) L9BKC AR 1260 {2}		5.47	6.30	4468832	8509343	516.177	542.304	
13) L9BKC AR 1260 {3}		5.65	6.40	5549394	5085518	540.795	570.605	
14) L9BKC AR 1260 {4}		6.59	7.40	8724452	6714187	516.853	546.402	
15) L9BKC AR 1260 {5}		7.04	7.50	5902450	2334890	530.172	664.458	#

Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907160.D
Acq On : 9-14-18 18:54:24
Sample : AZ79151S01 MS-3 5X1/0.05/25.29G DF10 AC
Misc : soil
Quant Method : G:\LUCY\DATA\180907\PCB0907.M

Vial: 60
Operator: MA
Inst : Lucy
Multiplr: 3954.13



Quantitation Report (Not Reviewed)

Signal #1 : G:\LUCY\DATA\180907\0907161.D\ECD1A.CH Vial: 61
Signal #2 : G:\LUCY\DATA\180907\0907161.D\ECD2B.CH
Acq On : 9-14-18 19:11:21 Operator: MA
Sample : AZ79151S01 MSD-3 5X1/0.05/25.66G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3897.12
IntFile Signal #1: events.e IntFile Signal #2: events2.e
Quant Time: Sep 17 10:59 2018 Quant Results File: PCB0907.RES

Quant Method : G:\LUCY\DATA\180907\PCB0907.M (Chemstation Integrator)
Title : 8082
Last Update : Fri Sep 07 13:31:30 2018
Response via : Initial Calibration
DataAcq Meth : EPA8081N.M

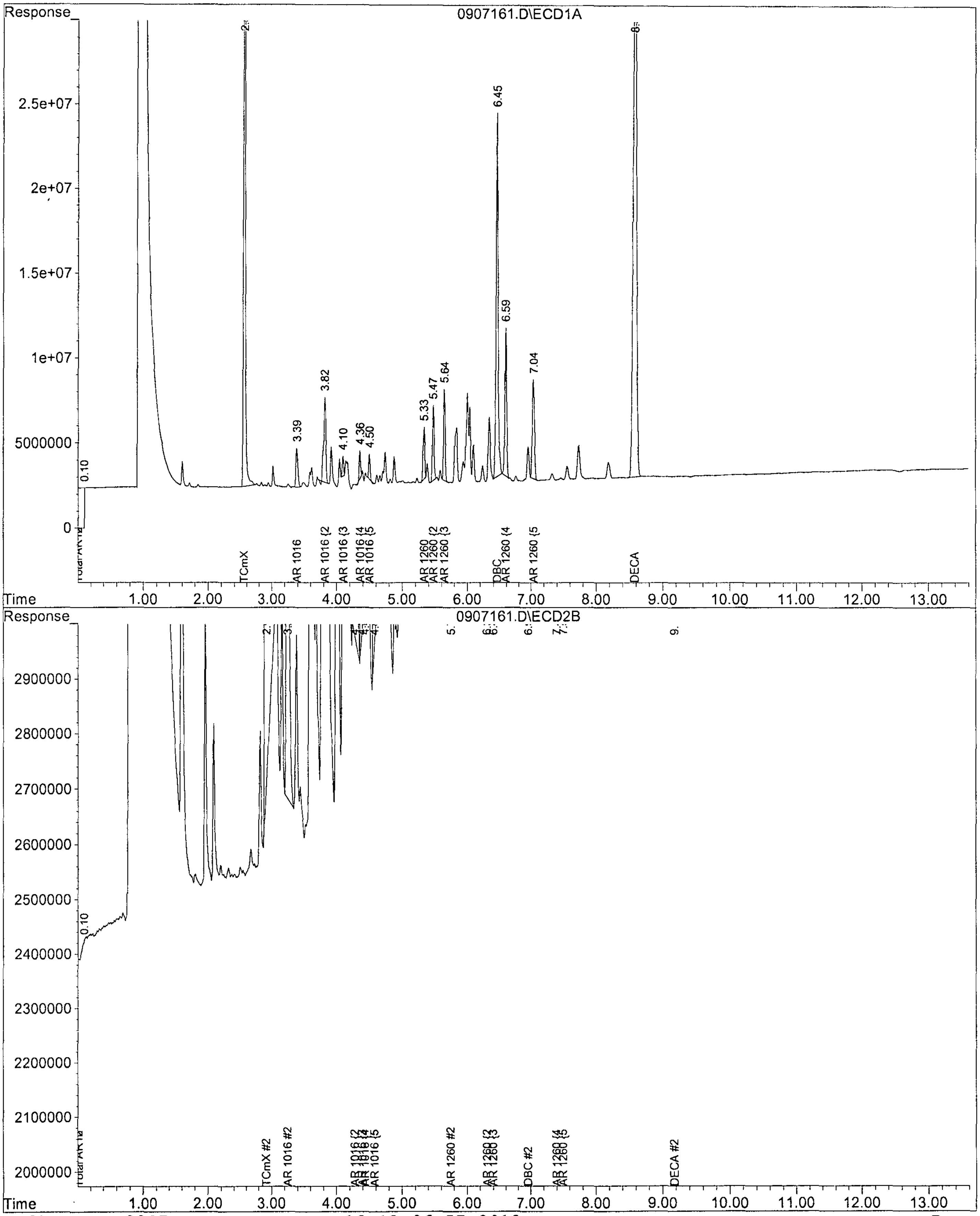
Volume Inj. : 2uL
Signal #1 Phase : DB-35MS Signal #2 Phase: DB-XLB
Signal #1 Info : 0.32 Signal #2 Info : 0.32

Compound	RT#1	RT#2	Resp#1	Resp#2	ppb	ppb
System Monitoring Compounds						
1) SA TCmX	2.56	2.92	58822529	107.6E6	364.804	388.770
Spiked Amount 389.712			Recovery	=	93.61%	99.76%
2) SA DBC	6.46	6.96	21383557	23789167	147.460	137.979
Spiked Amount 389.712			Recovery	=	37.84%	35.41%
3) SA DECA	8.58	9.17	38520492	59763289	362.620	371.306
Spiked Amount 389.712			Recovery	=	93.05%	95.28%
Target Compounds						
4) BNMC Total AR1016	0.00	0.00	11486126	11385965	497.993m	512.629m
5) L3BKC AR 1016	3.39	3.25	2274581	2251970	480.833	458.770
6) L3BKC AR 1016 {2}	3.82	4.28	4967856	2571288	501.449	538.742
7) L3BKC AR 1016 {3}	4.10	4.39	1155199	2038325	511.357	543.954
8) L3BKC AR 1016 {4}	4.36	4.44	1618279	2149573	469.666	510.229
9) L3BKC AR 1016 {5}	4.50	4.58	1470212	2374809	539.988	519.734
10) BNMC Total AR1260	0.00	0.00	27231204	28876824	513.040m	531.203m
11) L9BKC AR 1260	5.33	5.75	3002030	6627082	549.878	495.869
12) L9BKC AR 1260 {2}	5.47	6.30	4386098	8390841	499.316	527.042
13) L9BKC AR 1260 {3}	5.65	6.40	5341637	5039260	513.043	557.263
14) L9BKC AR 1260 {4}	6.59	7.40	8695851	6589663	507.731	528.536
15) L9BKC AR 1260 {5}	7.04	7.50	5805588	2229977	513.953	625.452

Target Compounds

Quantitation Report (Not Reviewed)

Data File : G:\LUCY\DATA\180907\0907161.D Vial: 61
Acq On : 9-14-18 19:11:21 Operator: MA
Sample : AZ79151S01 MSD-3 5X1/0.05/25.66G DF10 AC Inst : Lucy
Misc : soil Multiplr: 3897.12
Quant Method : G:\LUCY\DATA\180907\PCB0907.M



8082 Standard Prep

PCB Standard

Prepared: 01/15/18
Expires: 11/08/18
Hexane Lot No. 050717A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
AROCLOR 1016/1260	Restek	32039	1,000	A0126770-39383	11/20/18	05/31/24	250uL	25mL	Hexane	10
Pesticide Surr. Soln, 5000mg/L	O2SI	130070-02	5,000	276464-38055	11/08/18	04/18/19	10uL			2

PCB Calibration Curve

Prepared: 07/18/18
Expires: 11/08/18
Hexane Lot No. 102317A

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
PCB Standard	Restek	PCB-1D	10	Prepared 01/15/18	11/08/18	N/A	10uL	10mL	Hexane	0.01
PCB Standard	Restek	PCB-1C	10	Prepared 01/15/18	11/08/18	N/A	25uL	10mL	Hexane	0.025
PCB Standard	Restek	PCB-1B	10	Prepared 01/15/18	11/08/18	N/A	50uL	10mL	Hexane	0.05
PCB Standard	Restek	PCB-1	10	Prepared 01/15/18	11/08/18	N/A	500uL	50uL	Hexane	0.1
PCB Standard	Restek	PCB-2	10	Prepared 01/15/18	11/08/18	N/A	1250uL	50uL	Hexane	0.25
PCB Standard	Restek	PCB-3	10	Prepared 01/15/18	11/08/18	N/A	500uL	10mL	Hexane	0.5
PCB Standard	Restek	PCB-4	10	Prepared 01/15/18	11/08/18	N/A	750uL	10mL	Hexane	0.75
PCB Standard	Restek	PCB-5	10	Prepared 01/15/18	11/08/18	N/A	1000uL	10mL	Hexane	1.0

PCB Second Source (SS) Stock

Prepared: 07/12/18
Expires: 07/12/19
Hexane Lot No. 102317A

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlors 1016/1260 Solution (SS)	O2SI	130011-01-SS	200	G34-335598-38801	07/12/19	03/15/22	500uL	10mL	Hexane	10

PCB Second Source

Prepared: 07/12/18
Expires: 01/10/19
Hexane Lot No. 102317A

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. (ug/mL)	Reference to APPL Prep Date	Exp. Date	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
PCB Second Source Stock	O2SI	PSB Second Source	10	Prepared 07/12/18	07/12/19	N/A	500uL	10mL	Hexane	0.5

PCB Spike

Prepared: 07/06/18
Expires: 07/06/19
Acetone Lot. No. 030817A

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlors 1016/1260	Restek	32039	1,000	A0126770-38557	07/06/19	07/31/23	1250uL	100mL	Acetone	12.5

OCL-OP Soil Surrogate

Prepared: 07/24/18
Expires: 04/18/19
Acetone Lot. No. 030817A

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/mL)
Pesticide Surr. Soln, 5000mg/L	O2SI	130070-02	5,000	279464-39109	04/18/19	04/18/19	800uL	200mL	Acetone	20
Tributyl and Triphenyl phosphate	O2SI	130161-02	1,000	306115-37900/38590	04/26/2019 & 4/22/19	04/28/20	600uL / 400uL			5

OCL-OP Water Surrogate

Prepared: 05/30/18
Expires: 04/18/19
Acetone Lot No. 101717I

Prepared By (Initials): DS

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Pesticide Surr. Soln, 5000mg/L	O2SI	130070-02	5,000	276464-39109	04/22/19	04/18/19	60uL	200mL	Acetone	1.5
Tributyl and Triphenyl phosphate	O2SI	130161-02	1,000	306115-38590/38591	05/30/19	04/28/20	1mL			5

Individual AR Stock Standards (20ug/mL)

AR 1221 Stock

Prepared: 09/14/17
Expires: 09/14/18
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlor 1221	Restek	32007	1,000	A0105286-35629	09/14/18	11/30/20	200uL	10mL	Hexane	20

AR 1232 Stock

Prepared: 09/14/17
Expires: 09/14/18
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlor 1232	Restek	32008	1,000	A0107138-35632	09/14/18	02/28/21	200uL	10mL	Hexane	20

AR 1242 Stock

Prepared: 09/14/17
Expires: 09/14/18
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlor 1242	Restek	32009	1,000	A0105928-35634	09/14/18	12/31/20	200uL	10mL	Hexane	20

AR 1248 Stock

Prepared: 07/20/18
Expires: 07/20/19
Hexane Lot No. 102318A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlor 1248	Restek	32010	1,000	A0121842-38635	07/20/19	02/28/21	200uL	10mL	Hexane	20

AR 1254 Stock

Prepared: 06/28/18
Expires: 06/28/19
Hexane Lot No. 102317A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlor 1254	Restek	32011	1,000	A0125350-38151	06/28/19	05/31/23	200uL	10mL	Hexane	20

AR 1262 Stock

Prepared: 09/14/17
Expires: 09/14/18
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlor 1262	Restek	32409	1,000	A0108953-35262	09/14/18	05/31/21	200uL	10mL	Hexane	20

AR 1268 Stock

Prepared: 09/14/17
Expires: 09/14/18
Hexane Lot No. 050817A

Prepared By (Initials): DP

Initial Standard Information							Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier Part No.	Conc. (ug/mL)	Lot Number - QA Number	Exp. Date (1 yr.)	Exp. Date (Manufacturer)	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Arochlor 1268	Restek	32410	1,000	A0105927-35628	09/14/18	05/31/21	200uL	10mL	Hexane	20

_SEP025

Organic Extraction Worksheet

Method	OCL OP/Triazine Sep Funnel Low 3510C	Extraction Set	180907B	Extraction Method	SEP025	Units	mL

Spiked ID 1	OCLHX Spike 12-11-17 EXP 11-20-18	Surrogate ID 1	OCL/OP Water Surrogate 5-30-18 EXP 5-30-19
Spiked ID 2	TOX Spike 4-17-18 EXP 4-17-19	Surrogate ID 2	
Spiked ID 3	PCB Spike 7-6-18 EXP 1-6-19	Surrogate ID 3	
Spiked ID 4		Surrogate ID 4	
Spiked ID 5		Surrogate ID 5	
Spiked ID 6		Sufficient Vol for Matrix QC:	NO
Spiked ID 7		Ext. Start Time:	09/07/18 14:32
Spiked ID 8		Ext. End Time:	09/11/18 11:05
		GC Requires Extract By:	**09/19/18 0:00**

pH1			Water Bath Temp Criteria	35,35,35 °
pH2				
pH3				

Spiked By: SS **Date** 09/07/18 **Witnessed By:** EL **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907B Blk				0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB3				
2	180907B LCS-1		0.030	1	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB3				
3	180907B LCS-2		0.020	2	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB1				
4	180907B LCS-3		0.040	3	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB2				
5	180907B LCSD-1		0.030	1	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB3				
6	180907B LCSD-2		0.020	2	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB1				
7	180907B LCSD-3		0.040	3	0.100	1	500	1	7	09/07/18 14:32	
						equip	E-WB2				
8	AZ79179	AZ79179W06			0.100	1	490	1	7	09/07/18 14:32	86766
						equip	E-WB3				

KY 9/11/18

Solvent and Lot#	
PH STRIPS	HC 727135
Dichloromethane	58059
Filter Paper	400138
B. Soduim Sulfate	18D105205
Hexane	111617A

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	DP
Date	9/12/18
Time	9:00
Refrigerator	Hobart H

	Technician's Initials
Scanned By	FM
Sample Preparation	FM,SS,EL
Extraction	FM,SS,EL
Concentration	RB
Modified	09/11/18 1:17:41 PM

Reviewed By: KY 824 **Date** 9/11/18

Organic Extraction Worksheet

Method	LOW LEVEL OCL/OP/Triaz So Ext 3550B MIS	Extraction Set	180912A	Extraction Method	SON002LLMIS	Units	mL

Spiked ID 1	OCLHX Spike 12-11-17 EXP 11-20-18		Surrogate ID 1	OCL/OP Soil Surrogate 8-30-18 EXP 2-22-19	
Spiked ID 2	TOX Spike 4-17-18 EXP 4-17-19		Surrogate ID 2		
Spiked ID 3	PCB Spike 7-6-18 EXP 1-6-19		Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	09/12/18 14:10	
Spiked ID 8			Ext. End Time:	09/13/18 14:30	
			GC Requires Extract By:	09/24/18 0:00	

pH1			Water Bath Temp Criteria	35,35,35 °
pH2				
pH3				

Spiked By: KY Date 09/12/18 Witnessed By: YL Date 09/12/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180912A Blk				0.5	1 equip	30.12g E-S1.1 E-WB1	5x1/0.05	NA	09/12/18 14:10	*
2	180912A LCS-1		1	1	0.5	1 equip	30.49g E-S1.2 E-WB2	5x1/0.05	NA	09/12/18 14:10	
3	180912A LCS-2		1	2	0.5	1 equip	30.62g E-S2 E-WB3	5x1/0.05	NA	09/12/18 14:10	
4	180912A LCS-3		1	3	0.5	1 equip	30.67g E-S6 E-WB1	5x1/0.05	NA	09/12/18 14:10	*
5	180912A LCSD-1		1	1	0.5	1 equip	30.04g E-S7 E-WB2	5x1/0.05	NA	09/12/18 14:10	
6	180912A LCSD-2		1	2	0.5	1 equip	30.08g e-s8 E-WB3	5x1/0.05	NA	09/12/18 14:10	
7	180912A LCSD-3		1	3	0.5	1 equip	30.33g E-S1.1 E-WB1	5x1/0.05	NA	09/12/18 14:10	*
8	AZ79031	AZ79031S07			0.5	1 equip	30.80g E-S1.2 E-WB2	5x1/0.05	NA	09/12/18 14:10	86752 *
9	AZ79146	AZ79146S01			0.5	1 equip	30.41g E-S2 E-WB3	5x1/0.05	NA	09/12/18 14:10	86766 *
10	AZ79147	AZ79147S01			0.5	1 equip	30.30g E-S6 E-WB1	5x1/0.05	NA	09/12/18 14:10	86766 *
11	AZ79148	AZ79148S01			0.5	1 equip	30.23g E-S7 E-WB2	5x1/0.05	NA	09/12/18 14:10	86766 *
12	AZ79149	AZ79149S01			0.5	1 equip	30.91g e-s8 E-WB3	5x1/0.05	NA	09/12/18 14:10	86766 *
13	AZ79150	AZ79150S01			0.5	1 equip	30.06g E-S1.1 E-WB1	5x1/0.05	NA	09/12/18 14:10	86766 *
14	AZ79151 MS-1	AZ79151S01	1	1	0.5	1 equip	25.15g E-S1.2 E-WB2	5x1/0.05	NA	09/12/18 14:10	86766
15	AZ79151 MSD-1	AZ79151S01	1	1	0.5	1 equip	25.24g E-S2 E-WB3	5x1/0.05	NA	09/12/18 14:10	86766
16	AZ79151 MS-2	AZ79151S01	1	2	0.5	1 equip	25.20g E-S6 E-WB1	5x1/0.05	NA	09/12/18 14:10	86766

Solvent and Lot#	
BALANCE ID	EB1
SAND	18C025203
B.Na2S04	18D105205
DCM:Acetone MIX	9-11-18
FILTER PAPER	15751144
HEXANE	111617A
SULFURIC ACID (*)	177544

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	DP
Date	9/13/18
Time	5:06
Refrigerator	Hobart 1

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL,RB
Modified	09/13/18 4:18:31 PM

Reviewed By: Ky 825 Date 9/13/18

_SON002LL

Organic Extraction Worksheet

Method	LOW LEVEL OCL/OP/Triaz So Ext 3550B MIS	Extraction Set	180912A	Extraction Method	SON002LLMIS	Units	mL

Spiked ID 1	OCLHX Spike 12-11-17 EXP 11-20-18		Surrogate ID 1	OCL/OP Soil Surrogate 8-30-18 EXP 2-22-19
Spiked ID 2	TOX Spike 4-17-18 EXP 4-17-19		Surrogate ID 2	
Spiked ID 3	PCB Spike 7-6-18 EXP 1-6-19		Surrogate ID 3	
Spiked ID 4			Surrogate ID 4	
Spiked ID 5			Surrogate ID 5	
Spiked ID 6			Sufficient Vol for Matrix QC:	NO
Spiked ID 7			Ext. Start Time:	09/12/18 14:10
Spiked ID 8			Ext. End Time:	09/13/18 14:30
			GC Requires Extract By:	09/24/18 0:00

pH1			Water Bath Temp Criteria	35,35,35 °
pH2				
pH3				

Spiked By: KY **Date** 09/12/18 **Witnessed By:** YL **Date** 09/12/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
17	AZ79151 MSD-2	AZ79151S01	1	2	0.5	1	25.22g	5x1/0.05	NA	09/12/18 14:10	86766
						equip	E-S7 E-WB2				
18	AZ79151	AZ79151S01			0.5	1	30.07g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	e-s8 E-WB2				
19	AZ79151 MS-3	AZ79151S01	1	3	0.5	1	25.29g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.1 E-WB1				
20	AZ79151 MSD-3	AZ79151S01	1	3	0.5	1	25.66g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.2 E-WB2				
21	AZ79152	AZ79152S01			0.5	1	30.22g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S2 E-WB3				
22	AZ79153	AZ79153S01			0.5	1	30.49g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S6 E-WB1				
23	AZ79154	AZ79154S01			0.5	1	30.94g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S7 E-WB2				
24	AZ79155	AZ79155S01			0.5	1	30.74g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	e-s8 E-WB3				
25	AZ79156	AZ79156S01			0.5	1	30.72g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.1 E-WB1				
26	AZ79157	AZ79157S01			0.5	1	30.63g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S1.2 E-WB2				
27	AZ79158	AZ79158S01			0.5	1	30.30g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S2 E-WB3				
28	AZ79159	AZ79159S01			0.5	1	30.22g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S6 E-WB1				
29	AZ79160	AZ79160S01			0.5	1	30.69g	5x1/0.05	NA	09/12/18 14:10	86766 *
						equip	E-S7 E-WB2				

Ky 9/13/18

Solvent and Lot#	
BALANCE ID	EB1
SAND	18C025203
B.Na2S04	18D105205
DCM:Acetone MIX	9-11-18
FILTER PAPER	15751144
HEXANE	111617A
SULFURIC ACID (*)	177544

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL,RB

Modified	09/13/18 4:18:31 PM

Reviewed By: Ky 826 **Date** 9/13/18

Injection Log

Directory: G:\LUCY\DATA\180907\

Vial	FileName	Multiplier	SampleName	Misc Info	Injected
2	0907002.D	1	PCB - 1D 7/18/18	water	9-7-18 10:44:28
3	0907003.D	1	PCB - 1C 7/18/18	water	9-7-18 11:01:27
4	0907004.D	1	PCB - 1B 7/18/18	water	9-7-18 11:18:20
5	0907005.D	1	PCB - 1 7/18/18	water	9-7-18 11:35:15
6	0907006.D	1	PCB - 2 7/18/18	water	9-7-18 11:52:10
7	0907007.D	1	PCB - 3 7/18/18	water	9-7-18 12:09:10
8	0907008.D	1	PCB - 4 7/18/18	water	9-7-18 12:26:02
9	0907009.D	1	PCB - 5 7/18/18	water	9-7-18 12:42:58
10	0907010.D	1	PCB - SS 7/12/18	water	9-7-18 12:59:54
11	0907011.D	1	AR1221 1ug/mL 8/3/18	water	9-7-18 13:16:53
12	0907012.D	1	AR1232 1ug/mL 8/3/18	water	9-7-18 13:33:45
13	0907013.D	1	AR1242 1ug/mL 8/3/18	water	9-7-18 13:50:37
14	0907014.D	1	AR1248 1ug/mL 7/20/18	water	9-7-18 14:07:30
15	0907015.D	1	AR1254 1ug/mL 6/28/18	water	9-7-18 14:24:30
16	0907016.D	1	AR1262 1ug/mL 8/3/18	water	9-7-18 14:41:22
17	0907017.D	1	AR1268 1ug/mL 8/3/18	water	9-7-18 14:58:14
51	0907051.D	1	PCB - 2 7/18/18	soil	9-11-18 14:19:30
52	0907052.D	10	180907B BLK 1/500 DF5	water	9-11-18 16:15:08
53	0907053.D	10	180907B LCS-3 1/500 DF5	water	9-11-18 16:32:04
55	0907055.D	10.2041	AZ79179W06 1/490 DF5	water	9-11-18 17:05:53
66	0907066.D	1	PCB - 2 7/18/18	water	9-11-18 20:12:17
49	0907149.D	1	PCB - 2 7/18/18	soil	9-14-18 15:48:03
50	0907150.D	3320.05	180912A BLK 5X1/0.05/30.12G DF10 AC	soil	9-14-18 16:04:55
51	0907151.D	3260.52	180912A LCS-3 5X1/0.05/30.67G DF10 AC	soil	9-14-18 16:21:49
54	0907154.D	3288.39	AZ79146S01 5X1/0.05/30.41G DF10 AC	soil	9-14-18 17:12:41
55	0907155.D	3300.33	AZ79147S01 5X1/0.05/30.30G DF10 AC	soil	9-14-18 17:29:35
56	0907156.D	3307.97	AZ79148S01 5X1/0.05/30.23G DF10 AC	soil	9-14-18 17:46:37
57	0907157.D	3235.2	AZ79149S01 5X1/0.05/30.91G DF10 AC	soil	9-14-18 18:03:34
58	0907158.D	3326.68	AZ79150S01 5X1/0.05/30.06G DF10 AC	soil	9-14-18 18:20:27
59	0907159.D	3325.57	AZ79151S01 5X1/0.05/30.07G DF10 AC	soil	9-14-18 18:37:23
60	0907160.D	3954.13	AZ79151S01 MS-3 5X1/0.05/25.29G DF10 AC	soil	9-14-18 18:54:24
61	0907161.D	3897.12	AZ79151S01 MSD-3 5X1/0.05/25.66G DF10 AC	soil	9-14-18 19:11:21
62	0907162.D	3309.07	AZ79152S01 5X1/0.05/30.22G DF10 AC	soil	9-14-18 19:28:16
64	0907164.D	1	PCB - 2 7/18/18	soil	9-14-18 20:02:14
65	0907165.D	3279.76	AZ79153S01 5X1/0.05/30.49G DF10 AC	soil	9-14-18 20:19:07
66	0907166.D	3232.06	AZ79154S01 5X1/0.05/30.94G DF10 AC	soil	9-14-18 20:36:03
67	0907167.D	3253.09	AZ79155S01 5X1/0.05/30.74G DF10 AC	soil	9-14-18 20:52:58
68	0907168.D	3255.21	AZ79156S01 5X1/0.05/30.72G DF10 AC	soil	9-14-18 21:10:00
69	0907169.D	3264.77	AZ79157S01 5X1/0.05/30.63G DF10 AC	soil	9-14-18 21:26:56
70	0907170.D	3300.33	AZ79158S01 5X1/0.05/30.30G DF10 AC	soil	9-14-18 21:43:53
71	0907171.D	3309.07	AZ79159S01 5X1/0.05/30.22G DF10 AC	soil	9-14-18 22:00:46
72	0907172.D	3258.39	AZ79160S01 5X1/0.05/30.69G DF10 AC	soil	9-14-18 22:17:48
74	0907174.D	1	PCB - 2 7/18/18	soil	9-14-18 22:51:40

ORGANICS
Calibration Data

APPL, INC.

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 08/29/18
Matrix: Instrument: Yoda Initials: MA

		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type	r^2	Q	MRF
			0829Y003.D	0829Y004.D	0829Y005.D	0829Y006.D	0829Y007.D	0829Y008.D	0829Y009.D	0829Y010.D	0829Y011.D							
1	I	1,4-dichlorobenzene-D4(IS)	ISTD															
2		1,4-Dioxane		0.1212	0.1379	0.1199	0.1272	0.1427	0.1497	0.1661	0.1667		0.14	13				
3	TM	n-Nitrosodimethylamine		0.3395	0.3323	0.3011	0.2980	0.3000	0.3225	0.3214	0.3450		0.32	5.8	TM			
4	TM	Pyridine		0.5676	0.4913	0.4935	0.4770	0.4708	0.5313	0.5399	0.5508		0.52	7.1	TM			
5	S	2-Fluorophenol (S)		1.543	1.557	1.482	1.497	1.512	1.502	1.470	1.459		1.5	2.3	S			
6	S	Phenol-D6 (S)		1.967	1.938	1.825	1.774	1.781	1.741	1.666	1.637		1.8	6.5	S			
7	*TM	Phenol		2.759	2.607	2.350	2.205	2.201	2.466	2.372	2.303		2.4	8.1	*TM			0.800
8	TM	Aniline		1.061	1.032	0.9352	0.8973	0.8529	1.032	0.8362			0.95	9.7	TM			
9	TM	Bis (2-chloroethyl) ether		1.421	1.377	1.260	1.204	1.205	1.290	1.282	1.277		1.3	5.9	TM			0.700
10	TM	2-Chlorophenol		2.040	1.912	1.802	1.740	1.718	1.864	1.851	1.861		1.8	5.5	TM			0.800
11	TM	1,3-DCB		2.210	2.046	1.868	1.777	1.779	1.879	1.852	1.835		1.9	7.8	TM			
12	*TM	1,4-DCB		2.217	2.089	1.885	1.783	1.776	1.886	1.830	1.820		1.9	8.3	*TM			
13	TM	Benzyl alcohol		1.314	1.266	1.171	1.138	1.130	1.243	1.222	1.232		1.2	5.3	TM			
14	TM	1,2-DCB		2.069	1.965	1.787	1.696	1.693	1.795	1.743	1.715		1.8	7.6	TM			
15	TM	2-Methylphenol		1.671	1.585	1.463	1.408	1.394	1.505	1.477	1.480		1.5	6.1	TM			0.700
16	TM	Bis (2-chloroisopropyl) ether		2.800	2.632	2.408	2.318	2.327	2.543	2.484	2.524		2.5	6.4	TM			0.010
17	TML	Acetophenone		2.888	2.733	2.420	2.115	2.070	2.066	1.908	1.861		2.3	17	TML	0.996		0.010
18	TML	3&4-Methylphenol		2.279	2.152	1.905	1.646	1.602	1.602	1.517	1.503		1.8	17	TML	0.999		0.600
19	**TM	n-Nitrosodi-n-propylamine		1.525	1.460	1.322	1.217	1.207	1.332	1.320	1.316		1.3	8.1	**TM			0.500
20	TM	Hexachloroethane		0.7991	0.7568	0.6988	0.6804	0.6846	0.7343	0.7161	0.7230		0.72	5.5	TM			0.300
21	I	Napthalene-D8(IS)	ISTD															
22	S	Nitrobenzene-D5(S)		0.4241	0.4316	0.4138	0.4239	0.4330	0.4251	0.4174	0.4169		0.42	1.6	S			
23	TM	Nitrobenzene		0.5407	0.5136	0.4717	0.4580	0.4577	0.4856	0.4742	0.4643		0.48	6.1	TM			0.200
24	TM	Isophorone		0.9349	0.8791	0.8245	0.7904	0.7919	0.8414	0.8356	0.8319		0.84	5.6	TM			0.400
25	*TM	2-Nitrophenol		0.2302	0.2368	0.2261	0.2231	0.2221	0.2396	0.2325	0.2319		0.23	2.7	*TM			0.100
26	TM	2,4-Dimethylphenol		0.4703	0.4324	0.4121	0.3826	0.3849	0.3978	0.3924	0.3777		0.41	7.7	TM			0.200
27	TM	Benzoic acid		0.2502	0.3015	0.3211	0.3422	0.3565	0.3928	0.3653	0.4038		0.34	15	TM			
28	TM	Bis (2-chloroethoxy) methane		0.5479	0.5087	0.4763	0.4442	0.4377	0.4591	0.4488	0.4406		0.47	8.3	TM			0.300
29	*TM	2,4-Dichlorophenol		0.3919	0.3756	0.3425	0.3306	0.3307	0.3458	0.3403	0.3273		0.35	6.7	*TM			0.200
30	TM	1,2,4-Trichlorobenzene		0.4362	0.4017	0.3571	0.3317	0.3216	0.3276	0.3140	0.2955		0.35	14	TM			
31	TM	3,4-Dimethylphenol		0.6022	0.5859	0.5317	0.4868	0.4862	0.4994	0.4801	0.4588		0.52	10	TM			
32	TM	Naphthalene		1.447	1.361	1.231	1.154	1.156	1.174	1.142	1.083		1.2	10	TM			0.700
33	TM	4-Chloroaniline		0.5870	0.5589	0.5003	0.4529	0.4444	0.4454	0.4108			0.49	14	TM			0.010
34	TM	2,6-Dichlorophenol		0.4037	0.3642	0.3382	0.3142	0.3105	0.3078	0.2923	0.2710		0.33	13	TM			
35	TM	Hexachloropropene		0.2557	0.2531	0.2368	0.2366	0.2380	0.2532	0.2495	0.2405		0.25	3.4	TM			

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 08/29/18
Matrix: Instrument: Yoda

Initials: MA

		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type		Q	
36	*TM	Hexachlorobutadiene		0.2327	0.2179	0.1999	0.1923	0.1923	0.1973	0.1900	0.1820		0.20	8.3	*TM			0.010
37	TM	Caprolactum		0.2317	0.2213	0.2129	0.2034	0.2034	0.2221	0.2227	0.2367		0.22	5.5	TM			0.010
38	*TM	4-Chloro-3-methylphenol		0.4152	0.3969	0.3737	0.3615	0.3580	0.3784	0.3787	0.3714		0.38	4.9	*TM			0.200
39	TM	2-Methylnaphthalene		0.9161	0.8599	0.7842	0.7297	0.7262	0.7440	0.7198	0.6765		0.77	10	TM			0.400
40	TM	1-Methylnaphthalene		0.9270	0.8562	0.7915	0.7259	0.7246	0.7391	0.7120	0.6638		0.77	11	TM			
41	I	Acenaphthene-D10(IS)	ISTD															
42	**TM	Hexachlorocyclopentadiene		0.4735	0.4727	0.4491	0.4407	0.4363	0.4671	0.4542	0.4314		0.45	3.7	**TM			0.050
43	TM	1,2,4,5-Tetrachlorobenzene		0.8677	0.8068	0.7371	0.6781	0.6622	0.6621	0.6386	0.5844		0.70	13	TM			0.010
44	*TM	2,4,6-Trichlorophenol		0.5353	0.5810	0.5201	0.4832	0.4890	0.4959	0.5003	0.4854		0.51	6.5	*TM			0.200
45	TM	2,4,5-Trichlorophenol		0.5971	0.5479	0.5121	0.4998	0.4781	0.5194	0.5092	0.4843		0.52	7.4	TM			0.200
46	S	2-Fluorobiphenyl(S)		1.744	1.739	1.623	1.569	1.547	1.479	1.441	1.356		1.6	8.8	S			
47	TM	1,1'-Biphenyl		2.294	2.124	1.933	1.808	1.762	1.754	1.705	1.556		1.9	13	TM			0.010
48	TM	2-Chloronaphthalene		1.764	1.708	1.530	1.427	1.402	1.454	1.414	1.337		1.5	10	TM			0.800
49	TM	2-Nitroaniline		0.5109	0.5301	0.4912	0.5072	0.5004	0.5383	0.5414	0.5305		0.52	3.6	TM			0.010
50	TM	Dimethyl phthalate		1.943	1.874	1.720	1.634	1.593	1.698	1.681	1.640		1.7	7.1	TM			0.010
51	TM	2,6-DNT		0.3748	0.3859	0.3728	0.3786	0.3677	0.4003	0.4009	0.3942		0.38	3.4	TM			0.200
52	TM	Acenaphthylene		2.736	2.593	2.390	2.298	2.244	2.334	2.261	2.129		2.4	8.4	TM			0.900
53	TM	3-Nitroaniline		0.4500	0.4553	0.4347	0.4257	0.4175	0.4436	0.4349	0.4225		0.44	3.1	TM			0.010
54	*TM	Acenaphthene		1.789	1.715	1.557	1.459	1.440	1.481	1.467	1.377		1.5	9.3	*TM			0.900
55	**TML	2,4-Dinitrophenol			0.1588	0.1837	0.2181	0.2262	0.2606	0.2746	0.2842		0.23	20	**TML	0.993		0.010
56	**TM	4-Nitrophenol		0.3911	0.3877	0.3694	0.3724	0.3756	0.4105	0.4231	0.4234		0.39	5.6	**TM			0.010
57	TM	Dibenzofuran		2.510	2.378	2.153	1.979	1.936	1.951	1.844	1.675		2.1	14	TM			0.800
58	TM	2,4-DNT		0.5022	0.5572	0.5202	0.5149	0.5068	0.5286	0.5199	0.4808		0.52	4.3	TM			0.200
59	TM	2,3,4,6-Tetrachlorophenol		0.4779	0.4720	0.4460	0.4325	0.4302	0.4517	0.4403	0.4159		0.45	4.7	TM			0.010
60	TM	Diethyl phthalate		1.950	1.826	1.703	1.599	1.552	1.614	1.621	1.565		1.7	8.4	TM			0.010
61	TML	4-Chlorophenyl phenyl ether			0.9034	0.7972	0.7113	0.6791	0.6525	0.6018	0.5792		0.70	16	TML	0.993		0.400
62	TML	Fluorene		2.031	1.902	1.691	1.489	1.429	1.392	1.334	1.278		1.6	18	TML	0.997		0.900
63	TM	4-Nitroaniline		0.4786	0.4812	0.4031	0.4171	0.4115	0.4461	0.4532	0.4380		0.44	6.7	TM			0.010
64	S	2,4,6-Tribromophenol(S)		0.2035	0.2140	0.1975	0.1942	0.1940	0.1802	0.1743	0.1599		0.19	9.1	S			
65	I	Phenanthrene-D10(IS)	ISTD															
66	TM	4,6-Dinitro-2-methylphenol			0.1564	0.1561	0.1767	0.1806	0.2009	0.2000	0.1962		0.18	11	TM			0.010
67	TM	Diphenyl amine			0.8250	0.7205	0.6531	0.6472	0.6352	0.5835	0.5547		0.66	14	TM			
68	*TM	n-Nitrosodiphenylamine			0.8250	0.7205	0.6531	0.6472	0.6352	0.5835	0.5547		0.66	14	*TM			0.010
69	TM	1,2-Diphenylhydrazine		1.163	1.124	1.027	1.002	0.9953	1.029	1.000	1.103		1.1	6.2	TM			
70	TM	4-Bromophenyl phenyl ether		0.2936	0.2841	0.2699	0.2511	0.2507	0.2642	0.2486	0.2293		0.26	8.0	TM			0.100

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 6
Initial Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Initial Cal. Date: 08/29/18
Instrument: Yoda

Initials: MA

		Compound	4	5	10	20	40	50	60	80	100		Avg	%RSD	Type		Q	
71	TM	Hexachlorobenzene		0.3369	0.3070	0.2810	0.2671	0.2640	0.2746	0.2607	0.2438		0.28	11	TM			0.100
72	TM	Atrazine		0.2234	0.2214	0.2075	0.2107	0.2122	0.2457	0.2472	0.2419		0.23	7.3	TM			0.010
73	*TM	Pentachlorophenol		0.1902	0.2110	0.1983	0.1938	0.1994	0.2089	0.2050	0.1981		0.20	3.6	*TM			0.050
74	TM	Phenanthrene		1.626	1.527	1.373	1.276	1.269	1.291	1.254	1.187		1.4	11	TM			0.700
75	TM	Anthracene		1.607	1.561	1.406	1.335	1.315	1.347	1.301	1.215		1.4	9.7	TM			0.700
76	TM	Carbazol		1.469	1.424	1.264	1.235	1.245	1.275	1.235	1.150		1.3	8.2	TM			0.010
77	TM	Di-n-butylphthalate		1.657	1.649	1.526	1.465	1.466	1.484	1.432	1.307		1.5	7.6	TM			0.010
78	*TM	Fluoranthene		1.637	1.599	1.458	1.400	1.387	1.429	1.356	1.270		1.4	8.5	*TM			0.600
79	I	Chrysene-D12(IS)	ISTD															
80	TM	Benzidine		0.4797	0.4647	0.4428	0.4676	0.4607	0.6053	0.5939	0.5797		0.51	13	TM			
81	TM	Pyrene		1.825	1.735	1.651	1.606	1.601	1.716	1.632	1.579		1.7	5.0	TM			0.600
82	S	Terphenyl-D14(S)		1.079	1.100	1.050	1.056	1.051	1.041	0.9835	0.9435		1.0	4.9	S			
83	TM	Butyl benzylphthalate		0.7380	0.7238	0.7170	0.7190	0.7120	0.7826	0.7624	0.7352		0.74	3.3	TM			0.010
84	TM	3,3'-Dichlorobenzidine		0.5667	0.5692	0.5469	0.5494	0.5312	0.5630	0.5302	0.4931		0.54	4.7	TM			0.010
85	TM	Benz (a) anthracene		1.687	1.561	1.408	1.275	1.268	1.329	1.291	1.222		1.4	12	TM			0.800
86	TM	Bis (2-ethylhexyl) phthalate		1.054	0.9965	0.9237	0.8548	0.8352	0.8689	0.8240	0.7962		0.89	10	TM			0.010
87	TM	Chrysene		1.637	1.550	1.466	1.457	1.431	1.503	1.423	1.414		1.5	5.1	TM			0.700
88	*TM	Di-n-octylphthalate		1.561	1.612	1.605	1.690	1.678	1.852	1.795	1.724		1.7	5.9	*TM			0.010
89	I	Perylene-D12(IS)	ISTD															
90	TM	Benzo (b) fluoranthene		1.582	1.436	1.337	1.363	1.391	1.494	1.504	1.446		1.4	5.6	TM			0.700
91	TM	Benzo (k) fluoranthene		1.463	1.453	1.371	1.260	1.223	1.243	1.200	1.147		1.3	9.2	TM			0.700
92	*TM	Benzo (a) pyrene	1.626	1.338	1.272	1.244	1.244	1.241	1.310	1.300	1.265		1.3	9.2	*TM			0.700
93	TM	Indeno (1,2,3-cd) pyrene		1.529	1.486	1.419	1.406	1.416	1.506	1.503	1.489		1.5	3.3	TM			0.500
94	TM	Dibenz (a,h) anthracene	1.636	1.329	1.283	1.233	1.218	1.234	1.301	1.298	1.262		1.3	9.7	TM			0.400
95	TM	Benzo (g,h,i) perylene		1.268	1.208	1.160	1.148	1.147	1.227	1.228	1.216		1.2	3.7	TM			0.500
96																		
97																		
98																		
99																		
100																		
101																		
102																		
103																		
104																		
105																		

Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y003.D   Vial: 3
Acq On : 29 Aug 18 6:24   Operator: MA
Sample : 4ug/ml 8270 08/16/18   Inst : Yoda
Misc :   Multiplr: 1.00

Quant Time: Aug 29 9:16 2018   Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 09:11:38 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	332104	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1321291	40.00000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	670627	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1257634	40.00000 ppb	-0.01
79) Chrysene-D12(IS)	13.90	240	1242494	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.85	264	1298073	40.00000 ppb	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc Units
5) 2-Fluorophenol (S)	0.00	112	0d	0.00000 ppb
Spiked Amount 200.000			Recovery	= 0.000%
6) Phenol-D6 (S)	0.00	99	0d	0.00000 ppb
Spiked Amount 200.000			Recovery	= 0.000%
22) Nitrobenzene-D5(S)	0.00	82	0d	0.00000 ppb
Spiked Amount 100.000			Recovery	= 0.000%
46) 2-Fluorobiphenyl(S)	0.00	172	0d	0.00000 ppb
Spiked Amount 100.000			Recovery	= 0.000%
64) 2,4,6-Tribromophenol(S)	0.00	330	0d	0.00000 ppb
Spiked Amount 200.000			Recovery	= 0.000%
82) Terphenyl-D14(S)	0.00	244	0d	0.00000 ppb
Spiked Amount 100.000			Recovery	= 0.000%

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
92) Benzo (a) pyrene	15.75	252	211061	4.94188 ppb	99
94) Dibenz (a,h) anthracene	17.89	278	212308	5.18804 ppb	97

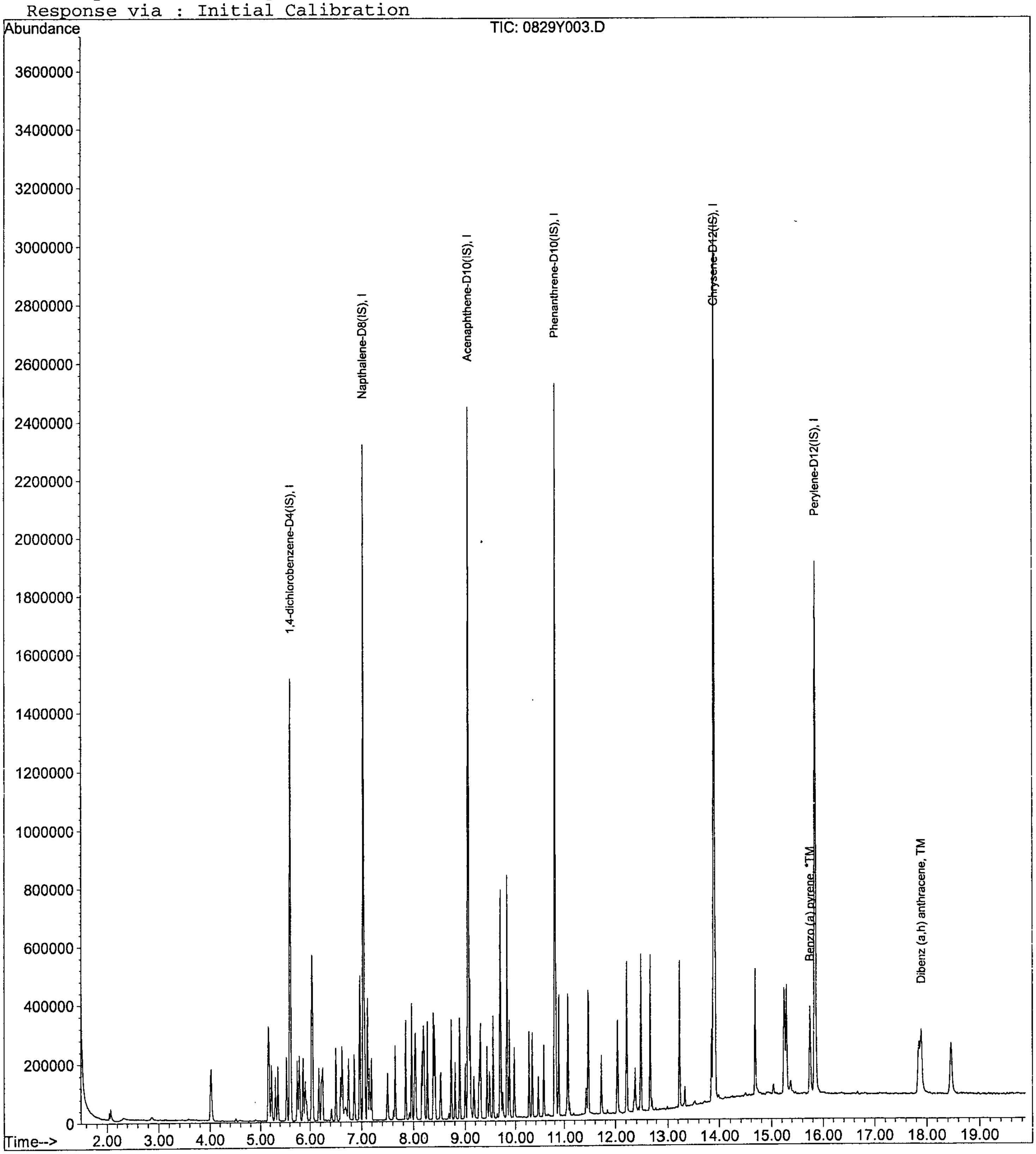
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y003.D Vial: 3
Acq On : 29 Aug 18 6:24 Operator: MA
Sample : 4ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 9:16 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

```
Data File : M:\YODA\DATA\Y180829\0829Y004.D          Vial: 4
Acq On    : 29 Aug 18   6:52                      Operator: MA
Sample    : 5ug/ml 8270 08/16/18                  Inst    : Yoda
Misc      :                                       Multiplr: 1.00

Quant Time: Aug 29 12:55 2018            Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	334748	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1362283	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	694730	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1290906	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1248362	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.85	264	1310804	40.00000 ppb	0.00
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	129106	10.26461 ppb	0.00
Spiked Amount 200.000			Recovery =	5.133%	
6) Phenol-D6 (S)	5.17	99	164609	10.98231 ppb	-0.02
Spiked Amount 200.000			Recovery =	5.491%	
22) Nitrobenzene-D5(S)	6.23	82	72220	5.01062 ppb	0.00
Spiked Amount 100.000			Recovery =	5.011%	
46) 2-Fluorobiphenyl(S)	8.27	172	151465	5.58245 ppb	0.00
Spiked Amount 100.000			Recovery =	5.582%	
64) 2,4,6-Tribromophenol(S)	9.98	330	35344	10.72677 ppb	-0.02
Spiked Amount 200.000			Recovery =	5.364%	
82) Terphenyl-D14(S)	12.66	244	168430	5.19867 ppb	0.00
Spiked Amount 100.000			Recovery =	5.199%	

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
2) 1,4-Dioxane	1.82	58	507	0.42842	64
3) n-Nitrosodimethylamine	2.04	42	14207	5.30569 ppb	89
4) Pyridine	2.07	79	23752	5.50809 ppb	98
7) Phenol	5.18	94	115464	5.72981 ppb	99
8) Aniline	5.23	66	44383	5.58627 ppb	85
9) Bis (2-chloroethyl) ether	5.31	63	59442	5.50780 ppb	91
10) 2-Chlorophenol	5.36	128	85364	5.51798 ppb	94
11) 1,3-DCB	5.54	146	92463	5.79760 ppb	97
12) 1,4-DCB	5.62	146	92754	5.80066 ppb	96
13) Benzyl alcohol	5.75	108	54980	5.41000 ppb	97
14) 1,2-DCB	5.79	146	86580	5.72247 ppb	98
15) 2-Methylphenol	5.87	107	69930	5.57899 ppb	97
16) Bis (2-chloroisopropyl) et	5.90	45	117178	5.59081 ppb	99
17) Acetophenone	6.05	105	120839	2.11627 ppb	84
18) 3&4-Methylphenol	6.03	107	190688	5.70320 ppb	93
19) n-Nitrosodi-n-propylamine	6.05	70	63824	5.70257 ppb	99
20) Hexachloroethane	6.17	117	33436	5.51745 ppb	98
23) Nitrobenzene	6.25	77	92065	5.59421 ppb	100
24) Isophorone	6.52	82	159198	5.55688 ppb	99
25) 2-Nitrophenol	6.61	139	39197	4.99750 ppb	94
26) 2,4-Dimethylphenol	6.64	122	80082	5.78793 ppb	94
27) Benzoic acid	6.68	105	42633	3.66376 ppb	99
28) Bis (2-chloroethoxy) metha	6.75	93	93303	5.82380 ppb	97
29) 2,4-Dichlorophenol	6.87	162	66729	5.62871 ppb	97
30) 1,2,4-Trichlorobenzene	6.97	180	74273	6.26377 ppb	98
31) 3,4-Dimethylphenol	6.97	107	102545	5.83099 ppb	95
32) Naphthalene	7.06	128	246405	5.93717 ppb	99
33) 4-Chloroaniline	7.12	127	99954	6.04287 ppb	96
34) 2,6-Dichlorophenol	7.13	162	68749	6.20658 ppb	95
35) Hexachloropropene	7.17	213	43548	5.21026 ppb	99
36) Hexachlorobutadiene	7.19	225	39619	5.80096 ppb	98
37) Caprolactum	7.50	55	39453	5.28299 ppb	93

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y004.D Vial: 4
Acq On : 29 Aug 18 6:52 Operator: MA
Sample : 5ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38)	4-Chloro-3-methylphenol	7.65	107	70696	5.47360 ppb		100
39)	2-Methylnaphthalene	7.85	142	155995	5.95207 ppb		97
40)	1-Methylnaphthalene	7.96	142	157853	6.03898 ppb		99
42)	Hexachlorocyclopentadiene	8.03	237	41118	5.22467 ppb		97
43)	1,2,4,5-Tetrachlorobenzene	8.04	216	75354	6.15727 ppb		97
44)	2,4,6-Trichlorophenol	8.17	196	46482	5.23447 ppb		96
45)	2,4,5-Trichlorophenol	8.21	196	51850	5.75797 ppb		97
47)	1,1'-Biphenyl	8.39	154	199216	6.14335 ppb		99
48)	2-Chloronaphthalene	8.42	162	153220	5.86352 ppb		96
49)	2-Nitroaniline	8.53	65	44367	4.92432 ppb		88
50)	Dimethyl phthalate	8.73	163	168695	5.63694 ppb		99
51)	2,6-DNT	8.81	165	32549	4.87507 ppb		91
52)	Acenaphthylene	8.90	152	237603	5.76491 ppb		98
53)	3-Nitroaniline	9.00	138	39079	5.16618 ppb	#	96
54)	Acenaphthene	9.10	154	155334	5.82398 ppb		98
55)	2,4-Dinitrophenol	9.12	184	8381	9.98888 ppb		91
56)	4-Nitrophenol	9.17	65	33964	4.96115 ppb		83
57)	Dibenzofuran	9.30	168	217962	6.11218 ppb		94
58)	2,4-DNT	9.27	165	43611	4.86312 ppb		98
59)	2,3,4,6-Tetrachlorophenol	9.43	232	41498	5.35925 ppb		94
60)	Diethyl phthalate	9.56	149	169350	5.80800 ppb		98
61)	4-Chlorophenyl phenyl ethe	9.70	204	81985	-1.53980 ppb		96
62)	Fluorene	9.70	166	176388	2.00361 ppb		98
63)	4-Nitroaniline	9.71	138	41564	5.42559 ppb		95
66)	4,6-Dinitro-2-methylphenol	9.75	198	19339	3.31132 ppb	#	82
67)	Diphenyl amine	9.83	169	272535	12.79739 ppb		98
68)	n-Nitrosodiphenylamine	9.83	169	272535	12.79739 ppb		98
69)	1,2-Diphenylhydrazine	9.89	77	187626	5.50865 ppb		91
70)	4-Bromophenyl phenyl ether	10.28	248	47382	5.61570 ppb		93
71)	Hexachlorobenzene	10.33	284	54357	6.02866 ppb		92
72)	Atrazine	10.45	200	18025	2.46871 ppb		95
73)	Pentachlorophenol	10.56	266	30684	4.74006 ppb		92
74)	Phenanthrene	10.82	178	262449	6.02256 ppb		100
75)	Anthracene	10.89	178	259364	5.79871 ppb		100
76)	Carbazol	11.07	167	237013	5.70537 ppb		97
77)	Di-n-butylphthalate	11.47	149	267377	5.53014 ppb		99
78)	Fluoranthene	12.22	202	264149	5.67567 ppb	#	94
80)	Benzidine	12.37	184	74849	4.68606 ppb		99
81)	Pyrene	12.48	202	284745	5.46920 ppb		99
83)	Butyl benzylphthalate	13.23	149	115165	5.01199 ppb		98
84)	3,3'-Dichlorobenzidine	13.85	252	88425	5.21113 ppb		99
85)	Benz (a) anthracene	13.89	228	263205	6.11069 ppb		99
86)	Bis (2-ethylhexyl) phthala	13.89	149	164463	5.89357 ppb		99
87)	Chrysene	13.92	228	255376	5.51034 ppb		100
88)	Di-n-octylphthalate	14.68	149	243641	4.62066 ppb		98
90)	Benzo (b) fluoranthene	15.25	252	259186	5.47684 ppb		97
91)	Benzo (k) fluoranthene	15.29	252	239779	5.65008 ppb		98
92)	Benzo (a) pyrene	15.74	252	219178	5.08388 ppb		99
93)	Indeno (1,2,3-cd) pyrene	17.84	276	250571	5.20430 ppb		99
94)	Dibenz (a,h) anthracene	17.89	278	217696	5.06950 ppb		98
95)	Benzo (g,h,i) perylene	18.45	276	207772	5.28201 ppb		98

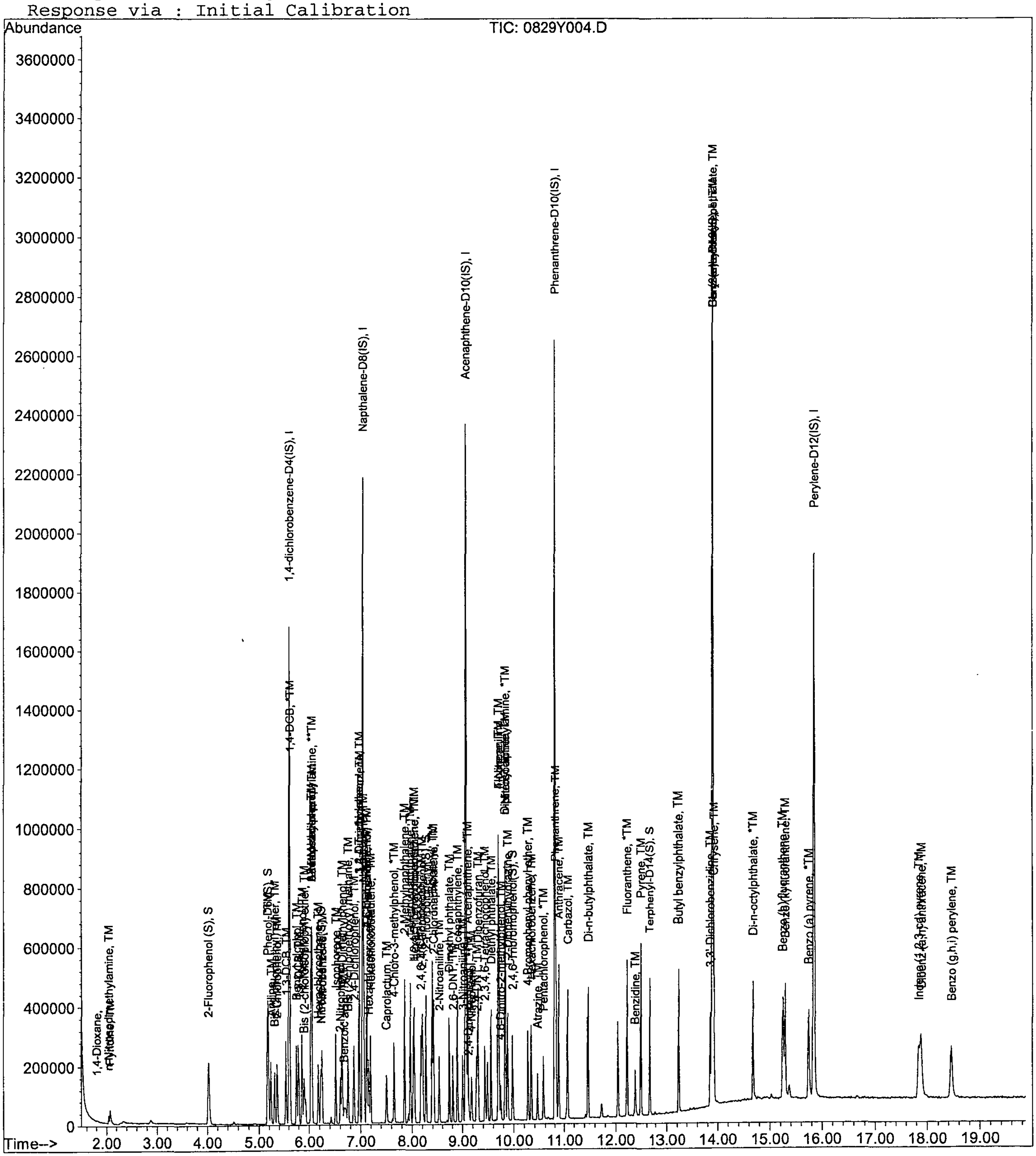
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y004.D Vial: 4
Acq On : 29 Aug 18 6:52 Operator: MA
Sample : 5ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y005.D   Vial: 5
Acq On : 29 Aug 18 7:20   Operator: MA
Sample : 10ug/ml 8270 08/16/18   Inst : Yoda
Misc :   Multiplr: 1.00

Quant Time: Aug 29 12:55 2018   Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	394362	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1631177	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.07	164	819592	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1504466	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1467991	40.00000 ppb	-0.01
89) Perylene-D12(IS)	15.85	264	1593057	40.00000 ppb	-0.01
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	307066	20.72290 ppb	-0.01
Spiked Amount 200.000				Recovery = 10.362%	
6) Phenol-D6 (S)	5.17	99	382167	21.64293 ppb	-0.02
Spiked Amount 200.000				Recovery = 10.822%	
22) Nitrobenzene-D5(S)	6.23	82	175999	10.19789 ppb	-0.01
Spiked Amount 100.000				Recovery = 10.198%	
46) 2-Fluorobiphenyl(S)	8.27	172	356240	11.12945 ppb	-0.01
Spiked Amount 100.000				Recovery = 11.129%	
64) 2,4,6-Tribromophenol(S)	9.99	330	87704	22.56270 ppb	-0.01
Spiked Amount 200.000				Recovery = 11.282%	
82) Terphenyl-D14(S)	12.66	244	403513	10.59126 ppb	0.00
Spiked Amount 100.000				Recovery = 10.591%	

Target Compounds					Qvalue
2) 1,4-Dioxane	1.82	58	1360	0.97550	77
3) n-Nitrosodimethylamine	2.04	42	32758	10.38436 ppb	89
4) Pyridine	2.07	79	48434	9.53398 ppb	94
7) Phenol	5.19	94	257040	10.82722 ppb	96
8) Aniline	5.23	66	101719	10.86751 ppb	97
9) Bis (2-chloroethyl) ether	5.31	63	135804	10.68121 ppb	98
10) 2-Chlorophenol	5.36	128	188550	10.34558 ppb	98
11) 1,3-DCB	5.54	146	201748	10.73773 ppb	98
12) 1,4-DCB	5.62	146	205910	10.93063 ppb	98
13) Benzyl alcohol	5.75	108	124790	10.42306 ppb	95
14) 1,2-DCB	5.79	146	193684	10.86633 ppb	99
15) 2-Methylphenol	5.87	107	156222	10.57930 ppb	100
16) Bis (2-chloroisopropyl) et	5.90	45	259478	10.50878 ppb	100
17) Acetophenone	6.06	105	269488	9.29220 ppb	78
18) 3&4-Methylphenol	6.04	107	424340	19.74734 ppb	98
19) n-Nitrosodi-n-propylamine	6.05	70	143986	10.92019 ppb	99
20) Hexachloroethane	6.17	117	74615	10.45137 ppb	95
23) Nitrobenzene	6.25	77	209424	10.62763 ppb	93
24) Isophorone	6.52	82	358491	10.45051 ppb	99
25) 2-Nitrophenol	6.61	139	96575	10.28326 ppb	97
26) 2,4-Dimethylphenol	6.64	122	176317	10.64262 ppb	98
27) Benzoic acid	6.70	105	123030	8.82995 ppb	97
28) Bis (2-chloroethoxy) metha	6.76	93	207450	10.81411 ppb	100
29) 2,4-Dichlorophenol	6.87	162	153173	10.79054 ppb	98
30) 1,2,4-Trichlorobenzene	6.97	180	163831	11.53898 ppb	99
31) 3,4-Dimethylphenol	6.97	107	238918	11.34600 ppb	98
32) Naphthalene	7.06	128	555044	11.16925 ppb	99
33) 4-Chloroaniline	7.12	127	227906	11.50708 ppb	97
34) 2,6-Dichlorophenol	7.13	162	148507	11.19693 ppb	96
35) Hexachloropropene	7.16	213	103198	10.31167 ppb	98
36) Hexachlorobutadiene	7.19	225	88857	10.86562 ppb	99
37) Caprolactum	7.52	55	90234	10.09105 ppb	98

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y005.D Vial: 5
Acq On : 29 Aug 18 7:20 Operator: MA
Sample : 10ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38)	4-Chloro-3-methylphenol	7.66	107	161870	10.46672 ppb		90
39)	2-Methylnaphthalene	7.85	142	350669	11.17432 ppb		99
40)	1-Methylnaphthalene	7.96	142	349148	11.15543 ppb		100
42)	Hexachlorocyclopentadiene	8.03	237	96854	10.43189 ppb		96
43)	1,2,4,5-Tetrachlorobenzene	8.04	216	165317	11.45032 ppb		96
44)	2,4,6-Trichlorophenol	8.17	196	119053	11.36440 ppb		99
45)	2,4,5-Trichlorophenol	8.21	196	112258	10.56711 ppb		91
47)	1,1'-Biphenyl	8.39	154	435244	11.37712 ppb		100
48)	2-Chloronaphthalene	8.42	162	349978	11.35278 ppb		97
49)	2-Nitroaniline	8.53	65	108609	10.21811 ppb		93
50)	Dimethyl phthalate	8.74	163	384073	10.87860 ppb		99
51)	2,6-DNT	8.82	165	79078	10.03962 ppb		87
52)	Acenaphthylene	8.90	152	531253	10.92597 ppb		99
53)	3-Nitroaniline	9.00	138	93284	10.45325 ppb		95
54)	Acenaphthene	9.11	154	351317	11.16532 ppb		99
55)	2,4-Dinitrophenol	9.13	184	32535	13.63445 ppb		89
56)	4-Nitrophenol	9.18	65	79440	9.83605 ppb		99
57)	Dibenzofuran	9.30	168	487274	11.58263 ppb		94
58)	2,4-DNT	9.28	165	114173	10.79198 ppb		83
59)	2,3,4,6-Tetrachlorophenol	9.44	232	96719	10.58783 ppb		98
60)	Diethyl phthalate	9.56	149	374097	10.87537 ppb		99
61)	4-Chlorophenyl phenyl ethe	9.70	204	185096	6.47437 ppb		94
62)	Fluorene	9.70	166	389717	9.18342 ppb		100
63)	4-Nitroaniline	9.72	138	98587	10.90856 ppb		90
66)	4,6-Dinitro-2-methylphenol	9.75	198	58808	8.64003 ppb		94
67)	Diphenyl amine	9.84	169	620569	25.00354 ppb		100
68)	n-Nitrosodiphenylamine	9.84	169	620569	25.00354 ppb		100
69)	1,2-Diphenylhydrazine	9.89	77	422901	10.65377 ppb		95
70)	4-Bromophenyl phenyl ether	10.27	248	106849	10.86609 ppb		95
71)	Hexachlorobenzene	10.34	284	115452	10.98699 ppb		93
72)	Atrazine	10.45	200	41635	4.89290 ppb		95
73)	Pentachlorophenol	10.56	266	79354	10.51848 ppb		97
74)	Phenanthrene	10.83	178	574202	11.30611 ppb		99
75)	Anthracene	10.89	178	586958	11.26007 ppb		100
76)	Carbazol	11.07	167	535690	11.06465 ppb		98
77)	Di-n-butylphthalate	11.47	149	620068	11.00433 ppb		99
78)	Fluoranthene	12.22	202	601513	11.08985 ppb	#	95
80)	Benzidine	12.37	184	170499	9.07738 ppb		98
81)	Pyrene	12.48	202	636555	10.39730 ppb		99
83)	Butyl benzylphthalate	13.23	149	265583	9.82896 ppb		99
84)	3,3'-Dichlorobenzidine	13.85	252	208859	10.46712 ppb		98
85)	Benz (a) anthracene	13.89	228	572682	11.30647 ppb		99
86)	Bis (2-ethylhexyl) phthala	13.89	149	365649	11.14273 ppb		99
87)	Chrysene	13.92	228	568773	10.43649 ppb		98
88)	Di-n-octylphthalate	14.68	149	591310	9.53644 ppb		97
90)	Benzo (b) fluoranthene	15.25	252	571719	9.94049 ppb		98
91)	Benzo (k) fluoranthene	15.29	252	578485	11.21610 ppb		99
92)	Benzo (a) pyrene	15.75	252	506568	9.66813 ppb		98
93)	Indeno (1,2,3-cd) pyrene	17.85	276	591988	10.11697 ppb		99
94)	Dibenz (a,h) anthracene	17.90	278	511147	9.79416 ppb		100
95)	Benzo (g,h,i) perylene	18.46	276	481163	10.06493 ppb		96

(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y005.D              Vial: 5
Acq On    : 29 Aug 18   7:20                         Operator: MA
Sample    : 10ug/ml 8270 08/16/18                    Inst    : Yoda
Misc      :                                          Multiplr: 1.00

Quant Time: Aug 29 12:55 2018          Quant Results File: Y0829NC.RES

Method        : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title         : EPA 8270C
Last Update   : Wed Aug 29 10:21:31 2018
Response via  : Initial Calibration
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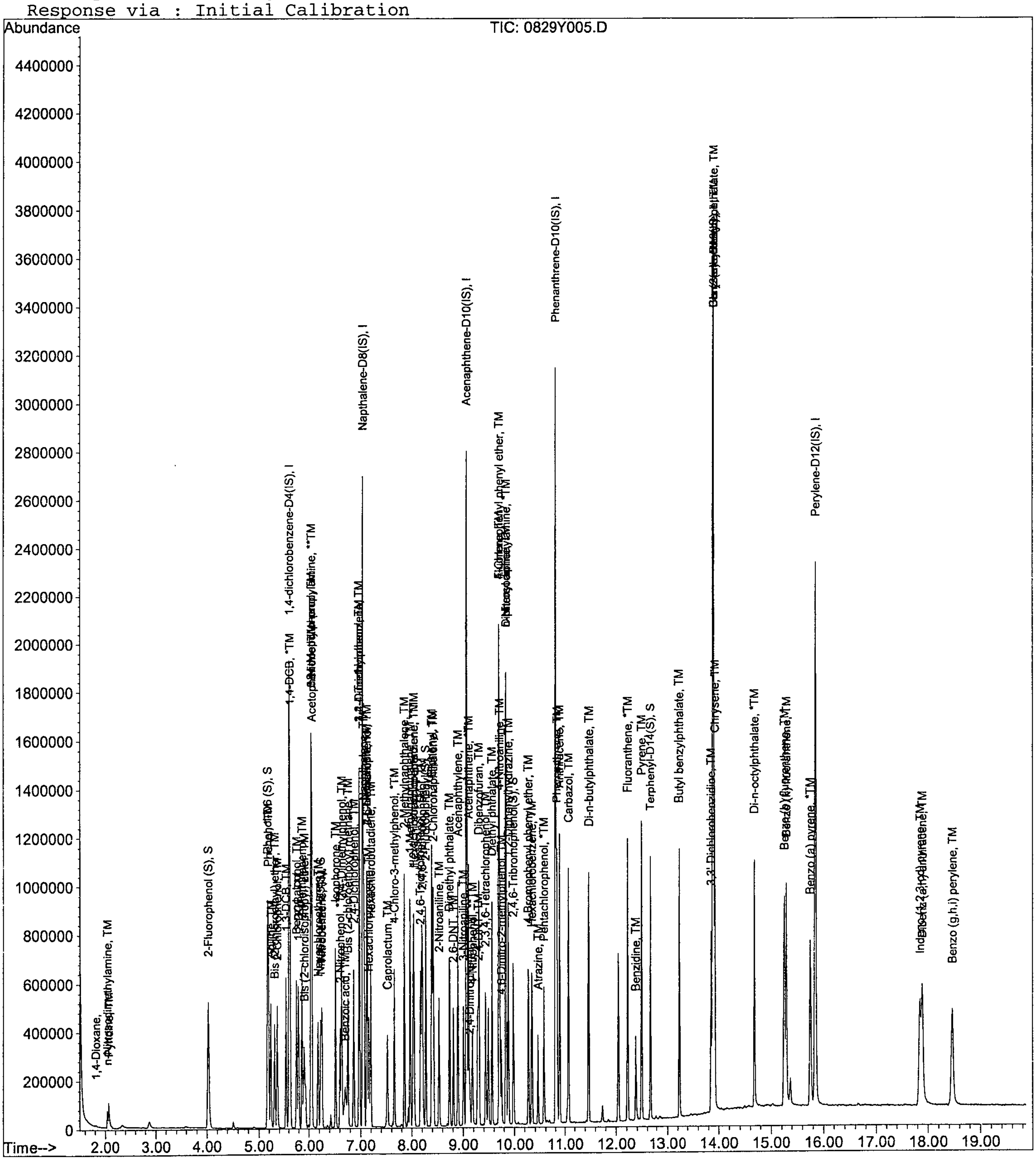


Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y006.D Vial: 6
Acq On : 29 Aug 18 7:47 Operator: MA
Sample : 20ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	355121	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1454638	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.07	164	741595	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1367145	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1286051	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.85	264	1417046	40.00000 ppb	0.00
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	526422	39.45223 ppb	0.00
Spiked Amount 200.000				Recovery = 19.726%	
6) Phenol-D6 (S)	5.17	99	648202	40.76542 ppb	-0.02
Spiked Amount 200.000				Recovery = 20.383%	
22) Nitrobenzene-D5(S)	6.23	82	300965	19.55520 ppb	0.00
Spiked Amount 100.000				Recovery = 19.555%	
46) 2-Fluorobiphenyl(S)	8.27	172	601987	20.78496 ppb	0.00
Spiked Amount 100.000				Recovery = 20.785%	
64) 2,4,6-Tribromophenol(S)	9.99	330	146499	41.65214 ppb	0.00
Spiked Amount 200.000				Recovery = 20.826%	
82) Terphenyl-D14(S)	12.66	244	674998	20.22358 ppb	0.00
Spiked Amount 100.000				Recovery = 20.224%	

Target Compounds					Qvalue
2) 1,4-Dioxane	1.81	58	2129	1.69583	59
3) n-Nitrosodimethylamine	2.04	42	53464	18.82099 ppb	93
4) Pyridine	2.07	79	87626	19.15472 ppb	94
7) Phenol	5.19	94	417211	19.51600 ppb	99
8) Aniline	5.23	66	166049	19.70075 ppb	95
9) Bis (2-chloroethyl) ether	5.31	63	223734	19.54154 ppb	99
10) 2-Chlorophenol	5.36	128	320040	19.50075 ppb	100
11) 1,3-DCB	5.54	146	331697	19.60486 ppb	99
12) 1,4-DCB	5.62	146	334712	19.73139 ppb	99
13) Benzyl alcohol	5.75	108	207850	19.27899 ppb	94
14) 1,2-DCB	5.79	146	317308	19.76919 ppb	98
15) 2-Methylphenol	5.87	107	259829	19.53984 ppb	99
16) Bis (2-chloroisopropyl) et	5.91	45	427556	19.22929 ppb	94
17) Acetophenone	6.06	105	429691	21.01512 ppb	80
18) 3&4-Methylphenol	6.04	107	676360	42.72778 ppb	96
19) n-Nitrosodi-n-propylamine	6.06	70	234705	19.76746 ppb	96
20) Hexachloroethane	6.17	117	124080	19.30046 ppb	93
23) Nitrobenzene	6.26	77	343106	19.52471 ppb	97
24) Isophorone	6.52	82	599651	19.60217 ppb	99
25) 2-Nitrophenol	6.61	139	164464	19.63736 ppb	99
26) 2,4-Dimethylphenol	6.64	122	299728	20.28747 ppb	96
27) Benzoic acid	6.73	105	233682	18.80697 ppb	97
28) Bis (2-chloroethoxy) metha	6.76	93	346416	20.24983 ppb	99
29) 2,4-Dichlorophenol	6.87	162	249134	19.68068 ppb	99
30) 1,2,4-Trichlorobenzene	6.97	180	259706	20.51160 ppb	98
31) 3,4-Dimethylphenol	6.97	107	386722	20.59392 ppb	99
32) Naphthalene	7.06	128	895331	20.20348 ppb	100
33) 4-Chloroaniline	7.12	127	363890	20.60277 ppb	98
34) 2,6-Dichlorophenol	7.13	162	245957	20.79492 ppb	98
35) Hexachloropropene	7.17	213	172194	19.29398 ppb	99
36) Hexachlorobutadiene	7.19	225	145368	19.93323 ppb	98
37) Caprolactum	7.53	55	154869	19.42124 ppb	98

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y006.D Vial: 6
Acq On : 29 Aug 18 7:47 Operator: MA
Sample : 20ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38)	4-Chloro-3-methylphenol	7.66	107	271830	19.71005 ppb		96
39)	2-Methylnaphthalene	7.85	142	570361	20.38073 ppb		99
40)	1-Methylnaphthalene	7.97	142	575676	20.62534 ppb		100
42)	Hexachlorocyclopentadiene	8.03	237	166510	19.82059 ppb		97
43)	1,2,4,5-Tetrachlorobenzene	8.05	216	273324	20.92226 ppb		98
44)	2,4,6-Trichlorophenol	8.17	196	192840	20.34389 ppb		98
45)	2,4,5-Trichlorophenol	8.21	196	189887	19.75446 ppb		96
47)	1,1'-Biphenyl	8.39	154	716674	20.70390 ppb		99
48)	2-Chloronaphthalene	8.42	162	567345	20.33946 ppb		98
49)	2-Nitroaniline	8.53	65	182133	18.93758 ppb		94
50)	Dimethyl phthalate	8.74	163	637893	19.96816 ppb		99
51)	2,6-DNT	8.82	165	138239	19.39648 ppb		88
52)	Acenaphthylene	8.90	152	886276	20.14460 ppb		99
53)	3-Nitroaniline	9.01	138	161196	19.96316 ppb		94
54)	Acenaphthene	9.11	154	577314	20.27753 ppb		98
55)	2,4-Dinitrophenol	9.13	184	68130	20.51755 ppb		91
56)	4-Nitrophenol	9.18	65	136990	18.74568 ppb		94
57)	Dibenzofuran	9.30	168	798256	20.97041 ppb		97
58)	2,4-DNT	9.28	165	192898	20.15098 ppb		87
59)	2,3,4,6-Tetrachlorophenol	9.44	232	165364	20.00631 ppb		98
60)	Diethyl phthalate	9.56	149	631537	20.29036 ppb		97
61)	4-Chlorophenyl phenyl ethe	9.70	204	295594	19.31386 ppb		97
62)	Fluorene	9.70	166	626995	21.16992 ppb		100
63)	4-Nitroaniline	9.72	138	149460	18.27695 ppb		98
66)	4,6-Dinitro-2-methylphenol	9.76	198	106679	17.24747 ppb	#	75
67)	Diphenyl amine	9.84	169	985029	43.67453 ppb		99
68)	n-Nitrosodiphenylamine	9.84	169	985029	43.67453 ppb		99
69)	1,2-Diphenylhydrazine	9.89	77	701865	19.45745 ppb		96
70)	4-Bromophenyl phenyl ether	10.28	248	184519	20.64959 ppb		92
71)	Hexachlorobenzene	10.34	284	192109	20.11838 ppb		93
72)	Atrazine	10.45	200	70911	9.17041 ppb		91
73)	Pentachlorophenol	10.56	266	135534	19.76970 ppb		98
74)	Phenanthrene	10.83	178	938341	20.33185 ppb		100
75)	Anthracene	10.89	178	961253	20.29269 ppb		99
76)	Carbazol	11.07	167	864189	19.64268 ppb		98
77)	Di-n-butylphthalate	11.47	149	1042803	20.36546 ppb		100
78)	Fluoranthene	12.22	202	996391	20.21520 ppb	#	95
80)	Benzidine	12.37	184	284655	17.29907 ppb		99
81)	Pyrene	12.48	202	1061606	19.79306 ppb		100
83)	Butyl benzylphthalate	13.23	149	460900	19.47059 ppb		97
84)	3,3'-Dichlorobenzidine	13.85	252	351538	20.10998 ppb		98
85)	Benz (a) anthracene	13.89	228	905310	20.40216 ppb		100
86)	Bis (2-ethylhexyl) phthala	13.89	149	593770	20.65431 ppb		99
87)	Chrysene	13.92	228	942142	19.73318 ppb		99
88)	Di-n-octylphthalate	14.68	149	1031254	18.98462 ppb		99
90)	Benzo (b) fluoranthene	15.25	252	947287	18.51630 ppb		99
91)	Benzo (k) fluoranthene	15.29	252	971500	21.17580 ppb		98
92)	Benzo (a) pyrene	15.75	252	881695	18.91780 ppb		99
93)	Indeno (1,2,3-cd) pyrene	17.85	276	1005350	19.31534 ppb		98
94)	Dibenz (a,h) anthracene	17.90	278	875053	18.84964 ppb		99
95)	Benzo (g,h,i) perylene	18.47	276	823181	19.35803 ppb		98

(#) = qualifier out of range (m) = manual integration

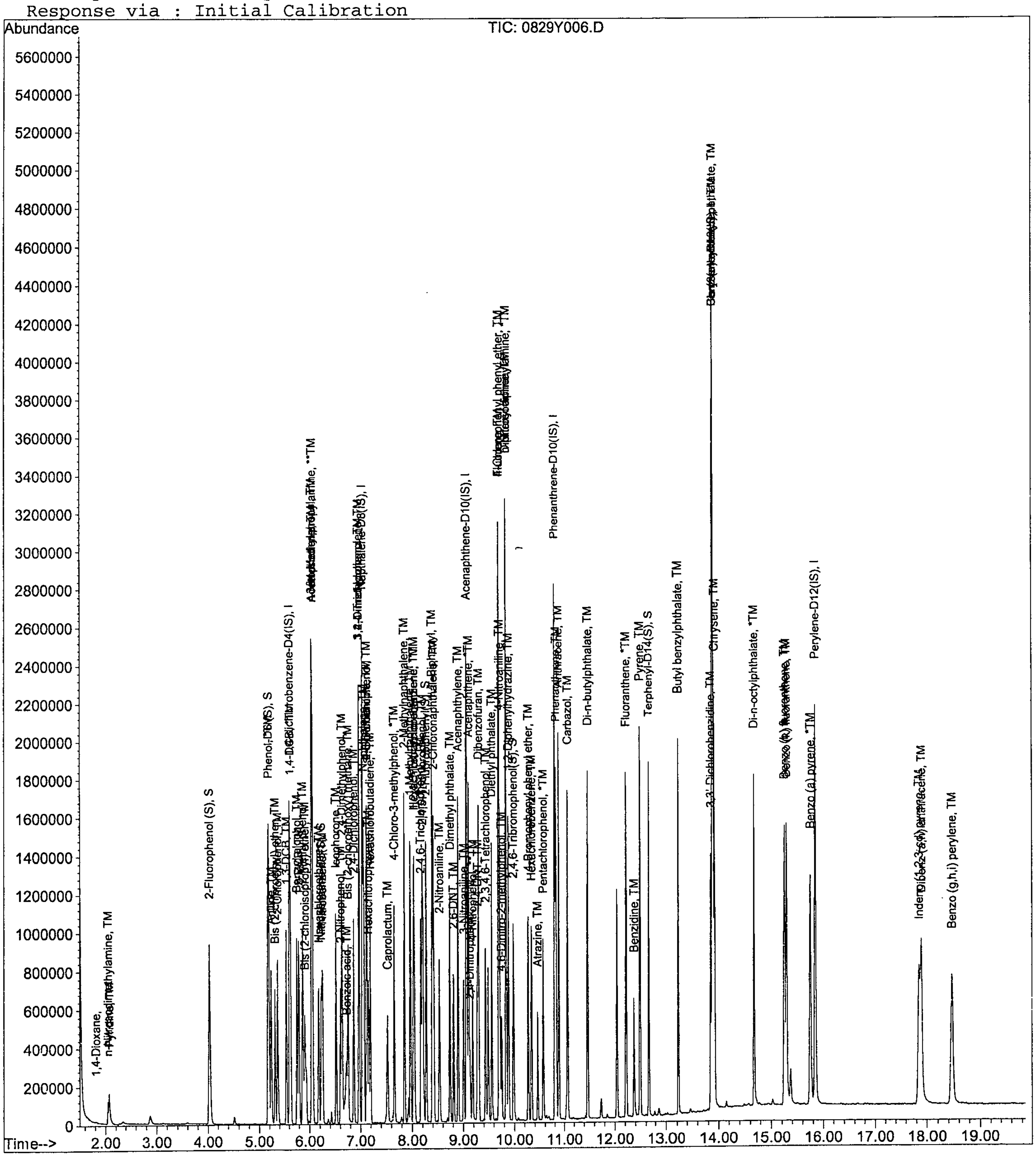
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y006.D
Acq On : 29 Aug 18 7:47
Sample : 20ug/ml 8270 08/16/18
Misc :

Vial: 6
Operator: MA
Inst : Yoda
Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y007.D Vial: 7
Acq On : 29 Aug 18 8:15 Operator: MA
Sample : 40ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	365630	40.00000	ppb	0.00
21) Napthalene-D8(IS)	7.05	136	1507824	40.00000	ppb	0.00
41) Acenaphthene-D10(IS)	9.07	164	766590	40.00000	ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1395599	40.00000	ppb	0.00
79) Chrysene-D12(IS)	13.91	240	1269692	40.00000	ppb	0.00
89) Perylene-D12(IS)	15.85	264	1472099	40.00000	ppb	0.00
System Monitoring Compounds						
5) 2-Fluorophenol (S)	4.04	112	1094974	79.70322	ppb	0.00
Spiked Amount 200.000			Recovery =	39.852%		
6) Phenol-D6 (S)	5.18	99	1296972	79.22217	ppb	0.00
Spiked Amount 200.000			Recovery =	39.611%		
22) Nitrobenzene-D5(S)	6.24	82	639228	40.06881	ppb	0.00
Spiked Amount 100.000			Recovery =	40.069%		
46) 2-Fluorobiphenyl(S)	8.28	172	1202838	40.17657	ppb	0.00
Spiked Amount 100.000			Recovery =	40.177%		
64) 2,4,6-Tribromophenol(S)	9.99	330	297799	81.90860	ppb	0.00
Spiked Amount 200.000			Recovery =	40.955%		
82) Terphenyl-D14(S)	12.66	244	1341143	40.69962	ppb	0.00
Spiked Amount 100.000			Recovery =	40.700%		
Target Compounds						Qvalue
2) 1,4-Dioxane	1.81	58	4649	3.59667		90
3) n-Nitrosodimethylamine	2.04	42	108941	37.24833	ppb	95
4) Pyridine	2.07	79	174406	37.02872	ppb	96
7) Phenol	5.20	94	806145	36.62542	ppb	100
8) Aniline	5.23	66	328097	37.80797	ppb	99
9) Bis (2-chloroethyl) ether	5.31	63	440387	37.35905	ppb	97
10) 2-Chlorophenol	5.36	128	636172	37.64923	ppb	98
11) 1,3-DCB	5.54	146	649608	37.29134	ppb	99
12) 1,4-DCB	5.62	146	651764	37.31740	ppb	99
13) Benzyl alcohol	5.76	108	416154	37.49064	ppb	98
14) 1,2-DCB	5.80	146	619943	37.51406	ppb	98
15) 2-Methylphenol	5.88	107	514706	37.59474	ppb	99
16) Bis (2-chloroisopropyl) et	5.91	45	847527	37.02187	ppb	96
17) Acetophenone	6.06	105	773318	41.16151	ppb	93
18) 3&4-Methylphenol	6.05	107	1203939	81.22911	ppb	99
19) n-Nitrosodi-n-propylamine	6.07	70	445010	36.40264	ppb	100
20) Hexachloroethane	6.18	117	248772	37.58390	ppb	83
23) Nitrobenzene	6.26	77	690649	37.91560	ppb	99
24) Isophorone	6.53	82	1191752	37.58337	ppb	99
25) 2-Nitrophenol	6.61	139	336401	38.75018	ppb	97
26) 2,4-Dimethylphenol	6.65	122	576831	37.66633	ppb	98
27) Benzoic acid	6.76	105	522413	40.56130	ppb	98
28) Bis (2-chloroethoxy) metha	6.76	93	669749	37.76938	ppb	99
29) 2,4-Dichlorophenol	6.88	162	498441	37.98613	ppb	97
30) 1,2,4-Trichlorobenzene	6.97	180	500159	38.10921	ppb	98
31) 3,4-Dimethylphenol	6.98	107	734021	37.70968	ppb	99
32) Naphthalene	7.07	128	1740534	37.89042	ppb	100
33) 4-Chloroaniline	7.13	127	682952	37.30354	ppb	97
34) 2,6-Dichlorophenol	7.13	162	473827	38.64757	ppb	98
35) Hexachloropropene	7.17	213	356806	38.56916	ppb	97
36) Hexachlorobutadiene	7.19	225	289967	38.35851	ppb	99
37) Caprolactum	7.55	55	306692	37.10387	ppb	95

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y007.D Vial: 7
Acq On : 29 Aug 18 8:15 Operator: MA
Sample : 40ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38) 4-Chloro-3-methylphenol	7.67	107	545037	38.12594 ppb		93
39) 2-Methylnaphthalene	7.85	142	1100331	37.93128 ppb		100
40) 1-Methylnaphthalene	7.97	142	1094521	37.83131 ppb		99
42) Hexachlorocyclopentadiene	8.03	237	337832	38.90278 ppb		99
43) 1,2,4,5-Tetrachlorobenzene	8.05	216	519800	38.49203 ppb		99
44) 2,4,6-Trichlorophenol	8.18	196	370440	37.80580 ppb		96
45) 2,4,5-Trichlorophenol	8.21	196	383105	38.55594 ppb		95
47) 1,1'-Biphenyl	8.39	154	1386368	38.74473 ppb		100
48) 2-Chloronaphthalene	8.42	162	1094208	37.94861 ppb		99
49) 2-Nitroaniline	8.54	65	388827	39.11072 ppb		88
50) Dimethyl phthalate	8.74	163	1252700	37.93508 ppb		100
51) 2,6-DNT	8.82	165	290245	39.39679 ppb		97
52) Acenaphthylene	8.90	152	1761335	38.72891 ppb		100
53) 3-Nitroaniline	9.01	138	326352	39.09895 ppb		95
54) Acenaphthene	9.11	154	1118628	38.00951 ppb		98
55) 2,4-Dinitrophenol	9.13	184	167194	37.17106 ppb		95
56) 4-Nitrophenol	9.19	65	285440	37.78599 ppb		97
57) Dibenzofuran	9.31	168	1517147	38.55637 ppb		94
58) 2,4-DNT	9.28	165	394701	39.88783 ppb		97
59) 2,3,4,6-Tetrachlorophenol	9.44	232	331580	38.80770 ppb		98
60) Diethyl phthalate	9.57	149	1225874	38.10135 ppb		99
61) 4-Chlorophenyl phenyl ethe	9.70	204	545277	42.55532 ppb		99
62) Fluorene	9.71	166	1141310	42.01359 ppb		98
63) 4-Nitroaniline	9.74	138	319764	37.82788 ppb		85
66) 4,6-Dinitro-2-methylphenol	9.77	198	246535	39.04623 ppb	#	71
67) Diphenyl amine	9.85	169	1823030	79.18209 ppb		99
68) n-Nitrosodiphenylamine	9.85	169	1823030	79.18209 ppb		99
69) 1,2-Diphenylhydrazine	9.89	77	1397980	37.96534 ppb		98
70) 4-Bromophenyl phenyl ether	10.28	248	350476	38.42224 ppb		95
71) Hexachlorobenzene	10.34	284	372749	38.23980 ppb		95
72) Atrazine	10.46	200	146993	18.62197 ppb		98
73) Pentachlorophenol	10.56	266	270495	38.65138 ppb		98
74) Phenanthrene	10.83	178	1780904	37.80164 ppb		100
75) Anthracene	10.89	178	1862952	38.52633 ppb		100
76) Carbazol	11.07	167	1723706	38.38037 ppb		100
77) Di-n-butylphthalate	11.47	149	2044062	39.10569 ppb		99
78) Fluoranthene	12.23	202	1954439	38.84404 ppb		99
80) Benzidine	12.37	184	593754	36.54857 ppb		98
81) Pyrene	12.49	202	2039255	38.51066 ppb		100
83) Butyl benzylphthalate	13.23	149	912930	39.06337 ppb		96
84) 3,3'-Dichlorobenzidine	13.85	252	697607	40.42127 ppb		97
85) Benz (a) anthracene	13.89	228	1619396	36.96508 ppb		100
86) Bis (2-ethylhexyl) phthala	13.89	149	1085390	38.24177 ppb		99
87) Chrysene	13.93	228	1849881	39.24499 ppb		98
88) Di-n-octylphthalate	14.68	149	2145195	40.00027 ppb		97
90) Benzo (b) fluoranthene	15.26	252	2006897	37.76110 ppb		98
91) Benzo (k) fluoranthene	15.30	252	1855545	38.93278 ppb		98
92) Benzo (a) pyrene	15.76	252	1832148	37.84075 ppb		98
93) Indeno (1,2,3-cd) pyrene	17.87	276	2069156	38.26706 ppb		99
94) Dibenz (a,h) anthracene	17.92	278	1795464	37.22993 ppb		100
95) Benzo (g,h,i) perylene	18.49	276	1689957	38.25501 ppb		99

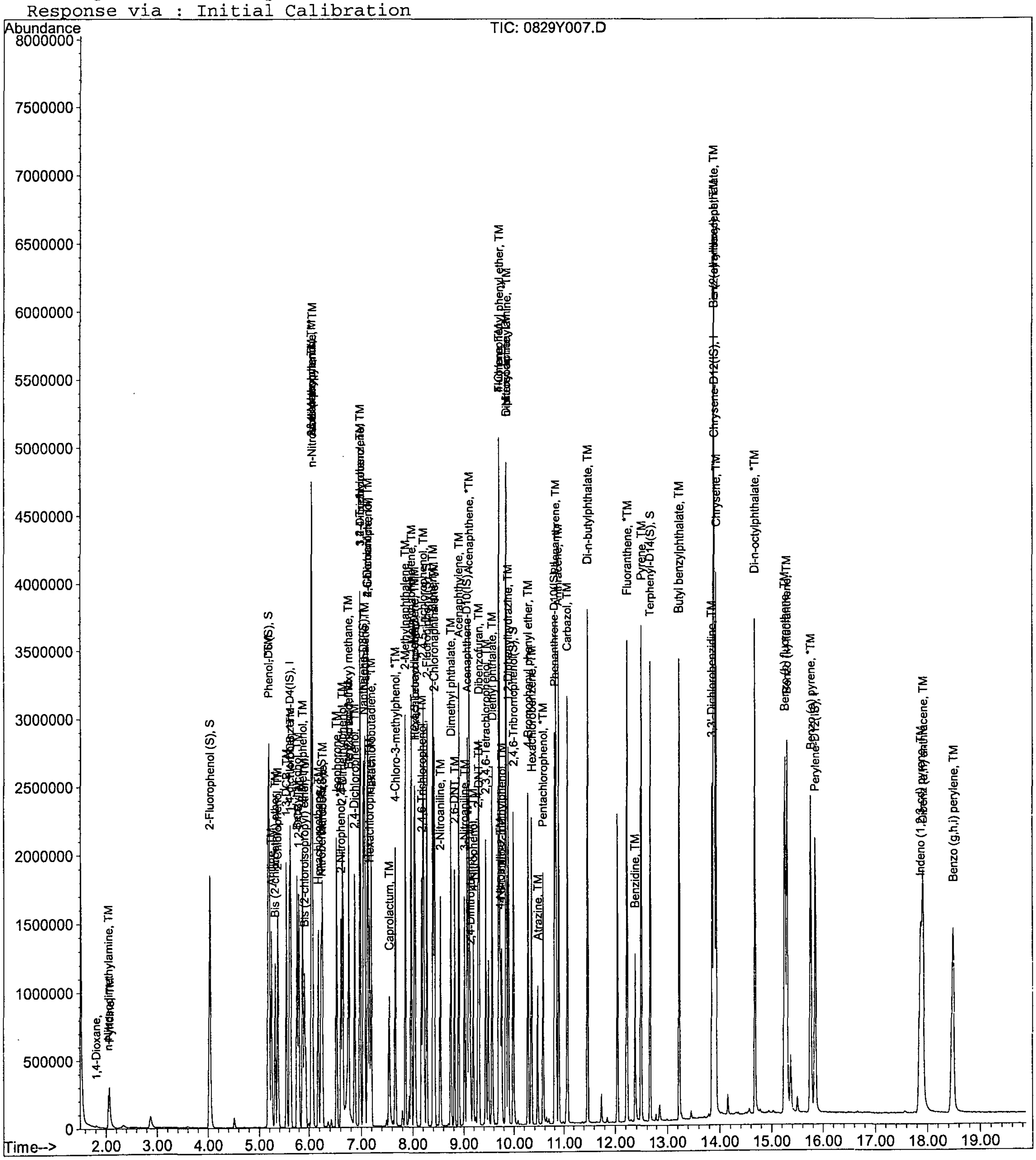
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y007.D Vial: 7
Acq On : 29 Aug 18 8:15 Operator: MA
Sample : 40ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y008.D Vial: 8
Acq On : 29 Aug 18 8:43 Operator: MA
Sample : 50ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	319743	40.00000 ppb		0.00
21) Napthalene-D8(IS)	7.05	136	1314186	40.00000 ppb		0.00
41) Acenaphthene-D10(IS)	9.06	164	679317	40.00000 ppb		0.00
65) Phenanthrene-D10(IS)	10.81	188	1213681	40.00000 ppb		0.00
79) Chrysene-D12(IS)	13.90	240	1119665	40.00000 ppb		0.00
89) Perylene-D12(IS)	15.85	264	1280652	40.00000 ppb		0.00
System Monitoring Compounds						
5) 2-Fluorophenol (S)	4.03	112	1208808	100.61672 ppb		0.00
Spiked Amount 200.000			Recovery	=	50.309%	
6) Phenol-D6 (S)	5.18	99	1423295	99.41498 ppb		0.00
Spiked Amount 200.000			Recovery	=	49.708%	
22) Nitrobenzene-D5(S)	6.23	82	711226	51.15076 ppb		0.00
Spiked Amount 100.000			Recovery	=	51.151%	
46) 2-Fluorobiphenyl(S)	8.28	172	1313381	49.50478 ppb		0.00
Spiked Amount 100.000			Recovery	=	49.505%	
64) 2,4,6-Tribromophenol(S)	9.99	330	329490	102.26786 ppb		0.00
Spiked Amount 200.000			Recovery	=	51.134%	
82) Terphenyl-D14(S)	12.66	244	1471489	50.63870 ppb		0.00
Spiked Amount 100.000			Recovery	=	50.639%	
Target Compounds						Qvalue
2) 1,4-Dioxane	1.81	58	5702	5.04439		100
3) n-Nitrosodimethylamine	2.04	42	119888	46.87400 ppb		100
4) Pyridine	2.06	79	188163	45.68276 ppb		100
7) Phenol	5.20	94	879777	45.70702 ppb		100
8) Aniline	5.24	66	340829	44.91159 ppb		100
9) Bis (2-chloroethyl) ether	5.31	63	481422	46.70119 ppb		100
10) 2-Chlorophenol	5.37	128	686824	46.48017 ppb		100
11) 1,3-DCB	5.54	146	711125	46.68135 ppb		100
12) 1,4-DCB	5.63	146	709907	46.47969 ppb		100
13) Benzyl alcohol	5.77	108	451562	46.51864 ppb		100
14) 1,2-DCB	5.79	146	676671	46.82315 ppb		100
15) 2-Methylphenol	5.88	107	556978	46.52075 ppb		100
16) Bis (2-chloroisopropyl) et	5.91	45	930076	46.45838 ppb		100
17) Acetophenone	6.06	105	827400	51.68331 ppb		100
18) 3&4-Methylphenol	6.05	107	1280390	100.96682 ppb		100
19) n-Nitrosodi-n-propylamine	6.07	70	482220	45.10754 ppb		100
20) Hexachloroethane	6.18	117	273609	47.26847 ppb		100
23) Nitrobenzene	6.26	77	751864	47.35803 ppb		100
24) Isophorone	6.53	82	1300886	47.06985 ppb		100
25) 2-Nitrophenol	6.61	139	364906	48.22711 ppb		100
26) 2,4-Dimethylphenol	6.64	122	632235	47.36713 ppb		100
27) Benzoic acid	6.77	105	586049	52.20662 ppb		100
28) Bis (2-chloroethoxy) metha	6.76	93	718969	46.51915 ppb		100
29) 2,4-Dichlorophenol	6.87	162	543286	47.50438 ppb		100
30) 1,2,4-Trichlorobenzene	6.97	180	528248	46.17996 ppb		100
31) 3,4-Dimethylphenol	6.98	107	798712	47.07912 ppb		100
32) Naphthalene	7.07	128	1899692	47.44865 ppb		100
33) 4-Chloroaniline	7.12	127	729998	45.74834 ppb		100
34) 2,6-Dichlorophenol	7.13	162	510043	47.73127 ppb		100
35) Hexachloropropene	7.17	213	390947	48.48637 ppb		100
36) Hexachlorobutadiene	7.20	225	315935	47.95178 ppb		100
37) Caprolactum	7.56	55	334201	46.38936 ppb		100

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y008.D Vial: 8
Acq On : 29 Aug 18 8:43 Operator: MA
Sample : 50ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38)	4-Chloro-3-methylphenol	7.66	107	588044	47.19524	ppb	100
39)	2-Methylnaphthalene	7.86	142	1192922	47.18240	ppb	100
40)	1-Methylnaphthalene	7.98	142	1190251	47.20191	ppb	100
42)	Hexachlorocyclopentadiene	8.03	237	370480	48.14324	ppb	100
43)	1,2,4,5-Tetrachlorobenzene	8.05	216	562333	46.99144	ppb	100
44)	2,4,6-Trichlorophenol	8.17	196	415243	47.82264	ppb	100
45)	2,4,5-Trichlorophenol	8.22	196	405971	46.10619	ppb	100
47)	1,1'-Biphenyl	8.39	154	1496578	47.19806	ppb	100
48)	2-Chloronaphthalene	8.42	162	1190257	46.58299	ppb	100
49)	2-Nitroaniline	8.53	65	424936	48.23403	ppb	100
50)	Dimethyl phthalate	8.75	163	1353026	46.23712	ppb	100
51)	2,6-DNT	8.82	165	312219	47.82402	ppb	100
52)	Acenaphthylene	8.90	152	1905429	47.27993	ppb	100
53)	3-Nitroaniline	9.02	138	354516	47.92976	ppb	100
54)	Acenaphthene	9.11	154	1223122	46.89937	ppb	100
55)	2,4-Dinitrophenol	9.14	184	192117	45.70791	ppb	100
56)	4-Nitrophenol	9.19	65	318966	47.64870	ppb	100
57)	Dibenzofuran	9.30	168	1643779	47.14141	ppb	100
58)	2,4-DNT	9.29	165	430387	49.08197	ppb	100
59)	2,3,4,6-Tetrachlorophenol	9.44	232	365332	48.25118	ppb	100
60)	Diethyl phthalate	9.57	149	1317498	46.20992	ppb	100
61)	4-Chlorophenyl phenyl ethe	9.70	204	576637	52.77813	ppb	100
62)	Fluorene	9.71	166	1213482	51.65265	ppb	100
63)	4-Nitroaniline	9.73	138	349390	46.64269	ppb	100
66)	4,6-Dinitro-2-methylphenol	9.76	198	274004	49.90149	ppb	100
67)	Diphenyl amine	9.84	169	1963765	98.07961	ppb	100
68)	n-Nitrosodiphenylamine	9.84	169	1963765	98.07961	ppb	100
69)	1,2-Diphenylhydrazine	9.89	77	1510032	47.15509	ppb	100
70)	4-Bromophenyl phenyl ether	10.28	248	380293	47.94009	ppb	100
71)	Hexachlorobenzene	10.34	284	400451	47.23943	ppb	100
72)	Atrazine	10.46	200	160955	23.44713	ppb	100
73)	Pentachlorophenol	10.57	266	302537	49.70962	ppb	100
74)	Phenanthrene	10.84	178	1925626	47.00003	ppb	100
75)	Anthracene	10.89	178	1995532	47.45377	ppb	100
76)	Carbazol	11.08	167	1889294	48.37284	ppb	100
77)	Di-n-butylphthalate	11.48	149	2224200	48.93006	ppb	100
78)	Fluoranthene	12.23	202	2104122	48.08717	ppb	100
80)	Benzidine	12.38	184	644769	45.00681	ppb	100
81)	Pyrene	12.49	202	2240996	47.99111	ppb	100
83)	Butyl benzylphthalate	13.23	149	996466	48.35095	ppb	100
84)	3,3'-Dichlorobenzidine	13.85	252	743432	48.84844	ppb	100
85)	Benz (a) anthracene	13.88	228	1774858	45.94228	ppb	100
86)	Bis (2-ethylhexyl) phthala	13.89	149	1168962	46.70495	ppb	100
87)	Chrysene	13.94	228	2002745	48.18106	ppb	100
88)	Di-n-octylphthalate	14.68	149	2348467	49.65819	ppb	100
90)	Benzo (b) fluoranthene	15.25	252	2227231	48.17156	ppb	100
91)	Benzo (k) fluoranthene	15.30	252	1957764	47.21828	ppb	100
92)	Benzo (a) pyrene	15.76	252	1986850	47.17046	ppb	100
93)	Indeno (1,2,3-cd) pyrene	17.87	276	2266429	48.18146	ppb	100
94)	Dibenz (a,h) anthracene	17.91	278	1977967	47.14552	ppb	100
95)	Benzo (g,h,i) perylene	18.49	276	1838450	47.83771	ppb	100

(#) = qualifier out of range (m) = manual integration

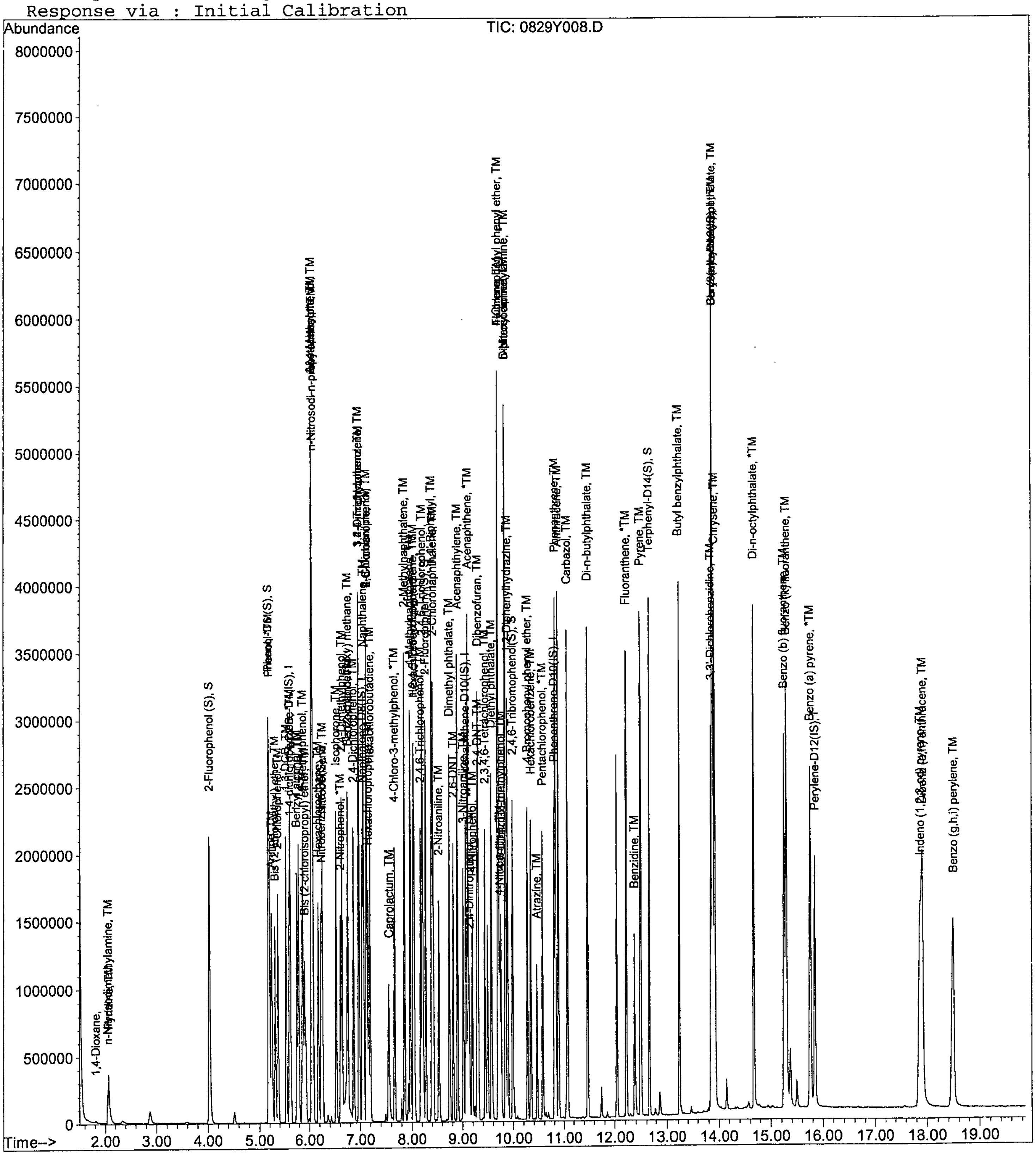
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y008.D
Acq On : 29 Aug 18 8:43
Sample : 50ug/ml 8270 08/16/18
Misc :

Vial: 8
Operator: MA
Inst : Yoda
Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y009.D
Acq On : 29 Aug 18 9:11
Sample : 60ug/ml 8270 08/16/18
Misc :

Vial: 9
Operator: MA
Inst : Yoda
Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	355713	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.05	136	1512059	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.07	164	786835	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.81	188	1414444	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.91	240	1236474	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.86	264	1492644	40.00000 ppb	0.00
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.04	112	1603363	119.96263 ppb	0.00
Spiked Amount 200.000			Recovery =	59.982%	
6) Phenol-D6 (S)	5.19	99	1858034	116.65728 ppb	0.00
Spiked Amount 200.000			Recovery =	58.328%	
22) Nitrobenzene-D5(S)	6.24	82	964149	60.26660 ppb	0.00
Spiked Amount 100.000			Recovery =	60.267%	
46) 2-Fluorobiphenyl(S)	8.28	172	1745386	56.79848 ppb	0.00
Spiked Amount 100.000			Recovery =	56.798%	
64) 2,4,6-Tribromophenol(S)	10.00	330	425307	113.96940 ppb	0.00
Spiked Amount 200.000			Recovery =	56.985%	
82) Terphenyl-D14(S)	12.66	244	1930989	60.17394 ppb	0.00
Spiked Amount 100.000			Recovery =	60.174%	

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
2) 1,4-Dioxane	1.81	58	7985	6.34977	80
3) n-Nitrosodimethylamine	2.04	42	172088	60.47949 ppb	94
4) Pyridine	2.07	79	283471	61.86258 ppb	94
7) Phenol	5.21	94	1315875	61.45061 ppb	99
8) Aniline	5.24	66	550398	65.19286 ppb	93
9) Bis (2-chloroethyl) ether	5.32	63	688469	60.03268 ppb	95
10) 2-Chlorophenol	5.37	128	994407	60.49058 ppb	98
11) 1,3-DCB	5.54	146	1002468	59.15198 ppb	99
12) 1,4-DCB	5.63	146	1006529	59.23649 ppb	99
13) Benzyl alcohol	5.76	108	663429	61.43351 ppb	92
14) 1,2-DCB	5.80	146	957870	59.57869 ppb	99
15) 2-Methylphenol	5.88	107	803054	60.29131 ppb	98
16) Bis (2-chloroisopropyl) et	5.91	45	1356809	60.92081 ppb	97
17) Acetophenone	6.07	105	1102106	63.04928 ppb	94
18) 3&4-Methylphenol	6.06	107	1709313	123.17918 ppb	99
19) n-Nitrosodi-n-propylamine	6.09	70	710449	59.73627 ppb	96
20) Hexachloroethane	6.18	117	391774	60.83844 ppb	86
23) Nitrobenzene	6.27	77	1101390	60.29531 ppb	99
24) Isophorone	6.53	82	1908260	60.01078 ppb	98
25) 2-Nitrophenol	6.61	139	543350	62.41343 ppb	92
26) 2,4-Dimethylphenol	6.65	122	902151	58.74432 ppb	99
27) Benzoic acid	6.79	105	898693	69.58107 ppb	99
28) Bis (2-chloroethoxy) metha	6.77	93	1041285	58.55707 ppb	100
29) 2,4-Dichlorophenol	6.88	162	784376	59.60978 ppb	99
30) 1,2,4-Trichlorobenzene	6.98	180	742951	56.45000 ppb	98
31) 3,4-Dimethylphenol	6.99	107	1132650	58.02591 ppb	99
32) Naphthalene	7.07	128	2662343	57.79533 ppb	100
33) 4-Chloroaniline	7.13	127	1010281	55.02803 ppb	98
34) 2,6-Dichlorophenol	7.14	162	698220	56.79061 ppb	99
35) Hexachloropropene	7.17	213	574290	61.90435 ppb	98
36) Hexachlorobutadiene	7.19	225	447418	59.02127 ppb	98
37) Caprolactum	7.57	55	503690	60.76619 ppb	96

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y009.D Vial: 9
Acq On : 29 Aug 18 9:11 Operator: MA
Sample : 60ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38) 4-Chloro-3-methylphenol	7.67	107	858346	59.87408 ppb		100
39) 2-Methylnaphthalene	7.86	142	1687425	58.00702 ppb		99
40) 1-Methylnaphthalene	7.97	142	1676423	57.78203 ppb		100
42) Hexachlorocyclopentadiene	8.03	237	551347	61.85636 ppb		99
43) 1,2,4,5-Tetrachlorobenzene	8.05	216	781484	56.38117 ppb		99
44) 2,4,6-Trichlorophenol	8.18	196	585251	58.19185 ppb		95
45) 2,4,5-Trichlorophenol	8.22	196	613040	60.10932 ppb		98
47) 1,1'-Biphenyl	8.40	154	2069574	56.35008 ppb		99
48) 2-Chloronaphthalene	8.43	162	1716421	57.99616 ppb		98
49) 2-Nitroaniline	8.54	65	635330	62.26130 ppb		97
50) Dimethyl phthalate	8.75	163	2004516	59.14022 ppb		100
51) 2,6-DNT	8.83	165	472431	62.47610 ppb		93
52) Acenaphthylene	8.90	152	2754636	59.01156 ppb		100
53) 3-Nitroaniline	9.02	138	523527	61.10790 ppb		99
54) Acenaphthene	9.11	154	1748224	57.87395 ppb		100
55) 2,4-Dinitrophenol	9.14	184	307588	59.97056 ppb		95
56) 4-Nitrophenol	9.20	65	484551	62.49352 ppb		99
57) Dibenzofuran	9.31	168	2302932	57.02024 ppb		100
58) 2,4-DNT	9.29	165	623838	61.42193 ppb		98
59) 2,3,4,6-Tetrachlorophenol	9.44	232	533163	60.79517 ppb		94
60) Diethyl phthalate	9.57	149	1905480	57.70035 ppb		98
61) 4-Chlorophenyl phenyl ethe	9.70	204	770086	62.43008 ppb		95
62) Fluorene	9.71	166	1642449	61.40748 ppb		100
63) 4-Nitroaniline	9.75	138	526452	60.67652 ppb		97
66) 4,6-Dinitro-2-methylphenol	9.77	198	426224	66.60599 ppb	#	74
67) Diphenyl amine	9.85	169	2695270	115.50753 ppb		100
68) n-Nitrosodiphenylamine	9.85	169	2695270	115.50753 ppb		100
69) 1,2-Diphenylhydrazine	9.90	77	2183202	58.49991 ppb		95
70) 4-Bromophenyl phenyl ether	10.28	248	560527	60.63115 ppb		91
71) Hexachlorobenzene	10.34	284	582710	58.98295 ppb	#	89
72) Atrazine	10.46	200	260665	32.58267 ppb		96
73) Pentachlorophenol	10.57	266	443253	62.49315 ppb		97
74) Phenanthrene	10.83	178	2738104	57.34492 ppb		100
75) Anthracene	10.90	178	2857551	58.30755 ppb		100
76) Carbazol	11.08	167	2705352	59.43533 ppb		99
77) Di-n-butylphthalate	11.47	149	3148012	59.42335 ppb		99
78) Fluoranthene	12.23	202	3032427	59.46583 ppb		98
80) Benzidine	12.38	184	1122601	70.95820 ppb		98
81) Pyrene	12.49	202	3183570	61.73583 ppb		99
83) Butyl benzylphthalate	13.24	149	1451506	63.77706 ppb		90
84) 3,3'-Dichlorobenzidine	13.86	252	1044250	62.13224 ppb		98
85) Benz (a) anthracene	13.89	228	2464584	57.76910 ppb		99
86) Bis (2-ethylhexyl) phthala	13.89	149	1611496	58.30353 ppb		96
87) Chrysene	13.93	228	2787154	60.71763 ppb		98
88) Di-n-octylphthalate	14.68	149	3434939	65.77011 ppb		95
90) Benzo (b) fluoranthene	15.26	252	3344790	62.06820 ppb		99
91) Benzo (k) fluoranthene	15.31	252	2783640	57.60203 ppb		99
92) Benzo (a) pyrene	15.77	252	2933698	59.75790 ppb		98
93) Indeno (1,2,3-cd) pyrene	17.88	276	3371195	61.48888 ppb		98
94) Dibenz (a,h) anthracene	17.93	278	2917959	59.67267 ppb		98
95) Benzo (g,h,i) perylene	18.51	276	2746154	61.30817 ppb		99

(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y009.D                Vial: 9
Acq On    : 29 Aug 18   9:11                            Operator: MA
Sample    : 60ug/ml 8270 08/16/18                       Inst     : Yoda
Misc      :                                             Multiplr: 1.00

Quant Time: Aug 29 12:55 2018            Quant Results File: Y0829NC.RES

Method        : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title         : EPA 8270C
Last Update   : Wed Aug 29 10:21:31 2018
Response via  : Initial Calibration
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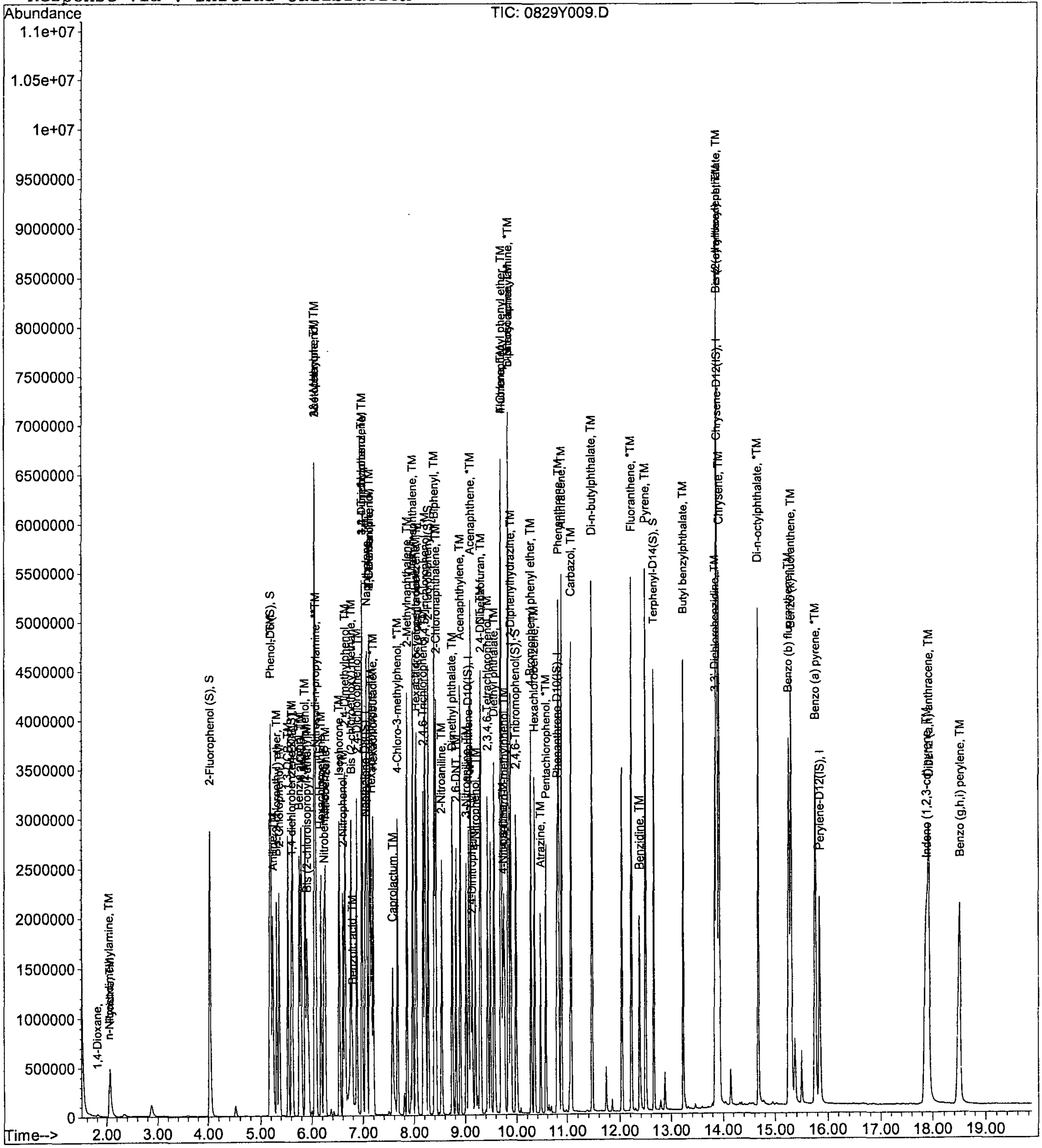

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y010.D Vial: 10
Acq On : 29 Aug 18 9:39 Operator: MA
Sample : 80ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	335619	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.05	136	1429308	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.07	164	735493	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.81	188	1359800	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.91	240	1177998	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.85	264	1411665	40.00000 ppb	0.00
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.04	112	1973019	156.45829 ppb	0.00
Spiked Amount 200.000				Recovery = 78.229%	
6) Phenol-D6 (S)	5.19	99	2236057	148.79703 ppb	0.00
Spiked Amount 200.000				Recovery = 74.399%	
22) Nitrobenzene-D5(S)	6.24	82	1193085	78.89452 ppb	0.00
Spiked Amount 100.000				Recovery = 78.895%	
46) 2-Fluorobiphenyl(S)	8.28	172	2119368	73.78307 ppb	0.00
Spiked Amount 100.000				Recovery = 73.783%	
64) 2,4,6-Tribromophenol(S)	10.00	330	512685	146.97433 ppb	0.00
Spiked Amount 200.000				Recovery = 73.487%	
82) Terphenyl-D14(S)	12.66	244	2317204	75.79374 ppb	0.00
Spiked Amount 100.000				Recovery = 75.794%	
Target Compounds					Qvalue
2) 1,4-Dioxane	1.81	58	11151	9.39832	79
3) n-Nitrosodimethylamine	2.04	42	215713	80.35022 ppb	92
4) Pyridine	2.06	79	362434	83.83040 ppb	99
7) Phenol	5.21	94	1592074	78.80033 ppb	94
8) Aniline	5.24	66	561293	70.46380 ppb	81
9) Bis (2-chloroethyl) ether	5.32	63	860675	79.54186 ppb	96
10) 2-Chlorophenol	5.38	128	1242175	80.08655 ppb	97
11) 1,3-DCB	5.54	146	1242990	77.73553 ppb	99
12) 1,4-DCB	5.63	146	1228392	76.62195 ppb	99
13) Benzyl alcohol	5.77	108	820037	80.48177 ppb	92
14) 1,2-DCB	5.80	146	1170165	77.14090 ppb	98
15) 2-Methylphenol	5.88	107	991207	78.87285 ppb	98
16) Bis (2-chloroisopropyl) et	5.92	45	1667165	79.33754 ppb	95
17) Acetophenone	6.07	105	1280807	79.03098 ppb	84
18) 3&4-Methylphenol	6.06	107	2036212	158.17288 ppb	99
19) n-Nitrosodi-n-propylamine	6.10	70	886276	78.98187 ppb	93
20) Hexachloroethane	6.18	117	480685	79.11453 ppb	100
23) Nitrobenzene	6.27	77	1355537	78.50489 ppb	99
24) Isophorone	6.54	82	2388648	79.46699 ppb	98
25) 2-Nitrophenol	6.61	139	664730	80.77679 ppb	91
26) 2,4-Dimethylphenol	6.65	122	1121728	77.27111 ppb	100
27) Benzoic acid	6.81	105	1044174	85.52548 ppb	93
28) Bis (2-chloroethoxy) metha	6.77	93	1283054	76.33040 ppb	99
29) 2,4-Dichlorophenol	6.88	162	972731	78.20399 ppb	98
30) 1,2,4-Trichlorobenzene	6.97	180	897516	72.14212 ppb	99
31) 3,4-Dimethylphenol	6.99	107	1372280	74.37242 ppb	99
32) Naphthalene	7.08	128	3263826	74.95467 ppb	100
33) 4-Chloroaniline	7.13	127	1174408	67.67117 ppb	100
34) 2,6-Dichlorophenol	7.14	162	835445	71.88612 ppb	97
35) Hexachloropropene	7.17	213	713192	81.32785 ppb	98
36) Hexachlorobutadiene	7.20	225	543071	75.78699 ppb	99
37) Caprolactum	7.59	55	636504	81.23492 ppb	96

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y010.D Vial: 10
Acq On : 29 Aug 18 9:39 Operator: MA
Sample : 80ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc	Unit		Qvalue
38)	4-Chloro-3-methylphenol	7.68	107	1082695	79.89609	ppb		95
39)	2-Methylnaphthalene	7.86	142	2057599	74.82724	ppb		99
40)	1-Methylnaphthalene	7.98	142	2035259	74.21159	ppb		99
42)	Hexachlorocyclopentadiene	8.03	237	668078	80.18472	ppb		100
43)	1,2,4,5-Tetrachlorobenzene	8.05	216	939300	72.49757	ppb		99
44)	2,4,6-Trichlorophenol	8.18	196	735954	78.28451	ppb		98
45)	2,4,5-Trichlorophenol	8.23	196	749017	78.56874	ppb		97
47)	1,1'-Biphenyl	8.40	154	2508613	73.07223	ppb		98
48)	2-Chloronaphthalene	8.43	162	2079688	75.17592	ppb		98
49)	2-Nitroaniline	8.54	65	796444	83.49861	ppb		97
50)	Dimethyl phthalate	8.76	163	2473374	78.06715	ppb		99
51)	2,6-DNT	8.83	165	589767	83.43747	ppb		97
52)	Acenaphthylene	8.90	152	3325293	76.20928	ppb		100
53)	3-Nitroaniline	9.03	138	639733	79.88443	ppb		98
54)	Acenaphthene	9.11	154	2157274	76.40055	ppb		99
55)	2,4-Dinitrophenol	9.15	184	403923	80.85071	ppb		99
56)	4-Nitrophenol	9.20	65	622425	85.87913	ppb		95
57)	Dibenzofuran	9.31	168	2712093	71.83856	ppb		99
58)	2,4-DNT	9.29	165	764743	80.55124	ppb		98
59)	2,3,4,6-Tetrachlorophenol	9.44	232	647689	79.00976	ppb		94
60)	Diethyl phthalate	9.57	149	2384963	77.26109	ppb		98
61)	4-Chlorophenyl phenyl ethe	9.70	204	885182	79.13847	ppb		92
62)	Fluorene	9.71	166	1962808	80.24045	ppb		100
63)	4-Nitroaniline	9.75	138	666598	82.19228	ppb		98
66)	4,6-Dinitro-2-methylphenol	9.78	198	543831	88.39955	ppb		85
67)	Diphenyl amine	9.85	169	3173694	141.47633	ppb		100
68)	n-Nitrosodiphenylamine	9.85	169	3173694	141.47633	ppb		100
69)	1,2-Diphenylhydrazine	9.90	77	2720099	75.81527	ppb		95
70)	4-Bromophenyl phenyl ether	10.28	248	676017	76.06198	ppb		87
71)	Hexachlorobenzene	10.34	284	709047	74.65515	ppb	#	88
72)	Atrazine	10.46	200	336112	43.70174	ppb		96
73)	Pentachlorophenol	10.58	266	557565	81.76867	ppb		99
74)	Phenanthrene	10.84	178	3409941	74.28525	ppb		99
75)	Anthracene	10.90	178	3537902	75.09090	ppb		99
76)	Carbazol	11.09	167	3358985	76.76083	ppb		99
77)	Di-n-butylphthalate	11.48	149	3895142	76.48121	ppb		99
78)	Fluoranthene	12.23	202	3688751	75.24319	ppb		98
80)	Benzidine	12.38	184	1399324	92.84017	ppb		98
81)	Pyrene	12.50	202	3844406	78.25148	ppb		99
83)	Butyl benzylphthalate	13.23	149	1796253	82.84257	ppb		97
84)	3,3'-Dichlorobenzidine	13.86	252	1249099	78.00992	ppb		96
85)	Benz (a) anthracene	13.89	228	3041031	74.81924	ppb		99
86)	Bis (2-ethylhexyl) phthala	13.89	149	1941227	73.71950	ppb		98
87)	Chrysene	13.94	228	3352765	76.66504	ppb		98
88)	Di-n-octylphthalate	14.68	149	4228388	84.98157	ppb		96
90)	Benzo (b) fluoranthene	15.26	252	4245201	83.29581	ppb		98
91)	Benzo (k) fluoranthene	15.31	252	3386917	74.10609	ppb		99
92)	Benzo (a) pyrene	15.77	252	3669807	79.04015	ppb		99
93)	Indeno (1,2,3-cd) pyrene	17.89	276	4242768	81.82511	ppb		99
94)	Dibenz (a,h) anthracene	17.94	278	3664577	79.24005	ppb		100
95)	Benzo (g,h,i) perylene	18.52	276	3468065	81.86632	ppb		99

(#) = qualifier out of range (m) = manual integration

Quantitation Report

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Data File : M:\YODA\DATA\Y180829\0829Y010.D              Vial: 10
Acq On    : 29 Aug 18   9:39                         Operator: MA
Sample    : 80ug/ml 8270 08/16/18                    Inst    : Yoda
Misc      :                                          Multiplr: 1.00

Quant Time: Aug 29 12:55 2018               Quant Results File: Y0829NC.RES

Method          : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title           : EPA 8270C
Last Update     : Wed Aug 29 10:21:31 2018
Response via    : Initial Calibration
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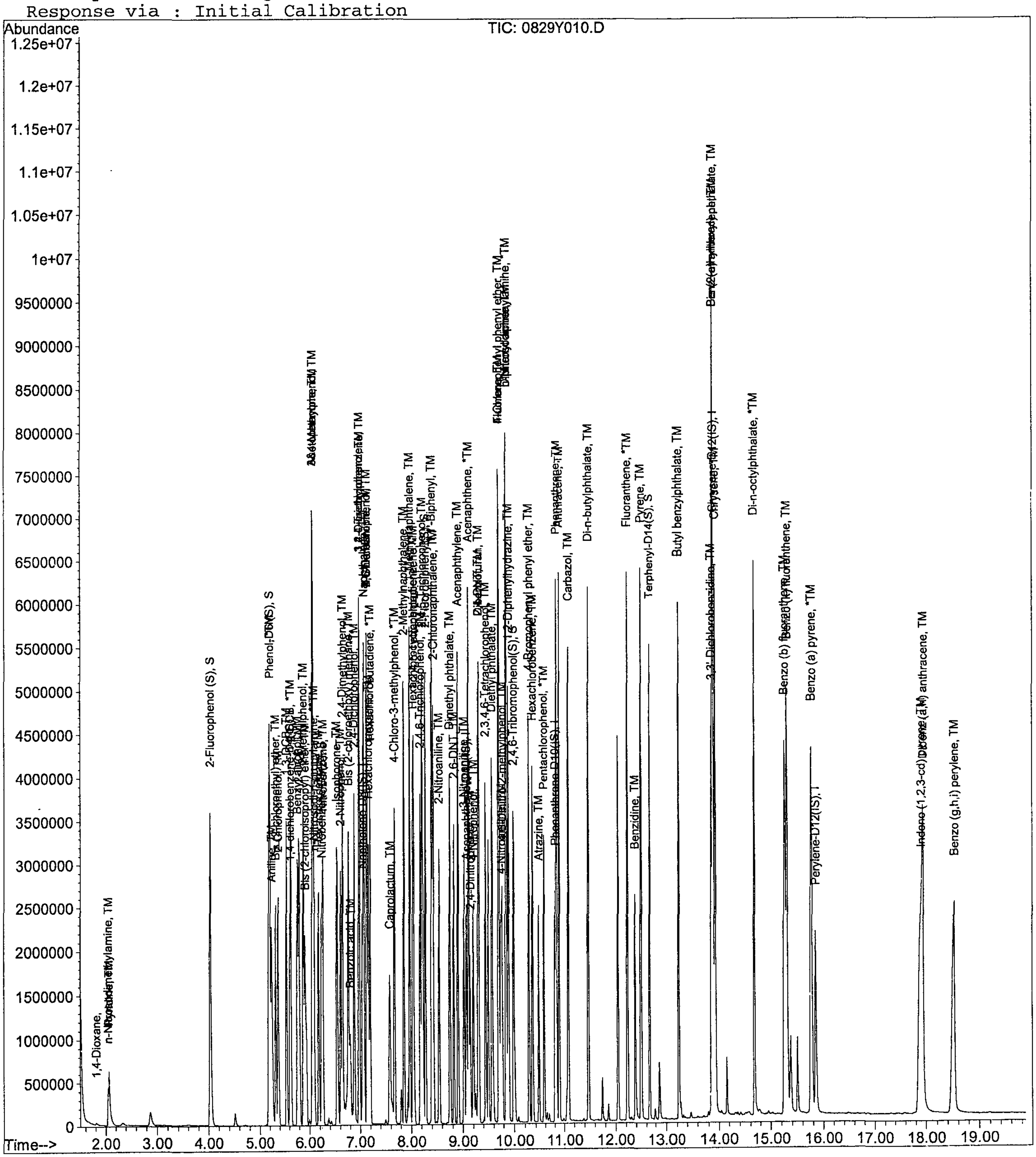

Quantitation Report (Not Reviewed)

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Data File : M:\YODA\DATA\Y180829\0829Y011.D          Vial: 11
Acq On    : 29 Aug 18  10:07                     Operator: MA
Sample    : 100ug/ml 8270 08/16/18               Inst    : Yoda
Misc      :                                      Multiplr: 1.00

Quant Time: Aug 29 12:55 2018          Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	346345	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.05	136	1519766	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.07	164	787043	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1445951	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.91	240	1217364	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.85	264	1486086	40.00000 ppb	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
5) 2-Fluorophenol (S)	4.05	112	2527431	194.21566 ppb	0.00
Spiked Amount 200.000			Recovery =	97.108%	
6) Phenol-D6 (S)	5.20	99	2834630	182.78703 ppb	0.00
Spiked Amount 200.000			Recovery =	91.394%	
22) Nitrobenzene-D5(S)	6.25	82	1583788	98.49668 ppb	0.00
Spiked Amount 100.000			Recovery =	98.497%	
46) 2-Fluorobiphenyl(S)	8.29	172	2667640	86.78760 ppb	0.00
Spiked Amount 100.000			Recovery =	86.788%	
64) 2,4,6-Tribromophenol(S)	10.01	330	629352	168.60272 ppb	0.00
Spiked Amount 200.000			Recovery =	84.302%	
82) Terphenyl-D14(S)	12.67	244	2871554	90.88876 ppb	0.00
Spiked Amount 100.000			Recovery =	90.889%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
2) 1,4-Dioxane	1.81	58	14431	11.78610		85
3) n-Nitrosodimethylamine	2.05	42	298744	107.83198 ppb		99
4) Pyridine	2.07	79	476922	106.89505 ppb		95
7) Phenol	5.22	94	1994389	95.65601 ppb		91
8) Aniline	5.22	66	1780203	216.56265 ppb	#	1
9) Bis (2-chloroethyl) ether	5.33	63	1105927	99.04228 ppb		98
10) 2-Chlorophenol	5.37	128	1611361	100.67166 ppb		98
11) 1,3-DCB	5.55	146	1589034	96.29922 ppb		100
12) 1,4-DCB	5.63	146	1576097	95.26575 ppb		99
13) Benzyl alcohol	5.77	108	1066395	101.41911 ppb		91
14) 1,2-DCB	5.80	146	1485343	94.88596 ppb		99
15) 2-Methylphenol	5.88	107	1281616	98.82316 ppb		98
16) Bis (2-chloroisopropyl) et	5.91	45	2185244	100.77149 ppb		98
17) Acetophenone	6.08	105	1611454	97.65134 ppb	#	79
18) 3&4-Methylphenol	6.07	107	2602053	198.27368 ppb		99
19) n-Nitrosodi-n-propylamine	6.11	70	1139458	98.39983 ppb		96
20) Hexachloroethane	6.18	117	626044	99.84772 ppb		91
23) Nitrobenzene	6.26	77	1764141	96.08769 ppb		97
24) Isophorone	6.55	82	3160807	98.89668 ppb		99
25) 2-Nitrophenol	6.62	139	881195	100.70764 ppb		95
26) 2,4-Dimethylphenol	6.65	122	1435222	92.98176 ppb		99
27) Benzoic acid	6.82	105	1518120	116.94398 ppb		98
28) Bis (2-chloroethoxy) metha	6.77	93	1674056	93.66379 ppb		99
29) 2,4-Dichlorophenol	6.89	162	1243710	94.03822 ppb		98
30) 1,2,4-Trichlorobenzene	6.98	180	1122855	84.88275 ppb		99
31) 3,4-Dimethylphenol	7.00	107	1743027	88.84283 ppb		99
32) Naphthalene	7.07	128	4116259	88.90445 ppb		100
33) 4-Chloroaniline	7.14	127	1385688	75.09296 ppb		98
34) 2,6-Dichlorophenol	7.15	162	1029790	83.33452 ppb		97
35) Hexachloropropene	7.17	213	913588	97.97885 ppb		99
36) Hexachlorobutadiene	7.20	225	691494	90.75604 ppb		99
37) Caprolactum	7.60	55	899476	107.96433 ppb		96

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y011.D Vial: 11
Acq On : 29 Aug 18 10:07 Operator: MA
Sample : 100ug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38)	4-Chloro-3-methylphenol	7.68	107	1411283	97.94508	ppb	96
39)	2-Methylnaphthalene	7.86	142	2570230	87.90631	ppb	100
40)	1-Methylnaphthalene	7.97	142	2522099	86.48948	ppb	99
42)	Hexachlorocyclopentadiene	8.04	237	848922	95.21653	ppb	99
43)	1,2,4,5-Tetrachlorobenzene	8.06	216	1149867	82.93671	ppb	99
44)	2,4,6-Trichlorophenol	8.19	196	955144	94.94543	ppb	98
45)	2,4,5-Trichlorophenol	8.24	196	952834	93.40185	ppb	96
47)	1,1'-Biphenyl	8.40	154	3061175	83.32723	ppb	99
48)	2-Chloronaphthalene	8.43	162	2629859	88.83684	ppb	99
49)	2-Nitroaniline	8.55	65	1043738	102.25759	ppb	95
50)	Dimethyl phthalate	8.75	163	3226622	95.17146	ppb	100
51)	2,6-DNT	8.84	165	775714	102.55631	ppb	95
52)	Acenaphthylene	8.91	152	4189329	89.72274	ppb	100
53)	3-Nitroaniline	9.03	138	831408	97.01919	ppb	100
54)	Acenaphthene	9.11	154	2710316	89.69973	ppb	99
55)	2,4-Dinitrophenol	9.15	184	559285	102.14776	ppb	97
56)	4-Nitrophenol	9.22	65	833122	107.42103	ppb	94
57)	Dibenzofuran	9.32	168	3295411	81.57231	ppb	99
58)	2,4-DNT	9.30	165	946037	93.12043	ppb	93
59)	2,3,4,6-Tetrachlorophenol	9.45	232	818407	93.29613	ppb	94
60)	Diethyl phthalate	9.58	149	3079204	93.21756	ppb	98
61)	4-Chlorophenyl phenyl ethe	9.71	204	1139649	97.30977	ppb	94
62)	Fluorene	9.72	166	2515497	97.32888	ppb	99
63)	4-Nitroaniline	9.76	138	861747	99.29489	ppb	97
66)	4,6-Dinitro-2-methylphenol	9.78	198	709348	108.43436	ppb	92
67)	Diphenyl amine	9.86	169	4010311	168.11956	ppb	99
68)	n-Nitrosodiphenylamine	9.86	169	4010311	168.11956	ppb	99
69)	1,2-Diphenylhydrazine	9.89	77	3985900	104.47679	ppb	97
70)	4-Bromophenyl phenyl ether	10.28	248	828949	87.71205	ppb	91
71)	Hexachlorobenzene	10.35	284	881298	87.26277	ppb	91
72)	Atrazine	10.47	200	437245	53.46395	ppb	97
73)	Pentachlorophenol	10.57	266	716031	98.75173	ppb	99
74)	Phenanthrene	10.84	178	4290192	87.89292	ppb	100
75)	Anthracene	10.91	178	4393527	87.69530	ppb	100
76)	Carbazol	11.08	167	4156473	89.32603	ppb	99
77)	Di-n-butylphthalate	11.48	149	4725763	87.26194	ppb	99
78)	Fluoranthene	12.23	202	4590807	88.06398	ppb	99
80)	Benzidine	12.38	184	1764288	113.26904	ppb	100
81)	Pyrene	12.50	202	4806141	94.66379	ppb	99
83)	Butyl benzylphthalate	13.24	149	2237655	99.86270	ppb	99
84)	3,3'-Dichlorobenzidine	13.87	252	1500689	90.69174	ppb	97
85)	Benz (a) anthracene	13.90	228	3719692	88.55713	ppb	100
86)	Bis (2-ethylhexyl) phthala	13.90	149	2423096	89.04320	ppb	98
87)	Chrysene	13.94	228	4303053	95.21274	ppb	98
88)	Di-n-octylphthalate	14.68	149	5247397	102.05116	ppb	96
90)	Benzo (b) fluoranthene	15.28	252	5374023	100.16411	ppb	98
91)	Benzo (k) fluoranthene	15.33	252	4260603	88.55398	ppb	98
92)	Benzo (a) pyrene	15.78	252	4699564	96.15011	ppb	100
93)	Indeno (1,2,3-cd) pyrene	17.91	276	5533536	101.37427	ppb	99
94)	Dibenz (a,h) anthracene	17.96	278	4688501	96.30362	ppb	99
95)	Benzo (g,h,i) perylene	18.54	276	4518757	101.32690	ppb	100

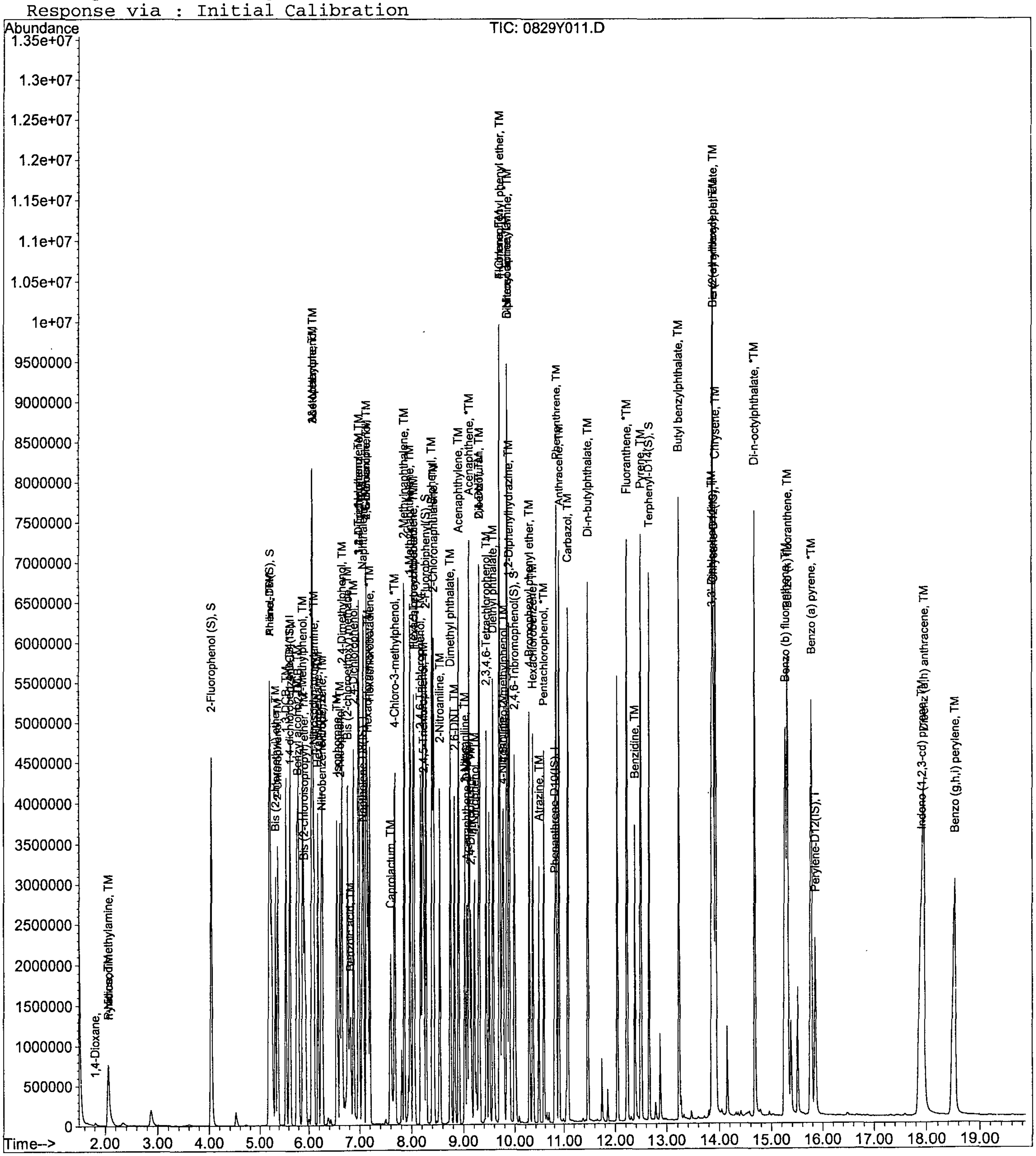
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File	: M:\YODA\DATA\Y180829\0829Y011.D	Vial:	11
Acq On	: 29 Aug 18 10:07	Operator:	MA
Sample	: 100ug/ml 8270 08/16/18	Inst :	Yoda
Misc	:	Multiplr:	1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:
SDG No:
Date Analyzed: 08/29/18
Instrument: Yoda
Initial Cal. Date: 08/29/18
Data File: 0829Y012.D

		Compound	MEAN	CCRF	%D		%Drift
1		1,4-Dioxane	0.1414	0.1364	3.6		
2	TM	n-Nitrosodimethylamine	0.3200	0.2771	13	TM	
3	TM	Pyridine	0.5153	0.4675	9.3	TM	
4	*TM	Phenol	2.408	2.231	7.4	*TM	
5	TM	Aniline	0.9494	0.8964	5.6	TM	
6	TM	Bis (2-chloroethyl) ether	1.290	1.216	5.7	TM	
7	TM	2-Chlorophenol	1.849	1.648	11	TM	
8	TM	1,3-DCB	1.906	1.761	7.6	TM	
9	*TM	1,4-DCB	1.911	1.758	8.0	*TM	
10	TM	Benzyl alcohol	1.214	1.046	14	TM	
11	TM	1,2-DCB	1.808	1.683	6.9	TM	
12	TM	2-Methylphenol	1.498	1.333	11	TM	
13	TM	Bis (2-chloroisopropyl) ether	2.504	2.227	11	TM	
14	TML	Acetophenone	2.258	1.994	12	TML	0.89
15	TML	3&4-Methylphenol	1.776	1.548	13	TML	2.8
16	**TM	n-Nitrosodi-n-propylamine	1.337	1.152	14	**TM	
17	TM	Hexachloroethane	0.7241	0.6729	7.1	TM	
18	TM	Nitrobenzene	0.4832	0.4457	7.8	TM	
19	TM	Isophorone	0.8412	0.7765	7.7	TM	
20	*TM	2-Nitrophenol	0.2303	0.2122	7.9	*TM	
21	TM	2,4-Dimethylphenol	0.4063	0.3604	11	TM	
22	TM	Benzoic acid	0.3417	0.3397	0.57	TM	
23	TM	Bis (2-chloroethoxy) methane	0.4704	0.4642	1.3	TM	
24	*TM	2,4-Dichlorophenol	0.3481	0.3189	8.4	*TM	
25	TM	1,2,4-Trichlorobenzene	0.3482	0.3139	9.8	TM	
26	TM	3,4-Dimethylphenol	0.5164	0.4560	12	TM	
27	TM	Naphthalene	1.219	1.095	10	TM	
28	TM	4-Chloroaniline	0.4857	0.4291	12	TM	
29	TM	2,6-Dichlorophenol	0.3252	0.3009	7.5	TM	
30	TM	Hexachloropropene	0.2454	0.2308	6.0	TM	
31	*TM	Hexachlorobutadiene	0.2005	0.1864	7.1	*TM	
32	TM	Caprolactum	0.2193	0.1954	11	TM	
33	*TM	4-Chloro-3-methylphenol	0.3792	0.3483	8.2	*TM	
34	TM	2-Methylnaphthalene	0.7695	0.6751	12	TM	
35	TM	1-Methylnaphthalene	0.7675	0.6858	11	TM	
36	**TM	Hexachlorocyclopentadiene	0.4531	0.4740	4.6	**TM	
37	TM	1,2,4,5-Tetrachlorobenzene	0.7046	0.6372	9.6	TM	
38	*TM	2,4,6-Trichlorophenol	0.5113	0.4759	6.9	*TM	
39	TM	2,4,5-Trichlorophenol	0.5185	0.4788	7.7	TM	
40	TM	1,1'-Biphenyl	1.867	1.681	9.9	TM	
		Average			8.8		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Second Source Calibration

Lab Name: APPL, Inc.
SDG No:
Case No:
Date Analyzed: 08/29/18
Matrix: 0
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y012.D

		Compound	MEAN	CCRF	%D	%Drift	
41	TM	2-Chloronaphthalene	1.505	1.405	6.6	TM	
42	TM	2-Nitroaniline	0.5187	0.4848	6.5	TM	
43	TM	Dimethyl phthalate	1.723	1.585	8.0	TM	
44	TM	2,6-DNT	0.3844	0.3732	2.9	TM	
45	TM	Acenaphthylene	2.373	2.193	7.6	TM	
46	TM	3-Nitroaniline	0.4355	0.4086	6.2	TM	
47	*TM	Acenaphthene	1.536	1.407	8.4	*TM	
48	**TML	2,4-Dinitrophenol	0.2295	0.2332	1.6	**TML	6.3
49	**TM	4-Nitrophenol	0.3942	0.3687	6.5	**TM	
50	TM	Dibenzofuran	2.053	1.865	9.2	TM	
51	TM	2,4-DNT	0.5163	0.5116	0.91	TM	
52	TM	2,3,4,6-Tetrachlorophenol	0.4458	0.4186	6.1	TM	
53	TM	Diethyl phthalate	1.679	1.533	8.7	TM	
54	TML	4-Chlorophenyl phenyl ether	0.7035	0.6848	2.7	TML	6.6
55	TML	Fluorene	1.568	1.404	11	TML	1.2
56	TM	4-Nitroaniline	0.4411	0.3989	9.6	TM	
57	TM	4,6-Dinitro-2-methylphenol	0.1810	0.1765	2.5	TM	
58	TM	Diphenyl amine	0.6599	0.6076	7.9	TM	
59	*TM	n-Nitrosodiphenylamine	0.6599	0.6076	7.9	*TM	
60	TM	1,2-Diphenylhydrazine	1.055	0.9659	8.5	TM	
61	TM	4-Bromophenyl phenyl ether	0.2614	0.2397	8.3	TM	
62	TM	Hexachlorobenzene	0.2794	0.2556	8.5	TM	
63	TM	Atrazine	0.2262	0.2324	2.7	TM	
64	*TM	Pentachlorophenol	0.2006	0.1896	5.5	*TM	
65	TM	Phenanthrene	1.350	1.196	11	TM	
66	TM	Anthracene	1.386	1.256	9.4	TM	
67	TM	Carbazol	1.287	1.177	8.6	TM	
68	TM	Di-n-butylphthalate	1.498	1.400	6.5	TM	
69	*TM	Fluoranthene	1.442	1.314	8.9	*TM	
70	TM	Benzidine	0.5118	0.5470	6.9	TM	
71	TM	Pyrene	1.668	1.537	7.9	TM	
72	TM	Butyl benzylphthalate	0.7363	0.7097	3.6	TM	
73	TM	3,3'-Dichlorobenzidine	0.5437	0.5082	6.5	TM	
74	TM	Benz (a) anthracene	1.380	1.220	12	TM	
75	TM	Bis (2-ethylhexyl) phthalate	0.8941	0.8182	8.5	TM	
76	TM	Chrysene	1.485	1.393	6.2	TM	
77	*TM	Di-n-octylphthalate	1.690	1.668	1.3	*TM	
78	TM	Benzo (b) fluoranthene	1.444	1.285	11	TM	
79	TM	Benzo (k) fluoranthene	1.295	1.252	3.3	TM	
80	*TM	Benzo (a) pyrene	1.316	1.213	7.8	*TM	
		Average			6.8		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 08/29/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y012.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Indeno (1,2,3-cd) pyrene	1.469	1.362	7.3	TM	
82	TM	Dibenz (a,h) anthracene	1.310	1.187	9.4	TM	
83	TM	Benzo (g,h,i) perylene	1.200	1.092	9.0	TM	
84							
85							
86							
87							
88							
89							
90							
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119							
120							
		Average			8.6		

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y012.D Vial: 12
Acq On : 29 Aug 18 10:35 Operator: MA
Sample : SSug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	325956	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1354704	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.07	164	690477	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1269875	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1153314	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.85	264	1330717	40.00000 ppb	-0.01
System Monitoring Compounds					
5) 2-Fluorophenol (S)	0.00	112	0	0.00000 ppb	
Spiked Amount 200.000			Recovery	= 0.000%	
6) Phenol-D6 (S)	0.00	99	0	0.00000 ppb	
Spiked Amount 200.000			Recovery	= 0.000%	
22) Nitrobenzene-D5(S)	6.18	82	70798	4.93944 ppb	-0.06
Spiked Amount 100.000			Recovery	= 4.939%	
46) 2-Fluorobiphenyl(S)	8.28	172	543	0.02014 ppb	0.00
Spiked Amount 100.000			Recovery	= 0.020%	
64) 2,4,6-Tribromophenol(S)	9.99	330	181	0.05527 ppb	-0.01
Spiked Amount 200.000			Recovery	= 0.028%	
82) Terphenyl-D14(S)	12.66	244	2884	0.09635 ppb	0.00
Spiked Amount 100.000			Recovery	= 0.096%	

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
2) 1,4-Dioxane	1.81	58	5557	4.82241	79
3) n-Nitrosodimethylamine	2.04	42	112893	43.29775 ppb	91
4) Pyridine	2.07	79	190477	45.36310 ppb	93
7) Phenol	5.19	94	908871	46.31851 ppb	99
8) Aniline	5.23	66	365222	47.20858 ppb	95
9) Bis (2-chloroethyl) ether	5.31	63	495524	47.15294 ppb	99
10) 2-Chlorophenol	5.36	128	671500	44.57695 ppb	99
11) 1,3-DCB	5.54	146	717695	46.21462 ppb	99
12) 1,4-DCB	5.63	146	716249	46.00106 ppb	97
13) Benzyl alcohol	5.76	108	426092	43.05812 ppb	98
14) 1,2-DCB	5.80	146	685706	46.54393 ppb	97
15) 2-Methylphenol	5.87	107	543206	44.50567 ppb	99
16) Bis (2-chloroisopropyl) et	5.91	45	907264	44.45508 ppb	97
17) Acetophenone	6.06	105	812316	49.55524 ppb	92
18) 3&4-Methylphenol	6.05	107	1261216	97.21840 ppb	99
19) n-Nitrosodi-n-propylamine	6.07	70	469542	43.08444 ppb	99
20) Hexachloroethane	6.18	117	274164	46.46154 ppb	84
23) Nitrobenzene	6.26	77	754665	46.11274 ppb	100
24) Isophorone	6.52	82	1314830	46.15148 ppb	97
25) 2-Nitrophenol	6.61	139	359317	46.06812 ppb	96
26) 2,4-Dimethylphenol	6.65	122	610238	44.35170 ppb	98
27) Benzoic acid	6.77	105	575290	49.71540 ppb	99
28) Bis (2-chloroethoxy) metha	6.76	93	786142	49.34408 ppb	98
29) 2,4-Dichlorophenol	6.88	162	539965	45.80187 ppb	97
30) 1,2,4-Trichlorobenzene	6.97	180	531582	45.08150 ppb	99
31) 3,4-Dimethylphenol	6.98	107	772262	44.15860 ppb	98
32) Naphthalene	7.07	128	1854988	44.94633 ppb	100
33) 4-Chloroaniline	7.13	127	726647	44.17633 ppb	97
34) 2,6-Dichlorophenol	7.13	162	509594	46.26290 ppb	97
35) Hexachloropropene	7.16	213	390795	47.01790 ppb	99
36) Hexachlorobutadiene	7.19	225	315569	46.46370 ppb	100
37) Caprolactum	7.55	55	330905	44.55807 ppb	98

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y012.D Vial: 12
Acq On : 29 Aug 18 10:35 Operator: MA
Sample : SSug/ml 8270 08/16/18 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Aug 29 12:55 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38) 4-Chloro-3-methylphenol	7.67	107	589742	45.91588 ppb		95
39) 2-Methylnaphthalene	7.85	142	1143179	43.86263 ppb		100
40) 1-Methylnaphthalene	7.97	142	1161323	44.67726 ppb		98
42) Hexachlorocyclopentadiene	8.03	237	409128	52.30618 ppb		97
43) 1,2,4,5-Tetrachlorobenzene	8.05	216	549943	45.21329 ppb		99
44) 2,4,6-Trichlorophenol	8.18	196	410738	46.53925 ppb		99
45) 2,4,5-Trichlorophenol	8.21	196	413227	46.17173 ppb		96
47) 1,1'-Biphenyl	8.39	154	1451172	45.02637 ppb		99
48) 2-Chloronaphthalene	8.42	162	1212222	46.67583 ppb		99
49) 2-Nitroaniline	8.54	65	418435	46.72844 ppb		90
50) Dimethyl phthalate	8.74	163	1368401	46.00672 ppb		99
51) 2,6-DNT	8.82	165	322066	48.53498 ppb		92
52) Acenaphthylene	8.90	152	1892494	46.19998 ppb		99
53) 3-Nitroaniline	9.01	138	352625	46.90356 ppb		95
54) Acenaphthene	9.11	154	1213965	45.79590 ppb		97
55) 2,4-Dinitrophenol	9.13	184	201304	46.86021 ppb		95
56) 4-Nitrophenol	9.19	65	318200	46.76599 ppb		97
57) Dibenzofuran	9.31	168	1609346	45.40794 ppb		96
58) 2,4-DNT	9.29	165	441564	49.54271 ppb		89
59) 2,3,4,6-Tetrachlorophenol	9.44	232	361285	46.94545 ppb		97
60) Diethyl phthalate	9.57	149	1323527	45.67108 ppb		100
61) 4-Chlorophenyl phenyl ethe	9.70	204	591063	53.31125 ppb		98
62) Fluorene	9.71	166	1211453	50.62203 ppb		99
63) 4-Nitroaniline	9.74	138	344271	45.21648 ppb		86
66) 4,6-Dinitro-2-methylphenol	9.76	198	280103	48.75486 ppb	#	72
67) Diphenyl amine	9.85	169	1928823	92.07149 ppb		100
68) n-Nitrosodiphenylamine	9.85	169	1928823	92.07149 ppb		100
69) 1,2-Diphenylhydrazine	9.89	77	1533286	45.76244 ppb		98
70) 4-Bromophenyl phenyl ether	10.27	248	380479	45.84107 ppb		94
71) Hexachlorobenzene	10.34	284	405711	45.74205 ppb		95
72) Atrazine	10.46	200	184432	25.67823 ppb		98
73) Pentachlorophenol	10.57	266	300966	47.26318 ppb		98
74) Phenanthrene	10.83	178	1898687	44.29178 ppb		100
75) Anthracene	10.90	178	1993170	45.30018 ppb		100
76) Carbazol	11.07	167	1867750	45.70507 ppb		100
77) Di-n-butylphthalate	11.47	149	2222868	46.73682 ppb		99
78) Fluoranthene	12.22	202	2085792	45.55886 ppb		98
80) Benzidine	12.37	184	788540	53.43654 ppb		98
81) Pyrene	12.49	202	2215593	46.06279 ppb		100
83) Butyl benzylphthalate	13.23	149	1023119	48.19580 ppb		96
84) 3,3'-Dichlorobenzidine	13.85	252	732671	46.73680 ppb		97
85) Benz (a) anthracene	13.89	228	1758699	44.19579 ppb		99
86) Bis (2-ethylhexyl) phthala	13.89	149	1179615	45.75550 ppb		98
87) Chrysene	13.93	228	2008550	46.91092 ppb		98
88) Di-n-octylphthalate	14.68	149	2404757	49.36489 ppb		97
90) Benzo (b) fluoranthene	15.26	252	2136832	44.47759 ppb		98
91) Benzo (k) fluoranthene	15.31	252	2082740	48.34264 ppb		98
92) Benzo (a) pyrene	15.76	252	2017034	46.08544 ppb		99
93) Indeno (1,2,3-cd) pyrene	17.87	276	2265605	46.35189 ppb		99
94) Dibenz (a,h) anthracene	17.92	278	1974480	45.29180 ppb		100
95) Benzo (g,h,i) perylene	18.49	276	1816782	45.49533 ppb		98

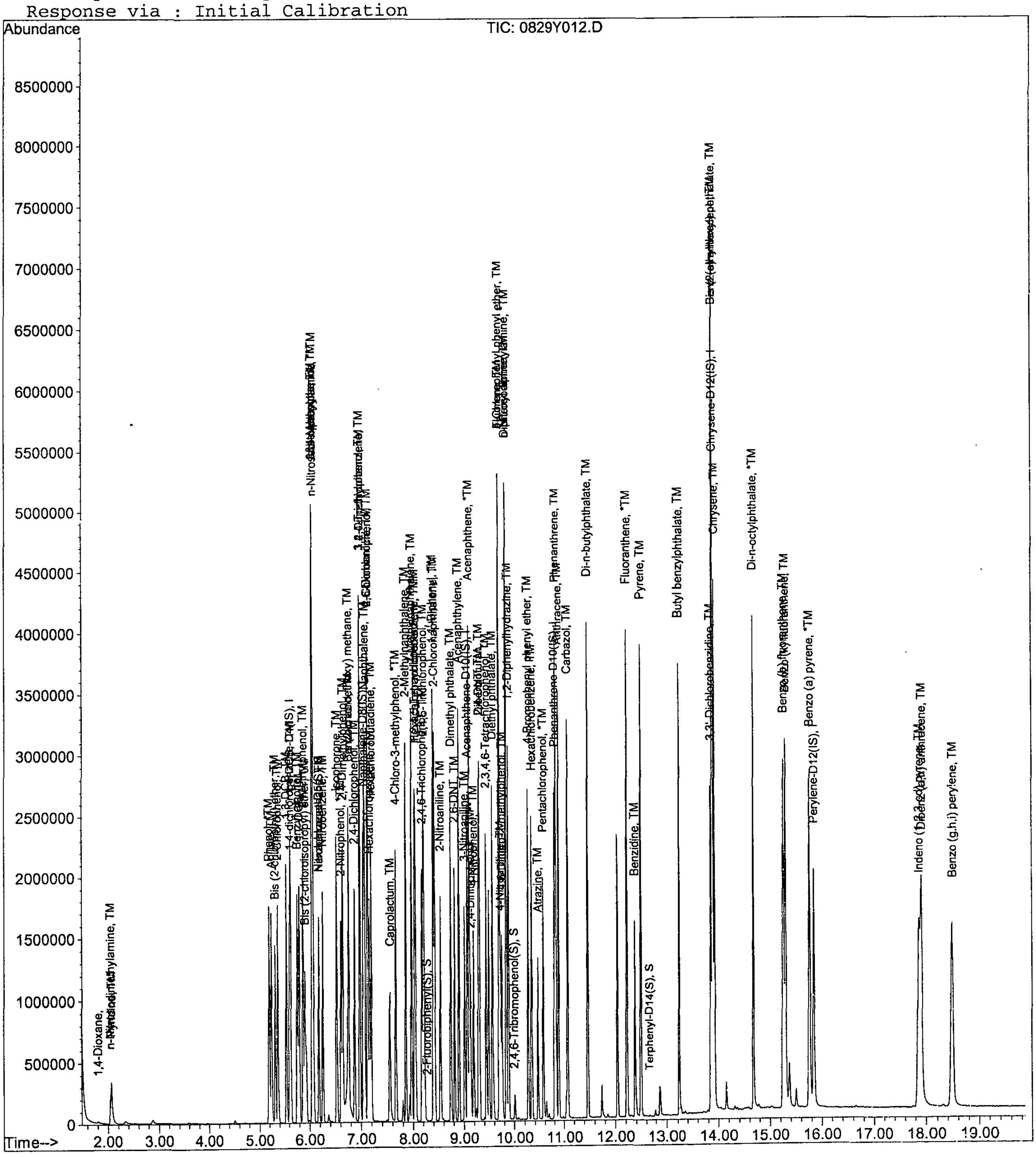
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y012.D   Vial: 12
Acq On : 29 Aug 18 10:35   Operator: MA
Sample : SSug/ml 8270 08/16/18   Inst : Yoda
Misc :   Multiplr: 1.00

Quant Time: Aug 29 12:55 2018   Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/11/18
Instrument: Yoda
Initial Cal. Date: 08/29/18
Data File: 0829Y196.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1414	0.1595	13		
3	TM	n-Nitrosodimethylamine	0.3200	0.3630	13	TM	
4	TM	Pyridine	0.5153	0.5944	15	TM	
5	S	2-Fluorophenol (S)	1.503	1.542	2.6	S	
6	S	Phenol-D6 (S)	1.791	1.841	2.8	S	
7	*TM	Phenol	2.408	2.642	9.7	*TM	
8	TM	Aniline	0.9494	1.035	9.0	TM	
9	TM	Bis (2-chloroethyl) ether	1.290	1.369	6.1	TM	
10	TM	2-Chlorophenol	1.849	1.934	4.6	TM	
11	TM	1,3-DCB	1.906	1.968	3.3	TM	
12	*TM	1,4-DCB	1.911	1.963	2.7	*TM	
13	TM	Benzyl alcohol	1.214	1.271	4.7	TM	
14	TM	1,2-DCB	1.808	1.884	4.2	TM	
15	TM	2-Methylphenol	1.498	1.566	4.6	TM	
16	TM	Bis (2-chloroisopropyl) ether	2.504	2.664	6.4	TM	
17	TML	Acetophenone	2.258	2.258	0.00	TML	14
18	TML	3&4-Methylphenol	1.776	1.742	1.9	TML	11
19	**TM	n-Nitrosodi-n-propylamine	1.337	1.339	0.09	**TM	
20	TM	Hexachloroethane	0.7241	0.7648	5.6	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4232	0.4454	5.2	S	
23	TM	Nitrobenzene	0.4832	0.5116	5.9	TM	
24	TM	Isophorone	0.8412	0.8895	5.7	TM	
25	*TM	2-Nitrophenol	0.2303	0.2482	7.8	*TM	
26	TM	2,4-Dimethylphenol	0.4063	0.4240	4.4	TM	
27	TM	Benzoic acid	0.3417	0.3864	13	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4704	0.4970	5.7	TM	
29	*TM	2,4-Dichlorophenol	0.3481	0.3680	5.7	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3482	0.3648	4.8	TM	
31	TM	3,4-Dimethylphenol	0.5164	0.5516	6.8	TM	
32	TM	Naphthalene	1.219	1.265	3.8	TM	
33	TM	4-Chloroaniline	0.4857	0.4823	0.69	TM	
34	TM	2,6-Dichlorophenol	0.3252	0.3427	5.4	TM	
35	TM	Hexachloropropene	0.2454	0.2696	9.9	TM	
36	*TM	Hexachlorobutadiene	0.2005	0.2171	8.3	*TM	
37	TM	Caprolactum	0.2193	0.2410	9.9	TM	
38	*TM	4-Chloro-3-methylphenol	0.3792	0.4009	5.7	*TM	
39	TM	2-Methylnaphthalene	0.7695	0.8043	4.5	TM	
40	TM	1-Methylnaphthalene	0.7675	0.8038	4.7	TM	
		Average			6.0		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/10/18
Instrument: Yoda
Initial Cal. Date: 08/29/18
Data File: 0829Y175.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1414	0.1362	3.7		
3	TM	n-Nitrosodimethylamine	0.3200	0.3117	2.6	TM	
4	TM	Pyridine	0.5153	0.5099	1.0	TM	
5	S	2-Fluorophenol (S)	1.503	1.530	1.8	S	
6	S	Phenol-D6 (S)	1.791	1.804	0.75	S	
7	*TM	Phenol	2.408	2.330	3.2	*TM	
8	TM	Aniline	0.9494	0.8729	8.1	TM	
9	TM	Bis (2-chloroethyl) ether	1.290	1.247	3.3	TM	
10	TM	2-Chlorophenol	1.849	1.783	3.6	TM	
11	TM	1,3-DCB	1.906	1.790	6.1	TM	
12	*TM	1,4-DCB	1.911	1.765	7.6	*TM	
13	TM	Benzyl alcohol	1.214	1.193	1.8	TM	
14	TM	1,2-DCB	1.808	1.710	5.4	TM	
15	TM	2-Methylphenol	1.498	1.448	3.3	TM	
16	TM	Bis (2-chloroisopropyl) ether	2.504	2.438	2.7	TM	
17	TML	Acetophenone	2.258	1.825	19	TML	10
18	TML	3&4-Methylphenol	1.776	1.429	20	TML	11
19	**TM	n-Nitrosodi-n-propylamine	1.337	1.254	6.3	**TM	
20	TM	Hexachloroethane	0.7241	0.6896	4.8	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4232	0.4469	5.6	S	
23	TM	Nitrobenzene	0.4832	0.4662	3.5	TM	
24	TM	Isophorone	0.8412	0.8154	3.1	TM	
25	*TM	2-Nitrophenol	0.2303	0.2304	0.04	*TM	
26	TM	2,4-Dimethylphenol	0.4063	0.3841	5.5	TM	
27	TM	Benzoic acid	0.3417	0.3718	8.8	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4704	0.4393	6.6	TM	
29	*TM	2,4-Dichlorophenol	0.3481	0.3313	4.8	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3482	0.3142	9.8	TM	
31	TM	3,4-Dimethylphenol	0.5164	0.4807	6.9	TM	
32	TM	Naphthalene	1.219	1.118	8.2	TM	
33	TM	4-Chloroaniline	0.4857	0.4102	16	TM	
34	TM	2,6-Dichlorophenol	0.3252	0.2912	10	TM	
35	TM	Hexachloropropene	0.2454	0.2407	1.9	TM	
36	*TM	Hexachlorobutadiene	0.2005	0.1890	5.8	*TM	
37	TM	Caprolactum	0.2193	0.2227	1.5	TM	
38	*TM	4-Chloro-3-methylphenol	0.3792	0.3667	3.3	*TM	
39	TM	2-Methylnaphthalene	0.7695	0.7098	7.8	TM	
40	TM	1-Methylnaphthalene	0.7675	0.7018	8.6	TM	
		Average			5.9		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 09/10/18
Matrix: 0 Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y175.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.4531	0.4278	5.6	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.7046	0.6288	11	TM	
44	*TM	2,4,6-Trichlorophenol	0.5113	0.4860	4.9	*TM	
45	TM	2,4,5-Trichlorophenol	0.5185	0.5044	2.7	TM	
46	S	2-Fluorobiphenyl(S)	1.562	1.501	3.9	S	
47	TM	1,1'-Biphenyl	1.867	1.654	11	TM	
48	TM	2-Chloronaphthalene	1.505	1.356	9.8	TM	
49	TM	2-Nitroaniline	0.5187	0.5192	0.08	TM	
50	TM	Dimethyl phthalate	1.723	1.603	7.0	TM	
51	TM	2,6-DNT	0.3844	0.3834	0.26	TM	
52	TM	Acenaphthylene	2.373	2.185	7.9	TM	
53	TM	3-Nitroaniline	0.4355	0.4239	2.7	TM	
54	*TM	Acenaphthene	1.536	1.383	9.9	*TM	
55	**TML	2,4-Dinitrophenol	0.2295	0.2251	1.9	**TML	9.0
56	**TM	4-Nitrophenol	0.3942	0.3849	2.4	**TM	
57	TM	Dibenzofuran	2.053	1.809	12	TM	
58	TM	2,4-DNT	0.5163	0.5035	2.5	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.4458	0.4259	4.5	TM	
60	TM	Diethyl phthalate	1.679	1.536	8.5	TM	
61	TML	4-Chlorophenyl phenyl ether	0.7035	0.6010	15	TML	9.0
62	TML	Fluorene	1.568	1.318	16	TML	5.7
63	TM	4-Nitroaniline	0.4411	0.4472	1.4	TM	
64	S	2,4,6-Tribromophenol(S)	0.1897	0.1864	1.8	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TM	4,6-Dinitro-2-methylphenol	0.1810	0.1832	1.2	TM	
67	TM	Diphenyl amine	0.6599	0.5590	15	TM	
68	*TM	n-Nitrosodiphenylamine	0.6599	0.5590	15	*TM	
69	TM	1,2-Diphenylhydrazine	1.055	0.9464	10	TM	
70	TM	4-Bromophenyl phenyl ether	0.2614	0.2460	5.9	TM	
71	TM	Hexachlorobenzene	0.2794	0.2536	9.2	TM	
72	TM	Atrazine	0.2262	0.1886	17	TM	
73	*TM	Pentachlorophenol	0.2006	0.1987	0.94	*TM	
74	TM	Phenanthrene	1.350	1.186	12	TM	
75	TM	Anthracene	1.386	1.246	10	TM	
76	TM	Carbazol	1.287	1.194	7.2	TM	
77	TM	Di-n-butylphthalate	1.498	1.337	11	TM	
78	*TM	Fluoranthene	1.442	1.327	8.0	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TM	Benzidine	0.5118	0.4174	18	TM	
		Average			7.7		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/10/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y175.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	1.668	1.517	9.1	TM	
82	S	Terphenyl-D14(S)	1.038	0.9891	4.7	S	
83	TM	Butyl benzylphthalate	0.7363	0.7152	2.9	TM	
84	TM	3,3'-Dichlorobenzidine	0.5437	0.5528	1.7	TM	
85	TM	Benz (a) anthracene	1.380	1.153	16	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.8941	0.7866	12	TM	
87	TM	Chrysene	1.485	1.343	9.6	TM	
88	*TM	Di-n-octylphthalate	1.690	1.648	2.4	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.444	1.341	7.1	TM	
91	TM	Benzo (k) fluoranthene	1.295	1.166	9.9	TM	
92	*TM	Benzo (a) pyrene	1.316	1.213	7.8	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.469	1.432	2.6	TM	
94	TM	Dibenz (a,h) anthracene	1.310	1.224	6.6	TM	
95	TM	Benzo (g,h,i) perylene	1.200	1.159	3.5	TM	
96							
97							
98							
99							
100							
101							
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112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			6.9		

Quantitation Report (Not Reviewed)

```
Data File : M:\YODA\DATA\Y180829\0829Y175.D            Vial: 74
Acq On    : 10 Sep 18  10:07                        Operator: MA
Sample    : 50ug/ml 8270 08/16/18 (1)               Inst    : Yoda
Misc      :                                         Multiplr: 1.00000
MS Integration Params: rteint.p
Quant Time: Sep 10 10:30 2018          Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416
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Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	517481	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	2203139	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	1160362	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	2141374	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.91	240	1925751	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.85	264	2294355	40.00000 ppb	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
5) 2-Fluorophenol (S)	4.01	112	1978975	101.77937 ppb	-0.03
Spiked Amount 200.000			Recovery =	50.890%	
6) Phenol-D6 (S)	5.18	99	2334459	100.75109 ppb	0.00
Spiked Amount 200.000			Recovery =	50.376%	
22) Nitrobenzene-D5(S)	6.23	82	1230842	52.80337 ppb	0.00
Spiked Amount 100.000			Recovery =	52.803%	
46) 2-Fluorobiphenyl(S)	8.27	172	2177495	48.04991 ppb	0.00
Spiked Amount 100.000			Recovery =	48.050%	
64) 2,4,6-Tribromophenol(S)	9.99	330	540586	98.22922 ppb	0.00
Spiked Amount 200.000			Recovery =	49.115%	
82) Terphenyl-D14(S)	12.66	244	2380841	47.63694 ppb	0.00
Spiked Amount 100.000			Recovery =	47.637%	

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
3) n-Nitrosodimethylamine	2.01	42	201611	48.70540 ppb	90
4) Pyridine	2.03	79	329838	49.47951 ppb	99
7) Phenol	5.20	94	1507201	48.38247 ppb	95
8) Aniline	5.23	66	564620	45.97109 ppb	99
9) Bis (2-chloroethyl) ether	5.31	63	806402	48.33484 ppb	95
10) 2-Chlorophenol	5.36	128	1153169	48.21941 ppb	100
11) 1,3-DCB	5.53	146	1158051	46.97121 ppb	100
12) 1,4-DCB	5.62	146	1141968	46.19791 ppb	99
13) Benzyl alcohol	5.75	108	771581	49.11314 ppb	91
14) 1,2-DCB	5.78	146	1105982	47.28656 ppb	98
15) 2-Methylphenol	5.87	107	936779	48.34510 ppb	98
16) Bis (2-chloroisopropyl) et	5.90	45	1577038	48.67371 ppb	96
17) Acetophenone	6.06	105	1180576	44.86473 ppb	83
18) 3&4-Methylphenol	6.05	107	1848064	88.95301 ppb	99
19) n-Nitrosodi-n-propylamine	6.08	70	811015	46.87480 ppb	98
20) Hexachloroethane	6.16	117	446042	47.61278 ppb	99
23) Nitrobenzene	6.26	77	1283792	48.23518 ppb	98
24) Isophorone	6.53	82	2245442	48.46413 ppb	99
25) 2-Nitrophenol	6.60	139	634479	50.01986 ppb	91
26) 2,4-Dimethylphenol	6.64	122	1057690	47.26851 ppb	99
27) Benzoic acid	6.79	105	1023905	54.40844 ppb	98
28) Bis (2-chloroethoxy) metha	6.76	93	1209798	46.69275 ppb	100
29) 2,4-Dichlorophenol	6.87	162	912404	47.58907 ppb	99
30) 1,2,4-Trichlorobenzene	6.97	180	865227	45.11913 ppb	99
31) 3,4-Dimethylphenol	6.98	107	1323903	46.54888 ppb	99
32) Naphthalene	7.06	128	3079607	45.88291 ppb	100
33) 4-Chloroaniline	7.12	127	1129771	42.23369 ppb	99
34) 2,6-Dichlorophenol	7.13	162	801847	44.76129 ppb	99
35) Hexachloropropene	7.16	213	662905	49.04199 ppb	98
36) Hexachlorobutadiene	7.18	225	520359	47.11129 ppb	99
37) Caprolactum	7.56	55	613222	50.77422 ppb	96
38) 4-Chloro-3-methylphenol	7.67	107	1009828	48.34491 ppb	97
39) 2-Methylnaphthalene	7.85	142	1954640	46.11579 ppb	98
40) 1-Methylnaphthalene	7.96	142	1932783	45.72136 ppb	100
42) Hexachlorocyclopentadiene	8.02	237	620551	47.20924 ppb	99
43) 1,2,4,5-Tetrachlorobenzene	8.04	216	912029	44.61828 ppb	98
44) 2,4,6-Trichlorophenol	8.17	196	701911	47.52745 ppb	100

45)	2,4,5-Trichlorophenol	8.22	196	731617	48.64374 ppb		99
47)	1,1'-Biphenyl	8.39	154	2399094	44.29462 ppb		99
48)	2-Chloronaphthalene	8.42	162	1967397	45.07727 ppb		98
49)	2-Nitroaniline	8.54	65	753006	50.03887 ppb		89
50)	Dimethyl phthalate	8.74	163	2325236	46.51903 ppb		99
51)	2,6-DNT	8.82	165	556118	49.86923 ppb		98
52)	Acenaphthylene	8.90	152	3169332	46.03952 ppb		100
53)	3-Nitroaniline	9.01	138	614774	48.65908 ppb		95
54)	Acenaphthene	9.11	154	2006030	45.03121 ppb		98
55)	2,4-Dinitrophenol	9.13	184	326427	45.51077 ppb		96
56)	4-Nitrophenol	9.20	65	558272	48.82379 ppb		99
57)	Dibenzofuran	9.30	168	2623510	44.04746 ppb		99
58)	2,4-DNT	9.28	165	730242	48.75381 ppb		97
59)	2,3,4,6-Tetrachlorophenol	9.44	232	617701	47.76146 ppb		99
60)	Diethyl phthalate	9.56	149	2228463	45.75828 ppb		98
61)	4-Chlorophenyl phenyl ethe	9.69	204	871681	45.52174 ppb		94
62)	Fluorene	9.70	166	1911516	47.14979 ppb		98
63)	4-Nitroaniline	9.75	138	648645	50.69430 ppb		91
66)	4,6-Dinitro-2-methylphenol	9.77	198	490266	50.60581 ppb		90
67)	Diphenyl amine	9.85	169	2992469	84.70927 ppb		100
68)	n-Nitrosodiphenylamine	9.85	169	2992469	84.70927 ppb		100
69)	1,2-Diphenylhydrazine	9.89	77	2533199	44.83568 ppb		96
70)	4-Bromophenyl phenyl ether	10.27	248	658427	47.04355 ppb	#	87
71)	Hexachlorobenzene	10.34	284	678755	45.38165 ppb		97
72)	Atrazine	10.45	200	252372	20.83715 ppb		96
73)	Pentachlorophenol	10.56	266	531876	49.53183 ppb		98
74)	Phenanthrene	10.83	178	3174091	43.90941 ppb		99
75)	Anthracene	10.89	178	3335671	44.95803 ppb		100
76)	Carbazol	11.07	167	3197326	46.39819 ppb		99
77)	Di-n-butylphthalate	11.46	149	3579716	44.63366 ppb		99
78)	Fluoranthene	12.22	202	3552223	46.01194 ppb		97
80)	Benzidine	12.37	184	1004771	40.77830 ppb		99
81)	Pyrene	12.49	202	3650658	45.45471 ppb		99
83)	Butyl benzylphthalate	13.22	149	1721538	48.56765 ppb		97
84)	3,3'-Dichlorobenzidine	13.85	252	1330758	50.83894 ppb		98
85)	Benz (a) anthracene	13.89	228	2776227	41.78225 ppb		99
86)	Bis (2-ethylhexyl) phthala	13.88	149	1893504	43.98622 ppb		99
87)	Chrysene	13.93	228	3232949	45.22073 ppb		98
88)	Di-n-octylphthalate	14.67	149	3968030	48.78309 ppb		100
90)	Benzo (b) fluoranthene	15.26	252	3845966	46.43029 ppb		98
91)	Benzo (k) fluoranthene	15.31	252	3344972	45.03113 ppb		98
92)	Benzo (a) pyrene	15.76	252	3480036	46.11681 ppb		99
93)	Indeno (1,2,3-cd) pyrene	17.87	276	4105890	48.72094 ppb		98
94)	Dibenz (a,h) anthracene	17.92	278	3511664	46.72022 ppb		99
95)	Benzo (g,h,i) perylene	18.50	276	3323487	48.27064 ppb		98

(#) = qualifier out of range (m) = manual integration
0829Y175.D Y0829NC.M Mon Sep 10 10:30:36 2018

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/10/18
Instrument: Yoda
Initial Cal. Date: 08/29/18
Data File: 0829Y191.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1414	0.1354	4.2		
3	TM	n-Nitrosodimethylamine	0.3200	0.3153	1.5	TM	
4	TM	Pyridine	0.5153	0.5149	0.08	TM	
5	S	2-Fluorophenol (S)	1.503	1.522	1.3	S	
6	S	Phenol-D6 (S)	1.791	1.833	2.4	S	
7	*TM	Phenol	2.408	2.410	0.07	*TM	
8	TM	Aniline	0.9494	0.8124	14	TM	
9	TM	Bis (2-chloroethyl) ether	1.290	1.251	3.0	TM	
10	TM	2-Chlorophenol	1.849	1.761	4.8	TM	
11	TM	1,3-DCB	1.906	1.777	6.8	TM	
12	*TM	1,4-DCB	1.911	1.772	7.3	*TM	
13	TM	Benzyl alcohol	1.214	1.174	3.3	TM	
14	TM	1,2-DCB	1.808	1.691	6.5	TM	
15	TM	2-Methylphenol	1.498	1.432	4.4	TM	
16	TM	Bis (2-chloroisopropyl) ether	2.504	2.439	2.6	TM	
17	TML	Acetophenone	2.258	1.967	13	TML	2.4
18	TML	3&4-Methylphenol	1.776	1.532	14	TML	3.9
19	**TM	n-Nitrosodi-n-propylamine	1.337	1.248	6.7	**TM	
20	TM	Hexachloroethane	0.7241	0.6812	5.9	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4232	0.4433	4.7	S	
23	TM	Nitrobenzene	0.4832	0.4651	3.8	TM	
24	TM	Isophorone	0.8412	0.8128	3.4	TM	
25	*TM	2-Nitrophenol	0.2303	0.2245	2.5	*TM	
26	TM	2,4-Dimethylphenol	0.4063	0.3842	5.4	TM	
27	TM	Benzoic acid	0.3417	0.3738	9.4	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4704	0.4485	4.7	TM	
29	*TM	2,4-Dichlorophenol	0.3481	0.3376	3.0	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3482	0.3272	6.0	TM	
31	TM	3,4-Dimethylphenol	0.5164	0.5006	3.1	TM	
32	TM	Naphthalene	1.219	1.132	7.1	TM	
33	TM	4-Chloroaniline	0.4857	0.4297	12	TM	
34	TM	2,6-Dichlorophenol	0.3252	0.3061	5.9	TM	
35	TM	Hexachloropropene	0.2454	0.2328	5.1	TM	
36	*TM	Hexachlorobutadiene	0.2005	0.1921	4.2	*TM	
37	TM	Caprolactum	0.2193	0.2208	0.70	TM	
38	*TM	4-Chloro-3-methylphenol	0.3792	0.3687	2.8	*TM	
39	TM	2-Methylnaphthalene	0.7695	0.7278	5.4	TM	
40	TM	1-Methylnaphthalene	0.7675	0.7143	6.9	TM	
		Average			5.2		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/10/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y191.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.4531	0.3927	13	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.7046	0.6682	5.2	TM	
44	*TM	2,4,6-Trichlorophenol	0.5113	0.4998	2.2	*TM	
45	TM	2,4,5-Trichlorophenol	0.5185	0.5026	3.1	TM	
46	S	2-Fluorobiphenyl(S)	1.562	1.548	0.92	S	
47	TM	1,1'-Biphenyl	1.867	1.730	7.3	TM	
48	TM	2-Chloronaphthalene	1.505	1.404	6.7	TM	
49	TM	2-Nitroaniline	0.5187	0.5173	0.28	TM	
50	TM	Dimethyl phthalate	1.723	1.637	5.0	TM	
51	TM	2,6-DNT	0.3844	0.3821	0.62	TM	
52	TM	Acenaphthylene	2.373	2.257	4.9	TM	
53	TM	3-Nitroaniline	0.4355	0.4275	1.8	TM	
54	*TM	Acenaphthene	1.536	1.457	5.2	*TM	
55	**TML	2,4-Dinitrophenol	0.2295	0.2531	10	**TML	0.27
56	**TM	4-Nitrophenol	0.3942	0.3887	1.4	**TM	
57	TM	Dibenzofuran	2.053	1.909	7.0	TM	
58	TM	2,4-DNT	0.5163	0.5097	1.3	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.4458	0.4386	1.6	TM	
60	TM	Diethyl phthalate	1.679	1.558	7.2	TM	
61	TML	4-Chlorophenyl phenyl ether	0.7035	0.6504	7.5	TML	0.24
62	TML	Fluorene	1.568	1.391	11	TML	0.22
63	TM	4-Nitroaniline	0.4411	0.4385	0.59	TM	
64	S	2,4,6-Tribromophenol(S)	0.1897	0.1961	3.4	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TM	4,6-Dinitro-2-methylphenol	0.1810	0.1856	2.6	TM	
67	TM	Diphenyl amine	0.6599	0.6069	8.0	TM	
68	*TM	n-Nitrosodiphenylamine	0.6599	0.6069	8.0	*TM	
69	TM	1,2-Diphenylhydrazine	1.055	0.9792	7.2	TM	
70	TM	4-Bromophenyl phenyl ether	0.2614	0.2488	4.8	TM	
71	TM	Hexachlorobenzene	0.2794	0.2629	5.9	TM	
72	TM	Atrazine	0.2262	0.1836	19	TM	
73	*TM	Pentachlorophenol	0.2006	0.2001	0.22	*TM	
74	TM	Phenanthrene	1.350	1.242	8.0	TM	
75	TM	Anthracene	1.386	1.282	7.5	TM	
76	TM	Carbazol	1.287	1.221	5.2	TM	
77	TM	Di-n-butylphthalate	1.498	1.443	3.7	TM	
78	*TM	Fluoranthene	1.442	1.371	4.9	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TM	Benzidine	0.5118	0.3681	28	TM	
		Average			6.0		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Ending Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/10/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y191.D

		Compound	MEAN	CCRF	%D	%Drift	
81	TM	Pyrene	1.668	1.525	8.6	TM	
82	S	Terphenyl-D14(S)	1.038	1.020	1.8	S	
83	TM	Butyl benzylphthalate	0.7363	0.7052	4.2	TM	
84	TM	3,3'-Dichlorobenzidine	0.5437	0.5558	2.2	TM	
85	TM	Benz (a) anthracene	1.380	1.190	14	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.8941	0.8243	7.8	TM	
87	TM	Chrysene	1.485	1.356	8.7	TM	
88	*TM	Di-n-octylphthalate	1.690	1.661	1.7	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.444	1.269	12	TM	
91	TM	Benzo (k) fluoranthene	1.295	1.324	2.2	TM	
92	*TM	Benzo (a) pyrene	1.316	1.238	5.9	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.469	1.424	3.1	TM	
94	TM	Dibenz (a,h) anthracene	1.310	1.240	5.4	TM	
95	TM	Benzo (g,h,i) perylene	1.200	1.152	4.0	TM	
96							
97							
98							
99							
100							
101							
102							
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			5.8		

```
Data File : M:\YODA\DATA\Y180829\0829Y191.D            Vial: 90
Acq On    : 10 Sep 18  20:06                        Operator: MA
Sample    : 50ug/ml 8270 08/16/18 (1)               Inst    : Yoda
Misc      :                                         Multiplr: 1.00

Quant Time: Sep 11  6:44 2018             Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416
```

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	387669	40.00000	ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1634564	40.00000	ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	854156	40.00000	ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1586025	40.00000	ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1492041	40.00000	ppb	0.00
89) Perylene-D12(IS)	15.85	264	1689013	40.00000	ppb	0.00
System Monitoring Compounds						
5) 2-Fluorophenol (S)	4.01	112	1475467	101.29367	ppb	-0.03
Spiked Amount 200.000			Recovery =	50.647%		
6) Phenol-D6 (S)	5.17	99	1776606	102.35003	ppb	-0.02
Spiked Amount 200.000			Recovery =	51.175%		
22) Nitrobenzene-D5(S)	6.23	82	905783	52.37494	ppb	0.00
Spiked Amount 100.000			Recovery =	52.375%		
46) 2-Fluorobiphenyl(S)	8.27	172	1652508	49.53764	ppb	0.00
Spiked Amount 100.000			Recovery =	49.538%		
64) 2,4,6-Tribromophenol(S)	9.99	330	418837	103.38970	ppb	0.00
Spiked Amount 200.000			Recovery =	51.695%		
82) Terphenyl-D14(S)	12.66	244	1901820	49.11366	ppb	0.00
Spiked Amount 100.000			Recovery =	49.114%		

Target Compounds						Qvalue
3) n-Nitrosodimethylamine	2.00	42	152774	49.26582	ppb	90
4) Pyridine	2.03	79	249504	49.96151	ppb	91
7) Phenol	5.19	94	1167646	50.03356	ppb	95
8) Aniline	5.23	66	393694	42.78787	ppb	96
9) Bis (2-chloroethyl) ether	5.30	63	605980	48.48421	ppb	99
10) 2-Chlorophenol	5.36	128	853116	47.61791	ppb	99
11) 1,3-DCB	5.53	146	861046	46.61909	ppb	99
12) 1,4-DCB	5.62	146	858475	46.35850	ppb	99
13) Benzyl alcohol	5.75	108	569084	48.35328	ppb	93
14) 1,2-DCB	5.78	146	819331	46.76085	ppb	99
15) 2-Methylphenol	5.87	107	693742	47.79106	ppb	98
16) Bis (2-chloroisopropyl) et	5.89	45	1182146	48.70311	ppb	99
17) Acetophenone	6.06	105	953228	48.81548	ppb	92
18) 3&4-Methylphenol	6.04	107	1484363	96.09961	ppb	96
19) n-Nitrosodi-n-propylamine	6.07	70	604691	46.65276	ppb	99
20) Hexachloroethane	6.16	117	330097	47.03517	ppb	98
23) Nitrobenzene	6.25	77	950201	48.11990	ppb	95
24) Isophorone	6.52	82	1660666	48.31042	ppb	98
25) 2-Nitrophenol	6.60	139	458760	48.74732	ppb	93
26) 2,4-Dimethylphenol	6.64	122	785083	47.28997	ppb	99
27) Benzoic acid	6.78	105	763750	54.70132	ppb	96
28) Bis (2-chloroethoxy) metha	6.75	93	916317	47.66749	ppb	98
29) 2,4-Dichlorophenol	6.87	162	689694	48.48602	ppb	99
30) 1,2,4-Trichlorobenzene	6.97	180	668527	46.98828	ppb	99
31) 3,4-Dimethylphenol	6.98	107	1022815	48.47191	ppb	99
32) Naphthalene	7.06	128	2312025	46.42887	ppb	100
33) 4-Chloroaniline	7.12	127	877966	44.23706	ppb	98
34) 2,6-Dichlorophenol	7.13	162	625357	47.05211	ppb	98
35) Hexachloropropene	7.16	213	475722	47.43621	ppb	99
36) Hexachlorobutadiene	7.18	225	392401	47.88418	ppb	99
37) Caprolactum	7.56	55	451167	50.35039	ppb	95
38) 4-Chloro-3-methylphenol	7.67	107	753260	48.60581	ppb	92

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y191.D Vial: 90
Acq On : 10 Sep 18 20:06 Operator: MA
Sample : 50ug/ml 8270 08/16/18 (1) Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Sep 11 6:44 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Compound	R.T.	QIon	Response	Conc Unit		Qvalue
39) 2-Methylnaphthalene	7.85	142	1487076	47.28855 ppb		100
40) 1-Methylnaphthalene	7.96	142	1459374	46.53102 ppb		98
42) Hexachlorocyclopentadiene	8.02	237	419274	43.33150 ppb		100
43) 1,2,4,5-Tetrachlorobenzene	8.04	216	713465	47.41690 ppb		99
44) 2,4,6-Trichlorophenol	8.17	196	533649	48.87899 ppb		98
45) 2,4,5-Trichlorophenol	8.22	196	536613	48.46862 ppb		94
47) 1,1'-Biphenyl	8.39	154	1847624	46.34188 ppb		98
48) 2-Chloronaphthalene	8.42	162	1498528	46.64303 ppb		98
49) 2-Nitroaniline	8.53	65	552335	49.86179 ppb		98
50) Dimethyl phthalate	8.73	163	1748195	47.51271 ppb		99
51) 2,6-DNT	8.82	165	407913	49.69235 ppb		96
52) Acenaphthylene	8.90	152	2409679	47.55306 ppb		99
53) 3-Nitroaniline	9.01	138	456463	49.08065 ppb		100
54) Acenaphthene	9.10	154	1555143	47.42451 ppb		99
55) 2,4-Dinitrophenol	9.13	184	270213	50.13303 ppb		97
56) 4-Nitrophenol	9.19	65	415041	49.30977 ppb		95
57) Dibenzofuran	9.30	168	2038173	46.48742 ppb		98
58) 2,4-DNT	9.28	165	544222	49.35989 ppb		99
59) 2,3,4,6-Tetrachlorophenol	9.44	232	468339	49.19442 ppb		97
60) Diethyl phthalate	9.56	149	1663019	46.38929 ppb		99
61) 4-Chlorophenyl phenyl ethe	9.69	204	694479	50.11816 ppb		96
62) Fluorene	9.70	166	1485159	50.11105 ppb		100
63) 4-Nitroaniline	9.74	138	468164	49.70572 ppb		96
66) 4,6-Dinitro-2-methylphenol	9.77	198	368020	51.28880 ppb	#	71
67) Diphenyl amine	9.84	169	2406282	91.96663 ppb		100
68) n-Nitrosodiphenylamine	9.84	169	2406282	91.96663 ppb		100
69) 1,2-Diphenylhydrazine	9.88	77	1941326	46.39118 ppb		97
70) 4-Bromophenyl phenyl ether	10.27	248	493298	47.58656 ppb		91
71) Hexachlorobenzene	10.33	284	521234	47.05248 ppb	#	88
72) Atrazine	10.45	200	181950	20.28298 ppb		99
73) Pentachlorophenol	10.56	266	396795	49.89105 ppb		98
74) Phenanthrene	10.82	178	2462265	45.98916 ppb		100
75) Anthracene	10.89	178	2542106	46.25942 ppb		100
76) Carbazol	11.07	167	2419855	47.41175 ppb		99
77) Di-n-butylphthalate	11.46	149	2860929	48.16189 ppb		99
78) Fluoranthene	12.22	202	2718717	47.54631 ppb		97
80) Benzidine	12.37	184	686603	35.96558 ppb		98
81) Pyrene	12.49	202	2843411	45.69480 ppb		99
83) Butyl benzylphthalate	13.22	149	1315276	47.89242 ppb		98
84) 3,3'-Dichlorobenzidine	13.85	252	1036522	51.10875 ppb		98
85) Benz (a) anthracene	13.89	228	2219773	43.11862 ppb		99
86) Bis (2-ethylhexyl) phthala	13.88	149	1537346	46.09369 ppb		99
87) Chrysene	13.93	228	2529699	45.66957 ppb		97
88) Di-n-octylphthalate	14.67	149	3097333	49.14752 ppb		99
90) Benzo (b) fluoranthene	15.25	252	2679226	43.93725 ppb		99
91) Benzo (k) fluoranthene	15.30	252	2795257	51.11751 ppb		100
92) Benzo (a) pyrene	15.76	252	2613424	47.04496 ppb		98
93) Indeno (1,2,3-cd) pyrene	17.86	276	3006786	48.46614 ppb		99
94) Dibenz (a,h) anthracene	17.91	278	2617782	47.31001 ppb		99
95) Benzo (g,h,i) perylene	18.49	276	2432977	48.00149 ppb		99

(#) = qualifier out of range (m) = manual integration

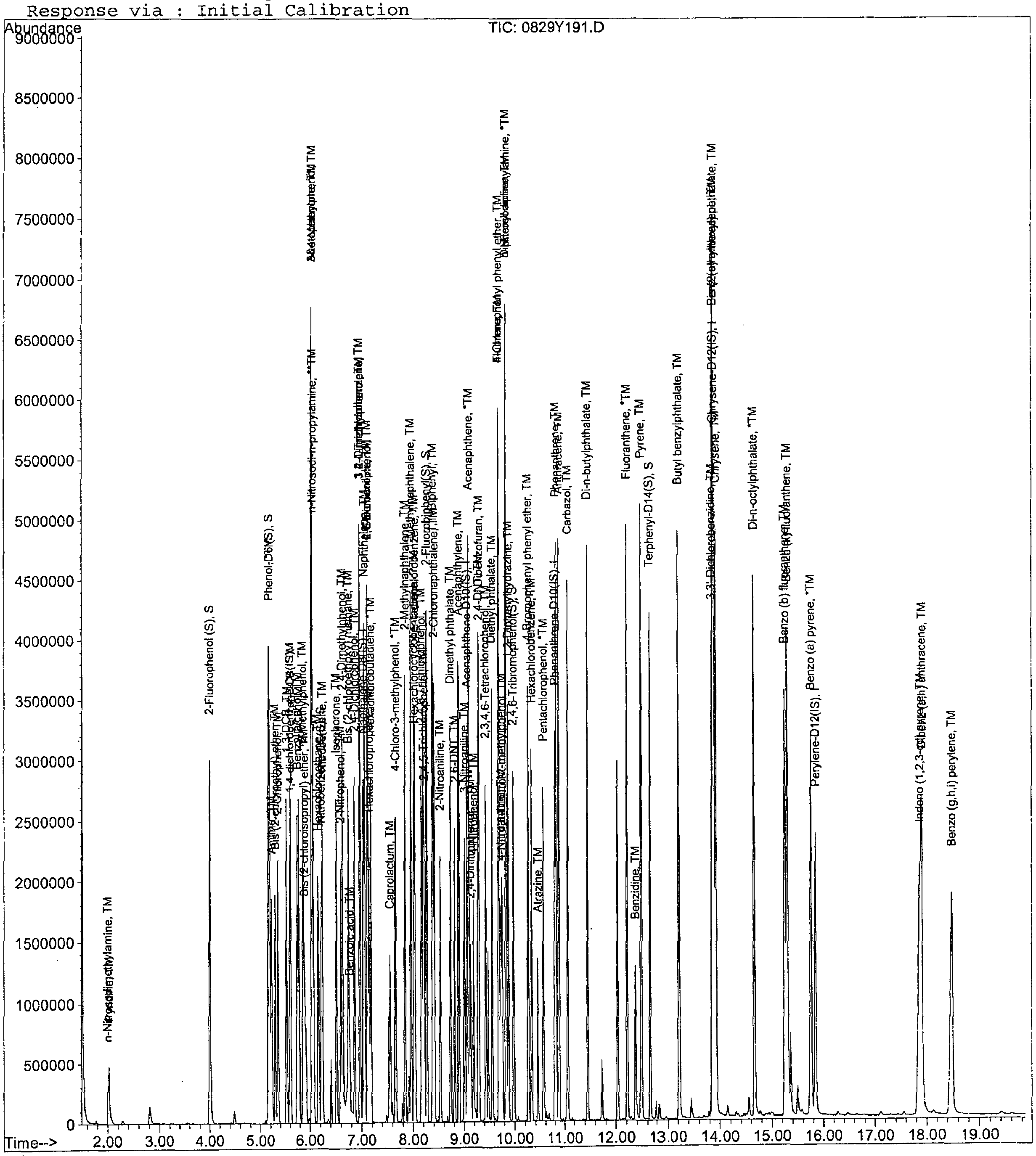
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y191.D
Acq On : 10 Sep 18 20:06
Sample : 50ug/ml 8270 08/16/18 (1)
Misc :

Vial: 90
Operator: MA
Inst : Yoda
Multiplr: 1.00

Quant Time: Sep 11 6:44 2018
Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/11/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y196.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.4531	0.4915	8.5	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.7046	0.7349	4.3	TM	
44	*TM	2,4,6-Trichlorophenol	0.5113	0.5295	3.6	*TM	
45	TM	2,4,5-Trichlorophenol	0.5185	0.5731	11	TM	
46	S	2-Fluorobiphenyl(S)	1.562	1.586	1.5	S	
47	TM	1,1'-Biphenyl	1.867	1.935	3.6	TM	
48	TM	2-Chloronaphthalene	1.505	1.550	3.0	TM	
49	TM	2-Nitroaniline	0.5187	0.5803	12	TM	
50	TM	Dimethyl phthalate	1.723	1.805	4.7	TM	
51	TM	2,6-DNT	0.3844	0.4127	7.4	TM	
52	TM	Acenaphthylene	2.373	2.489	4.9	TM	
53	TM	3-Nitroaniline	0.4355	0.4665	7.1	TM	
54	*TM	Acenaphthene	1.536	1.593	3.8	*TM	
55	**TML	2,4-Dinitrophenol	0.2295	0.2245	2.2	**TML	9.2
56	**TM	4-Nitrophenol	0.3942	0.4225	7.2	**TM	
57	TM	Dibenzofuran	2.053	2.157	5.0	TM	
58	TM	2,4-DNT	0.5163	0.5664	9.7	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.4458	0.4845	8.7	TM	
60	TM	Diethyl phthalate	1.679	1.741	3.7	TM	
61	TML	4-Chlorophenyl phenyl ether	0.7035	0.7481	6.3	TML	18
62	TML	Fluorene	1.568	1.583	0.91	TML	16
63	TM	4-Nitroaniline	0.4411	0.4739	7.4	TM	
64	S	2,4,6-Tribromophenol(S)	0.1897	0.2029	6.9	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TM	4,6-Dinitro-2-methylphenol	0.1810	0.1964	8.5	TM	
67	TM	Diphenyl amine	0.6599	0.6836	3.6	TM	
68	*TM	n-Nitrosodiphenylamine	0.6599	0.6836	3.6	*TM	
69	TM	1,2-Diphenylhydrazine	1.055	1.089	3.2	TM	
70	TM	4-Bromophenyl phenyl ether	0.2614	0.2766	5.8	TM	
71	TM	Hexachlorobenzene	0.2794	0.2959	5.9	TM	
72	TM	Atrazine	0.2262	0.2494	10	TM	
73	*TM	Pentachlorophenol	0.2006	0.2221	11	*TM	
74	TM	Phenanthrene	1.350	1.389	2.9	TM	
75	TM	Anthracene	1.386	1.445	4.3	TM	
76	TM	Carbazol	1.287	1.365	6.1	TM	
77	TM	Di-n-butylphthalate	1.498	1.620	8.1	TM	
78	*TM	Fluoranthene	1.442	1.537	6.6	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TM	Benzidine	0.5118	0.5196	1.5	TM	
		Average			5.8		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/11/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y196.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	1.668	1.666	0.16	TM	
82	S	Terphenyl-D14(S)	1.038	1.044	0.61	S	
83	TM	Butyl benzylphthalate	0.7363	0.7659	4.0	TM	
84	TM	3,3'-Dichlorobenzidine	0.5437	0.5833	7.3	TM	
85	TM	Benz (a) anthracene	1.380	1.345	2.6	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.8941	0.9160	2.4	TM	
87	TM	Chrysene	1.485	1.474	0.71	TM	
88	*TM	Di-n-octylphthalate	1.690	1.774	5.0	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.444	1.485	2.9	TM	
91	TM	Benzo (k) fluoranthene	1.295	1.445	12	TM	
92	*TM	Benzo (a) pyrene	1.316	1.389	5.6	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.469	1.601	9.0	TM	
94	TM	Dibenz (a,h) anthracene	1.310	1.407	7.3	TM	
95	TM	Benzo (g,h,i) perylene	1.200	1.297	8.1	TM	
96							
97							
98							
99							
100							
101							
102							
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			4.8		

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y196.D
Acq On : 11 Sep 18 9:47
Sample : 50ug/ml 8270 08/16/18 (1)
Misc :

Vial: 96
Operator: MA
Inst : Yoda
Multiplr: 1.00

Quant Time: Sep 11 10:30 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	321685	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1352002	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	703504	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1289645	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1241552	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.84	264	1351153	40.00000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	1240139	102.60143 ppb	0.00
Spiked Amount 200.000				Recovery = 51.301%	
6) Phenol-D6 (S)	5.18	99	1480610	102.79401 ppb	0.00
Spiked Amount 200.000				Recovery = 51.397%	
22) Nitrobenzene-D5(S)	6.23	82	752663	52.61681 ppb	0.00
Spiked Amount 100.000				Recovery = 52.617%	
46) 2-Fluorobiphenyl(S)	8.27	172	1394417	50.75222 ppb	0.00
Spiked Amount 100.000				Recovery = 50.752%	
64) 2,4,6-Tribromophenol(S)	9.99	330	356839	106.94861 ppb	0.00
Spiked Amount 200.000				Recovery = 53.475%	
82) Terphenyl-D14(S)	12.65	244	1620923	50.30500 ppb	0.00
Spiked Amount 100.000				Recovery = 50.305%	

Target Compounds					Qvalue
3) n-Nitrosodimethylamine	2.04	42	145966	56.72548 ppb	94
4) Pyridine	2.06	79	239022	57.68013 ppb	96
7) Phenol	5.20	94	1062183	54.85041 ppb	99
8) Aniline	5.24	66	415979	54.48332 ppb	98
9) Bis (2-chloroethyl) ether	5.31	63	550319	53.06239 ppb	98
10) 2-Chlorophenol	5.37	128	777559	52.30291 ppb	99
11) 1,3-DCB	5.53	146	791240	51.62688 ppb	98
12) 1,4-DCB	5.63	146	789185	51.35832 ppb	99
13) Benzyl alcohol	5.76	108	511180	52.34240 ppb	90
14) 1,2-DCB	5.79	146	757599	52.10660 ppb	98
15) 2-Methylphenol	5.87	107	629698	52.27707 ppb	98
16) Bis (2-chloroisopropyl) et	5.90	45	1071414	53.19529 ppb	98
17) Acetophenone	6.06	105	907786	56.89815 ppb	91
18) 3&4-Methylphenol	6.04	107	1400955	110.69118 ppb	96
19) n-Nitrosodi-n-propylamine	6.06	70	538240	50.04378 ppb	96
20) Hexachloroethane	6.17	117	307526	52.80721 ppb	85
23) Nitrobenzene	6.25	77	864535	52.93177 ppb	95
24) Isophorone	6.52	82	1503197	52.86875 ppb	98
25) 2-Nitrophenol	6.60	139	419444	53.88449 ppb	91
26) 2,4-Dimethylphenol	6.64	122	716575	52.18428 ppb	100
27) Benzoic acid	6.76	105	652978	56.54181 ppb	96
28) Bis (2-chloroethoxy) metha	6.75	93	839981	52.82878 ppb	99
29) 2,4-Dichlorophenol	6.87	162	621932	52.86005 ppb	99
30) 1,2,4-Trichlorobenzene	6.97	180	616481	52.38596 ppb	97
31) 3,4-Dimethylphenol	6.97	107	932232	53.41235 ppb	96
32) Naphthalene	7.06	128	2138206	51.91223 ppb	100
33) 4-Chloroaniline	7.12	127	815164	49.65674 ppb	98
34) 2,6-Dichlorophenol	7.13	162	579188	52.68600 ppb	97
35) Hexachloropropene	7.16	213	455638	54.92895 ppb	98
36) Hexachlorobutadiene	7.18	225	366894	54.12864 ppb	100
37) Caprolactum	7.56	55	407243	54.94697 ppb	98
38) 4-Chloro-3-methylphenol	7.66	107	677569	52.85930 ppb	99

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y196.D Vial: 96
Acq On : 11 Sep 18 9:47 Operator: MA
Sample : 50ug/ml 8270 08/16/18 (1) Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Sep 11 10:30 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Compound	R.T.	QIon	Response	Conc Unit	Qvalue
39) 2-Methylnaphthalene	7.85	142	1359233	52.25663 ppb	99
40) 1-Methylnaphthalene	7.96	142	1358418	52.36414 ppb	99
42) Hexachlorocyclopentadiene	8.02	237	432211	54.23408 ppb	99
43) 1,2,4,5-Tetrachlorobenzene	8.04	216	646224	52.14518 ppb	99
44) 2,4,6-Trichlorophenol	8.17	196	465633	51.78224 ppb	97
45) 2,4,5-Trichlorophenol	8.22	196	504006	55.27208 ppb	98
47) 1,1'-Biphenyl	8.39	154	1701217	51.80723 ppb	98
48) 2-Chloronaphthalene	8.42	162	1362773	51.50104 ppb	96
49) 2-Nitroaniline	8.53	65	510338	55.93632 ppb	99
50) Dimethyl phthalate	8.74	163	1586840	52.36290 ppb	99
51) 2,6-DNT	8.82	165	362900	53.67594 ppb	89
52) Acenaphthylene	8.89	152	2188999	52.44879 ppb	99
53) 3-Nitroaniline	9.01	138	410199	53.55129 ppb	98
54) Acenaphthene	9.10	154	1401182	51.87973 ppb	99
55) 2,4-Dinitrophenol	9.13	184	197405	45.41680 ppb	94
56) 4-Nitrophenol	9.19	65	371554	53.59627 ppb	95
57) Dibenzofuran	9.30	168	1896497	52.51909 ppb	95
58) 2,4-DNT	9.28	165	498042	54.84470 ppb	97
59) 2,3,4,6-Tetrachlorophenol	9.43	232	426045	54.33525 ppb	93
60) Diethyl phthalate	9.56	149	1530789	51.84495 ppb	99
61) 4-Chlorophenyl phenyl ethe	9.69	204	657833	59.18717 ppb	98
62) Fluorene	9.70	166	1391661	57.86864 ppb	100
63) 4-Nitroaniline	9.73	138	416718	53.71818 ppb	99
66) 4,6-Dinitro-2-methylphenol	9.76	198	316613	54.26499 ppb	91
67) Diphenyl amine	9.84	169	2204013	103.59475 ppb	99
68) n-Nitrosodiphenylamine	9.84	169	2204013	103.59475 ppb	99
69) 1,2-Diphenylhydrazine	9.88	77	1755147	51.58107 ppb	97
70) 4-Bromophenyl phenyl ether	10.27	248	445943	52.90469 ppb	94
71) Hexachlorobenzene	10.33	284	477067	52.96256 ppb	91
72) Atrazine	10.45	200	200992	27.55487 ppb	99
73) Pentachlorophenol	10.56	266	357997	55.35740 ppb	99
74) Phenanthrene	10.82	178	2239167	51.43362 ppb	100
75) Anthracene	10.89	178	2329405	52.13044 ppb	100
76) Carbazol	11.07	167	2201067	53.03587 ppb	98
77) Di-n-butylphthalate	11.46	149	2611290	54.06191 ppb	100
78) Fluoranthene	12.22	202	2477724	53.28999 ppb	98
80) Benzidine	12.37	184	806464	50.76709 ppb	99
81) Pyrene	12.49	202	2584775	49.91898 ppb	100
83) Butyl benzylphthalate	13.22	149	1188564	52.01017 ppb	99
84) 3,3'-Dichlorobenzidine	13.85	252	905206	53.63892 ppb	96
85) Benz (a) anthracene	13.88	228	2086887	48.71593 ppb	99
86) Bis (2-ethylhexyl) phthala	13.87	149	1421525	51.22007 ppb	97
87) Chrysene	13.92	228	2288286	49.64599 ppb	97
88) Di-n-octylphthalate	14.66	149	2753192	52.50082 ppb	96
90) Benzo (b) fluoranthene	15.25	252	2508888	51.43199 ppb	98
91) Benzo (k) fluoranthene	15.30	252	2441076	55.80302 ppb	98
92) Benzo (a) pyrene	15.75	252	2346562	52.80362 ppb	99
93) Indeno (1,2,3-cd) pyrene	17.86	276	2703611	54.47643 ppb	99
94) Dibenz (a,h) anthracene	17.90	278	2375737	53.67183 ppb	99
95) Benzo (g,h,i) perylene	18.48	276	2191350	54.04517 ppb	99

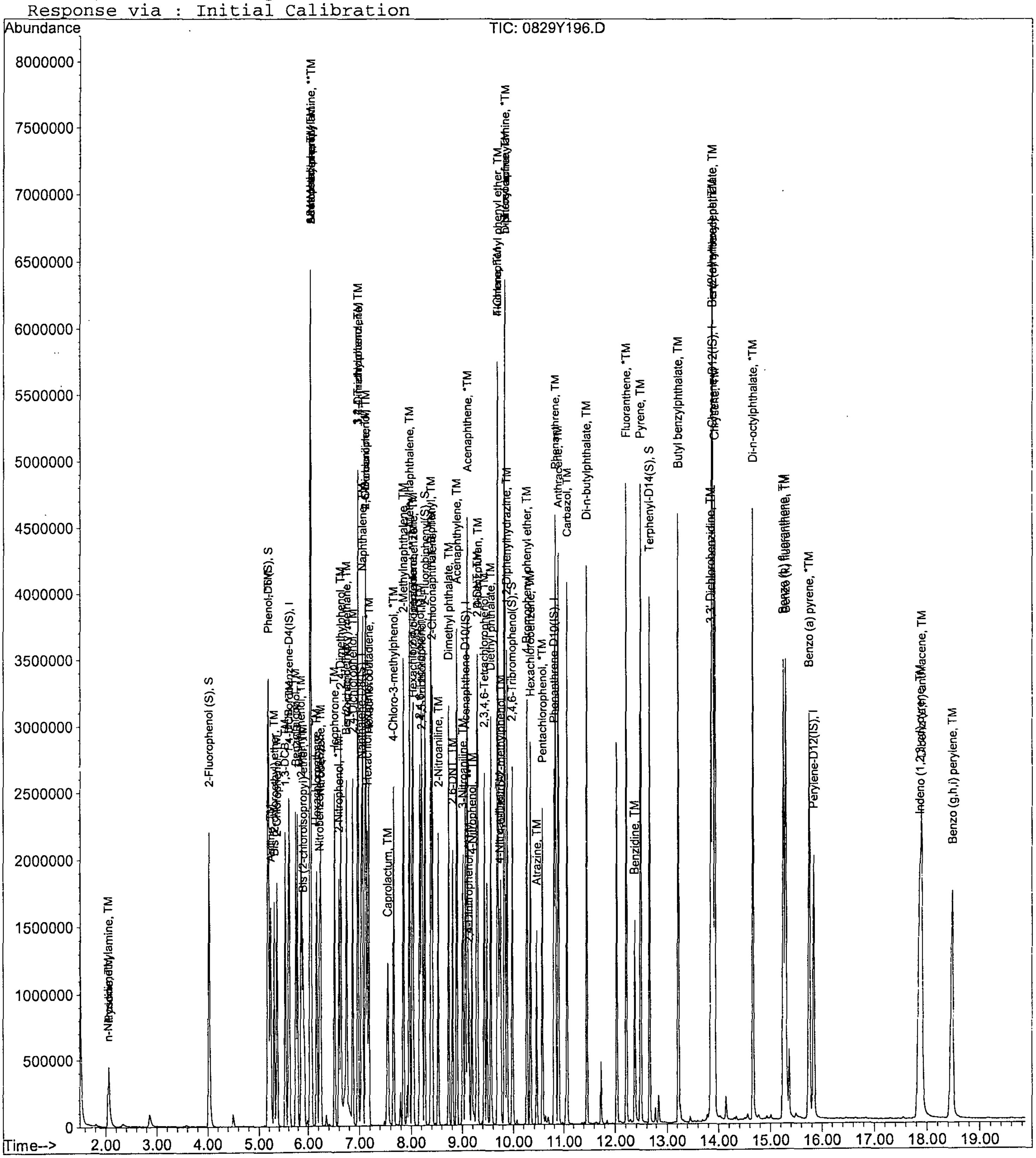
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y196.D Vial: 96
Acq On : 11 Sep 18 9:47 Operator: MA
Sample : 50ug/ml 8270 08/16/18 (1) Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Sep 11 10:30 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/11/18
Instrument: Yoda
Initial Cal. Date: 08/29/18
Data File: 0829Y203.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1414	0.1674	18		
3	TM	n-Nitrosodimethylamine	0.3200	0.3612	13	TM	
4	TM	Pyridine	0.5153	0.5968	16	TM	
5	S	2-Fluorophenol (S)	1.503	1.537	2.3	S	
6	S	Phenol-D6 (S)	1.791	1.830	2.2	S	
7	*TM	Phenol	2.408	2.601	8.0	*TM	
8	TM	Aniline	0.9494	1.025	7.9	TM	
9	TM	Bis (2-chloroethyl) ether	1.290	1.354	5.0	TM	
10	TM	2-Chlorophenol	1.849	1.911	3.4	TM	
11	TM	1,3-DCB	1.906	1.959	2.8	TM	
12	*TM	1,4-DCB	1.911	1.973	3.2	*TM	
13	TM	Benzyl alcohol	1.214	1.272	4.8	TM	
14	TM	1,2-DCB	1.808	1.873	3.6	TM	
15	TM	2-Methylphenol	1.498	1.554	3.7	TM	
16	TM	Bis (2-chloroisopropyl) ether	2.504	2.663	6.3	TM	
17	TML	Acetophenone	2.258	2.248	0.41	TML	13
18	TML	3&4-Methylphenol	1.776	1.726	2.8	TML	9.6
19	**TM	n-Nitrosodi-n-propylamine	1.337	1.329	0.60	**TM	
20	TM	Hexachloroethane	0.7241	0.7602	5.0	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4232	0.4470	5.6	S	
23	TM	Nitrobenzene	0.4832	0.5154	6.7	TM	
24	TM	Isophorone	0.8412	0.8853	5.2	TM	
25	*TM	2-Nitrophenol	0.2303	0.2495	8.3	*TM	
26	TM	2,4-Dimethylphenol	0.4063	0.4199	3.3	TM	
27	TM	Benzoic acid	0.3417	0.4054	19	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4704	0.4907	4.3	TM	
29	*TM	2,4-Dichlorophenol	0.3481	0.3661	5.2	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3482	0.3610	3.7	TM	
31	TM	3,4-Dimethylphenol	0.5164	0.5477	6.1	TM	
32	TM	Naphthalene	1.219	1.276	4.7	TM	
33	TM	4-Chloroaniline	0.4857	0.4725	2.7	TM	
34	TM	2,6-Dichlorophenol	0.3252	0.3434	5.6	TM	
35	TM	Hexachloropropene	0.2454	0.2742	12	TM	
36	*TM	Hexachlorobutadiene	0.2005	0.2148	7.1	*TM	
37	TM	Caprolactum	0.2193	0.2429	11	TM	
38	*TM	4-Chloro-3-methylphenol	0.3792	0.4023	6.1	*TM	
39	TM	2-Methylnaphthalene	0.7695	0.8155	6.0	TM	
40	TM	1-Methylnaphthalene	0.7675	0.8003	4.3	TM	
		Average			6.2		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/11/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y203.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.4531	0.4822	6.4	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.7046	0.7574	7.5	TM	
44	*TM	2,4,6-Trichlorophenol	0.5113	0.5438	6.4	*TM	
45	TM	2,4,5-Trichlorophenol	0.5185	0.5732	11	TM	
46	S	2-Fluorobiphenyl(S)	1.562	1.627	4.2	S	
47	TM	1,1'-Biphenyl	1.867	1.974	5.7	TM	
48	TM	2-Chloronaphthalene	1.505	1.573	4.6	TM	
49	TM	2-Nitroaniline	0.5187	0.5852	13	TM	
50	TM	Dimethyl phthalate	1.723	1.823	5.8	TM	
51	TM	2,6-DNT	0.3844	0.4260	11	TM	
52	TM	Acenaphthylene	2.373	2.522	6.3	TM	
53	TM	3-Nitroaniline	0.4355	0.4677	7.4	TM	
54	*TM	Acenaphthene	1.536	1.631	6.2	*TM	
55	**TML	2,4-Dinitrophenol	0.2295	0.2763	20	**TML	7.9
56	**TM	4-Nitrophenol	0.3942	0.4296	9.0	**TM	
57	TM	Dibenzofuran	2.053	2.186	6.5	TM	
58	TM	2,4-DNT	0.5163	0.5635	9.1	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.4458	0.4844	8.7	TM	
60	TM	Diethyl phthalate	1.679	1.765	5.1	TM	
61	TML	4-Chlorophenyl phenyl ether	0.7035	0.7537	7.1	TML	19
62	TML	Fluorene	1.568	1.599	1.9	TML	17
63	TM	4-Nitroaniline	0.4411	0.4820	9.3	TM	
64	S	2,4,6-Tribromophenol(S)	0.1897	0.2045	7.8	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TM	4,6-Dinitro-2-methylphenol	0.1810	0.2054	14	TM	
67	TM	Diphenyl amine	0.6599	0.6820	3.4	TM	
68	*TM	n-Nitrosodiphenylamine	0.6599	0.6820	3.4	*TM	
69	TM	1,2-Diphenylhydrazine	1.055	1.098	4.0	TM	
70	TM	4-Bromophenyl phenyl ether	0.2614	0.2804	7.2	TM	
71	TM	Hexachlorobenzene	0.2794	0.2940	5.2	TM	
72	TM	Atrazine	0.2262	0.2446	8.1	TM	
73	*TM	Pentachlorophenol	0.2006	0.2229	11	*TM	
74	TM	Phenanthrene	1.350	1.393	3.2	TM	
75	TM	Anthracene	1.386	1.441	3.9	TM	
76	TM	Carbazol	1.287	1.361	5.7	TM	
77	TM	Di-n-butylphthalate	1.498	1.622	8.3	TM	
78	*TM	Fluoranthene	1.442	1.525	5.7	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TM	Benzidine	0.5118	0.5238	2.3	TM	
		Average			7.2		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/11/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y203.D

		Compound	MEAN	CCRF	%D	%Drift	
81	TM	Pyrene	1.668	1.700	1.9	TM	
82	S	Terphenyl-D14(S)	1.038	1.039	0.12	S	
83	TM	Butyl benzylphthalate	0.7363	0.7668	4.1	TM	
84	TM	3,3'-Dichlorobenzidine	0.5437	0.5844	7.5	TM	
85	TM	Benz (a) anthracene	1.380	1.357	1.7	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.8941	0.9160	2.4	TM	
87	TM	Chrysene	1.485	1.467	1.2	TM	
88	*TM	Di-n-octylphthalate	1.690	1.787	5.8	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.444	1.486	2.9	TM	
91	TM	Benzo (k) fluoranthene	1.295	1.482	14	TM	
92	*TM	Benzo (a) pyrene	1.316	1.405	6.8	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.469	1.608	9.5	TM	
94	TM	Dibenz (a,h) anthracene	1.310	1.400	6.8	TM	
95	TM	Benzo (g,h,i) perylene	1.200	1.296	8.0	TM	
96							
97							
98							
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100							
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113							
114							
115							
116							
117							
118							
119							
120							
		Average			5.2		

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y203.D
Acq On : 11 Sep 18 15:17
Sample : 50ug/ml 8270 08/16/18 (1)
Misc :

Vial: 3
Operator: MA
Inst : Yoda
Multiplr: 1.00

Quant Time: Sep 12 7:14 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units		Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	328412	40.00000	ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1375259	40.00000	ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	703328	40.00000	ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1305307	40.00000	ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1237003	40.00000	ppb	0.00
89) Perylene-D12(IS)	15.84	264	1333096	40.00000	ppb	-0.02
System Monitoring Compounds						
5) 2-Fluorophenol (S)	4.03	112	1261922	102.26508	ppb	0.00
Spiked Amount 200.000			Recovery =	51.133%		
6) Phenol-D6 (S)	5.18	99	1502772	102.19555	ppb	0.00
Spiked Amount 200.000			Recovery =	51.098%		
22) Nitrobenzene-D5(S)	6.23	82	768484	52.81431	ppb	0.00
Spiked Amount 100.000			Recovery =	52.814%		
46) 2-Fluorobiphenyl(S)	8.27	172	1430831	52.09060	ppb	0.00
Spiked Amount 100.000			Recovery =	52.091%		
64) 2,4,6-Tribromophenol(S)	9.98	330	359650	107.81807	ppb	-0.02
Spiked Amount 200.000			Recovery =	53.909%		
82) Terphenyl-D14(S)	12.65	244	1607091	50.05914	ppb	0.00
Spiked Amount 100.000			Recovery =	50.059%		
Target Compounds						Qvalue
2) 1,4-Dioxane	1.81	58	6872	5.91898		100
3) n-Nitrosodimethylamine	2.04	42	148298	56.45125	ppb	93
4) Pyridine	2.06	79	244991	57.90956	ppb	98
7) Phenol	5.20	94	1067841	54.01307	ppb	99
8) Aniline	5.23	66	420621	53.96285	ppb	96
9) Bis (2-chloroethyl) ether	5.31	63	555680	52.48182	ppb	96
10) 2-Chlorophenol	5.37	128	784324	51.67730	ppb	98
11) 1,3-DCB	5.53	146	804128	51.39308	ppb	99
12) 1,4-DCB	5.63	146	809871	51.62495	ppb	97
13) Benzyl alcohol	5.76	108	522264	52.38195	ppb	94
14) 1,2-DCB	5.79	146	768863	51.79813	ppb	97
15) 2-Methylphenol	5.87	107	637816	51.86640	ppb	98
16) Bis (2-chloroisopropyl) et	5.90	45	1093299	53.16999	ppb	97
17) Acetophenone	6.06	105	923028	56.64456	ppb	87
18) 3&4-Methylphenol	6.04	107	1417112	109.58153	ppb	95
19) n-Nitrosodi-n-propylamine	6.06	70	545701	49.69820	ppb	97
20) Hexachloroethane	6.17	117	312057	52.48765	ppb	82
23) Nitrobenzene	6.25	77	885997	53.32844	ppb	95
24) Isophorone	6.52	82	1521977	52.62402	ppb	98
25) 2-Nitrophenol	6.60	139	428952	54.17405	ppb	94
26) 2,4-Dimethylphenol	6.64	122	721757	51.67279	ppb	99
27) Benzoic acid	6.77	105	696940	59.32796	ppb	98
28) Bis (2-chloroethoxy) metha	6.75	93	843554	52.15631	ppb	99
29) 2,4-Dichlorophenol	6.87	162	629276	52.57977	ppb	97
30) 1,2,4-Trichlorobenzene	6.96	180	620657	51.84891	ppb	98
31) 3,4-Dimethylphenol	6.97	107	941524	53.03248	ppb	96
32) Naphthalene	7.06	128	2193798	52.36121	ppb	99
33) 4-Chloroaniline	7.12	127	812323	48.64686	ppb	97
34) 2,6-Dichlorophenol	7.13	162	590351	52.79330	ppb	98
35) Hexachloropropene	7.16	213	471328	55.85955	ppb	100
36) Hexachlorobutadiene	7.18	225	369227	53.55164	ppb	99
37) Caprolactum	7.55	55	417563	55.38663	ppb	95

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y203.D Vial: 3
Acq On : 11 Sep 18 15:17 Operator: MA
Sample : 50ug/ml 8270 08/16/18 (1) Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Sep 12 7:14 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38) 4-Chloro-3-methylphenol	7.66	107	691610	53.04226 ppb		99
39) 2-Methylnaphthalene	7.84	142	1401868	52.98433 ppb		100
40) 1-Methylnaphthalene	7.96	142	1375806	52.13755 ppb		99
42) Hexachlorocyclopentadiene	8.02	237	423940	53.20954 ppb		99
43) 1,2,4,5-Tetrachlorobenzene	8.04	216	665857	53.74285 ppb		99
44) 2,4,6-Trichlorophenol	8.17	196	478101	53.18209 ppb		97
45) 2,4,5-Trichlorophenol	8.22	196	503929	55.27746 ppb		99
47) 1,1'-Biphenyl	8.38	154	1735527	52.86530 ppb		99
48) 2-Chloronaphthalene	8.41	162	1383199	52.28605 ppb		99
49) 2-Nitroaniline	8.53	65	514446	56.40069 ppb		97
50) Dimethyl phthalate	8.74	163	1602372	52.88866 ppb		99
51) 2,6-DNT	8.81	165	374488	55.40376 ppb		87
52) Acenaphthylene	8.89	152	2217093	53.13522 ppb		100
53) 3-Nitroaniline	9.01	138	411160	53.69018 ppb		97
54) Acenaphthene	9.10	154	1433686	53.09649 ppb		99
55) 2,4-Dinitrophenol	9.13	184	242941	53.96759 ppb		92
56) 4-Nitrophenol	9.19	65	377698	54.49616 ppb		98
57) Dibenzofuran	9.30	168	1922109	53.24168 ppb		95
58) 2,4-DNT	9.28	165	495429	54.57061 ppb		95
59) 2,3,4,6-Tetrachlorophenol	9.43	232	425872	54.32678 ppb		96
60) Diethyl phthalate	9.56	149	1551403	52.55626 ppb		100
61) 4-Chlorophenyl phenyl ethe	9.69	204	662595	59.70778 ppb		98
62) Fluorene	9.70	166	1405532	58.52365 ppb		98
63) 4-Nitroaniline	9.73	138	423742	54.63729 ppb		99
66) 4,6-Dinitro-2-methylphenol	9.76	198	335166	56.75556 ppb		86
67) Diphenyl amine	9.84	169	2225705	103.35910 ppb		100
68) n-Nitrosodiphenylamine	9.84	169	2225705	103.35910 ppb		100
69) 1,2-Diphenylhydrazine	9.88	77	1791396	52.01468 ppb		98
70) 4-Bromophenyl phenyl ether	10.27	248	457474	53.62148 ppb		95
71) Hexachlorobenzene	10.33	284	479665	52.61204 ppb		94
72) Atrazine	10.45	200	199536	27.02703 ppb		98
73) Pentachlorophenol	10.56	266	363715	55.56675 ppb		100
74) Phenanthrene	10.82	178	2273383	51.59299 ppb		100
75) Anthracene	10.89	178	2350513	51.97166 ppb		99
76) Carbazol	11.07	167	2220528	52.86281 ppb		97
77) Di-n-butylphthalate	11.46	149	2647024	54.14417 ppb		100
78) Fluoranthene	12.22	202	2487969	52.86828 ppb		98
80) Benzidine	12.37	184	809899	51.17081 ppb		99
81) Pyrene	12.49	202	2629139	50.96249 ppb		100
83) Butyl benzylphthalate	13.22	149	1185608	52.07161 ppb		99
84) 3,3'-Dichlorobenzidine	13.85	252	903697	53.74643 ppb		98
85) Benz (a) anthracene	13.89	228	2097591	49.14587 ppb		99
86) Bis (2-ethylhexyl) phthala	13.87	149	1416317	51.22009 ppb	#	96
87) Chrysene	13.92	228	2268851	49.40536 ppb		97
88) Di-n-octylphthalate	14.66	149	2762775	52.87730 ppb		94
90) Benzo (b) fluoranthene	15.25	252	2475723	51.43955 ppb		98
91) Benzo (k) fluoranthene	15.30	252	2470203	57.23375 ppb		98
92) Benzo (a) pyrene	15.75	252	2340864	53.38890 ppb		98
93) Indeno (1,2,3-cd) pyrene	17.86	276	2679769	54.72741 ppb		99
94) Dibenz (a,h) anthracene	17.91	278	2332300	53.40422 ppb		99
95) Benzo (g,h,i) perylene	18.48	276	2160018	53.99402 ppb		100

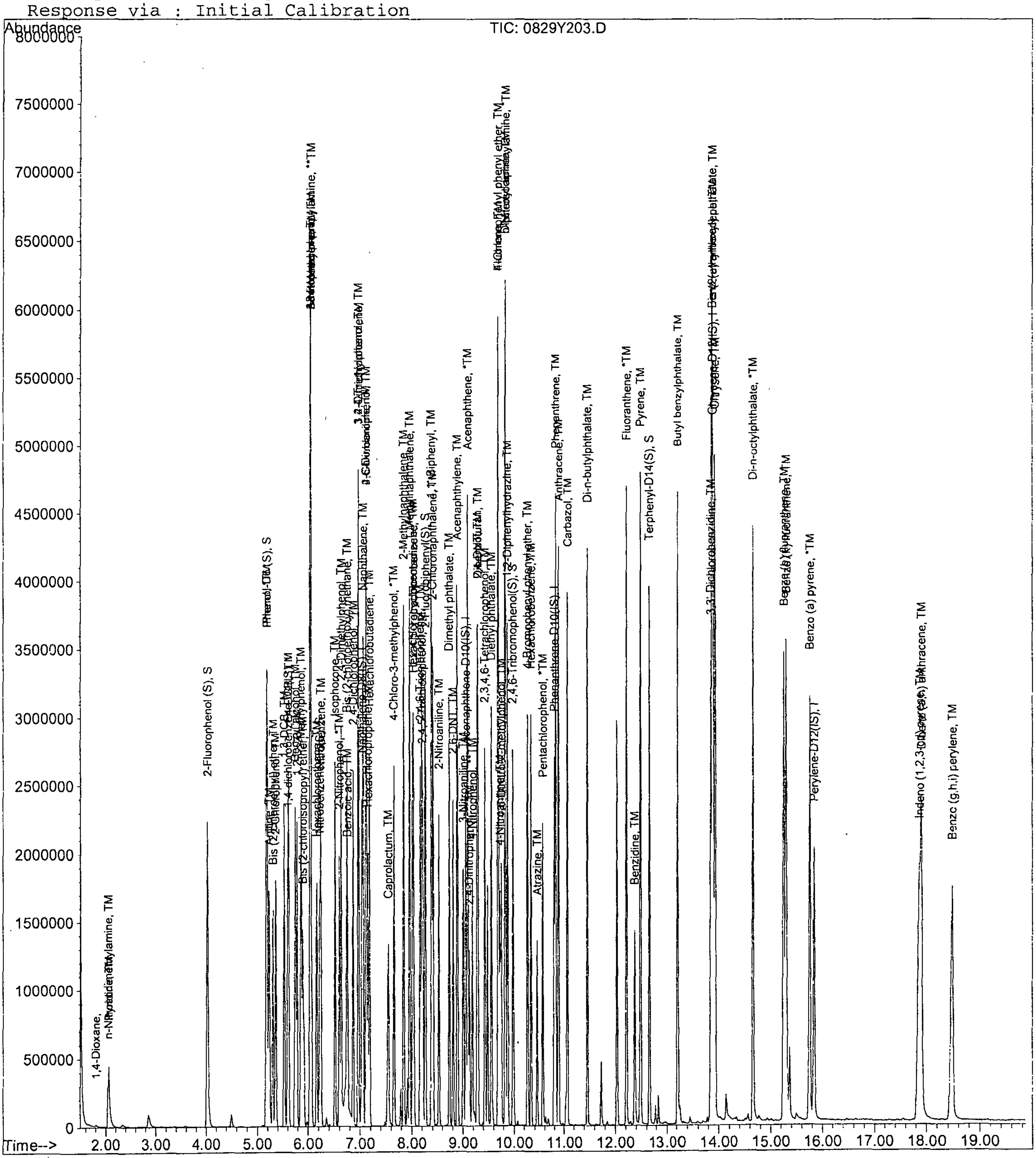
(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y203.D           Vial: 3
Acq On    : 11 Sep 18  15:17                      Operator: MA
Sample    : 50ug/ml 8270 08/16/18 (1)             Inst    : Yoda
Misc      :                                       Multiplr: 1.00

Quant Time: Sep 12  7:14 2018           Quant Results File: Y0829NC.RES

Method       : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
```



Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/12/18
Instrument: Yoda
Initial Cal. Date: 08/29/18
Data File: 0829Y225.D

		Compound	MEAN	CCRF	%D	%Drift		
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I		
2		1,4-Dioxane	0.1414	0.1744	23			*NT
3	TM	n-Nitrosodimethylamine	0.3200	0.3337	4.3	TM		
4	TM	Pyridine	0.5153	0.5251	1.9	TM		
5	S	2-Fluorophenol (S)	1.503	1.530	1.8	S		
6	S	Phenol-D6 (S)	1.791	1.816	1.4	S		
7	*TM	Phenol	2.408	2.585	7.4	*TM		
8	TM	Aniline	0.9494	0.9622	1.3	TM		
9	TM	Bis (2-chloroethyl) ether	1.290	1.331	3.2	TM		
10	TM	2-Chlorophenol	1.849	1.904	3.0	TM		
11	TM	1,3-DCB	1.906	1.962	3.0	TM		
12	*TM	1,4-DCB	1.911	1.963	2.8	*TM		
13	TM	Benzyl alcohol	1.214	1.280	5.4	TM		
14	TM	1,2-DCB	1.808	1.862	3.0	TM		
15	TM	2-Methylphenol	1.498	1.562	4.3	TM		
16	TM	Bis (2-chloroisopropyl) ether	2.504	2.622	4.7	TM		
17	TML	Acetophenone	2.258	2.170	3.9	TML	8.9	
18	TML	3&4-Methylphenol	1.776	1.653	6.9	TML	4.5	
19	**TM	n-Nitrosodi-n-propylamine	1.337	1.292	3.4	**TM		
20	TM	Hexachloroethane	0.7241	0.7604	5.0	TM		
21	I	Napthalene-D8(IS)	ISTD			I		
22	S	Nitrobenzene-D5(S)	0.4232	0.4377	3.4	S		
23	TM	Nitrobenzene	0.4832	0.5062	4.8	TM		
24	TM	Isophorone	0.8412	0.8795	4.5	TM		
25	*TM	2-Nitrophenol	0.2303	0.2509	9.0	*TM		
26	TM	2,4-Dimethylphenol	0.4063	0.4215	3.8	TM		
27	TM	Benzoic acid	0.3417	0.3613	5.7	TM		
28	TM	Bis (2-chloroethoxy) methane	0.4704	0.4863	3.4	TM		
29	*TM	2,4-Dichlorophenol	0.3481	0.3662	5.2	*TM		
30	TM	1,2,4-Trichlorobenzene	0.3482	0.3523	1.2	TM		
31	TM	3,4-Dimethylphenol	0.5164	0.5347	3.5	TM		
32	TM	Naphthalene	1.219	1.260	3.4	TM		
33	TM	4-Chloroaniline	0.4857	0.4735	2.5	TM		
34	TM	2,6-Dichlorophenol	0.3252	0.3383	4.0	TM		
35	TM	Hexachloropropene	0.2454	0.2678	9.1	TM		
36	*TM	Hexachlorobutadiene	0.2005	0.2103	4.9	*TM		
37	TM	Caprolactum	0.2193	0.2405	9.7	TM		
38	*TM	4-Chloro-3-methylphenol	0.3792	0.4004	5.6	*TM		
39	TM	2-Methylnaphthalene	0.7695	0.8002	4.0	TM		
40	TM	1-Methylnaphthalene	0.7675	0.8001	4.2	TM		
		Average			4.8			

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7
Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/12/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y225.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.4531	0.4803	6.0	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.7046	0.7250	2.9	TM	
44	*TM	2,4,6-Trichlorophenol	0.5113	0.5325	4.1	*TM	
45	TM	2,4,5-Trichlorophenol	0.5185	0.5589	7.8	TM	
46	S	2-Fluorobiphenyl(S)	1.562	1.575	0.84	S	
47	TM	1,1'-Biphenyl	1.867	1.924	3.1	TM	
48	TM	2-Chloronaphthalene	1.505	1.538	2.2	TM	
49	TM	2-Nitroaniline	0.5187	0.5606	8.1	TM	
50	TM	Dimethyl phthalate	1.723	1.778	3.2	TM	
51	TM	2,6-DNT	0.3844	0.4153	8.0	TM	
52	TM	Acenaphthylene	2.373	2.488	4.9	TM	
53	TM	3-Nitroaniline	0.4355	0.4709	8.1	TM	
54	*TM	Acenaphthene	1.536	1.536	0.04	*TM	
55	**TML	2,4-Dinitrophenol	0.2295	0.2061	10	**TML	15
56	**TM	4-Nitrophenol	0.3942	0.4067	3.2	**TM	
57	TM	Dibenzofuran	2.053	2.117	3.1	TM	
58	TM	2,4-DNT	0.5163	0.5654	9.5	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.4458	0.4758	6.7	TM	
60	TM	Diethyl phthalate	1.679	1.723	2.7	TM	
61	TML	4-Chlorophenyl phenyl ether	0.7035	0.7110	1.1	TML	11
62	TML	Fluorene	1.568	1.539	1.8	TML	12
63	TM	4-Nitroaniline	0.4411	0.4743	7.5	TM	
64	S	2,4,6-Tribromophenol(S)	0.1897	0.2000	5.4	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TM	4,6-Dinitro-2-methylphenol	0.1810	0.1934	6.9	TM	
67	TM	Diphenyl amine	0.6599	0.6668	1.0	TM	
68	*TM	n-Nitrosodiphenylamine	0.6599	0.6668	1.0	*TM	
69	TM	1,2-Diphenylhydrazine	1.055	1.074	1.7	TM	
70	TM	4-Bromophenyl phenyl ether	0.2614	0.2761	5.6	TM	
71	TM	Hexachlorobenzene	0.2794	0.2924	4.7	TM	
72	TM	Atrazine	0.2262	0.2507	11	TM	
73	*TM	Pentachlorophenol	0.2006	0.2191	9.3	*TM	
74	TM	Phenanthrene	1.350	1.373	1.7	TM	
75	TM	Anthracene	1.386	1.439	3.8	TM	
76	TM	Carbazol	1.287	1.356	5.4	TM	
77	TM	Di-n-butylphthalate	1.498	1.611	7.6	TM	
78	*TM	Fluoranthene	1.442	1.500	4.0	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TM	Benzidine	0.5118	0.5123	0.10	TM	
		Average			4.7		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/12/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y225.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	1.668	1.683	0.88	TM	
82	S	Terphenyl-D14(S)	1.038	1.036	0.23	S	
83	TM	Butyl benzylphthalate	0.7363	0.7637	3.7	TM	
84	TM	3,3'-Dichlorobenzidine	0.5437	0.5889	8.3	TM	
85	TM	Benz (a) anthracene	1.380	1.350	2.2	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.8941	0.9190	2.8	TM	
87	TM	Chrysene	1.485	1.452	2.2	TM	
88	*TM	Di-n-octylphthalate	1.690	1.838	8.8	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.444	1.505	4.2	TM	
91	TM	Benzo (k) fluoranthene	1.295	1.409	8.8	TM	
92	*TM	Benzo (a) pyrene	1.316	1.401	6.5	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.469	1.595	8.5	TM	
94	TM	Dibenz (a,h) anthracene	1.310	1.405	7.3	TM	
95	TM	Benzo (g,h,i) perylene	1.200	1.299	8.2	TM	
96							
97							
98							
99							
100							
101							
102							
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			5.2		

Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y225.D Vial: 25
Acq On : 12 Sep 18 9:01 Operator: MA
Sample : 50ug/ml 8270 08/16/18 (1) Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Sep 12 9:40 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	345948	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1440878	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	752322	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1372604	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1276400	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.84	264	1390244	40.00000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	1322990	101.77933 ppb	0.00
Spiked Amount 200.000				Recovery = 50.890%	
6) Phenol-D6 (S)	5.18	99	1570625	101.39572 ppb	0.00
Spiked Amount 200.000				Recovery = 50.698%	
22) Nitrobenzene-D5(S)	6.23	82	788330	51.71090 ppb	0.00
Spiked Amount 100.000				Recovery = 51.711%	
46) 2-Fluorobiphenyl(S)	8.27	172	1481372	50.41843 ppb	0.00
Spiked Amount 100.000				Recovery = 50.418%	
64) 2,4,6-Tribromophenol(S)	9.98	330	376097	105.40605 ppb	-0.02
Spiked Amount 200.000				Recovery = 52.703%	
82) Terphenyl-D14(S)	12.65	244	1652546	49.88620 ppb	0.00
Spiked Amount 100.000				Recovery = 49.886%	

Target Compounds					Qvalue
3) n-Nitrosodimethylamine	2.03	42	144288	52.14068 ppb	84
4) Pyridine	2.05	79	227064	50.95146 ppb	97
7) Phenol	5.19	94	1117900	53.67888 ppb	91
8) Aniline	5.23	66	416074	50.67371 ppb	99
9) Bis (2-chloroethyl) ether	5.30	63	575705	51.61694 ppb	97
10) 2-Chlorophenol	5.36	128	823286	51.49478 ppb	98
11) 1,3-DCB	5.53	146	848600	51.48618 ppb	99
12) 1,4-DCB	5.62	146	849080	51.38077 ppb	99
13) Benzyl alcohol	5.76	108	553615	52.71178 ppb	97
14) 1,2-DCB	5.78	146	805360	51.50666 ppb	99
15) 2-Methylphenol	5.87	107	675539	52.14940 ppb	99
16) Bis (2-chloroisopropyl) et	5.90	45	1133703	52.34017 ppb	99
17) Acetophenone	6.06	105	938321	54.45725 ppb	83
18) 3&4-Methylphenol	6.04	107	1429909	104.54106 ppb	97
19) n-Nitrosodi-n-propylamine	6.06	70	558898	48.31997 ppb	99
20) Hexachloroethane	6.17	117	328818	52.50334 ppb	99
23) Nitrobenzene	6.25	77	911739	52.37867 ppb	98
24) Isophorone	6.52	82	1583993	52.27409 ppb	100
25) 2-Nitrophenol	6.60	139	451977	54.48240 ppb	98
26) 2,4-Dimethylphenol	6.64	122	759197	51.87794 ppb	97
27) Benzoic acid	6.76	105	650706m	52.86961 ppb	98
28) Bis (2-chloroethoxy) metha	6.75	93	875941	51.69233 ppb	99
29) 2,4-Dichlorophenol	6.87	162	659562	52.60056 ppb	96
30) 1,2,4-Trichlorobenzene	6.96	180	634522	50.59318 ppb	98
31) 3,4-Dimethylphenol	6.97	107	962997	51.77174 ppb	98
32) Naphthalene	7.07	128	2269213	51.69465 ppb	100
33) 4-Chloroaniline	7.12	127	852903	48.75094 ppb	96
34) 2,6-Dichlorophenol	7.12	162	609308	52.00710 ppb	99
35) Hexachloropropene	7.15	213	482312	54.55813 ppb	99
36) Hexachlorobutadiene	7.19	225	378752	52.43142 ppb	99
37) Caprolactum	7.56	55	433112	54.83280 ppb	97
38) 4-Chloro-3-methylphenol	7.66	107	721245	52.79598 ppb	96

(#) = qualifier out of range (m) = manual integration

Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y225.D Vial: 25
Acq On : 12 Sep 18 9:01 Operator: MA
Sample : 50ug/ml 8270 08/16/18 (1) Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Sep 12 9:40 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
39)	2-Methylnaphthalene	7.85	142	1441233	51.99143	ppb	98
40)	1-Methylnaphthalene	7.97	142	1441100	52.12485	ppb	98
42)	Hexachlorocyclopentadiene	8.02	237	451700	53.00164	ppb	99
43)	1,2,4,5-Tetrachlorobenzene	8.04	216	681776	51.44410	ppb	100
44)	2,4,6-Trichlorophenol	8.17	196	500751	52.07410	ppb	98
45)	2,4,5-Trichlorophenol	8.22	196	525611	53.90107	ppb	97
47)	1,1'-Biphenyl	8.38	154	1809789	51.53727	ppb	100
48)	2-Chloronaphthalene	8.41	162	1446404	51.11460	ppb	100
49)	2-Nitroaniline	8.53	65	527162	54.03098	ppb	93
50)	Dimethyl phthalate	8.74	163	1672049	51.59437	ppb	99
51)	2,6-DNT	8.81	165	390521	54.01319	ppb	93
52)	Acenaphthylene	8.89	152	2340031	52.42934	ppb	100
53)	3-Nitroaniline	9.02	138	442865	54.06417	ppb	93
54)	Acenaphthene	9.10	154	1444681	50.01933	ppb	99
55)	2,4-Dinitrophenol	9.13	184	193851	42.39138	ppb	86
56)	4-Nitrophenol	9.19	65	382420	51.58412	ppb	99
57)	Dibenzofuran	9.29	168	1991254	51.56494	ppb	98
58)	2,4-DNT	9.28	165	531683	54.75002	ppb	93
59)	2,3,4,6-Tetrachlorophenol	9.43	232	447473	53.36492	ppb	95
60)	Diethyl phthalate	9.56	149	1620772	51.33055	ppb	100
61)	4-Chlorophenyl phenyl ethe	9.69	204	668651	55.74620	ppb	97
62)	Fluorene	9.70	166	1447550	56.11667	ppb	99
63)	4-Nitroaniline	9.73	138	446020	53.76457	ppb	98
66)	4,6-Dinitro-2-methylphenol	9.76	198	331795	53.43007	ppb	83
67)	Diphenyl amine	9.84	169	2288078	101.04605	ppb	99
68)	n-Nitrosodiphenylamine	9.84	169	2288078	101.04605	ppb	99
69)	1,2-Diphenylhydrazine	9.88	77	1842208	50.86750	ppb	99
70)	4-Bromophenyl phenyl ether	10.27	248	473771	52.80904	ppb	96
71)	Hexachlorobenzene	10.33	284	501762	52.33742	ppb	96
72)	Atrazine	10.45	200	215099	27.70658	ppb	99
73)	Pentachlorophenol	10.57	266	375997	54.62678	ppb	98
74)	Phenanthrene	10.83	178	2356500	50.85726	ppb	100
75)	Anthracene	10.89	178	2469351	51.92233	ppb	100
76)	Carbazol	11.08	167	2326810	52.67715	ppb	97
77)	Di-n-butylphthalate	11.46	149	2764727	53.77909	ppb	99
78)	Fluoranthene	12.22	202	2573610	52.00683	ppb	98
80)	Benzidine	12.37	184	817361	50.04830	ppb	98
81)	Pyrene	12.49	202	2685181	50.44227	ppb	99
83)	Butyl benzylphthalate	13.22	149	1218505	51.86461	ppb	97
84)	3,3'-Dichlorobenzidine	13.85	252	939543	54.15361	ppb	99
85)	Benz (a) anthracene	13.88	228	2153866	48.90676	ppb	100
86)	Bis (2-ethylhexyl) phthala	13.87	149	1466236	51.38871	ppb	97
87)	Chrysene	13.93	228	2316980	48.89611	ppb	99
88)	Di-n-octylphthalate	14.66	149	2933193	54.40619	ppb	99
90)	Benzo (b) fluoranthene	15.25	252	2615207	52.10406	ppb	98
91)	Benzo (k) fluoranthene	15.29	252	2447878	54.38507	ppb	98
92)	Benzo (a) pyrene	15.75	252	2434319	53.23811	ppb	98
93)	Indeno (1,2,3-cd) pyrene	17.86	276	2771294	54.27009	ppb	99
94)	Dibenz (a,h) anthracene	17.90	278	2442366	53.62561	ppb	100
95)	Benzo (g,h,i) perylene	18.48	276	2257540	54.11207	ppb	100

(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y225.D          Vial: 25
Acq On    : 12 Sep 18   9:01                       Operator: MA
Sample    : 50ug/ml 8270 08/16/18 (1)              Inst    : Yoda
Misc      :                                        Multiplr: 1.00

Quant Time: Sep 12  9:40 2018              Quant Results File: Y0829NC.RES

Method         : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title          : EPA 8270C
Last Update    : Wed Aug 29 10:21:31 2018
Response via   : Initial Calibration
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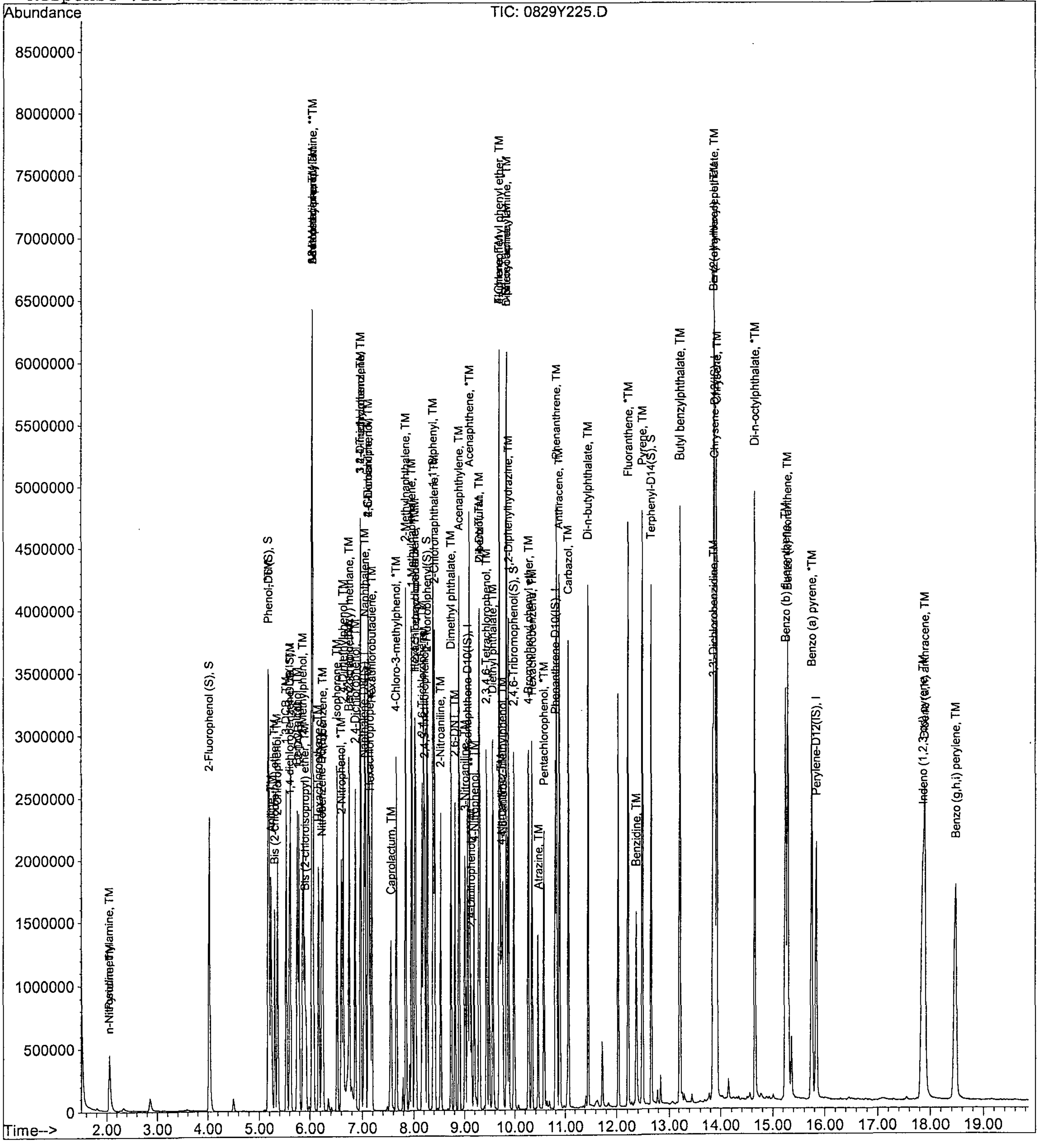

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y225.D              Vial: 25
Acq On    : 12 Sep 18   9:01                         Operator: MA
Sample    : 50ug/ml 8270 08/16/18 (1)                Inst     : Yoda
Misc      :                                          Multiplr: 1.00
Quant Time: Sep 12  9:37 2018                 Quant Results File: temp.res

Method         : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title          : EPA 8270C
Last Update    : Wed Aug 29 10:21:31 2018
Response via   : Multiple Level Calibration
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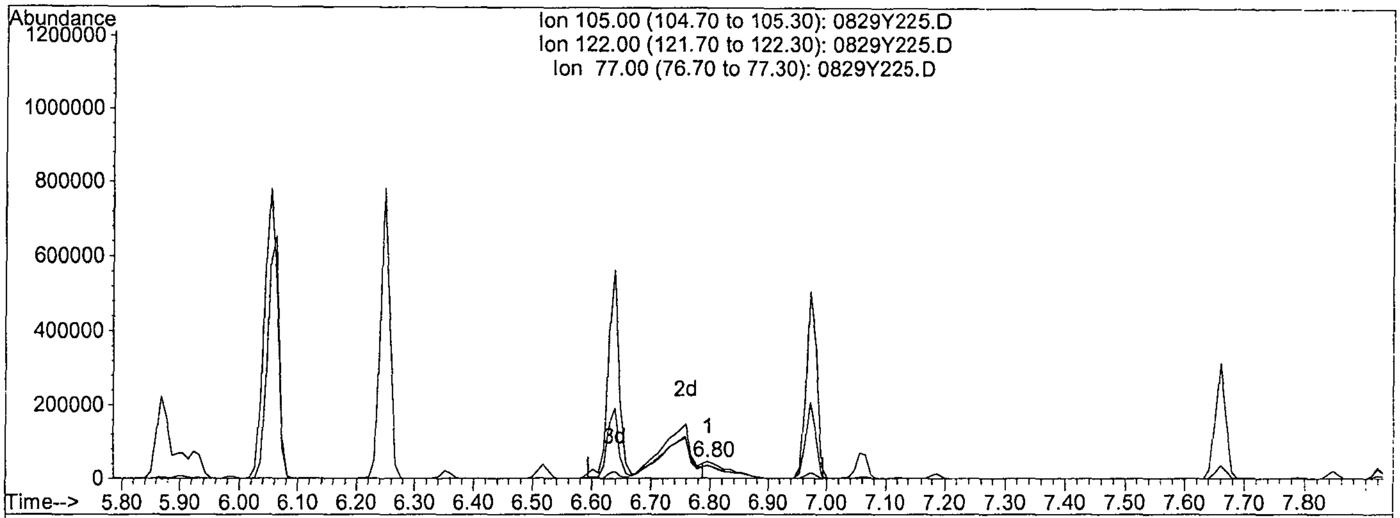
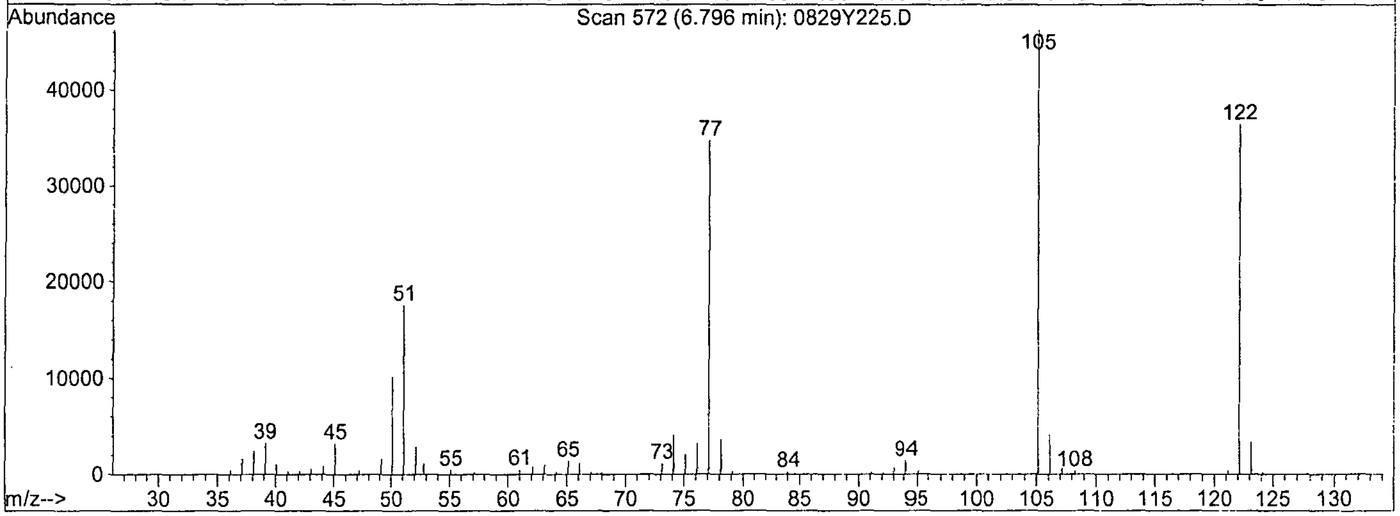




TIC: 0829Y225.D

(27) Benzoic acid (TM)

6.80min 9.9611ppb

response 122599

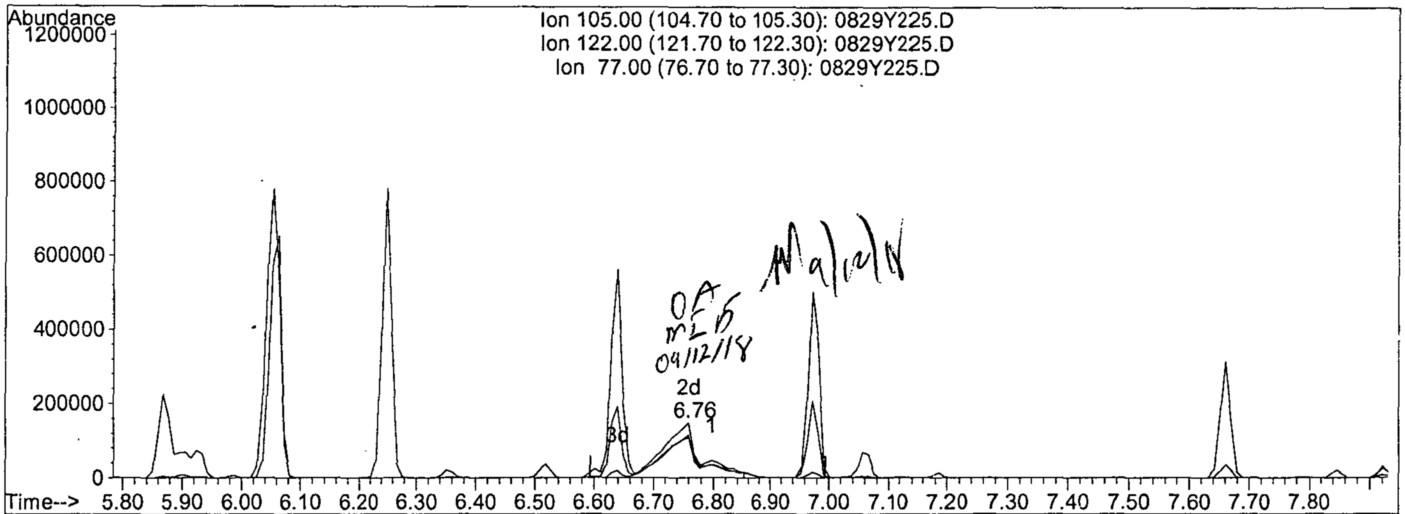
Ion	Exp%	Act%
105.00	100	100
122.00	78.90	78.23
77.00	71.90	74.57
0.00	0.00	0.00

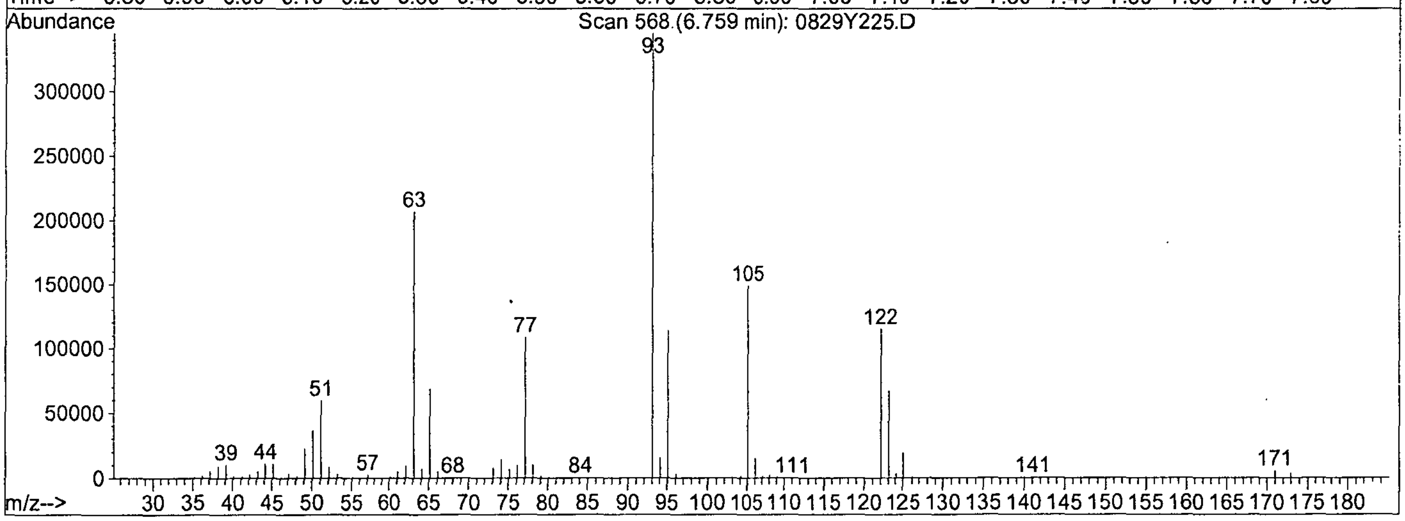
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y225.D
Acq On : 12 Sep 18 9:01
Sample : 50ug/ml 8270 08/16/18 (1)
Misc :
Quant Time: Sep 12 9:40 2018

Vial: 25
Operator: MA
Inst : Yoda
Multiplr: 1.00
Quant Results File: temp.res

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Multiple Level Calibration





TIC: 0829Y225.D

(27) Benzoic acid (TM)

6.76min 52.8696ppb m

response 650706

Ion	Exp%	Act%
105.00	100	100
122.00	78.90	77.40
77.00	71.90	72.96
0.00	0.00	0.00

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/12/18
Instrument: Yoda
Initial Cal. Date: 08/29/18
Data File: 0829Y240.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	1,4-dichlorobenzene-D4(IS)	ISTD			I	
2		1,4-Dioxane	0.1414	0.1614	14		
3	TM	n-Nitrosodimethylamine	0.3200	0.3269	2.2	TM	
4	TM	Pyridine	0.5153	0.5174	0.41	TM	
5	S	2-Fluorophenol (S)	1.503	1.529	1.7	S	
6	S	Phenol-D6 (S)	1.791	1.808	0.96	S	
7	*TM	Phenol	2.408	2.585	7.4	*TM	
8	TM	Aniline	0.9494	0.9416	0.81	TM	
9	TM	Bis (2-chloroethyl) ether	1.290	1.351	4.8	TM	
10	TM	2-Chlorophenol	1.849	1.925	4.1	TM	
11	TM	1,3-DCB	1.906	1.937	1.7	TM	
12	*TM	1,4-DCB	1.911	1.963	2.7	*TM	
13	TM	Benzyl alcohol	1.214	1.278	5.2	TM	
14	TM	1,2-DCB	1.808	1.866	3.2	TM	
15	TM	2-Methylphenol	1.498	1.536	2.5	TM	
16	TM	Bis (2-chloroisopropyl) ether	2.504	2.610	4.2	TM	
17	TML	Acetophenone	2.258	2.176	3.6	TML	9.2
18	TML	3&4-Methylphenol	1.776	1.647	7.2	TML	4.1
19	**TM	n-Nitrosodi-n-propylamine	1.337	1.304	2.5	**TM	
20	TM	Hexachloroethane	0.7241	0.7596	4.9	TM	
21	I	Napthalene-D8(IS)	ISTD			I	
22	S	Nitrobenzene-D5(S)	0.4232	0.4356	2.9	S	
23	TM	Nitrobenzene	0.4832	0.5036	4.2	TM	
24	TM	Isophorone	0.8412	0.8736	3.8	TM	
25	*TM	2-Nitrophenol	0.2303	0.2487	8.0	*TM	
26	TM	2,4-Dimethylphenol	0.4063	0.4151	2.2	TM	
27	TM	Benzoic acid	0.3417	0.3772	10	TM	
28	TM	Bis (2-chloroethoxy) methane	0.4704	0.4864	3.4	TM	
29	*TM	2,4-Dichlorophenol	0.3481	0.3650	4.9	*TM	
30	TM	1,2,4-Trichlorobenzene	0.3482	0.3540	1.7	TM	
31	TM	3,4-Dimethylphenol	0.5164	0.5247	1.6	TM	
32	TM	Naphthalene	1.219	1.241	1.9	TM	
33	TM	4-Chloroaniline	0.4857	0.4692	3.4	TM	
34	TM	2,6-Dichlorophenol	0.3252	0.3323	2.2	TM	
35	TM	Hexachloropropene	0.2454	0.2638	7.5	TM	
36	*TM	Hexachlorobutadiene	0.2005	0.2101	4.7	*TM	
37	TM	Caprolactum	0.2193	0.2380	8.5	TM	
38	*TM	4-Chloro-3-methylphenol	0.3792	0.3986	5.1	*TM	
39	TM	2-Methylnaphthalene	0.7695	0.7935	3.1	TM	
40	TM	1-Methylnaphthalene	0.7675	0.7835	2.1	TM	
		Average			4.1		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/12/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y240.D

		Compound	MEAN	CCRF	%D		%Drift
41	I	Acenaphthene-D10(IS)	ISTD			I	
42	**TM	Hexachlorocyclopentadiene	0.4531	0.4752	4.9	**TM	
43	TM	1,2,4,5-Tetrachlorobenzene	0.7046	0.7240	2.7	TM	
44	*TM	2,4,6-Trichlorophenol	0.5113	0.5479	7.2	*TM	
45	TM	2,4,5-Trichlorophenol	0.5185	0.5524	6.6	TM	
46	S	2-Fluorobiphenyl(S)	1.562	1.556	0.42	S	
47	TM	1,1'-Biphenyl	1.867	1.911	2.4	TM	
48	TM	2-Chloronaphthalene	1.505	1.555	3.4	TM	
49	TM	2-Nitroaniline	0.5187	0.5687	9.6	TM	
50	TM	Dimethyl phthalate	1.723	1.780	3.3	TM	
51	TM	2,6-DNT	0.3844	0.4226	9.9	TM	
52	TM	Acenaphthylene	2.373	2.486	4.7	TM	
53	TM	3-Nitroaniline	0.4355	0.4767	9.5	TM	
54	*TM	Acenaphthene	1.536	1.554	1.2	*TM	
55	**TML	2,4-Dinitrophenol	0.2295	0.2071	9.8	**TML	15
56	**TM	4-Nitrophenol	0.3942	0.4195	6.4	**TM	
57	TM	Dibenzofuran	2.053	2.117	3.1	TM	
58	TM	2,4-DNT	0.5163	0.5688	10	TM	
59	TM	2,3,4,6-Tetrachlorophenol	0.4458	0.4856	8.9	TM	
60	TM	Diethyl phthalate	1.679	1.746	4.0	TM	
61	TML	4-Chlorophenyl phenyl ether	0.7035	0.7212	2.5	TML	13
62	TML	Fluorene	1.568	1.526	2.7	TML	11
63	TM	4-Nitroaniline	0.4411	0.4883	11	TM	
64	S	2,4,6-Tribromophenol(S)	0.1897	0.2020	6.5	S	
65	I	Phenanthrene-D10(IS)	ISTD			I	
66	TM	4,6-Dinitro-2-methylphenol	0.1810	0.1939	7.2	TM	
67	TM	Diphenyl amine	0.6599	0.6660	0.92	TM	
68	*TM	n-Nitrosodiphenylamine	0.6599	0.6660	0.92	*TM	
69	TM	1,2-Diphenylhydrazine	1.055	1.072	1.6	TM	
70	TM	4-Bromophenyl phenyl ether	0.2614	0.2751	5.2	TM	
71	TM	Hexachlorobenzene	0.2794	0.2889	3.4	TM	
72	TM	Atrazine	0.2262	0.2486	9.9	TM	
73	*TM	Pentachlorophenol	0.2006	0.2189	9.1	*TM	
74	TM	Phenanthrene	1.350	1.361	0.82	TM	
75	TM	Anthracene	1.386	1.415	2.1	TM	
76	TM	Carbazol	1.287	1.342	4.3	TM	
77	TM	Di-n-butylphthalate	1.498	1.589	6.1	TM	
78	*TM	Fluoranthene	1.442	1.496	3.7	*TM	
79	I	Chrysene-D12(IS)	ISTD			I	
80	TM	Benzidine	0.5118	0.5044	1.4	TM	
		Average			5.1		

Semi-Volatile Analysis by GC-MS
EPA 8270

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix: 0

SDG No:
Date Analyzed: 09/12/18
Instrument: Yoda
Cal. Date: 08/29/18
Data File: 0829Y240.D

		Compound	MEAN	CCRF	%D		%Drift
81	TM	Pyrene	1.668	1.660	0.48	TM	
82	S	Terphenyl-D14(S)	1.038	1.036	0.23	S	
83	TM	Butyl benzylphthalate	0.7363	0.7836	6.4	TM	
84	TM	3,3'-Dichlorobenzidine	0.5437	0.5857	7.7	TM	
85	TM	Benz (a) anthracene	1.380	1.340	2.9	TM	
86	TM	Bis (2-ethylhexyl) phthalate	0.8941	0.9323	4.3	TM	
87	TM	Chrysene	1.485	1.478	0.44	TM	
88	*TM	Di-n-octylphthalate	1.690	1.838	8.8	*TM	
89	I	Perylene-D12(IS)	ISTD			I	
90	TM	Benzo (b) fluoranthene	1.444	1.450	0.37	TM	
91	TM	Benzo (k) fluoranthene	1.295	1.474	14	TM	
92	*TM	Benzo (a) pyrene	1.316	1.405	6.8	*TM	
93	TM	Indeno (1,2,3-cd) pyrene	1.469	1.603	9.1	TM	
94	TM	Dibenz (a,h) anthracene	1.310	1.407	7.4	TM	
95	TM	Benzo (g,h,i) perylene	1.200	1.294	7.8	TM	
96							
97							
98							
99							
100							
101							
102							
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
		Average			5.5		

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y240.D   Vial: 40
Acq On : 12 Sep 18 17:10   Operator: MA
Sample : 50ug/ml 8270 08/16/18 (2)   Inst : Yoda
Misc :   Multiplr: 1.00

Quant Time: Sep 12 17:18 2018   Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	338844	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1420264	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	728218	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1344939	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1253440	40.00000 ppb	0.00
89) Perylene-D12(IS)	15.84	264	1365721	40.00000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.04	112	1295093	101.72203 ppb	0.00
Spiked Amount 200.000			Recovery =	50.861%	
6) Phenol-D6 (S)	5.18	99	1531717	100.95705 ppb	0.00
Spiked Amount 200.000			Recovery =	50.478%	
22) Nitrobenzene-D5(S)	6.23	82	773309	51.46183 ppb	0.00
Spiked Amount 100.000			Recovery =	51.462%	
46) 2-Fluorobiphenyl(S)	8.27	172	1416068	49.79109 ppb	0.00
Spiked Amount 100.000			Recovery =	49.791%	
64) 2,4,6-Tribromophenol(S)	9.99	330	367676	106.45677 ppb	0.00
Spiked Amount 200.000			Recovery =	53.229%	
82) Terphenyl-D14(S)	12.65	244	1622720	49.88313 ppb	0.00
Spiked Amount 100.000			Recovery =	49.883%	

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
3) n-Nitrosodimethylamine	2.05	42	138470	51.08733 ppb	91
4) Pyridine	2.07	79	219151	50.20683 ppb	98
7) Phenol	5.20	94	1094991	53.68118 ppb	95
8) Aniline	5.24	66	398840	49.59317 ppb	94
9) Bis (2-chloroethyl) ether	5.31	63	572173	52.37580 ppb	98
10) 2-Chlorophenol	5.37	128	815423	52.07227 ppb	99
11) 1,3-DCB	5.54	146	820632	50.83316 ppb	99
12) 1,4-DCB	5.63	146	831411	51.36635 ppb	100
13) Benzyl alcohol	5.76	108	541182	52.60829 ppb	92
14) 1,2-DCB	5.79	146	790548	51.61935 ppb	98
15) 2-Methylphenol	5.88	107	650433	51.26400 ppb	99
16) Bis (2-chloroisopropyl) et	5.90	45	1105428	52.10475 ppb	98
17) Acetophenone	6.06	105	921573	54.62282 ppb	99
18) 3&4-Methylphenol	6.05	107	1395522	104.12984 ppb	100
19) n-Nitrosodi-n-propylamine	6.06	70	552313	48.75177 ppb	95
20) Hexachloroethane	6.17	117	321738	52.44991 ppb	90
23) Nitrobenzene	6.26	77	893984	52.10409 ppb	97
24) Isophorone	6.52	82	1550868	51.92377 ppb	98
25) 2-Nitrophenol	6.60	139	441559	53.99913 ppb	92
26) 2,4-Dimethylphenol	6.64	122	736996	51.09183 ppb	99
27) Benzoic acid	6.76	105	669669	55.20007 ppb	97
28) Bis (2-chloroethoxy) metha	6.75	93	863596	51.70351 ppb	99
29) 2,4-Dichlorophenol	6.87	162	648085	52.43543 ppb	99
30) 1,2,4-Trichlorobenzene	6.97	180	628548	50.84425 ppb	99
31) 3,4-Dimethylphenol	6.98	107	931466	50.80342 ppb	97
32) Naphthalene	7.06	128	2203784	50.93279 ppb	100
33) 4-Chloroaniline	7.12	127	832979	48.30315 ppb	98
34) 2,6-Dichlorophenol	7.13	162	589874	51.07909 ppb	99
35) Hexachloropropene	7.16	213	468277	53.73935 ppb	98
36) Hexachlorobutadiene	7.18	225	372923	52.37378 ppb	99
37) Caprolactum	7.56	55	422491	54.26450 ppb	96
38) 4-Chloro-3-methylphenol	7.66	107	707701	52.55644 ppb	99

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y240.D
Acq On : 12 Sep 18 17:10
Sample : 50ug/ml 8270 08/16/18 (2)
Misc :

Vial: 40
Operator: MA
Inst : Yoda
Multiplr: 1.00

Quant Time: Sep 12 17:18 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Compound	R.T.	QIon	Response	Conc Unit		Qvalue
39) 2-Methylnaphthalene	7.85	142	1408649	51.55354 ppb		98
40) 1-Methylnaphthalene	7.96	142	1391033	51.04418 ppb		99
42) Hexachlorocyclopentadiene	8.02	237	432578	52.43799 ppb		99
43) 1,2,4,5-Tetrachlorobenzene	8.04	216	659044	51.37486 ppb		98
44) 2,4,6-Trichlorophenol	8.17	196	498746	53.58234 ppb		98
45) 2,4,5-Trichlorophenol	8.22	196	502863	53.27518 ppb		99
47) 1,1'-Biphenyl	8.39	154	1739699	51.18114 ppb		98
48) 2-Chloronaphthalene	8.42	162	1415770	51.68808 ppb		97
49) 2-Nitroaniline	8.53	65	517711	54.81867 ppb		97
50) Dimethyl phthalate	8.74	163	1620658	51.66389 ppb		100
51) 2,6-DNT	8.82	165	384649	54.96199 ppb		88
52) Acenaphthylene	8.89	152	2262525	52.37071 ppb		100
53) 3-Nitroaniline	9.01	138	433927	54.72644 ppb		97
54) Acenaphthene	9.10	154	1414587	50.59854 ppb		99
55) 2,4-Dinitrophenol	9.13	184	188499	42.54698 ppb		94
56) 4-Nitrophenol	9.19	65	381898	53.21881 ppb		94
57) Dibenzofuran	9.30	168	1927243	51.55926 ppb		97
58) 2,4-DNT	9.28	165	517759	55.08096 ppb		95
59) 2,3,4,6-Tetrachlorophenol	9.43	232	442033	54.46105 ppb		94
60) Diethyl phthalate	9.56	149	1589362	52.00189 ppb		99
61) 4-Chlorophenyl phenyl ethe	9.69	204	656532	56.69580 ppb		96
62) Fluorene	9.70	166	1388718	55.56261 ppb		99
63) 4-Nitroaniline	9.73	138	444446	55.34816 ppb		97
66) 4,6-Dinitro-2-methylphenol	9.76	198	325993	53.57558 ppb		93
67) Diphenyl amine	9.84	169	2239231	100.92299 ppb		100
68) n-Nitrosodiphenylamine	9.84	169	2239231	100.92299 ppb		100
69) 1,2-Diphenylhydrazine	9.88	77	1802212	50.78674 ppb		99
70) 4-Bromophenyl phenyl ether	10.27	248	462564	52.62041 ppb		94
71) Hexachlorobenzene	10.33	284	485729	51.70723 ppb	#	87
72) Atrazine	10.45	200	208938	27.46658 ppb		98
73) Pentachlorophenol	10.56	266	368039	54.57047 ppb		98
74) Phenanthrene	10.82	178	2288627	50.40843 ppb		100
75) Anthracene	10.89	178	2378736	51.04583 ppb		100
76) Carbazol	11.07	167	2256093	52.12680 ppb		98
77) Di-n-butylphthalate	11.46	149	2672011	53.04472 ppb		100
78) Fluoranthene	12.22	202	2514670	51.86105 ppb		98
80) Benzidine	12.37	184	790325	49.27928 ppb		99
81) Pyrene	12.49	202	2601322	49.76207 ppb		99
83) Butyl benzylphthalate	13.22	149	1227704	53.21337 ppb		99
84) 3,3'-Dichlorobenzidine	13.85	252	917669	53.86170 ppb		99
85) Benz (a) anthracene	13.89	228	2100084	48.55904 ppb		99
86) Bis (2-ethylhexyl) phthala	13.87	149	1460722	52.13323 ppb		97
87) Chrysene	13.92	228	2316464	49.78068 ppb		98
88) Di-n-octylphthalate	14.66	149	2880530	54.40807 ppb		96
90) Benzo (b) fluoranthene	15.25	252	2474571	50.18737 ppb		99
91) Benzo (k) fluoranthene	15.30	252	2515985	56.90193 ppb		99
92) Benzo (a) pyrene	15.75	252	2398279	53.39172 ppb		99
93) Indeno (1,2,3-cd) pyrene	17.86	276	2736774	54.55642 ppb		99
94) Dibenz (a,h) anthracene	17.91	278	2402778	53.70370 ppb		99
95) Benzo (g,h,i) perylene	18.48	276	2208944	53.89797 ppb		97

(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y240.D            Vial: 40
Acq On    : 12 Sep 18  17:10                        Operator: MA
Sample    : 50ug/ml 8270 08/16/18 (2)               Inst    : Yoda
Misc      :                                         Multiplr: 1.00

Quant Time: Sep 12 17:18 2018           Quant Results File: Y0829NC.RES

Method        : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title         : EPA 8270C
Last Update   : Wed Aug 29 10:21:31 2018
Response via  : Initial Calibration
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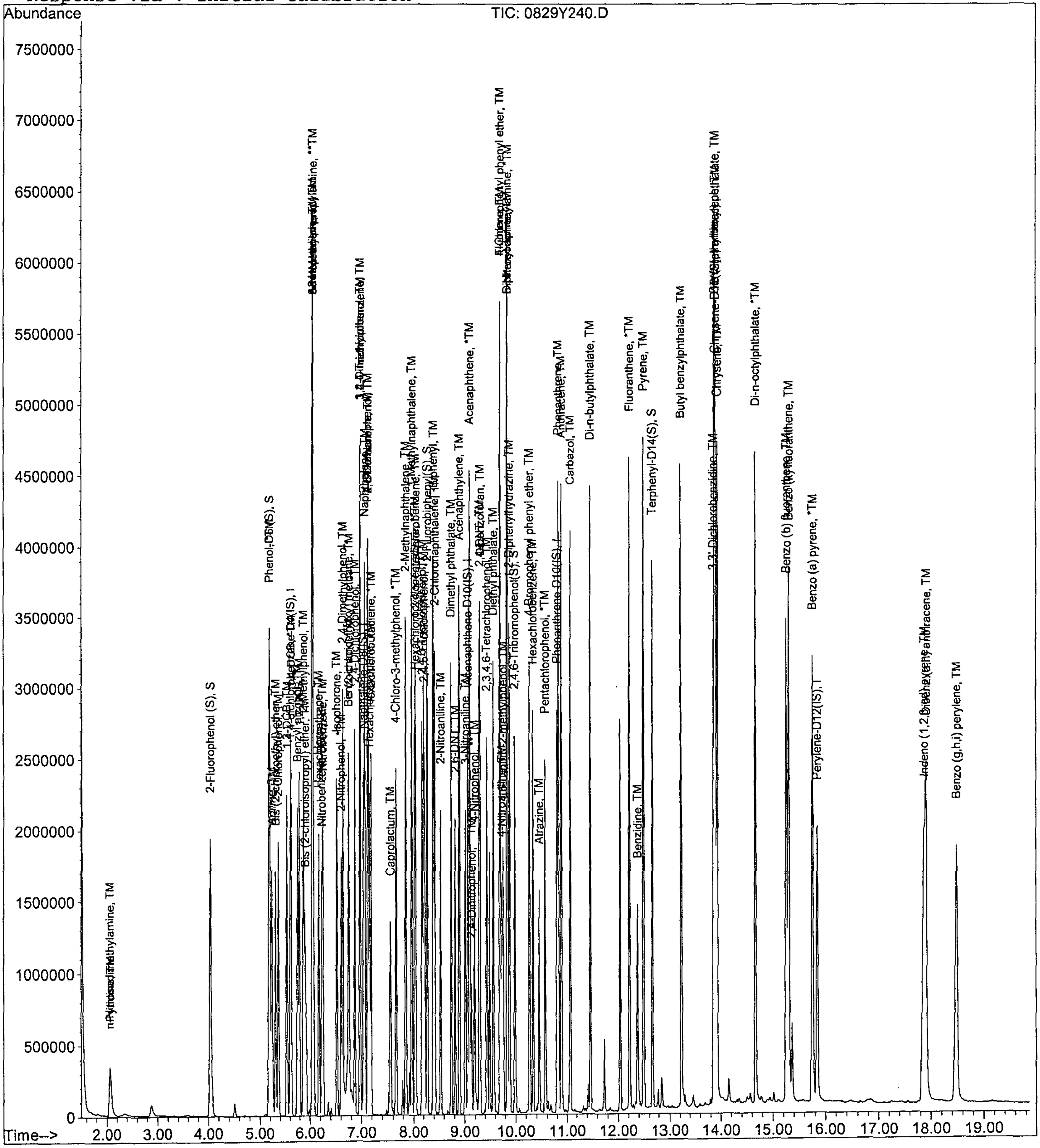


ORGANICS
Raw Data

APPL, INC.

Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y199.D
Acq On : 11 Sep 18 12:13
Sample : AZ79146SO1 1/30.36G
Misc :

Vial: 99
Operator: MA
Inst : Yoda
Multiplr: 658.76

Quant Time: Sep 12 12:04 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	381529	40.0000 ppb	-0.01
21) Napthalene-D8(IS)	7.03	136	1519991	40.0000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	783331	40.0000 ppb	-0.01
65) Phenanthrene-D10(IS)	10.79	188	1462017	40.0000 ppb	-0.01
79) Chrysene-D12(IS)	13.89	240	1481079	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1473519	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.02	112	101806	4678.3017 ppb	-0.02
Spiked Amount 6587.615				Recovery = 71.017%	
6) Phenol-D6 (S)	5.16	99	128008	4936.2373 ppb	-0.03
Spiked Amount 6587.615				Recovery = 74.932%	
22) Nitrobenzene-D5(S)	6.22	82	56386	2309.7239 ppb	-0.02
Spiked Amount 3293.808				Recovery = 70.123%	
46) 2-Fluorobiphenyl(S)	8.26	172	115297	2482.7337 ppb	-0.02
Spiked Amount 3293.808				Recovery = 75.376%	
64) 2,4,6-Tribromophenol(S)	9.98	330	28424	5040.0847 ppb	-0.02
Spiked Amount 6587.615				Recovery = 76.508%	
82) Terphenyl-D14(S)	12.65	244	133006	2279.4769 ppb	-0.01
Spiked Amount 3293.808				Recovery = 69.205%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

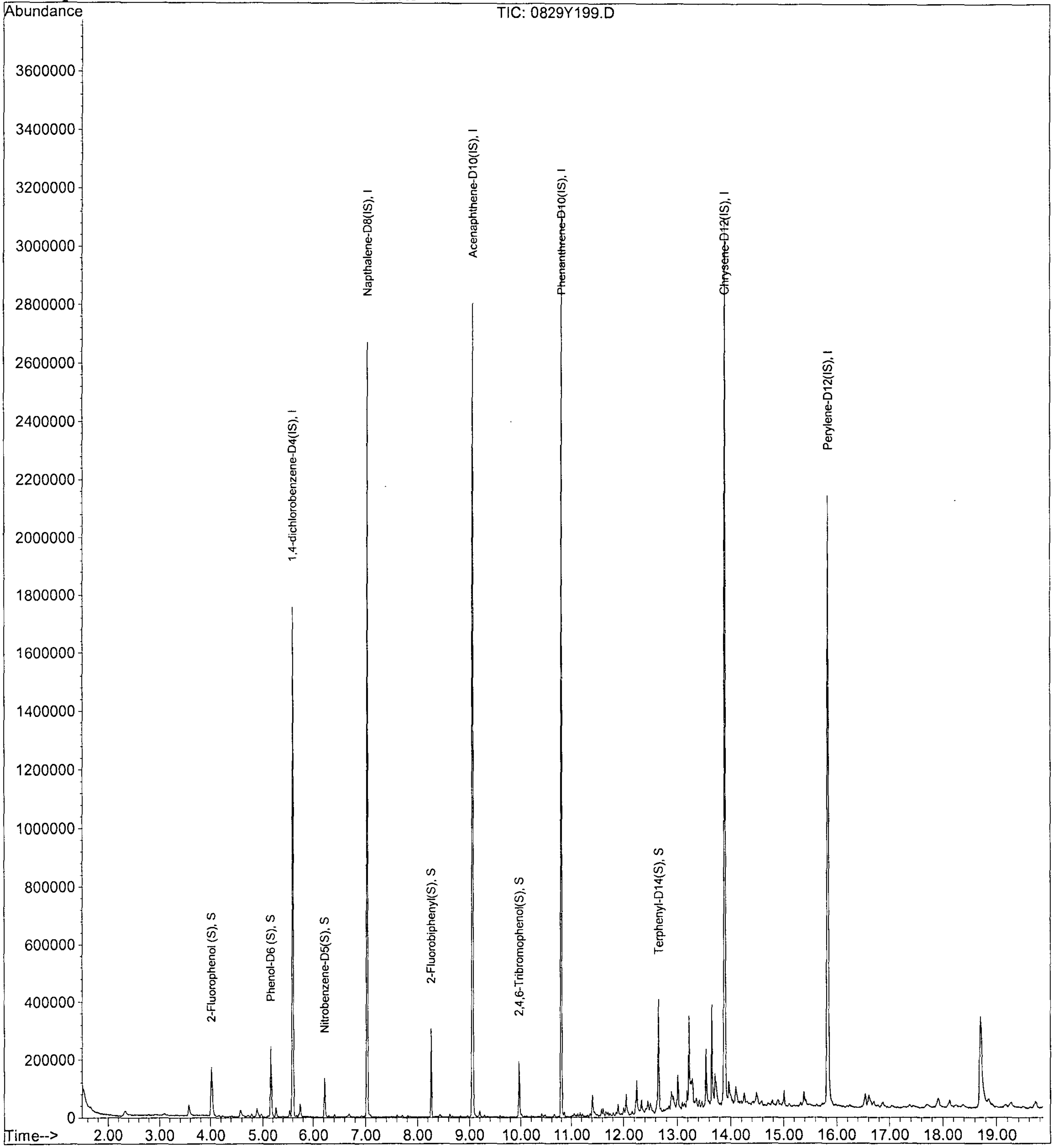
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y199.D
Acq On : 11 Sep 18 12:13
Sample : AZ79146SO1 1/30.36G
Misc :

Vial: 99
Operator: MA
Inst : Yoda
Multiplr: 658.76

Quant Time: Sep 12 12:04 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y207.D Vial: 7
Acq On : 11 Sep 18 17:10 Operator: MA
Sample : AZ79147S01 1/30.19G df20 Inst : Yoda
Misc : Multiplr: 662.47

Quant Time: Sep 12 10:43 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	321024	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1304602	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.05	164	766303	40.0000 ppb	-0.02
65) Phenanthrene-D10(IS)	10.80	188	1486963	40.0000 ppb	0.00
79) Chrysene-D12(IS)	13.89	240	1451269	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.83	264	1477947	40.0000 ppb	-0.03
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	101629	5581.6280 ppb	0.00
Spiked Amount 6624.710			Recovery =	84.255%	
6) Phenol-D6 (S)	5.17	99	126533	5831.6453 ppb	-0.02
Spiked Amount 6624.710			Recovery =	88.029%	
22) Nitrobenzene-D5(S)	6.22	82	57828	2775.4172 ppb	-0.02
Spiked Amount 3312.355			Recovery =	83.790%	
46) 2-Fluorobiphenyl(S)	8.26	172	115473	2556.0874 ppb	-0.02
Spiked Amount 3312.355			Recovery =	77.168%	
64) 2,4,6-Tribromophenol(S)	9.97	330	31484	5738.8605 ppb	-0.03
Spiked Amount 6624.710			Recovery =	86.628%	
82) Terphenyl-D14(S)	12.65	244	136144	2394.5896 ppb	0.00
Spiked Amount 3312.355			Recovery =	72.293%	
Target Compounds					Qvalue
14) 1,2-DCB	5.79	146	4049	184.8678 ppb	93
60) Diethyl phthalate	9.54	149	8480	174.6706 ppb #	88

(#) = qualifier out of range (m) = manual integration

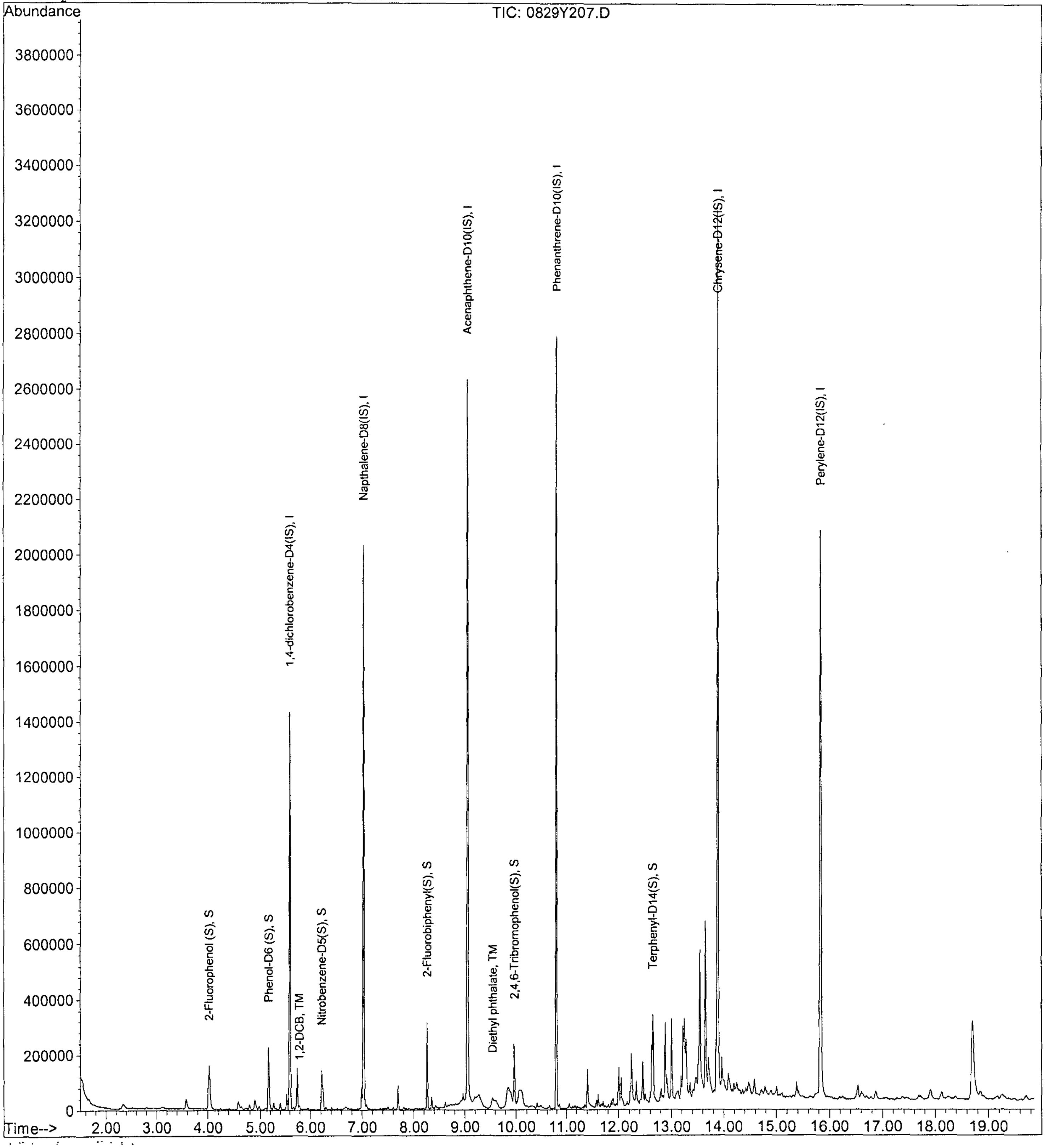
Quantitation Report

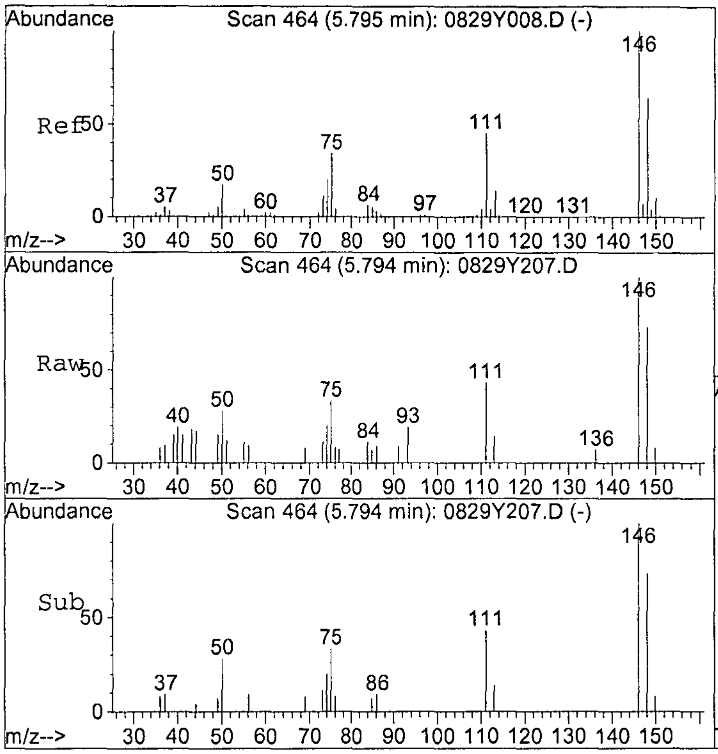
Data File : M:\YODA\DATA\Y180829\0829Y207.D
Acq On : 11 Sep 18 17:10
Sample : AZ79147S01 1/30.19G df20
Misc :

Vial: 7
Operator: MA
Inst : Yoda
Multiplr: 662.47

Quant Time: Sep 12 10:43 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration

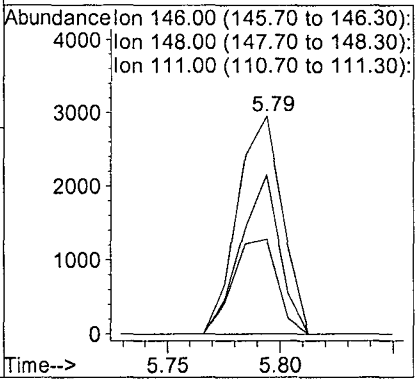


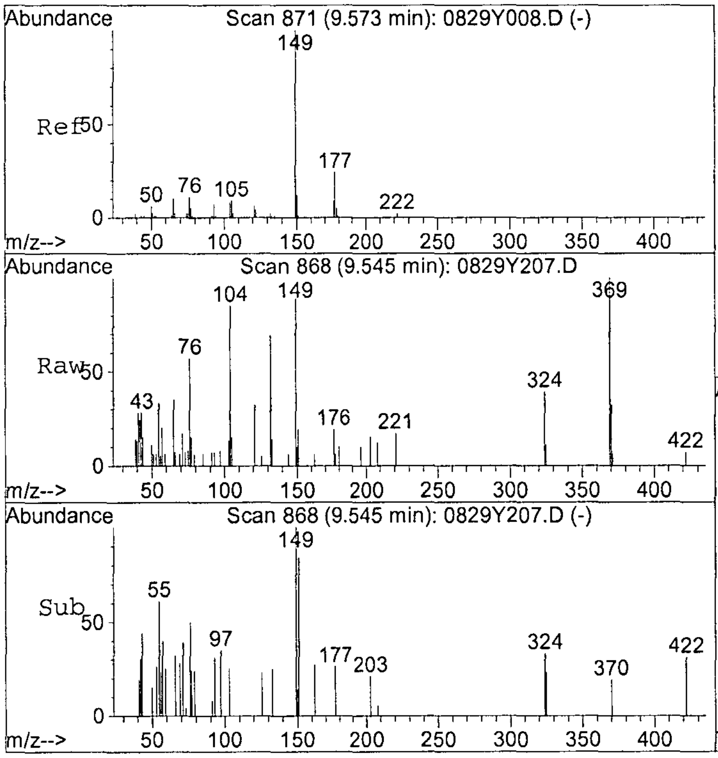


#14
1,2-DCB
Concen: 184.8678 ppb
RT: 5.79 min   Scan# 464
Delta R.T.   -0.01 min
Lab File: 0829Y207.D
Acq: 11 Sep 18 17:10

Tgt Ion:146 Resp: 4049

Ion	Ratio	Lower	Upper
146	100		
148	73.0	44.9	83.5
111	43.4	31.2	57.9

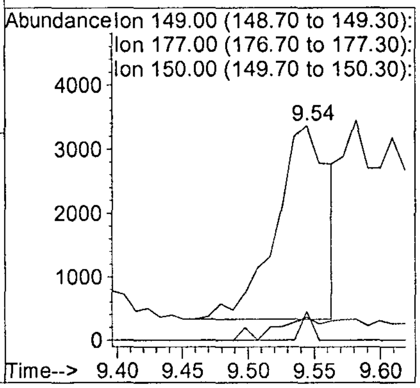




#60
Diethyl phthalate
Concen: 174.6706 ppb
RT: 9.54 min   Scan# 868
Delta R.T.   -0.03 min
Lab File: 0829Y207.D
Acq: 11 Sep 18 17:10

Tgt Ion:149 Resp: 8480

Ion	Ratio	Lower	Upper
149	100		
177	15.1	16.7	30.9#
150	12.0	8.3	15.3



Data File : M:\YODA\DATA\Y180829\0829Y208.D Vial: 8
Acq On : 11 Sep 18 17:38 Operator: MA
Sample : AZ79148S01 1/30.31G df20 Inst : Yoda
Misc : Multiplr: 659.85

Quant Time: Sep 12 10:38 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	350468	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.03	136	1435474	40.0000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	747126	40.0000 ppb	-0.01
65) Phenanthrene-D10(IS)	10.79	188	1437915	40.0000 ppb	-0.01
79) Chrysene-D12(IS)	13.89	240	1408981	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1415587	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	101446	5083.2834 ppb	-0.01
Spiked Amount 6598.482			Recovery =	77.037%	
6) Phenol-D6 (S)	5.17	99	130638	5493.1693 ppb	-0.02
Spiked Amount 6598.482			Recovery =	83.249%	
22) Nitrobenzene-D5(S)	6.22	82	59817	2598.8096 ppb	-0.02
Spiked Amount 3299.241			Recovery =	78.770%	
46) 2-Fluorobiphenyl(S)	8.26	172	118641	2682.9573 ppb	-0.02
Spiked Amount 3299.241			Recovery =	81.320%	
64) 2,4,6-Tribromophenol(S)	9.98	330	30628	5703.4562 ppb	-0.02
Spiked Amount 6598.482			Recovery =	86.436%	
82) Terphenyl-D14(S)	12.65	244	135967	2453.4992 ppb	-0.01
Spiked Amount 3299.241			Recovery =	74.366%	

Target Compounds Qvalue

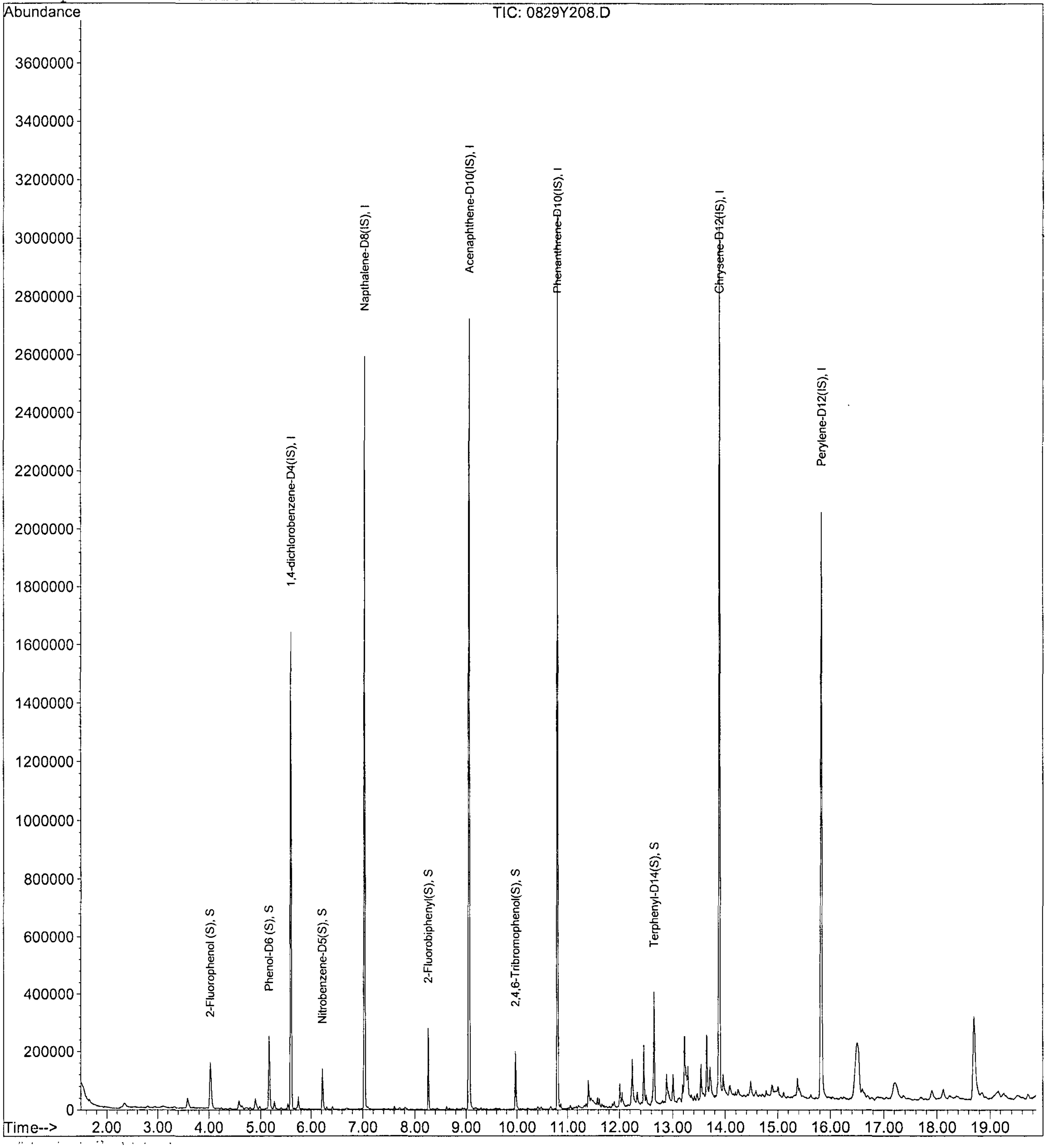
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y208.D   Vial: 8
Acq On   : 11 Sep 18 17:38   Operator: MA
Sample   : AZ79148S01 1/30.31G df20   Inst   : Yoda
Misc   :   Multiplr: 659.85

Quant Time: Sep 12 10:38 2018   Quant Results File: Y0829NC.RES

Method   : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title   : EPA 8270C
Last Update   : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y209.D   Vial: 9
Acq On : 11 Sep 18 18:06   Operator: MA
Sample : AZ79149S01 1/30.35G df20   Inst : Yoda
Misc :   Multiplr: 658.98

Quant Time: Sep 12 10:42 2018   Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	302453	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.03	136	1248707	40.0000 ppb	-0.02
41) Acenaphthene-D10(IS)	9.05	164	712502	40.0000 ppb	-0.02
65) Phenanthrene-D10(IS)	10.79	188	1401657	40.0000 ppb	-0.02
79) Chrysene-D12(IS)	13.89	240	1366782	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.83	264	1400183	40.0000 ppb	-0.03
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	102308	5932.4917 ppb	0.00
Spiked Amount 6589.786			Recovery =	90.026%	
6) Phenol-D6 (S)	5.16	99	129598	6306.2315 ppb	-0.03
Spiked Amount 6589.786			Recovery =	95.697%	
22) Nitrobenzene-D5(S)	6.22	82	55576	2772.0406 ppb	-0.02
Spiked Amount 3294.893			Recovery =	84.131%	
46) 2-Fluorobiphenyl(S)	8.26	172	113087	2678.1018 ppb	-0.02
Spiked Amount 3294.893			Recovery =	81.280%	
64) 2,4,6-Tribromophenol(S)	9.97	330	28621	5581.3558 ppb	-0.03
Spiked Amount 6589.786			Recovery =	84.697%	
82) Terphenyl-D14(S)	12.66	244	132144	2454.8978 ppb	0.00
Spiked Amount 3294.893			Recovery =	74.506%	

Target Compounds   Qvalue

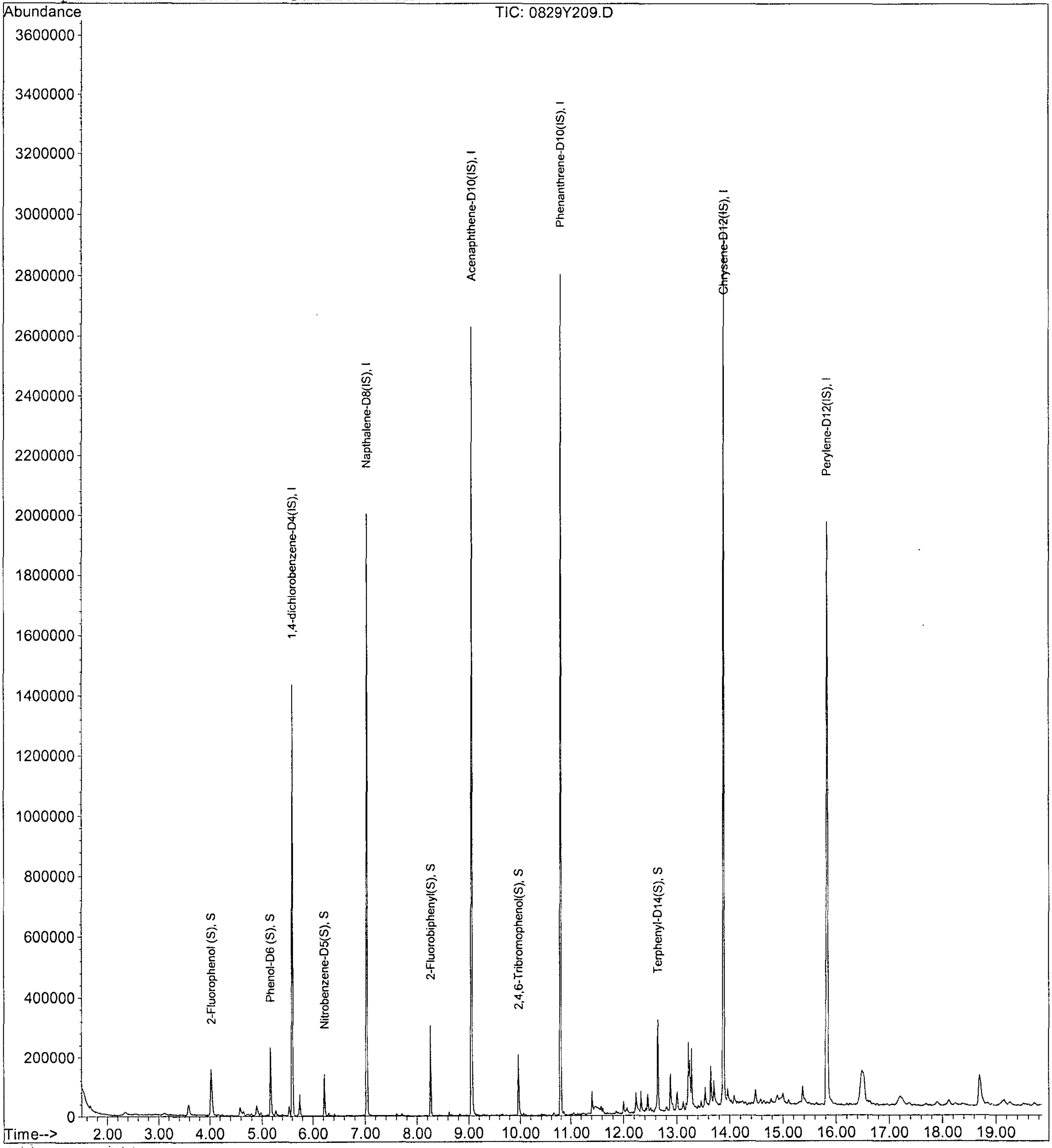
(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y209.D            Vial: 9
Acq On    : 11 Sep 18  18:06                       Operator: MA
Sample    : AZ79149S01 1/30.35G df20               Inst    : Yoda
Misc      :                                        Multiplr: 658.98

Quant Time: Sep 12 10:42 2018           Quant Results File: Y0829NC.RES

Method        : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title         : EPA 8270C
Last Update   : Wed Aug 29 10:21:31 2018
Response via  : Initial Calibration
```



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y212.D Vial: 12
Acq On : 11 Sep 18 19:30 Operator: MA
Sample : AZ79150S01 1/30.70G df20 Inst : Yoda
Misc : Multiplr: 651.47

Quant Time: Sep 12 10:49 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	342952	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.03	136	1443877	40.0000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	854914	40.0000 ppb	-0.01
65) Phenanthrene-D10(IS)	10.79	188	1639209	40.0000 ppb	-0.01
79) Chrysene-D12(IS)	13.89	240	1597898	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1656342	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	104453	5280.7207 ppb	-0.01
Spiked Amount 6514.658			Recovery =	81.059%	
6) Phenol-D6 (S)	5.17	99	131919	5596.5926 ppb	-0.02
Spiked Amount 6514.658			Recovery =	85.908%	
22) Nitrobenzene-D5(S)	6.22	82	57495	2451.8444 ppb	-0.02
Spiked Amount 3257.329			Recovery =	75.272%	
46) 2-Fluorobiphenyl(S)	8.26	172	116700	2277.0318 ppb	-0.02
Spiked Amount 3257.329			Recovery =	69.905%	
64) 2,4,6-Tribromophenol(S)	9.98	330	28342	4553.7505 ppb	-0.02
Spiked Amount 6514.658			Recovery =	69.900%	
82) Terphenyl-D14(S)	12.65	244	130372	2048.0505 ppb	-0.01
Spiked Amount 3257.329			Recovery =	62.875%	

Target Compounds Qvalue

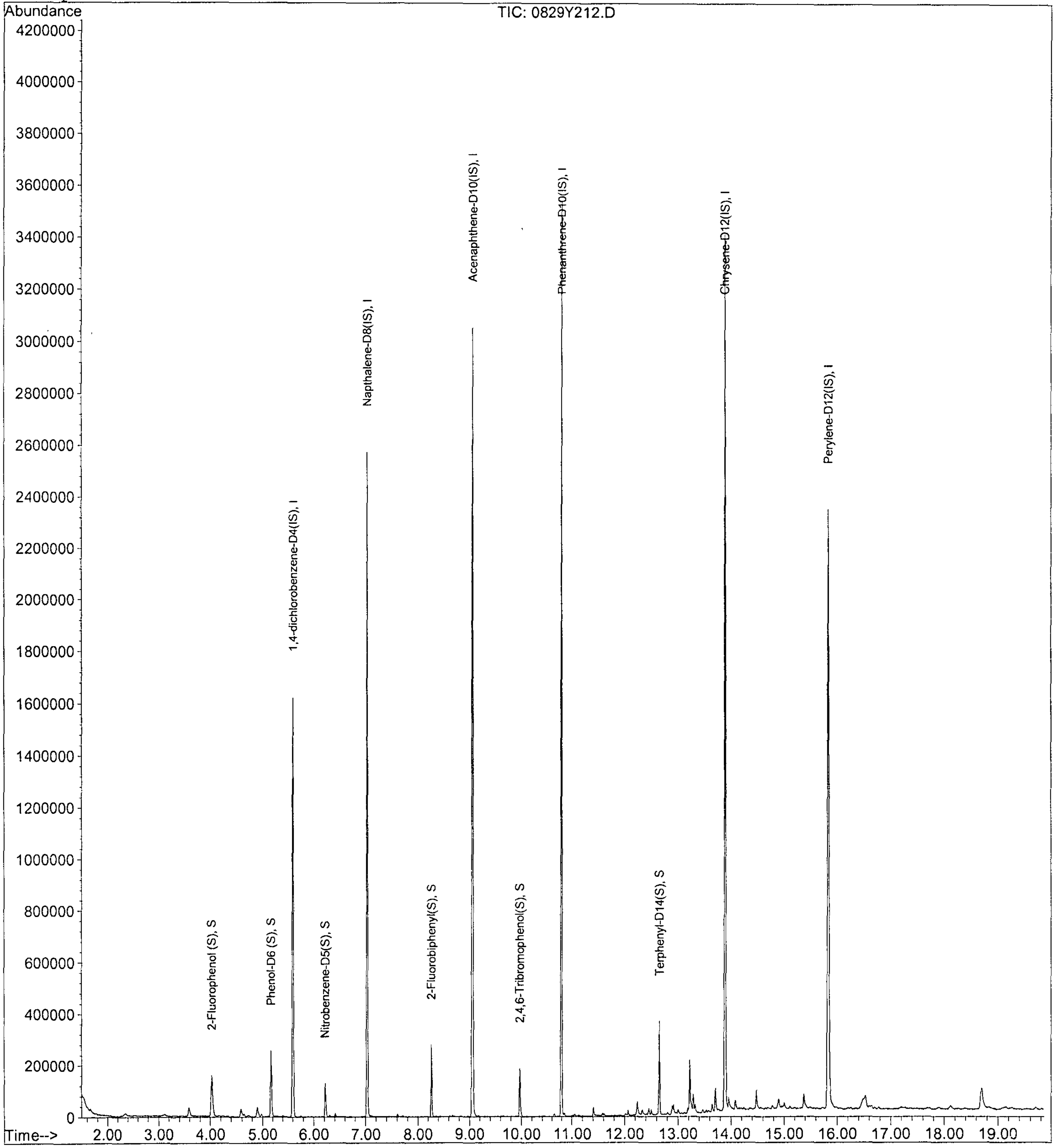
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y212.D Vial: 12
Acq On : 11 Sep 18 19:30 Operator: MA
Sample : AZ79150S01 1/30.70G df20 Inst : Yoda
Misc : Multiplr: 651.47

Quant Time: Sep 12 10:49 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

```
Data File : M:\YODA\DATA\Y180829\0829Y213.D            Vial: 13
Acq On    : 11 Sep 18  19:58                        Operator: MA
Sample    : AZ79151S01 1/30.51G df20                Inst    : Yoda
Misc      :                                         Multiplr: 655.52

Quant Time: Sep 12 10:50 2018              Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards                R.T. QIon  Response  Conc Units   Dev(Min)
-----------------------------------------------------------------------------

  1) 1,4-dichlorobenzene-D4(IS)   5.61  152    383810   40.0000 ppb     0.00
 21) Napthalene-D8(IS)            7.04  136   1577421   40.0000 ppb    -0.01
 41) Acenaphthene-D10(IS)         9.06  164    866957   40.0000 ppb    -0.01
 65) Phenanthrene-D10(IS)        10.79  188   1655699   40.0000 ppb    -0.01
 79) Chrysene-D12(IS)            13.89  240   1623817   40.0000 ppb    -0.02
 89) Perylene-D12(IS)            15.84  264   1659710   40.0000 ppb    -0.02

System Monitoring Compounds
  5) 2-Fluorophenol (S)           4.03  112    105712  4805.1816 ppb    -0.01
  Spiked Amount    6555.228                     Recovery   =   73.303%
  6) Phenol-D6 (S)                5.17   99    132869  5068.1942 ppb    -0.02
  Spiked Amount    6555.228                     Recovery   =   77.315%
 22) Nitrobenzene-D5(S)           6.22   82     59567  2339.6307 ppb    -0.02
  Spiked Amount    3277.614                     Recovery   =   71.382%
 46) 2-Fluorobiphenyl(S)          8.26  172    122573  2373.0894 ppb    -0.02
  Spiked Amount    3277.614                     Recovery   =   72.403%
 64) 2,4,6-Tribromophenol(S)      9.98  330     30572  4873.9789 ppb    -0.02
  Spiked Amount    6555.228                     Recovery   =   74.353%
 82) Terphenyl-D14(S)            12.65  244    136720  2126.6525 ppb    -0.01
  Spiked Amount    3277.614                     Recovery   =   64.884%

Target Compounds                                                    Qvalue
```

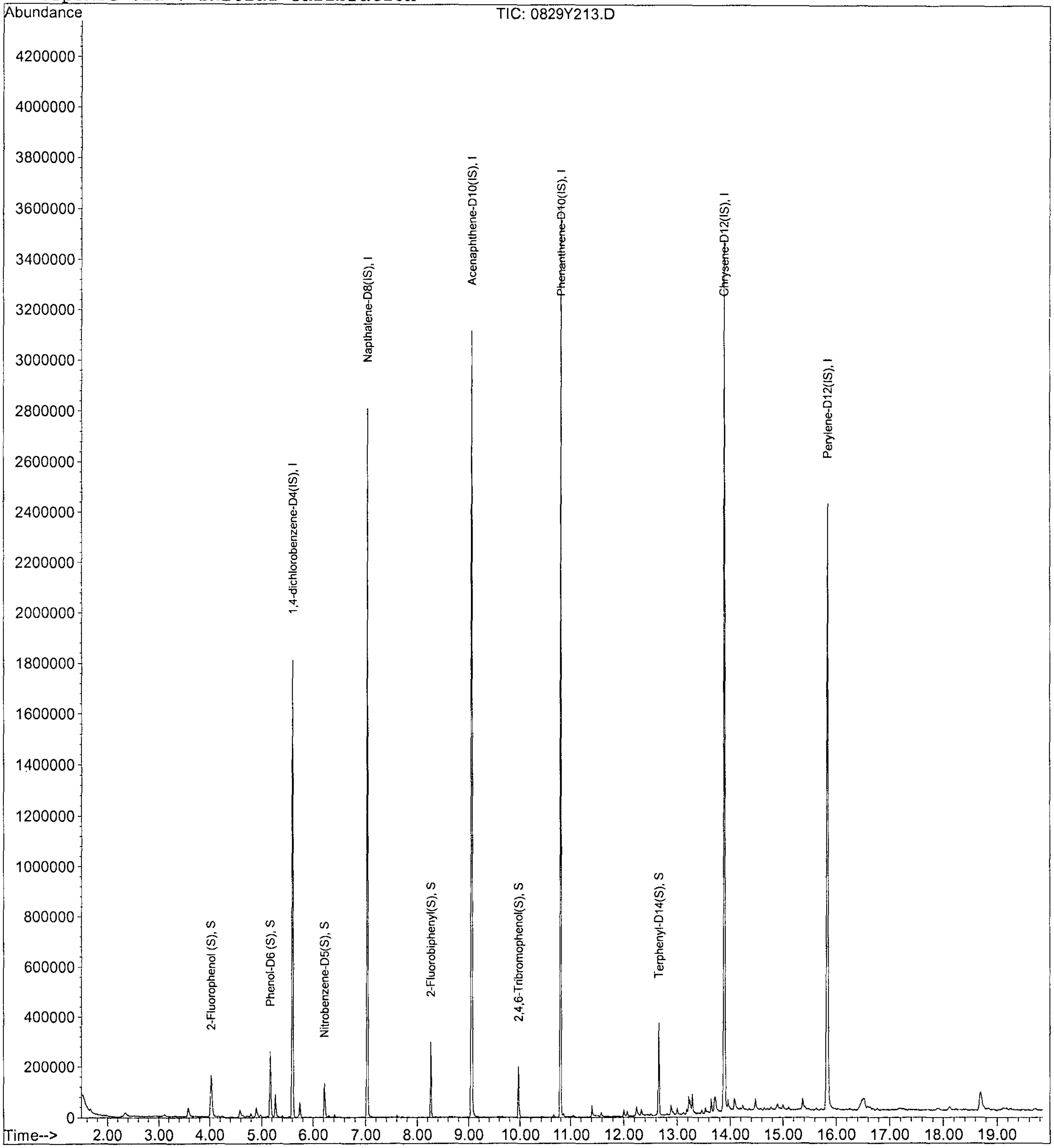
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y213.D
Acq On : 11 Sep 18 19:58
Sample : AZ79151S01 1/30.51G df20
Misc :

Vial: 13
Operator: MA
Inst : Yoda
Multiplr: 655.52

Quant Time: Sep 12 10:50 2018
Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y228.D Vial: 28
Acq On : 12 Sep 18 11:01 Operator: MA
Sample : AZ79152S01 1/30.59G DF40 Inst : Yoda
Misc : Multiplr: 1307.62

Quant Time: Sep 12 11:33 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	394650	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.03	136	1619464	40.0000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	903725	40.0000 ppb	-0.01
65) Phenanthrene-D10(IS)	10.79	188	1726388	40.0000 ppb	-0.01
79) Chrysene-D12(IS)	13.89	240	1722611	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1793421	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.02	112	49054	4325.7134 ppb	-0.02
Spiked Amount 6538.084			Recovery =	66.162%	
6) Phenol-D6 (S)	5.17	99	60245	4458.0854 ppb	-0.02
Spiked Amount 6538.084			Recovery =	68.186%	
22) Nitrobenzene-D5(S)	6.22	82	27687	2112.9413 ppb	-0.02
Spiked Amount 3269.042			Recovery =	64.635%	
46) 2-Fluorobiphenyl(S)	8.26	172	56794	2104.1496 ppb	-0.02
Spiked Amount 3269.042			Recovery =	64.366%	
64) 2,4,6-Tribromophenol(S)	9.98	330	14479	4417.2628 ppb	-0.02
Spiked Amount 6538.084			Recovery =	67.562%	
82) Terphenyl-D14(S)	12.65	244	65374	1912.1107 ppb	-0.01
Spiked Amount 3269.042			Recovery =	58.491%	

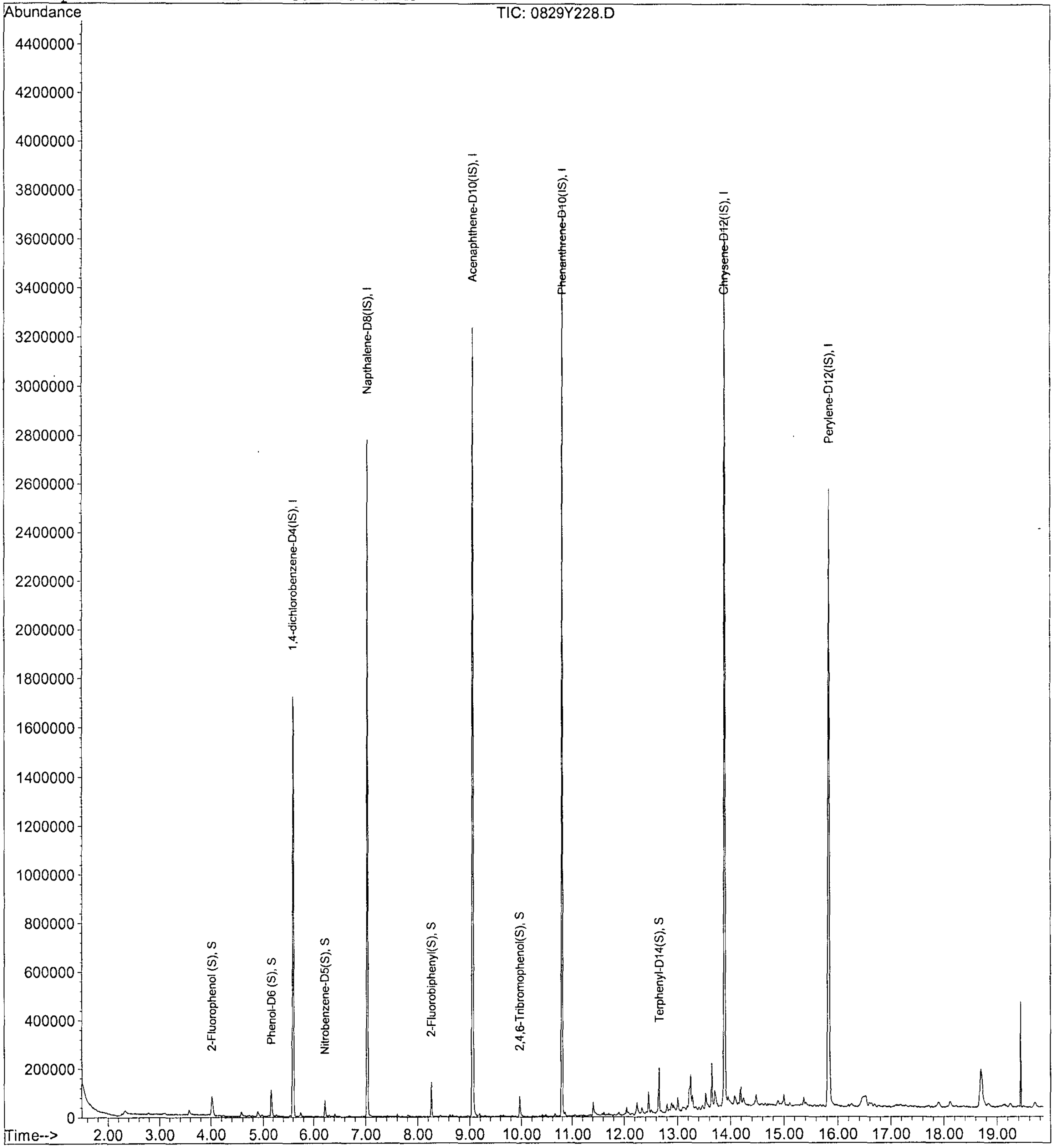
Target Compounds Qvalue

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y228.D              Vial: 28
Acq On    : 12 Sep 18  11:01                          Operator: MA
Sample    : AZ79152S01 1/30.59G DF40                  Inst    : Yoda
Misc      :                                           Multiplr: 1307.62

Quant Time: Sep 12 11:33 2018            Quant Results File: Y0829NC.RES

Method        : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title         : EPA 8270C
Last Update   : Wed Aug 29 10:21:31 2018
Response via  : Initial Calibration
```



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y215.D
Acq On : 11 Sep 18 20:54
Sample : AZ79153S01 1/30.31G df40
Misc :

Vial: 15
Operator: MA
Inst : Yoda
Multiplr: 1319.70

Quant Time: Sep 12 10:53 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	431104	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1757293	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	894382	40.0000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1677524	40.0000 ppb	0.00
79) Chrysene-D12(IS)	13.89	240	1640921	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1694242	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	47906	3902.9855 ppb	0.00
Spiked Amount 6598.482			Recovery =	59.150%	
6) Phenol-D6 (S)	5.17	99	61328	4192.8555 ppb	-0.02
Spiked Amount 6598.482			Recovery =	63.543%	
22) Nitrobenzene-D5(S)	6.22	82	26441	1876.7662 ppb	-0.02
Spiked Amount 3299.241			Recovery =	56.885%	
46) 2-Fluorobiphenyl(S)	8.26	172	56458	2133.0771 ppb	-0.02
Spiked Amount 3299.241			Recovery =	64.654%	
64) 2,4,6-Tribromophenol(S)	9.98	330	13884	4319.5269 ppb	-0.02
Spiked Amount 6598.482			Recovery =	65.462%	
82) Terphenyl-D14(S)	12.65	244	61801	1915.1231 ppb	0.00
Spiked Amount 3299.241			Recovery =	58.047%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

Quantitation Report

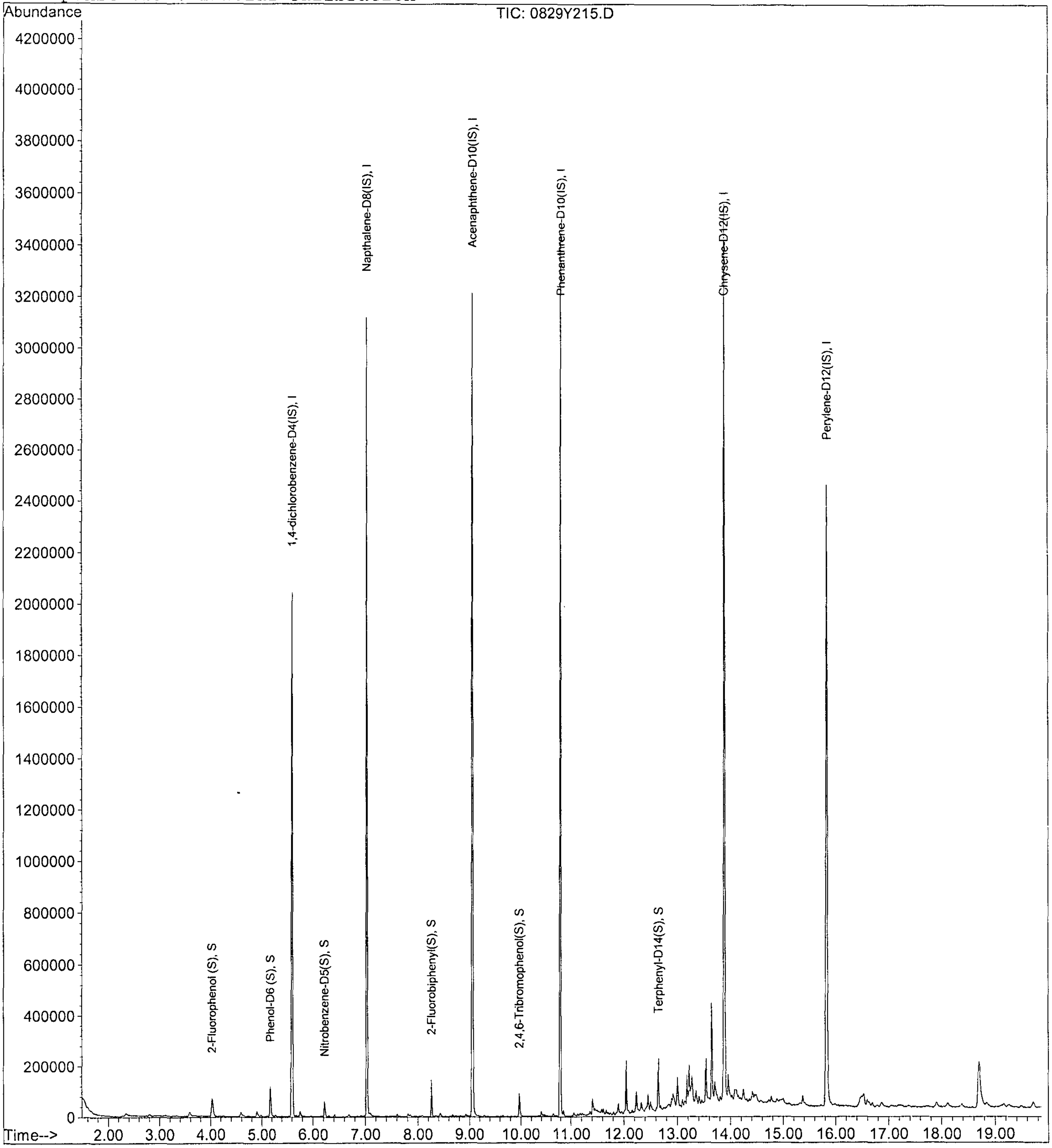
Data File : M:\YODA\DATA\Y180829\0829Y215.D
Acq On : 11 Sep 18 20:54
Sample : AZ79153S01 1/30.31G df40
Misc :

Vial: 15
Operator: MA
Inst : Yoda
Multiplr: 1319.70

Quant Time: Sep 12 10:53 2018

Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y216.D Vial: 16
Acq On : 11 Sep 18 21:22 Operator: MA
Sample : AZ79154S01 1/30.75G df20 Inst : Yoda
Misc : Multiplr: 650.41

Quant Time: Sep 12 10:54 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	415230	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1696135	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	954448	40.0000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1835560	40.0000 ppb	0.00
79) Chrysene-D12(IS)	13.89	240	1787226	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1864929	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	116749	4867.0243 ppb	0.00
Spiked Amount 6504.065				Recovery = 74.830%	
6) Phenol-D6 (S)	5.17	99	145408	5086.7772 ppb	-0.02
Spiked Amount 6504.065				Recovery = 78.209%	
22) Nitrobenzene-D5(S)	6.22	82	62502	2265.2700 ppb	-0.02
Spiked Amount 3252.033				Recovery = 69.657%	
46) 2-Fluorobiphenyl(S)	8.26	172	128142	2235.9050 ppb	-0.02
Spiked Amount 3252.033				Recovery = 68.754%	
64) 2,4,6-Tribromophenol(S)	9.98	330	34093	4898.5503 ppb	-0.02
Spiked Amount 6504.065				Recovery = 75.315%	
82) Terphenyl-D14(S)	12.65	244	144924	2032.1684 ppb	0.00
Spiked Amount 3252.033				Recovery = 62.489%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y216.D          Vial: 16
Acq On    : 11 Sep 18  21:22                      Operator: MA
Sample    : AZ79154S01 1/30.75G df20              Inst    : Yoda
Misc      :                                       Multiplr: 650.41

Quant Time: Sep 12 10:54 2018          Quant Results File: Y0829NC.RES

Method       : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
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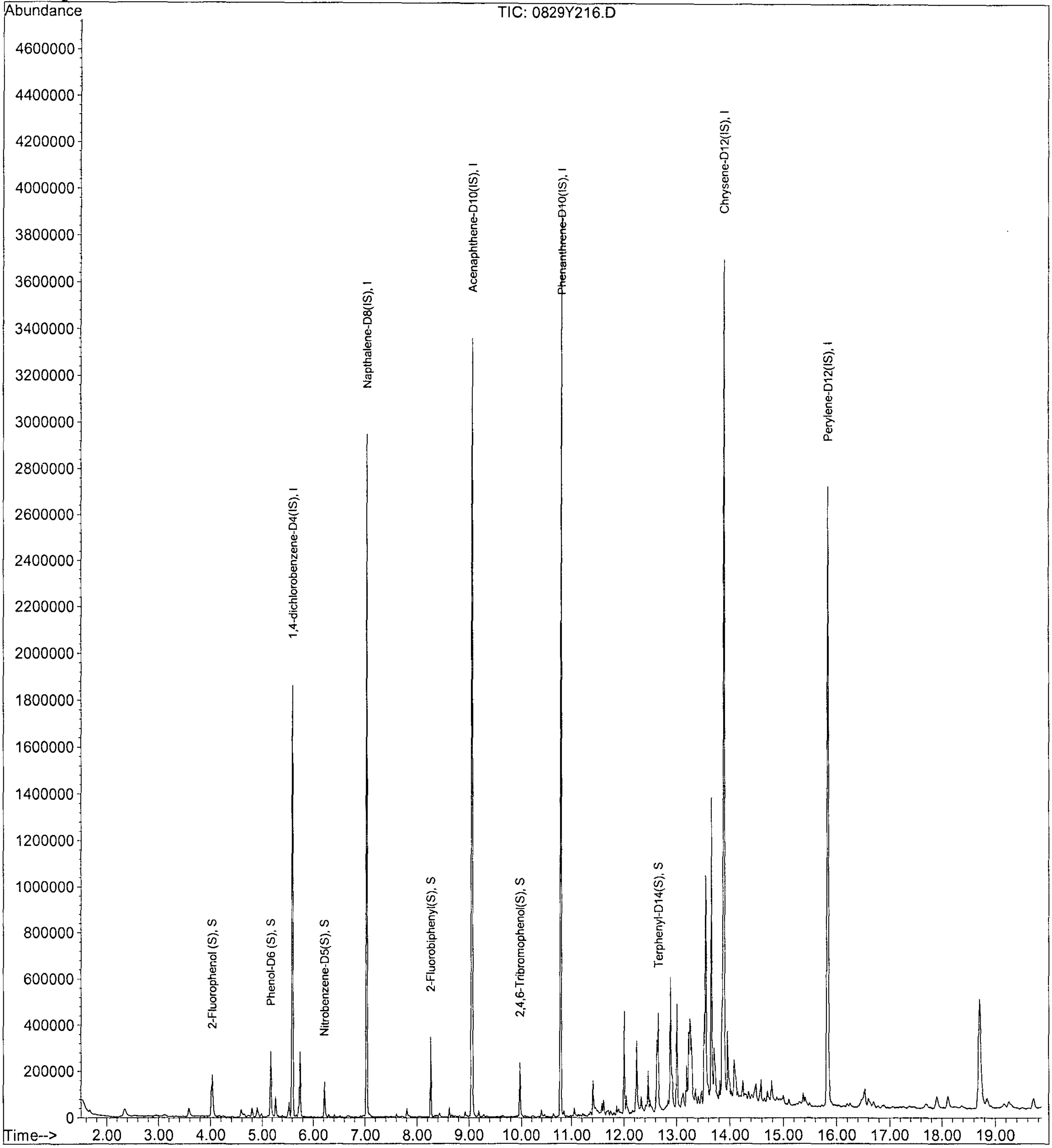


Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y217.D   Vial: 17
Acq On : 11 Sep 18 21:50   Operator: MA
Sample : AZ79155S01 1/30.41G df20   Inst : Yoda
Misc :   Multiplr: 657.68

Quant Time: Sep 12 10:55 2018   Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	517544	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	2074877	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	1069048	40.0000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1994391	40.0000 ppb	0.00
79) Chrysene-D12(IS)	13.89	240	1924020	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	2017012	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	108010	3652.9512 ppb	0.00
Spiked Amount 6576.784			Recovery =	55.543%	
6) Phenol-D6 (S)	5.17	99	137893	3913.5076 ppb	-0.02
Spiked Amount 6576.784			Recovery =	59.505%	
22) Nitrobenzene-D5(S)	6.22	82	60953	1826.0695 ppb	-0.02
Spiked Amount 3288.392			Recovery =	55.531%	
46) 2-Fluorobiphenyl(S)	8.26	172	121879	1919.8792 ppb	-0.02
Spiked Amount 3288.392			Recovery =	58.384%	
64) 2,4,6-Tribromophenol(S)	9.97	330	31870	4133.9725 ppb	-0.03
Spiked Amount 6576.784			Recovery =	62.857%	
82) Terphenyl-D14(S)	12.65	244	135705	1787.3649 ppb	0.00
Spiked Amount 3288.392			Recovery =	54.354%	

Target Compounds   Qvalue

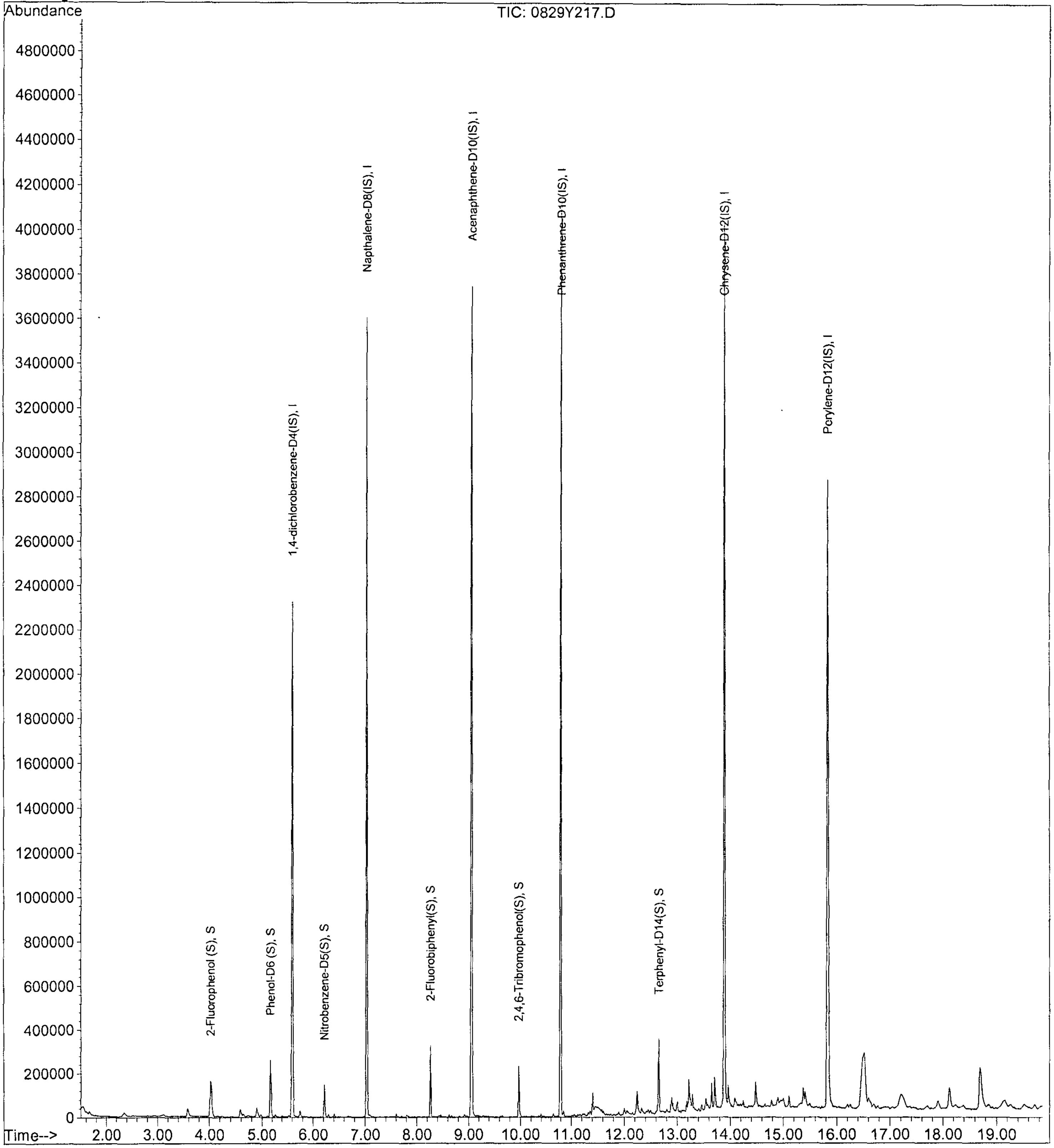
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y217.D
Acq On : 11 Sep 18 21:50
Sample : AZ79155S01 1/30.41G df20
Misc :

Vial: 17
Operator: MA
Inst : Yoda
Multiplr: 657.68

Quant Time: Sep 12 10:55 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y218.D
Acq On : 11 Sep 18 22:18
Sample : AZ79156S01 1/30.55G df20
Misc :

Vial: 18
Operator: MA
Inst : Yoda
Multiplr: 654.66

Quant Time: Sep 12 11:01 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	450928	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.03	136	1844604	40.0000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	961492	40.0000 ppb	-0.01
65) Phenanthrene-D10(IS)	10.79	188	1818415	40.0000 ppb	-0.01
79) Chrysene-D12(IS)	13.89	240	1762735	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1809624	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.04	112	115493	4462.5262 ppb	0.00
Spiked Amount 6546.645				Recovery = 68.165%	
6) Phenol-D6 (S)	5.17	99	147570	4784.8383 ppb	-0.02
Spiked Amount 6546.645				Recovery = 73.088%	
22) Nitrobenzene-D5(S)	6.22	82	64675	2169.4668 ppb	-0.02
Spiked Amount 3273.322				Recovery = 66.277%	
46) 2-Fluorobiphenyl(S)	8.26	172	132300	2306.5429 ppb	-0.02
Spiked Amount 3273.322				Recovery = 70.465%	
64) 2,4,6-Tribromophenol(S)	9.98	330	35184	5051.1168 ppb	-0.02
Spiked Amount 6546.645				Recovery = 77.156%	
82) Terphenyl-D14(S)	12.65	244	148962	2131.6729 ppb	-0.01
Spiked Amount 3273.322				Recovery = 65.123%	
Target Compounds					Qvalue
27) Benzoic acid	6.67	105	1175	48.8204 ppb	92

(#) = qualifier out of range (m) = manual integration

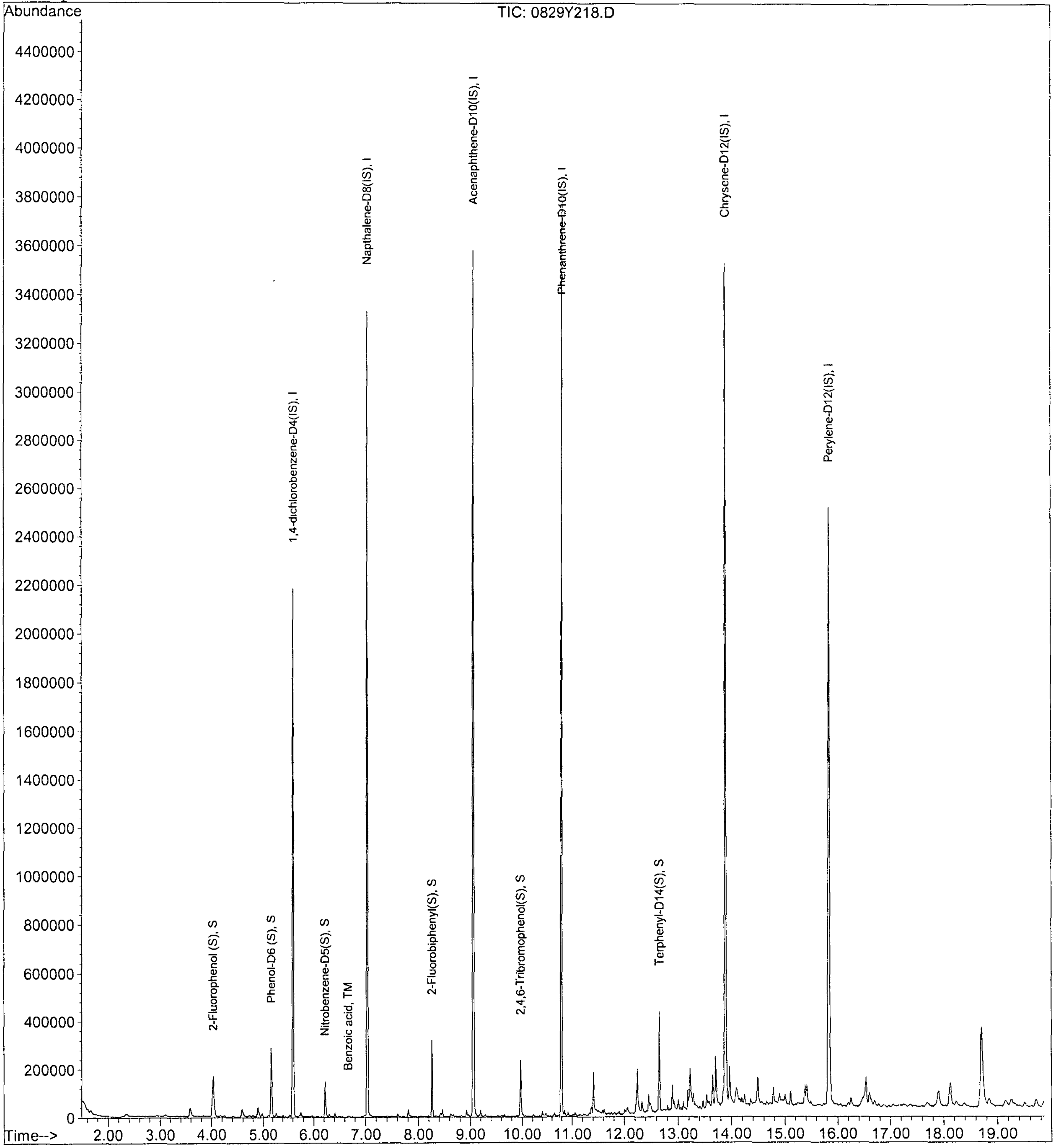
Quantitation Report

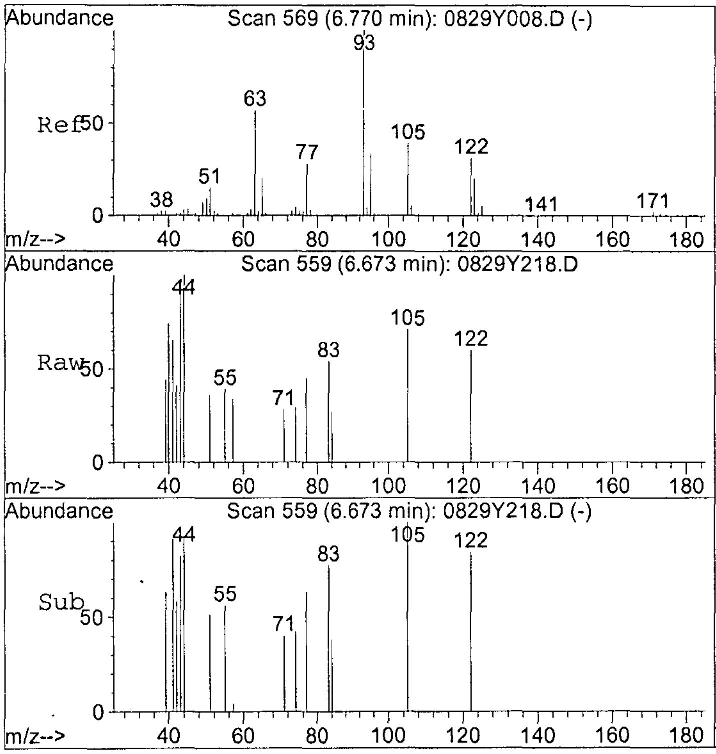
Data File : M:\YODA\DATA\Y180829\0829Y218.D
Acq On : 11 Sep 18 22:18
Sample : AZ79156S01 1/30.55G df20
Misc :

Vial: 18
Operator: MA
Inst : Yoda
Multiplr: 654.66

Quant Time: Sep 12 11:01 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration

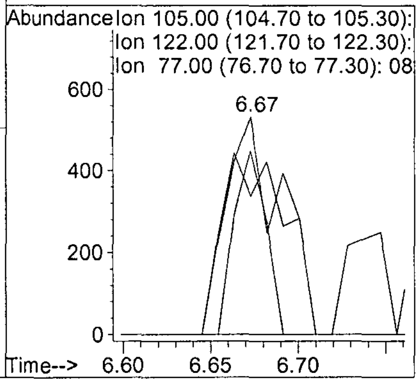




#27
Benzoic acid
Concen: 48.8204 ppb
RT: 6.67 min   Scan# 559
Delta R.T.   -0.12 min
Lab File: 0829Y218.D
Acq: 11 Sep 18 22:18

Tgt Ion:105 Resp: 1175

Ion	Ratio	Lower	Upper
105	100		
122	84.3	55.2	102.6
77	63.1	50.3	93.5



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y219.D   Vial: 19
Acq On : 11 Sep 18 22:46   Operator: MA
Sample : AZ79157S01 1/30.36G df40   Inst : Yoda
Misc :   Multiplr: 1317.52

Quant Time: Sep 12 11:02 2018   Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	410891	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1695438	40.0000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	940893	40.0000 ppb	-0.01
65) Phenanthrene-D10(IS)	10.79	188	1783708	40.0000 ppb	-0.01
79) Chrysene-D12(IS)	13.89	240	1743251	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1796432	40.0000 ppb	-0.02

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
5) 2-Fluorophenol (S)	4.03	112	50557	4314.4531 ppb	-0.01
Spiked Amount 6587.615			Recovery =	65.493%	
6) Phenol-D6 (S)	5.17	99	59852	4286.1482 ppb	-0.02
Spiked Amount 6587.615			Recovery =	65.064%	
22) Nitrobenzene-D5(S)	6.22	82	32678	2400.1149 ppb	-0.02
Spiked Amount 3293.808			Recovery =	72.867%	
46) 2-Fluorobiphenyl(S)	8.26	172	67950	2436.3257 ppb	-0.02
Spiked Amount 3293.808			Recovery =	73.967%	
64) 2,4,6-Tribromophenol(S)	9.98	330	16460	4859.7757 ppb	-0.02
Spiked Amount 6587.615			Recovery =	73.771%	
82) Terphenyl-D14(S)	12.65	244	73371	2136.6598 ppb	-0.01
Spiked Amount 3293.808			Recovery =	64.869%	

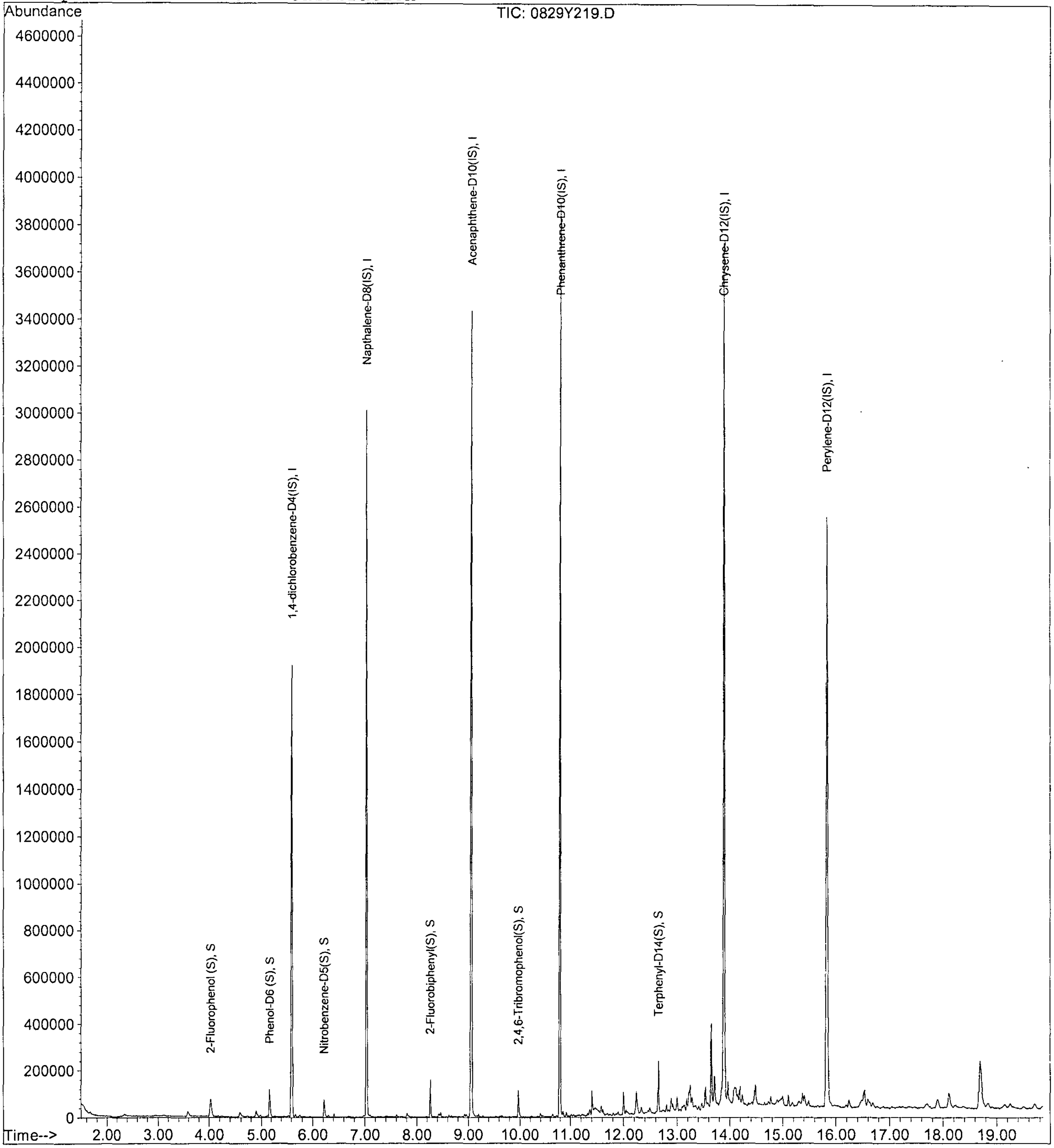
Target Compounds   Qvalue

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y219.D            Vial: 19
Acq On    : 11 Sep 18  22:46                       Operator: MA
Sample    : AZ79157S01 1/30.36G df40               Inst    : Yoda
Misc      :                                        Multiplr: 1317.52

Quant Time: Sep 12 11:02 2018              Quant Results File: Y0829NC.RES

Method        : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title         : EPA 8270C
Last Update   : Wed Aug 29 10:21:31 2018
Response via  : Initial Calibration
```



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y229.D Vial: 29
Acq On : 12 Sep 18 11:29 Operator: MA
Sample : AZ79158S01 1/30.14G DF20 Inst : Yoda
Misc : Multiplr: 663.57

Quant Time: Sep 21 12:36 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	380901	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1575429	40.00000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	933357	40.00000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1766184	40.00000 ppb	0.00
79) Chrysene-D12(IS)	13.89	240	1744615	40.00000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1818024	40.00000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	126685	5873.72610 ppb	0.00
Spiked Amount 6635.700			Recovery =	88.517%	
6) Phenol-D6 (S)	5.17	99	158558	6169.08450 ppb	-0.02
Spiked Amount 6635.700			Recovery =	92.968%	
22) Nitrobenzene-D5(S)	6.22	82	68971	2745.71651 ppb	-0.02
Spiked Amount 3317.850			Recovery =	82.756%	
46) 2-Fluorobiphenyl(S)	8.26	172	141358	2573.28715 ppb	-0.02
Spiked Amount 3317.850			Recovery =	77.559%	
64) 2,4,6-Tribromophenol(S)	9.98	330	37398	5606.04716 ppb	-0.02
Spiked Amount 6635.700			Recovery =	84.483%	
82) Terphenyl-D14(S)	12.65	244	159769	2341.49534 ppb	0.00
Spiked Amount 3317.850			Recovery =	70.573%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

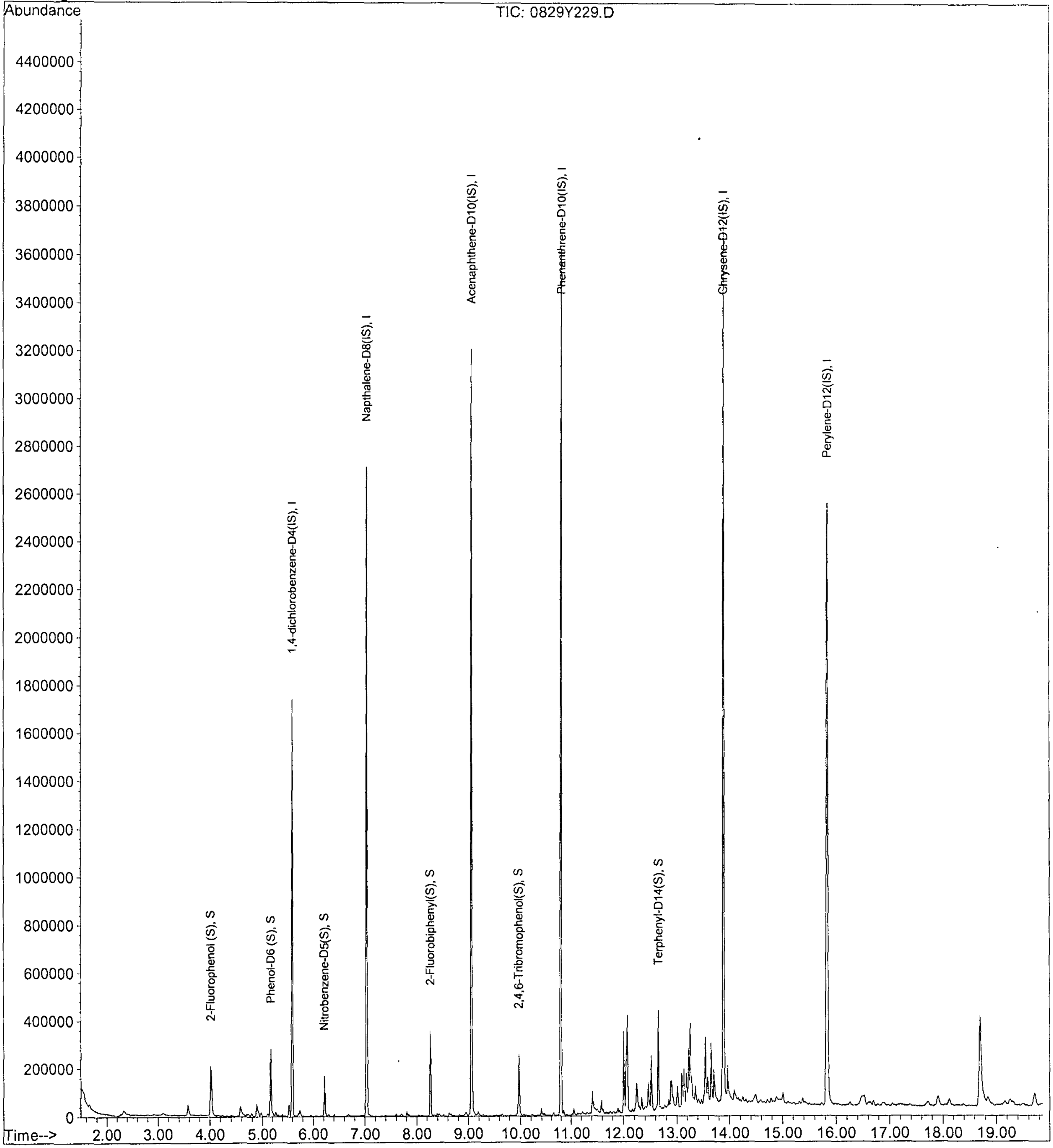
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y229.D
Acq On : 12 Sep 18 11:29
Sample : AZ79158S01 1/30.14G DF20
Misc :

Vial: 29
Operator: MA
Inst : Yoda
Multiplr: 663.57

Quant Time: Sep 21 12:36 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Thu Sep 13 14:34:24 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y221.D Vial: 21
Acq On : 11 Sep 18 23:42 Operator: MA
Sample : AZ79159S01 1/30.37G df20 Inst : Yoda
Misc : Multiplr: 658.55

Quant Time: Sep 12 11:04 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	437026	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1760298	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	895790	40.0000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1672330	40.0000 ppb	0.00
79) Chrysene-D12(IS)	13.89	240	1618844	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1687491	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	122295	4904.5679 ppb	0.00
Spiked Amount 6585.446			Recovery =	74.476%	
6) Phenol-D6 (S)	5.17	99	155394	5229.6227 ppb	-0.02
Spiked Amount 6585.446			Recovery =	79.412%	
22) Nitrobenzene-D5(S)	6.22	82	65161	2304.0307 ppb	-0.02
Spiked Amount 3292.723			Recovery =	69.973%	
46) 2-Fluorobiphenyl(S)	8.26	172	132064	2485.9512 ppb	-0.02
Spiked Amount 3292.723			Recovery =	75.498%	
64) 2,4,6-Tribromophenol(S)	9.98	330	37012	5737.0841 ppb	-0.02
Spiked Amount 6585.446			Recovery =	87.118%	
82) Terphenyl-D14(S)	12.65	244	149682	2346.1927 ppb	0.00
Spiked Amount 3292.723			Recovery =	71.254%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

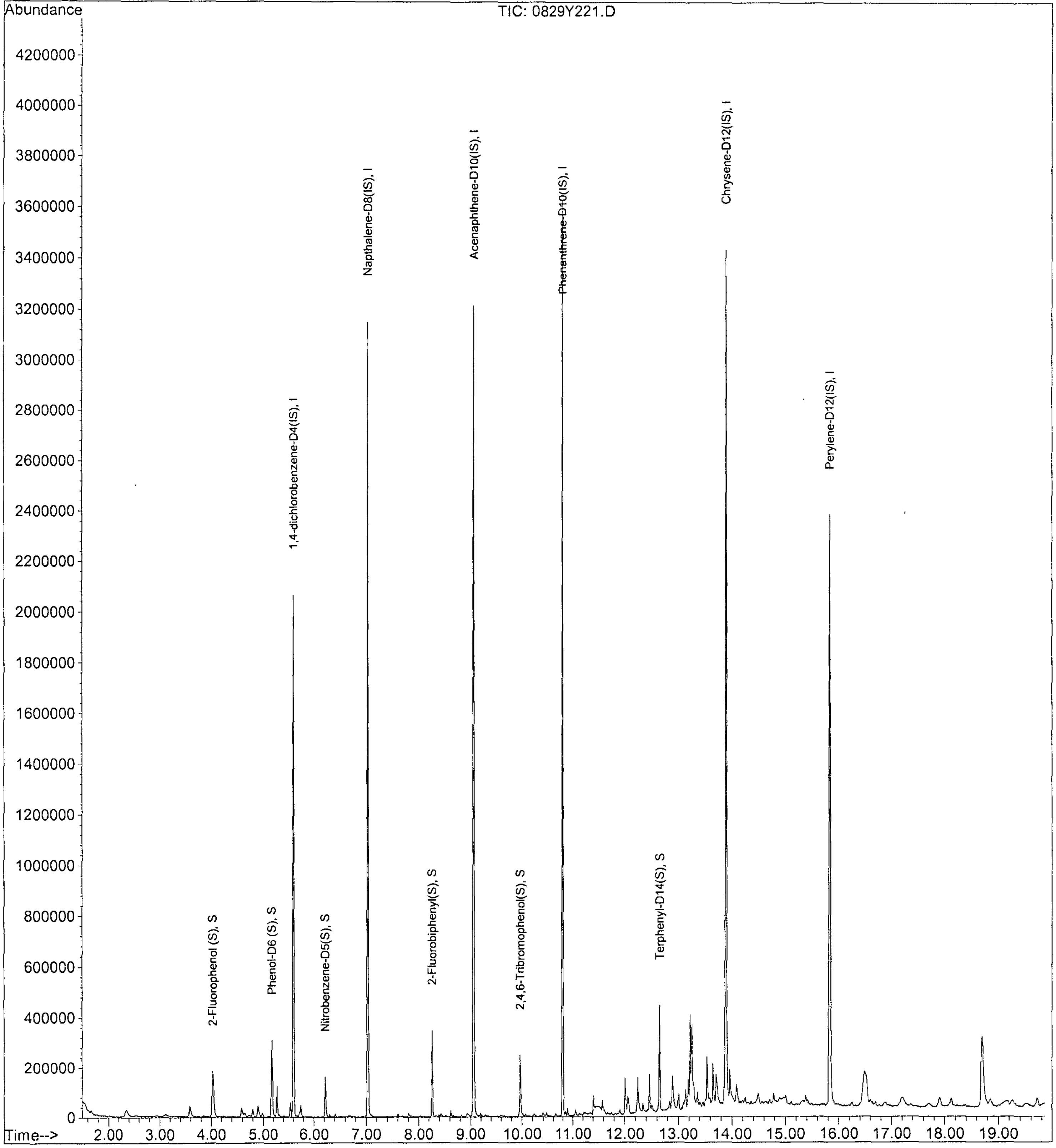
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y221.D
Acq On : 11 Sep 18 23:42
Sample : AZ79159S01 1/30.37G df20
Misc :

Vial: 21
Operator: MA
Inst : Yoda
Multiplr: 658.55

Quant Time: Sep 12 11:04 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y230.D
Acq On : 12 Sep 18 11:57
Sample : AZ79160S01 1/30.70G DF20
Misc :

Vial: 30
Operator: MA
Inst : Yoda
Multiplr: 651.47

Quant Time: Sep 12 12:09 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	325184	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1428801	40.0000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	904644	40.0000 ppb	-0.01
65) Phenanthrene-D10(IS)	10.79	188	1713965	40.0000 ppb	-0.01
79) Chrysene-D12(IS)	13.89	240	1699207	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1762975	40.0000 ppb	-0.02
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.03	112	101478	5410.6364 ppb	-0.01
Spiked Amount 6514.658			Recovery =	83.053%	
6) Phenol-D6 (S)	5.17	99	127478	5703.6879 ppb	-0.02
Spiked Amount 6514.658			Recovery =	87.552%	
22) Nitrobenzene-D5(S)	6.22	82	55457	2389.8885 ppb	-0.02
Spiked Amount 3257.329			Recovery =	73.370%	
46) 2-Fluorobiphenyl(S)	8.26	172	110654	2040.3754 ppb	-0.02
Spiked Amount 3257.329			Recovery =	62.640%	
64) 2,4,6-Tribromophenol(S)	9.98	330	28269	4292.3380 ppb	-0.02
Spiked Amount 6514.658			Recovery =	65.887%	
82) Terphenyl-D14(S)	12.65	244	126142	1863.4546 ppb	-0.01
Spiked Amount 3257.329			Recovery =	57.208%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

Quantitation Report

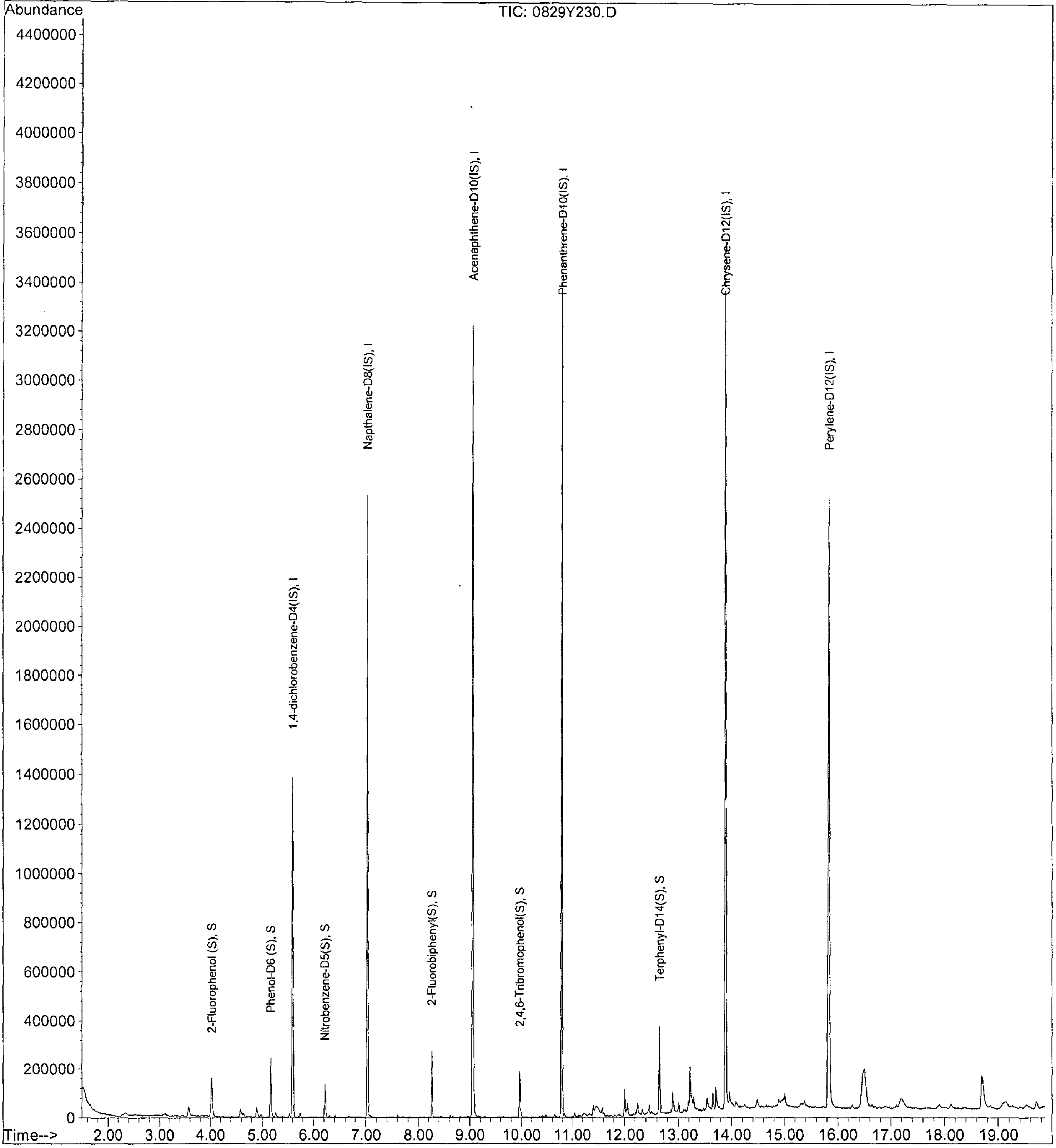
Data File : M:\YODA\DATA\Y180829\0829Y230.D
Acq On : 12 Sep 18 11:57
Sample : AZ79160S01 1/30.70G DF20
Misc :

Vial: 30
Operator: MA
Inst : Yoda
Multiplr: 651.47

Quant Time: Sep 12 12:09 2018

Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y181.D Vial: 80
Acq On : 10 Sep 18 13:10 Operator: MA
Sample : AZ79179W03 1/910 Inst : Yoda
Misc : Multiplr: 1.10

Quant Time: Sep 11 7:07 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	327778	40.0000 ppb	-0.01
21) Napthalene-D8(IS)	7.04	136	1347691	40.0000 ppb	-0.01
41) Acenaphthene-D10(IS)	9.06	164	703633	40.0000 ppb	-0.01
65) Phenanthrene-D10(IS)	10.79	188	1348764	40.0000 ppb	-0.01
79) Chrysene-D12(IS)	13.89	240	1348723	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.83	264	1386723	40.0000 ppb	-0.03
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.02	112	1289821	115.0858 ppb	-0.02
Spiked Amount 219.780			Recovery =	52.364%	
6) Phenol-D6 (S)	5.17	99	1089509	81.5769 ppb	-0.02
Spiked Amount 219.780			Recovery =	37.118%	
22) Nitrobenzene-D5(S)	6.22	82	1014340	78.1723 ppb	-0.02
Spiked Amount 109.890			Recovery =	71.137%	
46) 2-Fluorobiphenyl(S)	8.27	172	1589382	63.5578 ppb	-0.01
Spiked Amount 109.890			Recovery =	57.838%	
64) 2,4,6-Tribromophenol(S)	9.98	330	499581	164.5081 ppb	-0.02
Spiked Amount 219.780			Recovery =	74.851%	
82) Terphenyl-D14(S)	12.66	244	2121757	66.6108 ppb	0.00
Spiked Amount 109.890			Recovery =	60.616%	
Target Compounds					Qvalue
13) Benzyl alcohol	5.74	108	71144	7.8565 ppb	92
50) Dimethyl phthalate	8.72	163	69352	2.5144 ppb	99

(#) = qualifier out of range (m) = manual integration

Quantitation Report

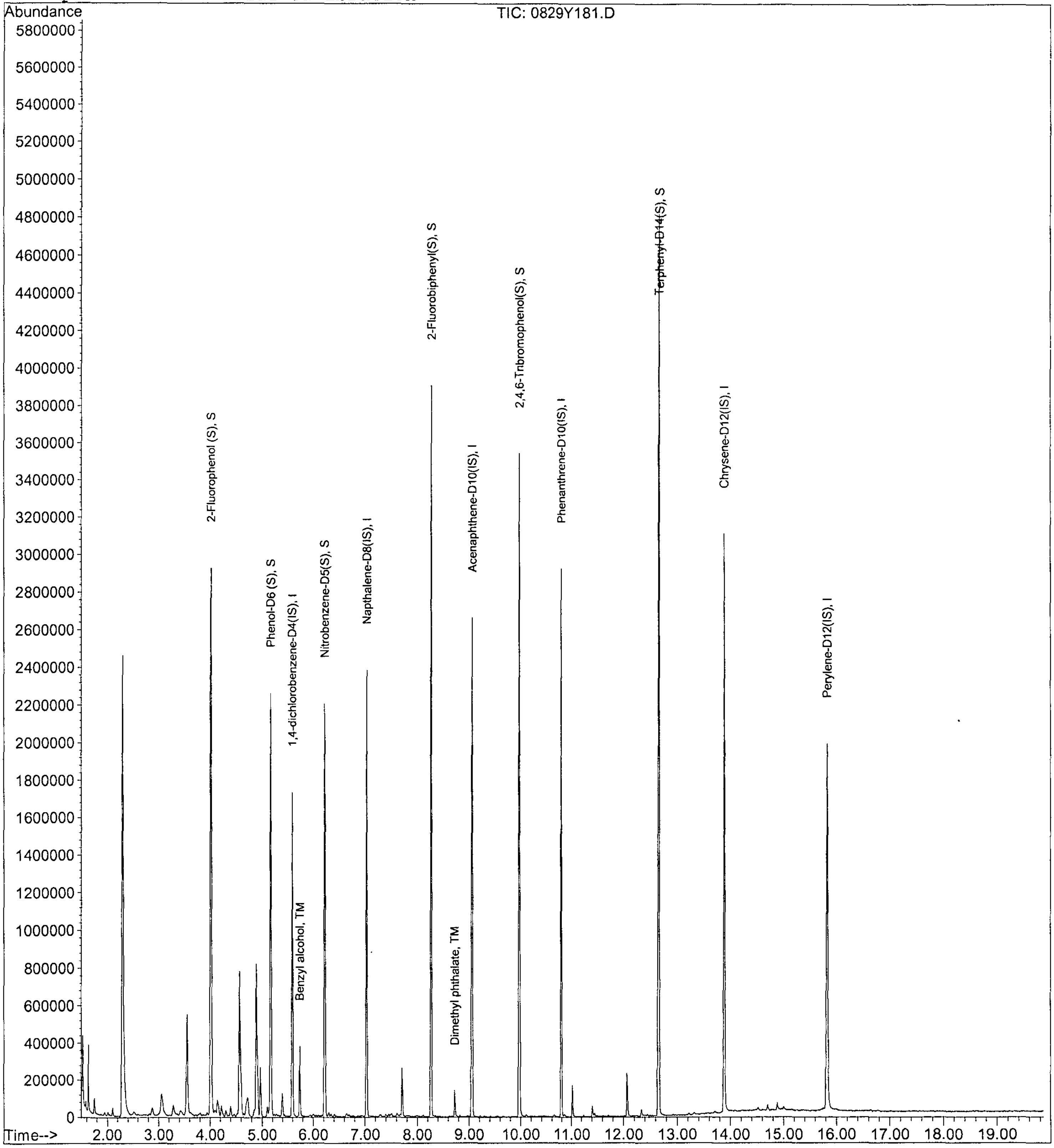
Data File : M:\YODA\DATA\Y180829\0829Y181.D
Acq On : 10 Sep 18 13:10
Sample : AZ79179W03 1/910
Misc :

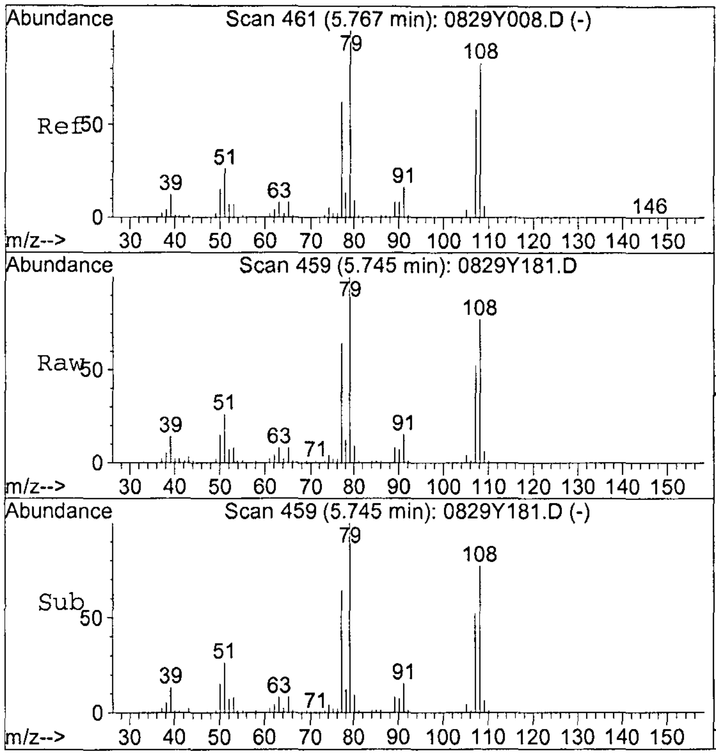
Vial: 80
Operator: MA
Inst : Yoda
Multiplr: 1.10

Quant Time: Sep 11 7:07 2018

Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration

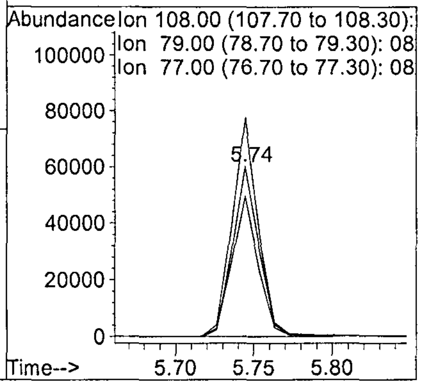


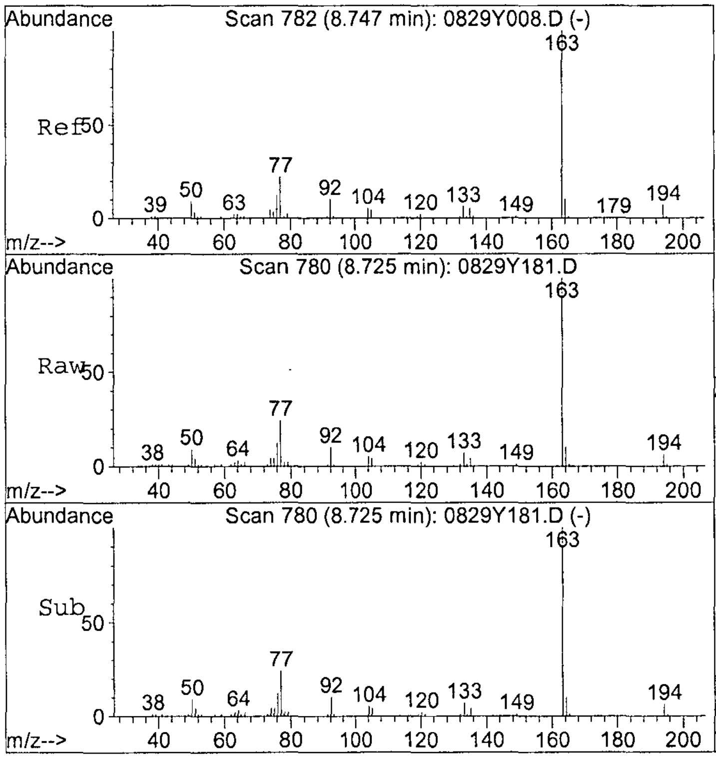


#13
Benzyl alcohol
Concen: 7.8565 ppb
RT: 5.74 min   Scan# 459
Delta R.T.   -0.02 min
Lab File: 0829Y181.D
Acq: 10 Sep 18 13:10

Tgt Ion:108 Resp: 71144

Ion	Ratio	Lower	Upper
108	100		
79	129.1	84.6	157.2
77	82.5	52.2	96.9

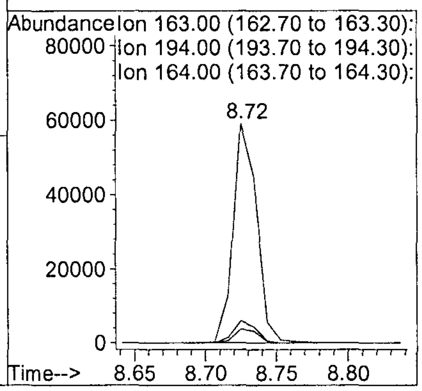




#50
Dimethyl phthalate
Concen: 2.5144 ppb
RT: 8.72 min   Scan# 780
Delta R.T.   -0.03 min
Lab File: 0829Y181.D
Acq: 10 Sep 18 13:10

Tgt Ion:163 Resp: 69352

Ion	Ratio	Lower	Upper
163	100		
194	6.3	4.8	8.8
164	10.2	7.1	13.1



Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y204.D Vial: 4
Acq On : 11 Sep 18 15:45 Operator: MA
Sample : 180907A BLK 1/30.54G Inst : Yoda
Misc : Multiplr: 32.74

Quant Time: Sep 12 10:26 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	321043	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1423495	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	841050	40.0000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1594019	40.0000 ppb	0.00
79) Chrysene-D12(IS)	13.89	240	1564123	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.84	264	1591920	40.0000 ppb	-0.02

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
5) 2-Fluorophenol (S)	4.05	112	2302136	6249.0218 ppb	0.00
Spiked Amount 6548.788				Recovery = 95.423%	
6) Phenol-D6 (S)	5.18	99	2763360	6294.5197 ppb	0.00
Spiked Amount 6548.788				Recovery = 96.117%	
22) Nitrobenzene-D5(S)	6.23	82	1375255	2989.9158 ppb	0.00
Spiked Amount 3274.394				Recovery = 91.312%	
46) 2-Fluorobiphenyl(S)	8.27	172	2322121	2314.8473 ppb	0.00
Spiked Amount 3274.394				Recovery = 70.695%	
64) 2,4,6-Tribromophenol(S)	9.98	330	617647	5070.1212 ppb	-0.02
Spiked Amount 6548.788				Recovery = 77.421%	
82) Terphenyl-D14(S)	12.66	244	2553542	2059.7578 ppb	0.00
Spiked Amount 3274.394				Recovery = 62.905%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

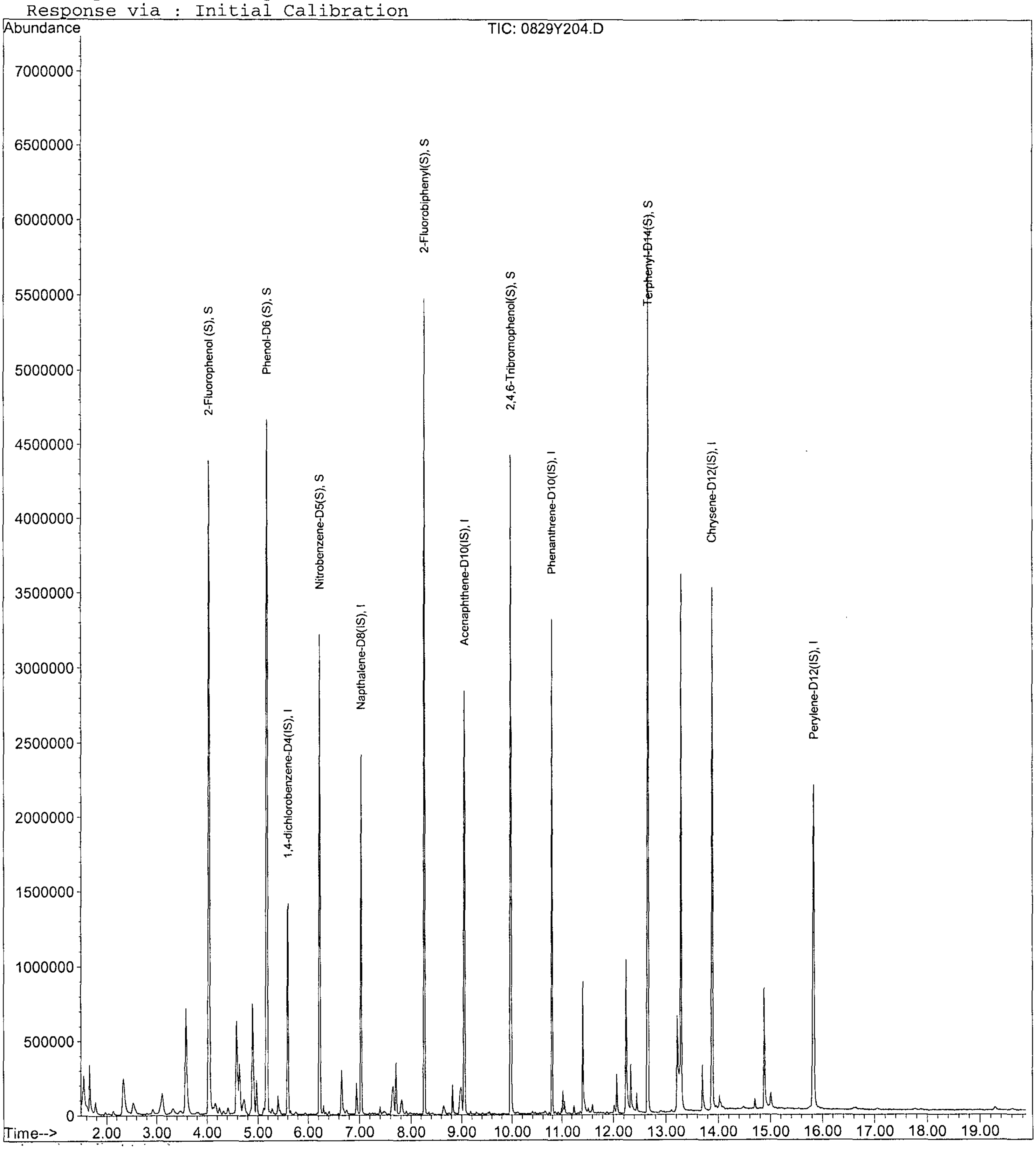
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y204.D
Acq On : 11 Sep 18 15:45
Sample : 180907A BLK 1/30.54G
Misc :

Vial: 4
Operator: MA
Inst : Yoda
Multiplr: 32.74

Quant Time: Sep 12 10:26 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



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Data File : M:\YODA\DATA\Y180829\0829Y178.D              Vial: 77
Acq On    : 10 Sep 18  11:47                          Operator: MA
Sample    : 180907A Blk 1/1000                        Inst    : Yoda
Misc      :                                           Multiplr: 1.00

Quant Time: Sep 11  7:04 2018             Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	251204	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.03	136	1039163	40.0000 ppb	-0.02
41) Acenaphthene-D10(IS)	9.05	164	534685	40.0000 ppb	-0.02
65) Phenanthrene-D10(IS)	10.79	188	1015819	40.0000 ppb	-0.02
79) Chrysene-D12(IS)	13.89	240	1001544	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.83	264	1045363	40.0000 ppb	-0.03
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.01	112	1303862	138.1398 ppb	-0.03
Spiked Amount 200.000				Recovery = 69.070%	
6) Phenol-D6 (S)	5.16	99	1065220	94.7045 ppb	-0.03
Spiked Amount 200.000				Recovery = 47.353%	
22) Nitrobenzene-D5(S)	6.22	82	1003092	91.2343 ppb	-0.02
Spiked Amount 100.000				Recovery = 91.234%	
46) 2-Fluorobiphenyl(S)	8.26	172	1439452	68.9331 ppb	-0.02
Spiked Amount 100.000				Recovery = 68.933%	
64) 2,4,6-Tribromophenol(S)	9.98	330	494473	194.9907 ppb	-0.02
Spiked Amount 200.000				Recovery = 97.496%	
82) Terphenyl-D14(S)	12.65	244	2133773	82.0903 ppb	0.00
Spiked Amount 100.000				Recovery = 82.090%	

Target Compounds Qvalue

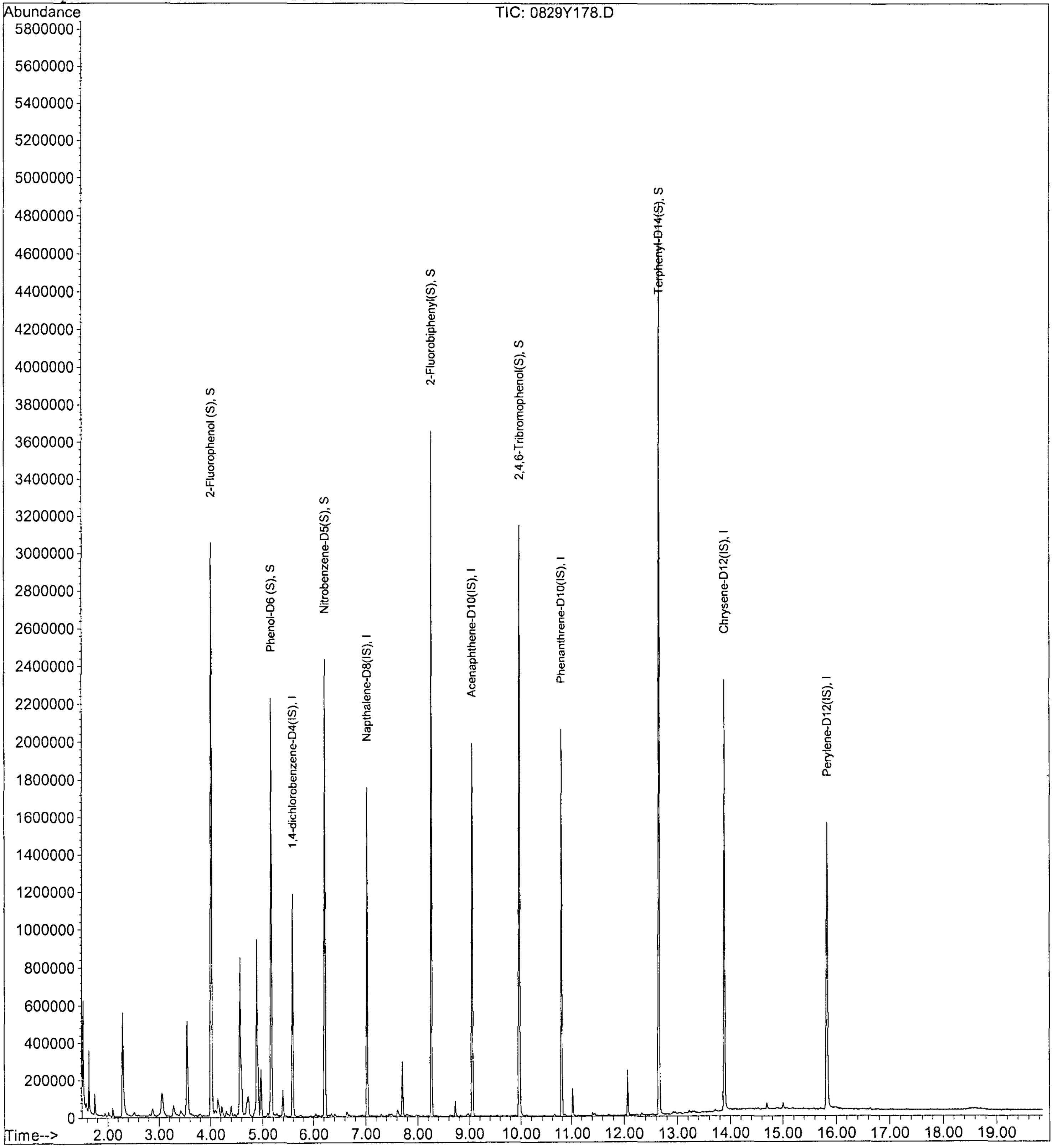
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y178.D   Vial: 77
Acq On : 10 Sep 18 11:47   Operator: MA
Sample : 180907A Blk 1/1000   Inst : Yoda
Misc :   Multiplr: 1.00

Quant Time: Sep 11 7:04 2018   Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y205.D Vial: 5
Acq On : 11 Sep 18 16:14 Operator: MA
Sample : 180907A LCS-1 1/30.31G Inst : Yoda
Misc : Multiplr: 32.99

Quant Time: Sep 12 12:06 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	404795	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1782179	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	935995	40.0000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	1711496	40.0000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1623841	40.0000 ppb	0.00
89) Perylene-D12(IS)	15.84	264	1795183	40.0000 ppb	-0.02

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
5) 2-Fluorophenol (S)	4.05	112	2298388	4985.5848 ppb	0.01
Spiked Amount 6598.482				Recovery = 75.557%	
6) Phenol-D6 (S)	5.19	99	2692117	4900.3913 ppb	0.00
Spiked Amount 6598.482				Recovery = 74.265%	
22) Nitrobenzene-D5(S)	6.23	82	1365664	2389.5045 ppb	0.00
Spiked Amount 3299.241				Recovery = 72.426%	
46) 2-Fluorobiphenyl(S)	8.27	172	2292584	2069.1629 ppb	0.00
Spiked Amount 3299.241				Recovery = 62.716%	
64) 2,4,6-Tribromophenol(S)	9.99	330	612094	4549.1269 ppb	0.00
Spiked Amount 6598.482				Recovery = 68.942%	
82) Terphenyl-D14(S)	12.66	244	2508940	1964.1491 ppb	0.00
Spiked Amount 3299.241				Recovery = 59.533%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
2) 1,4-Dioxane	1.81	58	5764	132.8880		75
3) n-Nitrosodimethylamine	2.04	42	123099	1254.2691 ppb		93
4) Pyridine	2.06	79	139464	882.3892 ppb		97
7) Phenol	5.21	94	861141	1165.9085 ppb		98
8) Aniline	5.20	66	747656	2567.4600 ppb	#	1
9) Bis (2-chloroethyl) ether	5.31	63	494359	1249.7537 ppb		98
10) 2-Chlorophenol	5.37	128	675882	1191.9913 ppb		99
11) 1,3-DCB	5.53	146	697513	1193.2452 ppb		98
12) 1,4-DCB	5.63	146	697646	1190.3558 ppb		98
13) Benzyl alcohol	5.76	108	450274	1208.8333 ppb		92
14) 1,2-DCB	5.79	146	669864	1207.9519 ppb		99
15) 2-Methylphenol	5.88	107	560168	1219.2897 ppb		97
16) Bis (2-chloroisopropyl) et	5.91	45	936646	1219.2733 ppb		96
17) Acetophenone	6.06	105	802678	1260.9982 ppb		86
18) 3&4-Methylphenol	6.04	107	1247734	2487.4242 ppb		96
19) n-Nitrosodi-n-propylamine	6.06	70	466933	1138.2520 ppb		100
20) Hexachloroethane	6.17	117	276592	1245.2619 ppb		83
23) Nitrobenzene	6.25	77	756357	1159.0461 ppb		96
24) Isophorone	6.52	82	1330880	1171.5533 ppb		99
25) 2-Nitrophenol	6.60	139	369003	1186.4781 ppb		93
26) 2,4-Dimethylphenol	6.64	122	611432	1114.4646 ppb		98
27) Benzoic acid	6.77	105	617485	1338.2511 ppb		97
28) Bis (2-chloroethoxy) metha	6.75	93	780102	1227.9836 ppb		98
29) 2,4-Dichlorophenol	6.87	162	546872	1163.3500 ppb		98
30) 1,2,4-Trichlorobenzene	6.96	180	533480	1134.6277 ppb		99
31) 3,4-Dimethylphenol	6.97	107	794953	1139.9851 ppb		98
32) Naphthalene	7.07	128	1892931	1150.2573 ppb		99
33) 4-Chloroaniline	7.12	127	520981	794.3193 ppb		96
34) 2,6-Dichlorophenol	7.12	162	526852	1199.5113 ppb		99
35) Hexachloropropene	7.16	213	412251	1243.8932 ppb		99
36) Hexachlorobutadiene	7.19	225	325035	1200.2085 ppb		99
37) Caprolactum	7.54	55	362404	1223.8358 ppb		92

(#) = qualifier out of range (m) = manual integration

Data File : M:\YODA\DATA\Y180829\0829Y205.D Vial: 5
Acq On : 11 Sep 18 16:14 Operator: MA
Sample : 180907A LCS-1 1/30.31G Inst : Yoda
Misc : Multiplr: 32.99

Quant Time: Sep 12 12:06 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc	Unit	Qvalue
38)	4-Chloro-3-methylphenol	7.66	107	602569	1176.5618	ppb	98
39)	2-Methylnaphthalene	7.85	142	1206699	1161.1451	ppb	99
40)	1-Methylnaphthalene	7.97	142	1187947	1146.1400	ppb	98
42)	Hexachlorocyclopentadiene	8.02	237	378143	1176.6291	ppb	98
43)	1,2,4,5-Tetrachlorobenzene	8.04	216	575285	1151.1216	ppb	99
44)	2,4,6-Trichlorophenol	8.17	196	416538	1148.6794	ppb	98
45)	2,4,5-Trichlorophenol	8.22	196	439365	1194.8204	ppb	97
47)	1,1'-Biphenyl	8.38	154	1500513	1133.1242	ppb	99
48)	2-Chloronaphthalene	8.41	162	1223469	1146.5488	ppb	100
49)	2-Nitroaniline	8.53	65	441840	1200.9034	ppb	96
50)	Dimethyl phthalate	8.74	163	1395621	1141.9974	ppb	100
51)	2,6-DNT	8.81	165	331529	1215.9655	ppb	93
52)	Acenaphthylene	8.89	152	1925288	1143.9123	ppb	99
53)	3-Nitroaniline	9.02	138	328995	1065.0543	ppb	93
54)	Acenaphthene	9.10	154	1239389	1137.9360	ppb	98
55)	2,4-Dinitrophenol	9.13	184	213317	1269.0321	ppb	88
56)	4-Nitrophenol	9.19	65	337865	1208.5451	ppb	97
57)	Dibenzofuran	9.29	168	1671799	1148.0378	ppb	99
58)	2,4-DNT	9.28	165	443456	1210.9503	ppb	91
59)	2,3,4,6-Tetrachlorophenol	9.43	232	375486	1187.4819	ppb	96
60)	Diethyl phthalate	9.56	149	1360617	1142.7050	ppb	100
61)	4-Chlorophenyl phenyl ethe	9.69	204	588051	1200.3835	ppb	99
62)	Fluorene	9.70	166	1245086	1216.6135	ppb	100
63)	4-Nitroaniline	9.73	138	347268	1110.0712	ppb	97
66)	4,6-Dinitro-2-methylphenol	9.76	198	292988	1248.3867	ppb	83
67)	Diphenyl amine	9.84	169	1944591	2272.2714	ppb	100
68)	n-Nitrosodiphenylamine	9.84	169	1944591	2272.2714	ppb	100
69)	1,2-Diphenylhydrazine	9.88	77	1581034	1155.1180	ppb	99
70)	4-Bromophenyl phenyl ether	10.27	248	404680	1193.5343	ppb	97
71)	Hexachlorobenzene	10.33	284	417756	1152.9770	ppb	95
72)	Atrazine	10.45	200	194616	663.2945	ppb	99
73)	Pentachlorophenol	10.57	266	307661	1182.7067	ppb	98
74)	Phenanthrene	10.83	178	1969258	1124.5313	ppb	100
75)	Anthracene	10.88	178	2063084	1147.8143	ppb	99
76)	Carbazol	11.08	167	1936534	1160.0318	ppb	97
77)	Di-n-butylphthalate	11.47	149	2363628	1216.5327	ppb	99
78)	Fluoranthene	12.22	202	2176351	1163.6703	ppb	99
80)	Benzidine	12.38	184	28052	44.5448	ppb	97
81)	Pyrene	12.49	202	2260100	1101.0475	ppb	100
83)	Butyl benzylphthalate	13.22	149	1036596	1144.2230	ppb	96
84)	3,3'-Dichlorobenzidine	13.85	252	632778	945.8438	ppb	95
85)	Benz (a) anthracene	13.88	228	1830480	1077.8852	ppb	100
86)	Bis (2-ethylhexyl) phthala	13.87	149	1278514	1162.0548	ppb	97
87)	Chrysene	13.93	228	1960529	1072.9578	ppb	98
88)	Di-n-octylphthalate	14.66	149	2456987	1181.8651	ppb	98
90)	Benzo (b) fluoranthene	15.25	252	2194194	1116.9581	ppb	98
91)	Benzo (k) fluoranthene	15.29	252	2017169	1145.0609	ppb	99
92)	Benzo (a) pyrene	15.76	252	1982110	1107.5651	ppb	98
93)	Indeno (1,2,3-cd) pyrene	17.85	276	2270533	1136.0621	ppb	99
94)	Dibenz (a,h) anthracene	17.90	278	1986837	1114.6027	ppb	98
95)	Benzo (g,h,i) perylene	18.48	276	1817708	1113.2152	ppb	100

(#) = qualifier out of range (m) = manual integration

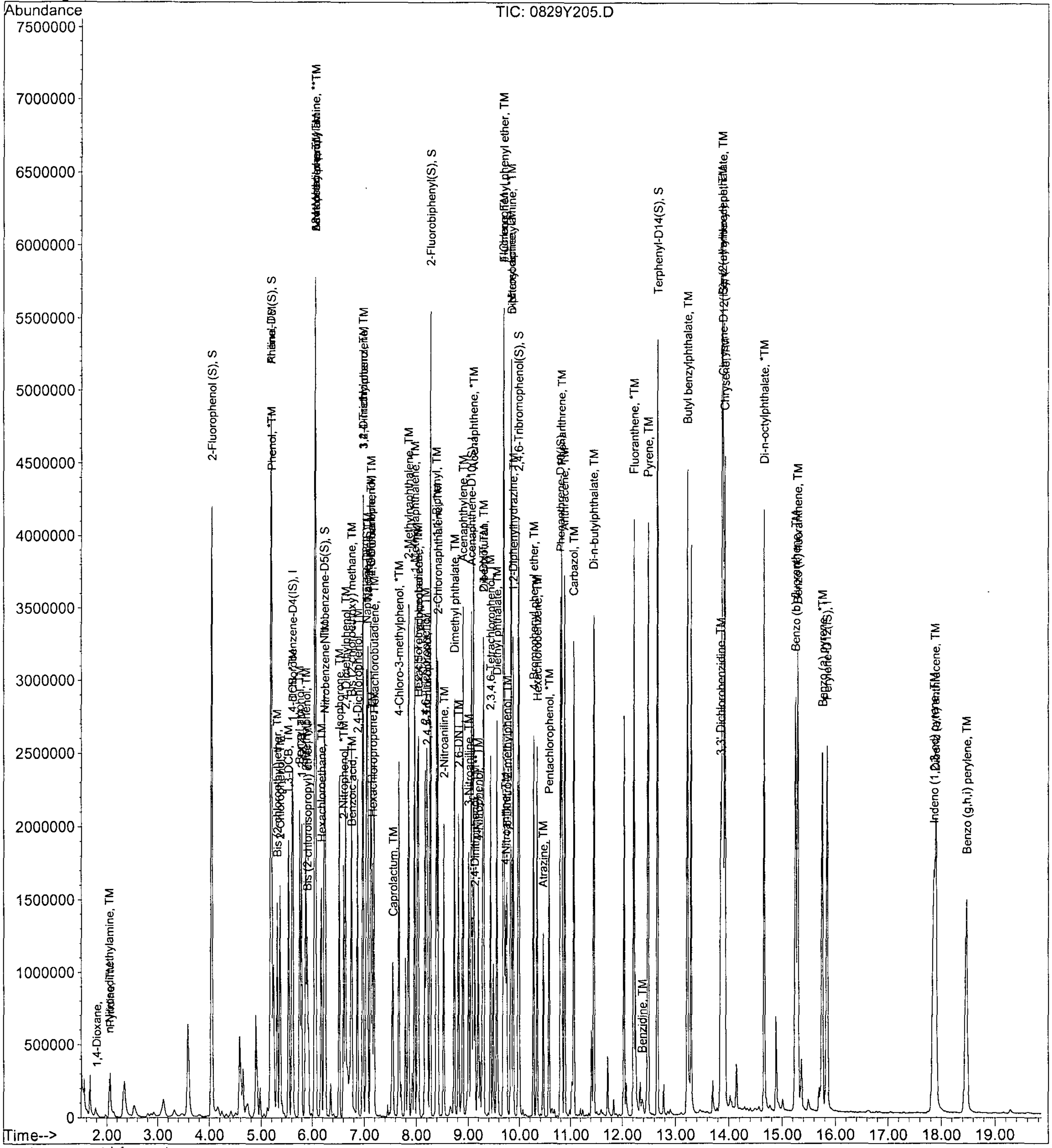
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y205.D
Acq On : 11 Sep 18 16:14
Sample : 180907A LCS-1 1/30.31G
Misc :

Vial: 5
Operator: MA
Inst : Yoda
Multiplr: 32.99

Quant Time: Sep 12 12:06 2018 Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y201.D Vial: 1
Acq On : 11 Sep 18 13:33 Operator: MA
Sample : 180907A LCS-1 1/1000 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Sep 11 14:42 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.61	152	478675	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	2180114	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.06	164	1168021	40.0000 ppb	0.00
65) Phenanthrene-D10(IS)	10.80	188	2149871	40.0000 ppb	0.00
79) Chrysene-D12(IS)	13.90	240	1993422	40.0000 ppb	0.00
89) Perylene-D12(IS)	15.85	264	2289452	40.0000 ppb	0.00
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.04	112	2115474	117.6199 ppb	0.00
Spiked Amount 200.000				Recovery = 58.810%	
6) Phenol-D6 (S)	5.18	99	1747806	81.5475 ppb	0.00
Spiked Amount 200.000				Recovery = 40.774%	
22) Nitrobenzene-D5(S)	6.23	82	1669161	72.3636 ppb	0.00
Spiked Amount 100.000				Recovery = 72.364%	
46) 2-Fluorobiphenyl(S)	8.27	172	2500924	54.8250 ppb	0.00
Spiked Amount 100.000				Recovery = 54.825%	
64) 2,4,6-Tribromophenol(S)	9.99	330	759317	137.0698 ppb	0.00
Spiked Amount 200.000				Recovery = 68.535%	
82) Terphenyl-D14(S)	12.66	244	3206020	61.9699 ppb	0.00
Spiked Amount 100.000				Recovery = 61.970%	
Target Compounds					**Qvalue**
2) 1,4-Dioxane	1.81	58	4778	2.8235	89
3) n-Nitrosodimethylamine	2.04	42	119038	31.0887 ppb	93
4) Pyridine	2.06	79	132182	21.4363 ppb	94
7) Phenol	5.20	94	645604	22.4046 ppb	97
8) Aniline	5.24	66	472175	41.5609 ppb	94
9) Bis (2-chloroethyl) ether	5.31	63	610819	39.5799 ppb	99
10) 2-Chlorophenol	5.37	128	843817	38.1444 ppb	100
11) 1,3-DCB	5.53	146	409198	17.9428 ppb	98
12) 1,4-DCB	5.63	146	427521	18.6973 ppb	97
13) Benzyl alcohol	5.76	108	560994	38.6036 ppb	92
14) 1,2-DCB	5.79	146	442171	20.4378 ppb	95
15) 2-Methylphenol	5.88	107	664609	37.0796 ppb	98
16) Bis (2-chloroisopropyl) et	5.90	45	1106654	36.9248 ppb	98
17) Acetophenone	6.06	105	963819	38.9018 ppb	98
18) 3&4-Methylphenol	6.05	107	1321268	66.4598 ppb	99
19) n-Nitrosodi-n-propylamine	6.06	70	586010	36.6159 ppb	95
20) Hexachloroethane	6.17	117	138191	15.9471 ppb	87
23) Nitrobenzene	6.26	77	937686	35.6032 ppb	99
24) Isophorone	6.53	82	1710789	37.3145 ppb	98
25) 2-Nitrophenol	6.60	139	471594	37.5713 ppb	92
26) 2,4-Dimethylphenol	6.64	122	800124	36.1355 ppb	99
27) Benzoic acid	6.75	105	372352	19.9951 ppb	98
28) Bis (2-chloroethoxy) metha	6.75	93	989708	38.6017 ppb	99
29) 2,4-Dichlorophenol	6.87	162	701720	36.9868 ppb	100
30) 1,2,4-Trichlorobenzene	6.97	180	350499	18.4706 ppb	96
31) 3,4-Dimethylphenol	6.98	107	1066127	37.8813 ppb	99
32) Naphthalene	7.06	128	1668096	25.1154 ppb	100
33) 4-Chloroaniline	7.12	127	895138	33.8159 ppb	99
34) 2,6-Dichlorophenol	7.13	162	637007	35.9350 ppb	99
35) Hexachloropropene	7.16	213	185714	13.8843 ppb	98
36) Hexachlorobutadiene	7.18	225	166595	15.2422 ppb	100
37) Caprolactum	7.54	55	167148	13.9859 ppb	94

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y201.D Vial: 1
Acq On : 11 Sep 18 13:33 Operator: MA
Sample : 180907A LCS-1 1/1000 Inst : Yoda
Misc : Multiplr: 1.00

Quant Time: Sep 11 14:42 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Compound	R.T.	QIon	Response	Conc Unit		Qvalue
38) 4-Chloro-3-methylphenol	7.66	107	782866	37.8751 ppb		94
39) 2-Methylnaphthalene	7.84	142	994512	23.7113 ppb		98
40) 1-Methylnaphthalene	7.96	142	1010459	24.1556 ppb		97
42) Hexachlorocyclopentadiene	8.02	237	176744	13.3579 ppb		99
43) 1,2,4,5-Tetrachlorobenzene	8.04	216	423479	20.5816 ppb		100
44) 2,4,6-Trichlorophenol	8.17	196	539396	36.1294 ppb		98
45) 2,4,5-Trichlorophenol	8.22	196	550574	36.3665 ppb		96
47) 1,1'-Biphenyl	8.39	154	1405646	25.7824 ppb		98
48) 2-Chloronaphthalene	8.42	162	1094589	24.9149 ppb		96
49) 2-Nitroaniline	8.53	65	568825	37.5518 ppb		98
50) Dimethyl phthalate	8.74	163	1902309	37.8083 ppb		99
51) 2,6-DNT	8.82	165	430387	38.3414 ppb		90
52) Acenaphthylene	8.89	152	2060814	29.7403 ppb		100
53) 3-Nitroaniline	9.01	138	508840	40.0104 ppb		100
54) Acenaphthene	9.10	154	1312850	29.2775 ppb		99
55) 2,4-Dinitrophenol	9.13	184	283686	40.4398 ppb		98
56) 4-Nitrophenol	9.19	65	227389	19.7560 ppb		96
57) Dibenzofuran	9.30	168	1792796	29.9028 ppb		96
58) 2,4-DNT	9.28	165	566003	37.5408 ppb		98
59) 2,3,4,6-Tetrachlorophenol	9.43	232	486920	37.4024 ppb		95
60) Diethyl phthalate	9.56	149	1755106	35.8023 ppb		99
61) 4-Chlorophenyl phenyl ethe	9.69	204	615981	28.8851 ppb		98
62) Fluorene	9.70	166	1378739	32.0215 ppb		99
63) 4-Nitroaniline	9.74	138	488322	37.9141 ppb		95
66) 4,6-Dinitro-2-methylphenol	9.77	198	393395	40.4462 ppb	#	70
67) Diphenyl amine	9.84	169	2359353	66.5234 ppb		99
68) n-Nitrosodiphenylamine	9.84	169	2359353	66.5234 ppb		99
69) 1,2-Diphenylhydrazine	9.88	77	1843377	32.4974 ppb		97
70) 4-Bromophenyl phenyl ether	10.27	248	452767	32.2216 ppb		92
71) Hexachlorobenzene	10.33	284	497605	33.1384 ppb		90
72) Atrazine	10.45	200	254545	20.9335 ppb		97
73) Pentachlorophenol	10.56	266	407012	37.7539 ppb		99
74) Phenanthrene	10.82	178	2352232	32.4115 ppb		99
75) Anthracene	10.89	178	2526050	33.9114 ppb		100
76) Carbazol	11.07	167	2497019	36.0924 ppb		99
77) Di-n-butylphthalate	11.46	149	2940520	36.5189 ppb		99
78) Fluoranthene	12.22	202	2698711	34.8182 ppb		98
80) Benzidine	12.36	184	472506	18.5255 ppb		98
81) Pyrene	12.49	202	2818749	33.9051 ppb		100
83) Butyl benzylphthalate	13.22	149	1333623	36.3467 ppb		98
84) 3,3'-Dichlorobenzidine	13.85	252	846042	31.2241 ppb		97
85) Benz (a) anthracene	13.89	228	2235601	32.5036 ppb		99
86) Bis (2-ethylhexyl) phthala	13.87	149	1559645	35.0007 ppb		97
87) Chrysene	13.92	228	2513138	33.9591 ppb		97
88) Di-n-octylphthalate	14.66	149	3175559	37.7151 ppb		96
90) Benzo (b) fluoranthene	15.25	252	2780677	33.6415 ppb		99
91) Benzo (k) fluoranthene	15.30	252	2709030	36.5480 ppb		97
92) Benzo (a) pyrene	15.75	252	2585671	34.3382 ppb		99
93) Indeno (1,2,3-cd) pyrene	17.86	276	3020817	35.9221 ppb		99
94) Dibenz (a,h) anthracene	17.91	278	2624068	34.9861 ppb		98
95) Benzo (g,h,i) perylene	18.48	276	2449704	35.6559 ppb		99

(#) = qualifier out of range (m) = manual integration

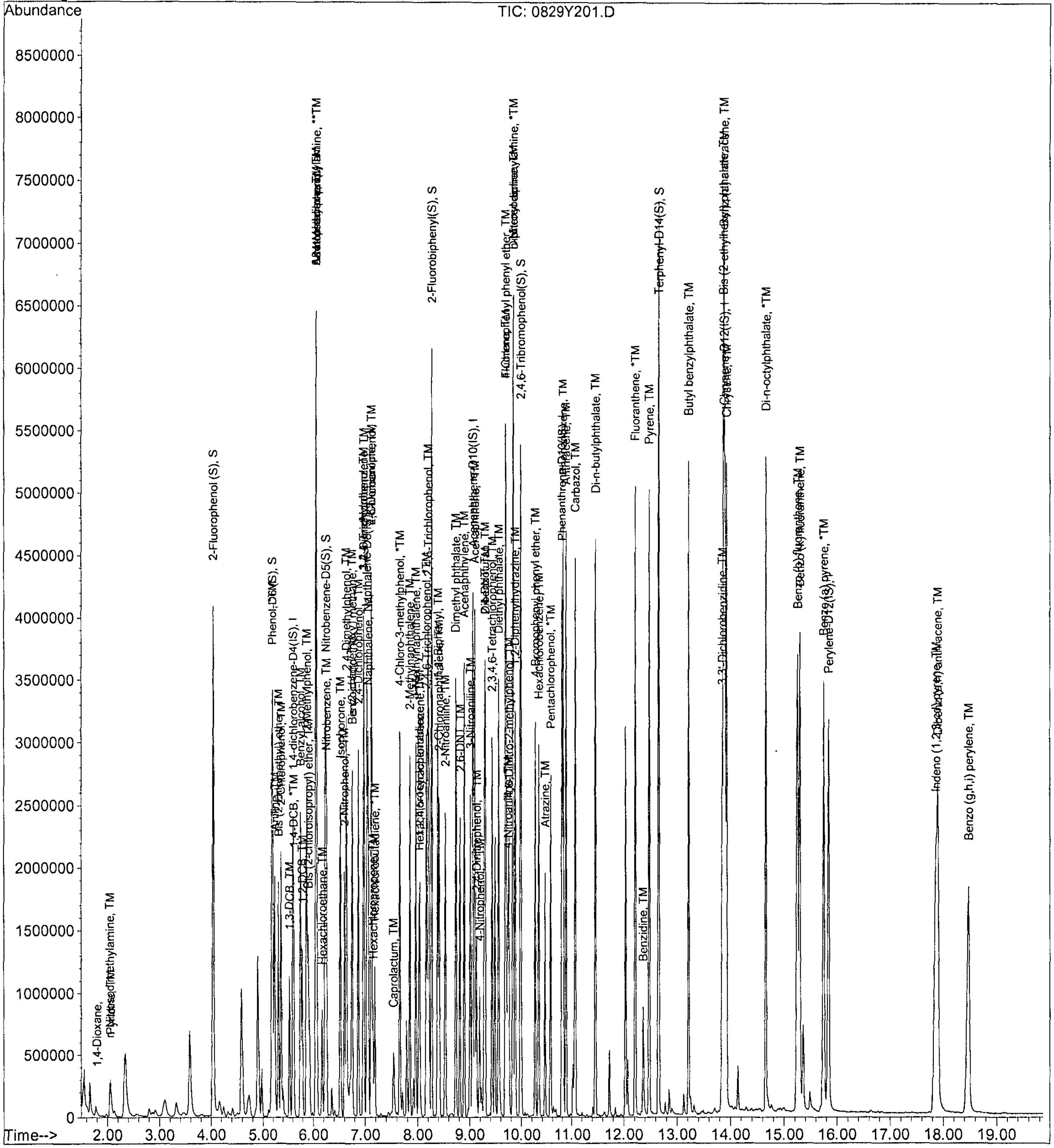
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y201.D
Acq On : 11 Sep 18 13:33
Sample : 180907A LCS-1 1/1000
Misc :

Vial: 1
Operator: MA
Inst : Yoda
Multiplr: 1.00

Quant Time: Sep 11 14:42 2018   Quant Results File: Y0829NC.RES

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

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Data File : M:\YODA\DATA\Y180829\0829Y231.D          Vial: 31
Acq On    : 12 Sep 18  12:25                       Operator: MA
Sample    : AZ79150S01 MS-1 1/30.20G DF20          Inst    : Yoda
Misc      :                                        Multiplr: 662.25

Quant Time: Sep 12 12:43 2018            Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title        : EPA 8270C
Last Update  : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	322973	40.0000 ppb	0.00
21) Napthalene-D8(IS)	7.04	136	1375948	40.0000 ppb	0.00
41) Acenaphthene-D10(IS)	9.05	164	723397	40.0000 ppb	-0.02
65) Phenanthrene-D10(IS)	10.79	188	1350658	40.0000 ppb	-0.02
79) Chrysene-D12(IS)	13.89	240	1325917	40.0000 ppb	-0.02
89) Perylene-D12(IS)	15.83	264	1375381	40.0000 ppb	-0.03

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
5) 2-Fluorophenol (S)	4.02	112	88515	4830.4523 ppb	-0.02
Spiked Amount 6622.517			Recovery =	72.940%	
6) Phenol-D6 (S)	5.16	99	112572	5155.1983 ppb	-0.03
Spiked Amount 6622.517			Recovery =	77.843%	
22) Nitrobenzene-D5(S)	6.22	82	48358	2199.8388 ppb	-0.02
Spiked Amount 3311.258			Recovery =	66.435%	
46) 2-Fluorobiphenyl(S)	8.26	172	99189	2325.0858 ppb	-0.02
Spiked Amount 3311.258			Recovery =	70.218%	
64) 2,4,6-Tribromophenol(S)	9.97	330	26543	5123.4912 ppb	-0.03
Spiked Amount 6622.517			Recovery =	77.365%	
82) Terphenyl-D14(S)	12.66	244	108805	2093.9651 ppb	0.00
Spiked Amount 3311.258			Recovery =	63.238%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) n-Nitrosodimethylamine	2.04	42	4442	1138.6570 ppb		94
4) Pyridine	2.09	79	1259	200.4019 ppb		79
7) Phenol	5.18	94	33666	1146.7266 ppb		99
8) Aniline	5.23	66	3423	295.7242 ppb		74
9) Bis (2-chloroethyl) ether	5.30	63	18271	1162.0438 ppb		97
10) 2-Chlorophenol	5.36	128	24294	1077.9023 ppb		96
11) 1,3-DCB	5.53	146	26512	1141.0326 ppb		91
12) 1,4-DCB	5.62	146	25985	1115.4306 ppb		94
13) Benzyl alcohol	5.75	108	15125	1021.5581 ppb		96
14) 1,2-DCB	5.79	146	25063	1137.0360 ppb		96
15) 2-Methylphenol	5.86	107	18780	1028.4007 ppb		91
16) Bis (2-chloroisopropyl) et	5.90	45	33269	1089.5408 ppb		97
17) Acetophenone	6.05	105	33895	-2372.9605 ppb		96
18) 3&4-Methylphenol	6.04	107	49458	-3873.3493 ppb		97
19) n-Nitrosodi-n-propylamine	6.05	70	18392	1127.9529 ppb		96
20) Hexachloroethane	6.17	117	8996	1018.9402 ppb		91
23) Nitrobenzene	6.24	77	26855	1069.9354 ppb		96
24) Isophorone	6.50	82	45422	1039.5562 ppb		97
25) 2-Nitrophenol	6.60	139	10696	894.1487 ppb		94
26) 2,4-Dimethylphenol	6.63	122	18075	856.5544 ppb		95
27) Benzoic acid	6.70	105	268	15.1010 ppb	#	52
28) Bis (2-chloroethoxy) metha	6.74	93	28976	1185.8729 ppb		96
29) 2,4-Dichlorophenol	6.86	162	17041	942.4934 ppb		96
30) 1,2,4-Trichlorobenzene	6.96	180	21163	1170.2294 ppb		95
31) 3,4-Dimethylphenol	6.96	107	25618	955.1278 ppb		100
32) Naphthalene	7.06	128	70414	1112.4430 ppb		99
33) 4-Chloroaniline	7.11	127	13748	544.9684 ppb		96
34) 2,6-Dichlorophenol	7.12	162	18509	1095.6131 ppb		96
35) Hexachloropropene	7.15	213	11452	898.3824 ppb		98
36) Hexachlorobutadiene	7.19	225	11163	1071.6823 ppb		96
37) Caprolactum	7.59	55	555	48.7283 ppb	#	13
38) 4-Chloro-3-methylphenol	7.65	107	18981	963.5751 ppb		95

(#) = qualifier out of range (m) = manual integration

Quantitation Report (QT Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y231.D Vial: 31
Acq On : 12 Sep 18 12:25 Operator: MA
Sample : AZ79150S01 MS-1 1/30.20G DF20 Inst : Yoda
Misc : Multiplr: 662.25

Quant Time: Sep 12 12:43 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc Unit		Qvalue
39)	2-Methylnaphthalene	7.85	142	44510	1113.5345 ppb		97
40)	1-Methylnaphthalene	7.96	142	42291	1060.8332 ppb		98
42)	Hexachlorocyclopentadiene	8.02	237	7812	631.3233 ppb		95
43)	1,2,4,5-Tetrachlorobenzene	8.03	216	21310	1107.4590 ppb		94
44)	2,4,6-Trichlorophenol	8.16	196	13701	981.3017 ppb		96
45)	2,4,5-Trichlorophenol	8.21	196	14014	989.7952 ppb		80
47)	1,1'-Biphenyl	8.38	154	56746	1112.9588 ppb		98
48)	2-Chloronaphthalene	8.41	162	45092	1097.5016 ppb		94
49)	2-Nitroaniline	8.52	65	12250	864.7393 ppb		97
50)	Dimethyl phthalate	8.73	163	49004	1041.4423 ppb		98
51)	2,6-DNT	8.80	165	7969	759.1186 ppb		86
52)	Acenaphthylene	8.90	152	65447	1009.9336 ppb		98
53)	3-Nitroaniline	9.00	138	8299	697.7732 ppb	#	79
54)	Acenaphthene	9.09	154	44690	1065.6795 ppb		93
55)	2,4-Dinitrophenol	9.14	184	335	5601.6152 ppb	#	34
56)	4-Nitrophenol	9.20	65	5919	549.8878 ppb		99
57)	Dibenzofuran	9.29	168	62983	1123.3149 ppb		92
58)	2,4-DNT	9.27	165	11053	783.9025 ppb		88
59)	2,3,4,6-Tetrachlorophenol	9.43	232	10071	827.2027 ppb		97
60)	Diethyl phthalate	9.55	149	48716	1062.6149 ppb		99
61)	4-Chlorophenyl phenyl ethe	9.69	204	23205	-5249.3492 ppb		86
62)	Fluorene	9.69	166	49393	-2655.7033 ppb		99
63)	4-Nitroaniline	9.71	138	10244	850.4753 ppb		97
66)	4,6-Dinitro-2-methylphenol	9.74	198	3183	344.9655 ppb		91
67)	Diphenyl amine	9.82	169	78095	2321.1056 ppb		99
68)	n-Nitrosodiphenylamine	9.82	169	78095	2321.1056 ppb		99
69)	1,2-Diphenylhydrazine	9.87	77	55120	1024.3163 ppb		98
70)	4-Bromophenyl phenyl ether	10.26	248	14333	1075.2266 ppb		97
71)	Hexachlorobenzene	10.32	284	15998	1123.0611 ppb	#	89
72)	Atrazine	10.45	200	6402	554.9876 ppb		99
73)	Pentachlorophenol	10.57	266	7096	693.8378 ppb		96
74)	Phenanthrene	10.82	178	75655	1098.8699 ppb		98
75)	Anthracene	10.88	178	73687	1042.7623 ppb		99
76)	Carbazol	11.07	167	66584	1014.5055 ppb		99
77)	Di-n-butylphthalate	11.46	149	82068	1074.3808 ppb		99
78)	Fluoranthene	12.21	202	77396	1052.5901 ppb		97
81)	Pyrene	12.48	202	81793	979.5597 ppb		98
83)	Butyl benzylphthalate	13.21	149	35283	957.4213 ppb		97
84)	3,3'-Dichlorobenzidine	13.84	252	18759	689.3093 ppb		100
85)	Benz (a) anthracene	13.87	228	81591	1181.0987 ppb		98
86)	Bis (2-ethylhexyl) phthala	13.87	149	53583	1197.2492 ppb		97
87)	Chrysene	13.92	228	70932	954.3067 ppb		98
88)	Di-n-octylphthalate	14.65	149	77003	910.5611 ppb		94
90)	Benzo (b) fluoranthene	15.24	252	68677	915.9423 ppb		99
91)	Benzo (k) fluoranthene	15.27	252	71350	1061.1462 ppb		98
92)	Benzo (a) pyrene	15.74	252	62116	909.3685 ppb		97
93)	Indeno (1,2,3-cd) pyrene	17.83	276	68615	899.4733 ppb		95
94)	Dibenz (a,h) anthracene	17.86	278	59029	867.5974 ppb		96
95)	Benzo (g,h,i) perylene	18.44	276	57459	921.9514 ppb		95

(#) = qualifier out of range (m) = manual integration

Quantitation Report

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Data File : M:\YODA\DATA\Y180829\0829Y231.D              Vial: 31
Acq On    : 12 Sep 18  12:25                         Operator: MA
Sample    : AZ79150S01 MS-1 1/30.20G DF20            Inst    : Yoda
Misc      :                                          Multiplr: 662.25

Quant Time: Sep 12 12:43 2018              Quant Results File: Y0829NC.RES

Method         : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title          : EPA 8270C
Last Update    : Wed Aug 29 10:21:31 2018
Response via   : Initial Calibration
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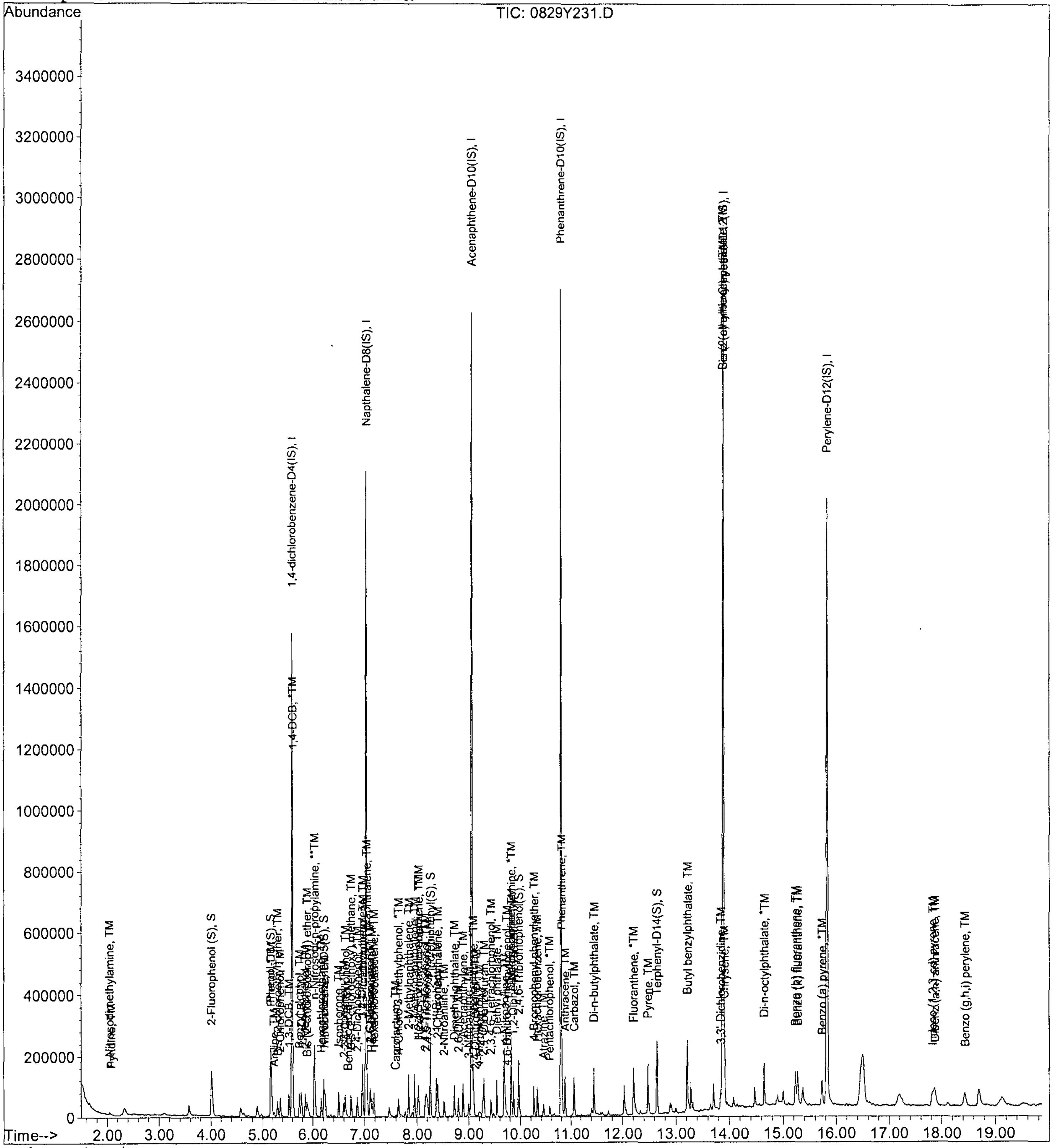


Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y227.D
Acq On : 12 Sep 18 10:33
Sample : AZ79150S01 MSD-1 1/30.04G DF20
Misc :

Vial: 27
Operator: MA
Inst : Yoda
Multiplr: 665.78

Quant Time: Sep 12 12:05 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) 1,4-dichlorobenzene-D4(IS)	5.60	152	348170	40.00000 ppb	0.00
21) Napthalene-D8(IS)	7.03	136	1443150	40.00000 ppb	-0.02
41) Acenaphthene-D10(IS)	9.05	164	808790	40.00000 ppb	-0.02
65) Phenanthrene-D10(IS)	10.79	188	1562867	40.00000 ppb	-0.02
79) Chrysene-D12(IS)	13.89	240	1532208	40.00000 ppb	-0.02
89) Perylene-D12(IS)	15.83	264	1595790	40.00000 ppb	-0.03
System Monitoring Compounds					
5) 2-Fluorophenol (S)	4.02	112	111574	5678.26442 ppb	-0.02
Spiked Amount 6657.790				Recovery = 85.288%	
6) Phenol-D6 (S)	5.16	99	143184	6114.92543 ppb	-0.03
Spiked Amount 6657.790				Recovery = 91.846%	
22) Nitrobenzene-D5(S)	6.22	82	58355	2544.47365 ppb	-0.02
Spiked Amount 3328.895				Recovery = 76.436%	
46) 2-Fluorobiphenyl(S)	8.26	172	124711	2628.62108 ppb	-0.02
Spiked Amount 3328.895				Recovery = 78.964%	
64) 2,4,6-Tribromophenol(S)	9.97	330	33528	5819.30852 ppb	-0.03
Spiked Amount 6657.790				Recovery = 87.406%	
82) Terphenyl-D14(S)	12.65	244	140444	2351.41453 ppb	0.00
Spiked Amount 3328.895				Recovery = 70.637%	

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
2) 1,4-Dioxane	1.82	58	162	87.62672	# 1
3) n-Nitrosodimethylamine	2.04	42	4708	1125.46632 ppb	90
4) Pyridine	2.07	79	2290	339.93304 ppb	99
7) Phenol	5.18	94	42804	1359.67282 ppb	97
8) Aniline	5.23	66	3885	313.00604 ppb	76
9) Bis (2-chloroethyl) ether	5.29	63	22292	1322.18091 ppb	86
10) 2-Chlorophenol	5.36	128	28833	1193.03146 ppb	99
11) 1,3-DCB	5.53	146	32938	1322.00913 ppb	95
12) 1,4-DCB	5.62	146	32000	1281.00700 ppb	99
13) Benzyl alcohol	5.75	108	19998	1259.60952 ppb	84
14) 1,2-DCB	5.78	146	30330	1283.20272 ppb	98
15) 2-Methylphenol	5.86	107	25350	1294.57266 ppb	94
16) Bis (2-chloroisopropyl) et	5.90	45	40417	1234.38179 ppb	98
17) Acetophenone	6.04	105	42357	-2137.96206 ppb	87
18) 3&4-Methylphenol	6.04	107	64849	-3282.34744 ppb	99
19) n-Nitrosodi-n-propylamine	6.04	70	24565	1404.94869 ppb	99
20) Hexachloroethane	6.17	117	12064	1274.30172 ppb	96
23) Nitrobenzene	6.24	77	33703	1287.05866 ppb	96
24) Isophorone	6.50	82	57711	1266.01155 ppb	96
25) 2-Nitrophenol	6.60	139	13836	1108.65465 ppb	91
26) 2,4-Dimethylphenol	6.63	122	24280	1102.86591 ppb	95
27) Benzoic acid	6.69	105	1336	72.15619 ppb	90
28) Bis (2-chloroethoxy) metha	6.74	93	37059	1453.75346 ppb	94
29) 2,4-Dichlorophenol	6.86	162	22127	1173.01383 ppb	96
30) 1,2,4-Trichlorobenzene	6.96	180	25561	1354.78060 ppb	98
31) 3,4-Dimethylphenol	6.96	107	32457	1159.90386 ppb	94
32) Naphthalene	7.06	128	89225	1351.14727 ppb	98
33) 4-Chloroaniline	7.11	127	16848	640.14372 ppb	99
34) 2,6-Dichlorophenol	7.12	162	23557	1336.56964 ppb	96
35) Hexachloropropene	7.15	213	15900	1195.56833 ppb	94
36) Hexachlorobutadiene	7.19	225	13987	1287.08447 ppb	98
37) Caprolactum	7.60	55	512	43.08797 ppb	# 13

(#) = qualifier out of range (m) = manual integration

Quantitation Report (Not Reviewed)

Data File : M:\YODA\DATA\Y180829\0829Y227.D
Acq On : 12 Sep 18 10:33
Sample : AZ79150S01 MSD-1 1/30.04G DF20
Misc :

Vial: 27
Operator: MA
Inst : Yoda
Multiplr: 665.78

Quant Time: Sep 12 12:05 2018 Quant Results File: Y0829NC.RES

Quant Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Wed Aug 29 10:21:31 2018
Response via : Initial Calibration
DataAcq Meth : SVOC416

	Compound	R.T.	QIon	Response	Conc Unit			Qvalue
38)	4-Chloro-3-methylphenol	7.65	107	25104	1221.53741	ppb		86
39)	2-Methylnaphthalene	7.85	142	56435	1353.29338	ppb		98
40)	1-Methylnaphthalene	7.96	142	54455	1309.28525	ppb		98
42)	Hexachlorocyclopentadiene	8.02	237	11508	836.25201	ppb		90
43)	1,2,4,5-Tetrachlorobenzene	8.03	216	26328	1230.29664	ppb		98
44)	2,4,6-Trichlorophenol	8.16	196	16672	1073.70682	ppb		94
45)	2,4,5-Trichlorophenol	8.21	196	20129	1278.36006	ppb		93
47)	1,1'-Biphenyl	8.38	154	69836	1231.60355	ppb		99
48)	2-Chloronaphthalene	8.41	162	57207	1251.99494	ppb		92
49)	2-Nitroaniline	8.52	65	16788	1065.60391	ppb		97
50)	Dimethyl phthalate	8.73	163	63323	1210.07670	ppb		99
51)	2,6-DNT	8.80	165	11247	963.36362	ppb		83
52)	Acenaphthylene	8.89	152	85469	1185.93109	ppb		98
53)	3-Nitroaniline	9.00	138	10811	817.33879	ppb		84
54)	Acenaphthene	9.09	154	56300	1207.18104	ppb		96
55)	2,4-Dinitrophenol	9.13	184	518	5647.02745	ppb	#	68
56)	4-Nitrophenol	9.19	65	7792	650.91222	ppb		83
57)	Dibenzofuran	9.29	168	81505	1307.10411	ppb		91
58)	2,4-DNT	9.27	165	14989	955.87756	ppb		98
59)	2,3,4,6-Tetrachlorophenol	9.43	232	14514	1071.94916	ppb		92
60)	Diethyl phthalate	9.54	149	61059	1197.57226	ppb		98
61)	4-Chlorophenyl phenyl ethe	9.68	204	30135	-5020.91019	ppb		98
62)	Fluorene	9.69	166	64982	-2409.58905	ppb		97
63)	4-Nitroaniline	9.71	138	12464	930.45920	ppb		97
66)	4,6-Dinitro-2-methylphenol	9.74	198	4279	402.91322	ppb		95
67)	Diphenyl amine	9.82	169	98953	2555.23481	ppb		98
68)	n-Nitrosodiphenylamine	9.82	169	98953	2555.23481	ppb		98
69)	1,2-Diphenylhydrazine	9.87	77	70479	1137.92807	ppb		97
70)	4-Bromophenyl phenyl ether	10.26	248	17857	1163.86228	ppb		93
71)	Hexachlorobenzene	10.32	284	20108	1226.41303	ppb		91
72)	Atrazine	10.45	200	7273	547.78658	ppb		97
73)	Pentachlorophenol	10.57	266	10017	850.96601	ppb		95
74)	Phenanthrene	10.82	178	95094	1200.02957	ppb		98
75)	Anthracene	10.88	178	93587	1150.64186	ppb		99
76)	Carbazol	11.07	167	84821	1122.84057	ppb		93
77)	Di-n-butylphthalate	11.46	149	103243	1174.28951	ppb		98
78)	Fluoranthene	12.21	202	98119	1159.37533	ppb	#	96
80)	Benzidine	12.38	184	779	26.45526	ppb	#	69
81)	Pyrene	12.48	202	105181	1095.86616	ppb		99
83)	Butyl benzylphthalate	13.21	149	47292	1116.42787	ppb		95
84)	3,3'-Dichlorobenzidine	13.84	252	24324	777.57962	ppb		90
85)	Benz (a) anthracene	13.87	228	103647	1305.28726	ppb		98
86)	Bis (2-ethylhexyl) phthala	13.87	149	81295	1580.25362	ppb		98
87)	Chrysene	13.92	228	92889	1087.21512	ppb		99
88)	Di-n-octylphthalate	14.65	149	103588	1065.65423	ppb		94
90)	Benzo (b) fluoranthene	15.24	252	90567	1046.60036	ppb		98
91)	Benzo (k) fluoranthene	15.27	252	89236	1149.94063	ppb		96
92)	Benzo (a) pyrene	15.74	252	82956	1052.29701	ppb		98
93)	Indeno (1,2,3-cd) pyrene	17.83	276	91583	1040.25103	ppb		99
94)	Dibenz (a,h) anthracene	17.86	278	80311	1022.77933	ppb		97
95)	Benzo (g,h,i) perylene	18.43	276	76356	1061.56655	ppb		98

(#) = qualifier out of range (m) = manual integration

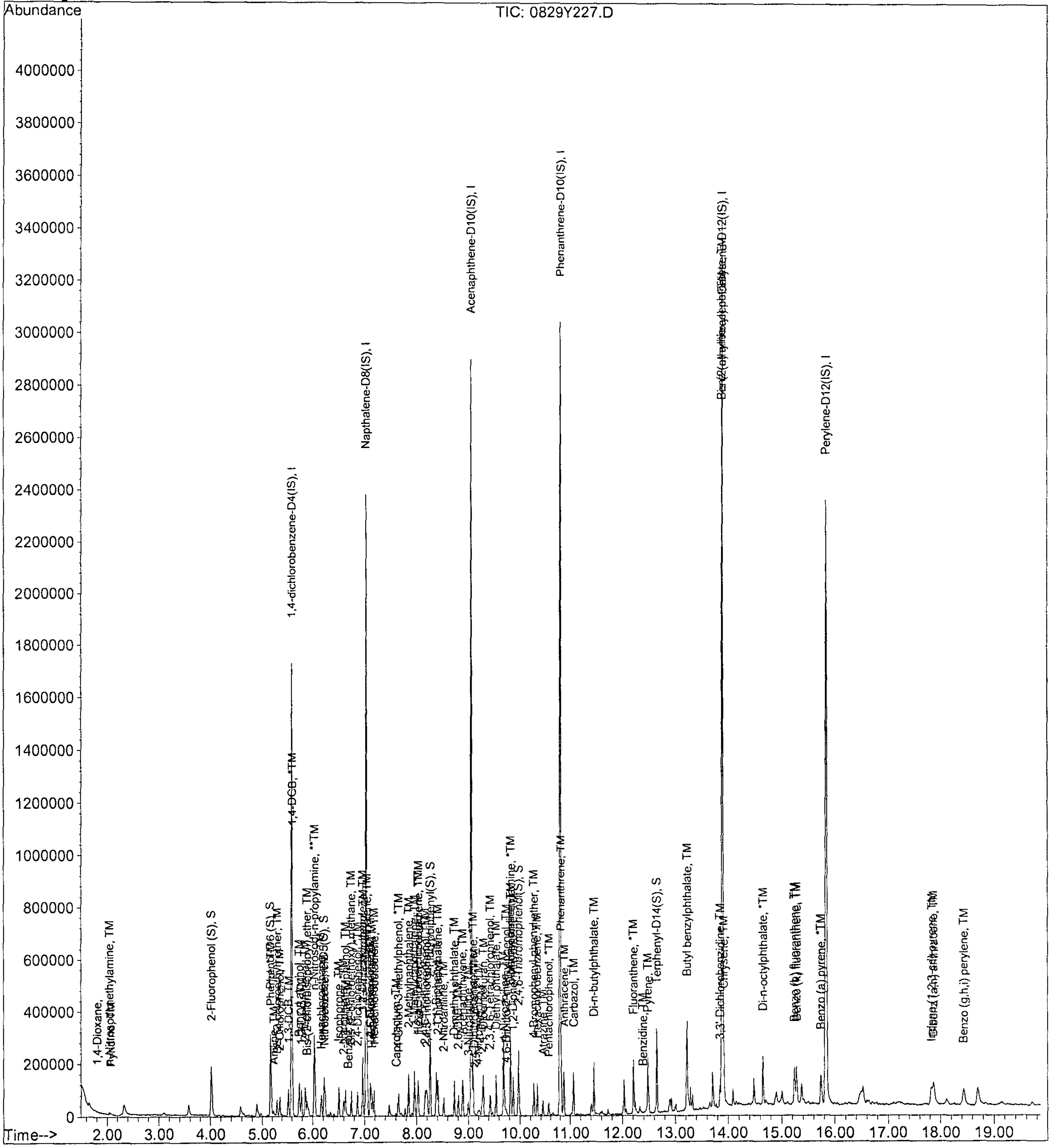
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y227.D
Acq On : 12 Sep 18 10:33
Sample : AZ79150S01 MSD-1 1/30.04G DF20
Misc :

Vial: 27
Operator: MA
Inst : Yoda
Multiplr: 665.78

Quant Time: Sep 12 12:05 2018 Quant Results File: Y0829NC.RES

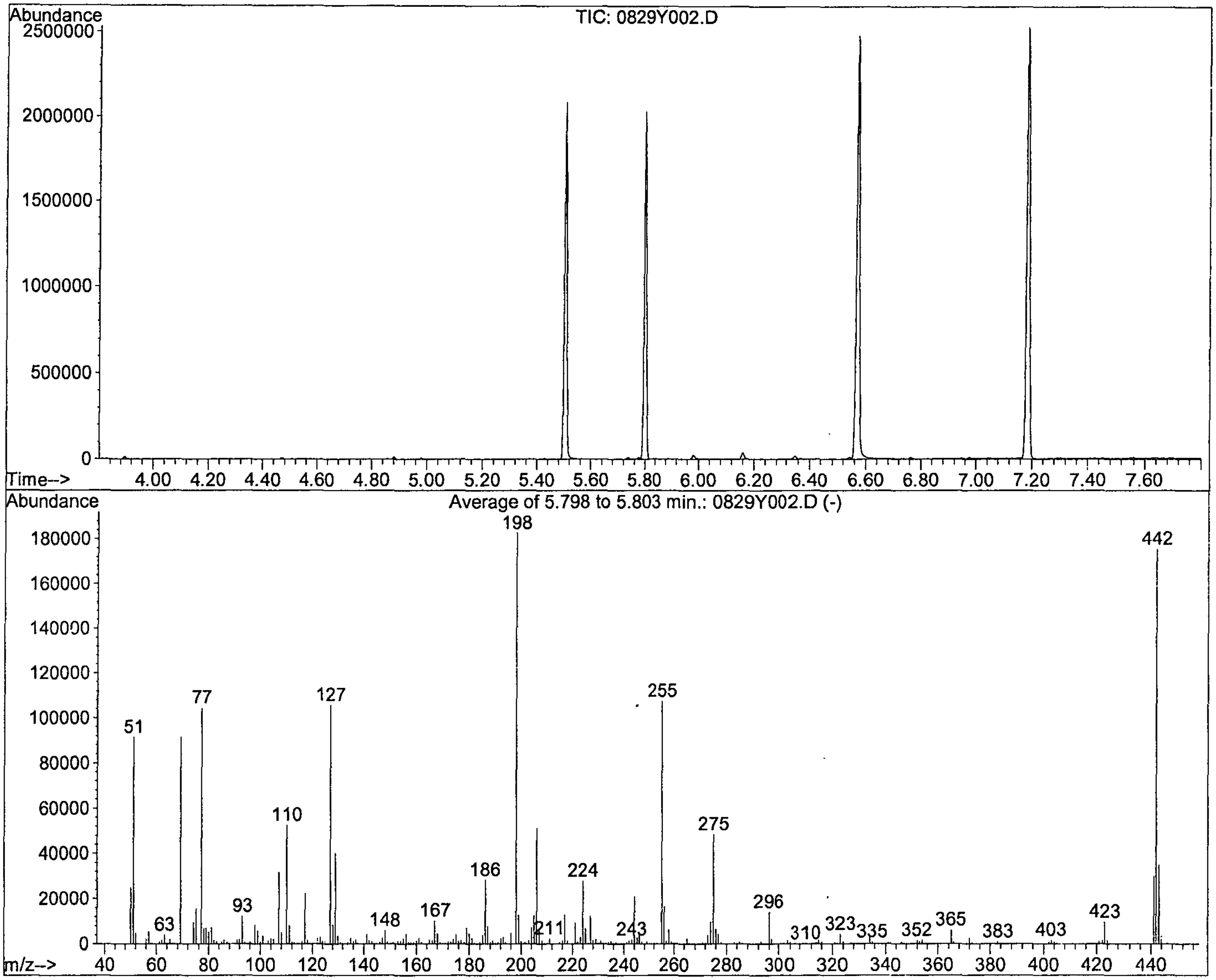
Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C
Last Update : Thu Sep 13 14:34:24 2018
Response via : Initial Calibration



Data File : M:\YODA\DATA\Y180829\0829Y002.D
Acq On : 29 Aug 18 5:57
Sample : SV Tune 03/07/18
Misc :

Vial: 2
Operator: MA
Inst : Yoda
Multiplr: 1.00

Method : M:\YODA\DATA\Y180829\Y0829NC.M (RTE Integrator)
Title : EPA 8270C



AutoFind: Scans 886, 887, 888; Background Corrected with Scan 878

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	50.0	91381	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.0	0	PASS
127	198	10	80	57.8	105707	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	182784	PASS
199	198	5	9	7.0	12778	PASS
275	198	10	60	26.5	48507	PASS
365	198	1	100	3.3	6068	PASS
441	442	0.01	24	17.0	29875	PASS
442	198	50	150	96.0	175509	PASS
443	442	15	24	19.9	34843	PASS

Data File Name:	**0829Y002.D**
Data File Path:	**M:\YODA\DATA\Y180829**
Operator:	**MA**
Date Acquired:	**29 Aug 2018 05:57**
Method File:	**DFTPP2.M**
Sample Name:	**SV Tune 03/07/18**
Vial Number:	**2**
Instrument Name:	**Yoda**

#	Name	Ret Time	Target Response
1)	DDT	7.19	18735000
2)	DDD	6.98	0
3)	DDE	7.09	0

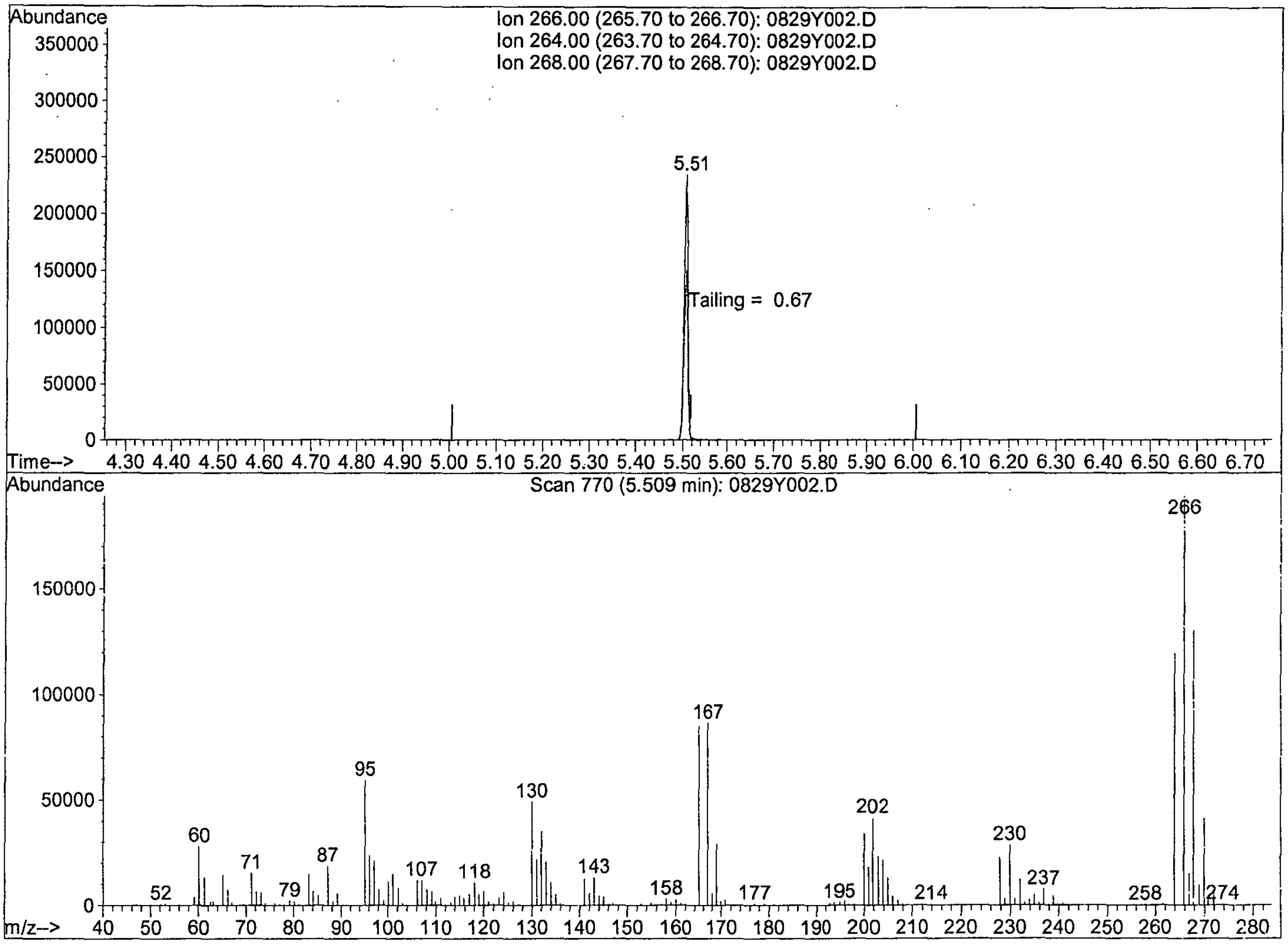
Breakdown **0.00**

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y002.D
Acq On : 29 Aug 18 5:57
Sample : SV Tune 03/07/18
Misc :
Quant Time: Aug 29 6:06 2018

Vial: 2
Operator: MA
Inst : Yoda
Multiplr: 1.00
Quant Results File: temp.res

Method : M:\YODA\DATA\Y180829\DFTPP2.M (Chemstation Integrator)
Title :
Last Update : Wed Aug 29 06:06:37 2018
Response via : Single Level Calibration



TIC: 0829Y002.D

(5) Pentachlorophenol

5.51min 0.0000

response 1423568

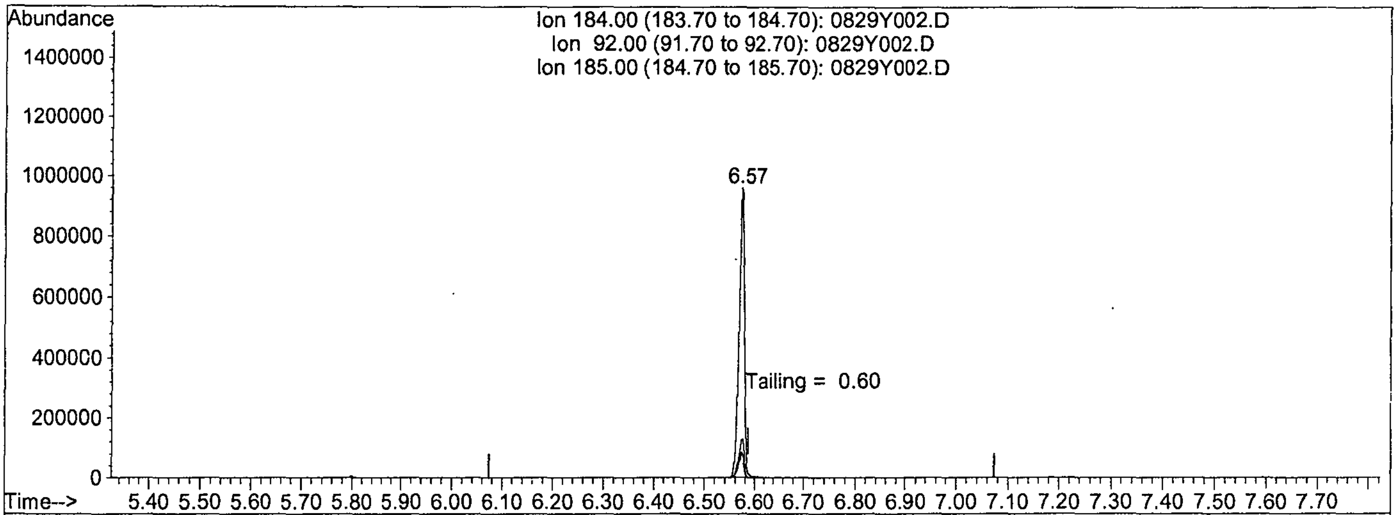
Ion	Exp%	Act%
266.00	100	100
264.00	63.00	61.64
268.00	64.10	63.73
0.00	0.00	0.00

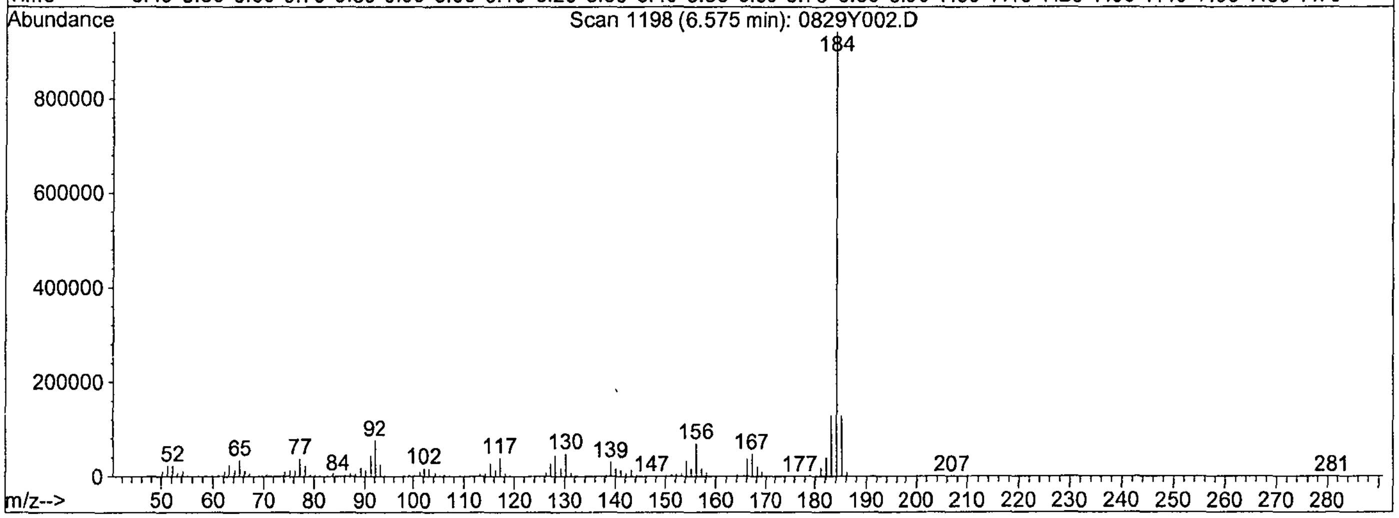
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y002.D
Acq On : 29 Aug 18 5:57
Sample : SV Tune 03/07/18
Misc :
Quant Time: Aug 29 6:06 2018

Vial: 2
Operator: MA
Inst : Yoda
Multiplr: 1.00
Quant Results File: temp.res

Method : M:\YODA\DATA\Y180829\DFTPP2.M (Chemstation Integrator)
Title :
Last Update : Wed Aug 29 06:06:37 2018
Response via : Single Level Calibration





TIC: 0829Y002.D

(6) Benzidine

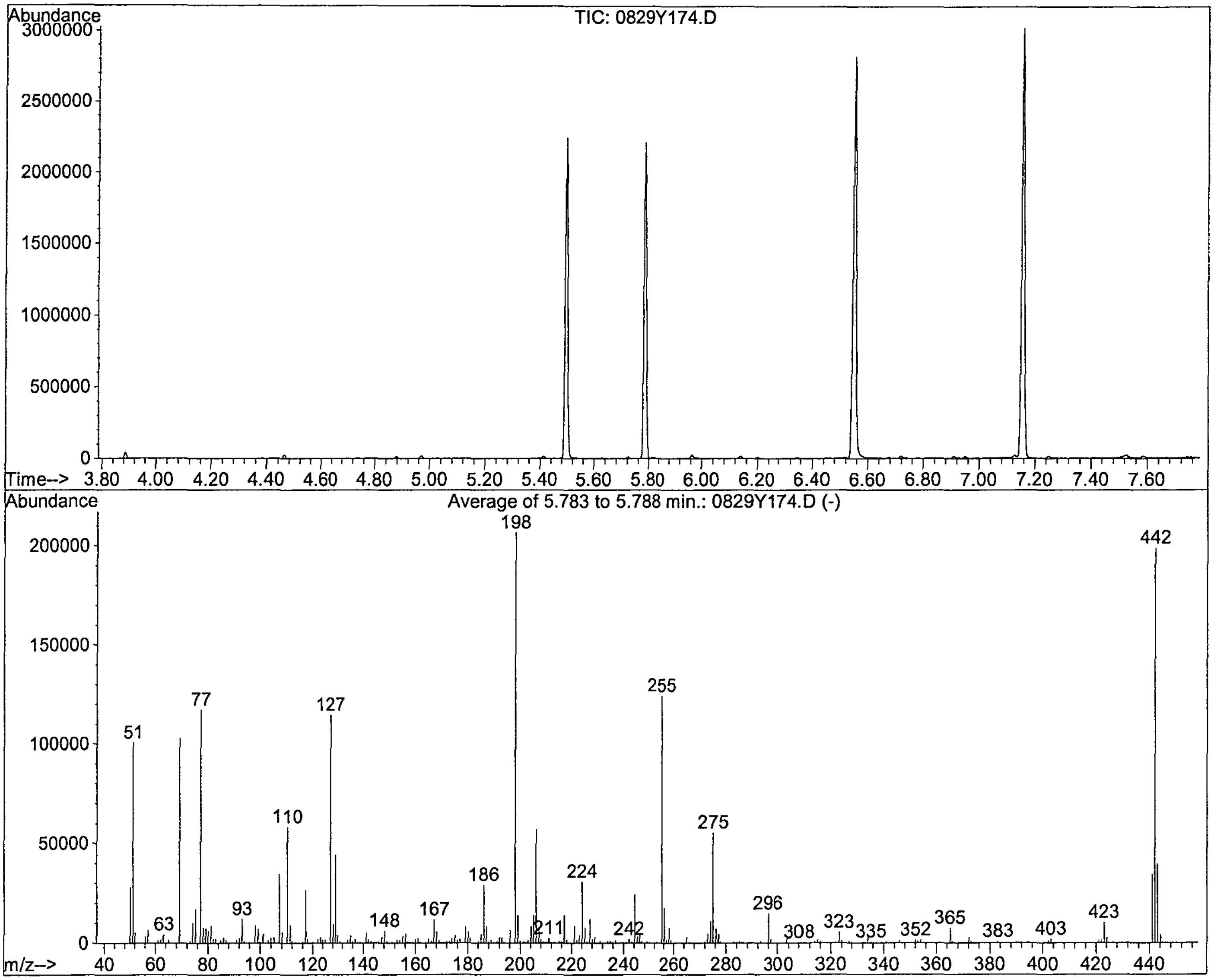
6.57min 0.0000

response 7284663

Ion	Exp%	Act%
184.00	100	100
92.00	9.10	8.18
185.00	13.30	13.74
0.00	0.00	0.00

Data File : M:\YODA\DATA\Y180829\0829Y174.D Vial: 73
Acq On : 10 Sep 18 9:52 Operator: MA
Sample : SV TUNE 03/07/18 Inst : Yoda
Misc : Multiplr: 1.00

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C



AutoFind: Scans 879, 880, 881; Background Corrected with Scan 872

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	48.7	100536	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.2	220	PASS
127	198	10	80	55.4	114499	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	206613	PASS
199	198	5	9	6.8	13988	PASS
275	198	10	60	26.7	55077	PASS
365	198	1	100	3.5	7312	PASS
441	442	0.01	24	17.2	34104	PASS
442	198	50	150	96.1	198656	PASS
443	442	15	24	19.7	39203	PASS

Data File Name:	**0829Y174.D**
Data File Path:	**M:\YODA\DATA\Y180829**
Operator:	**MA**
Date Acquired:	**10 Sep 2018 09:52**
Method File:	**DFTPP2.M**
Sample Name:	**SV TUNE 03/07/18**
Vial Number:	**73**
Instrument Name:	**Yoda**

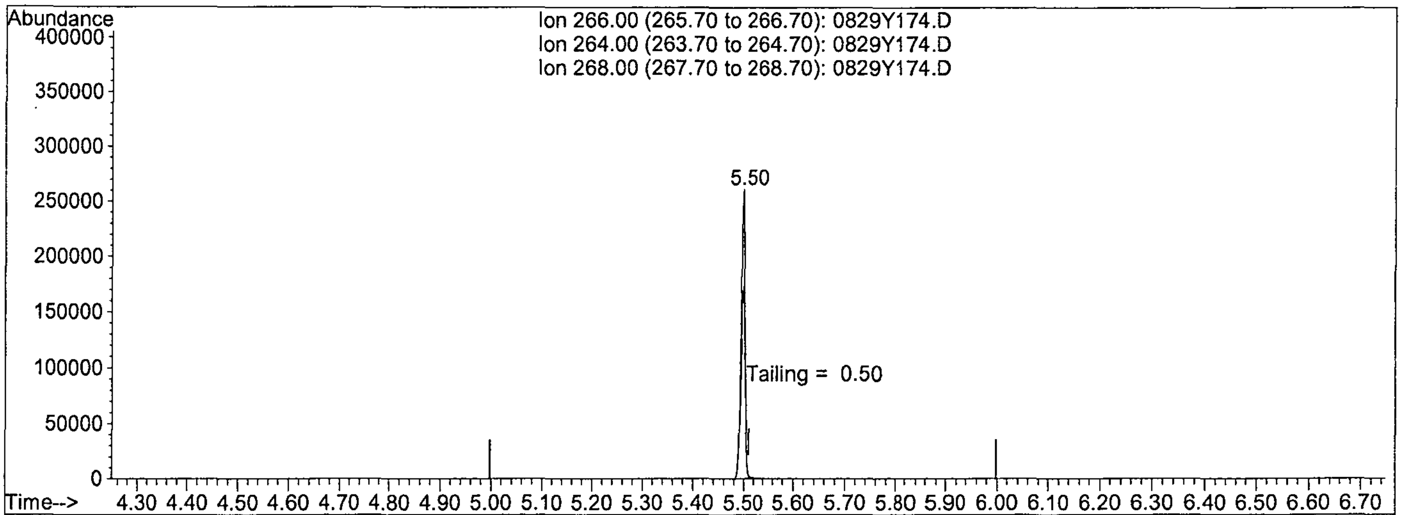
#	Name	Ret Time	Target Response
1)	DDT	7.16	21766300
2)	DDD	6.95	144806
3)	DDE	7.04	0

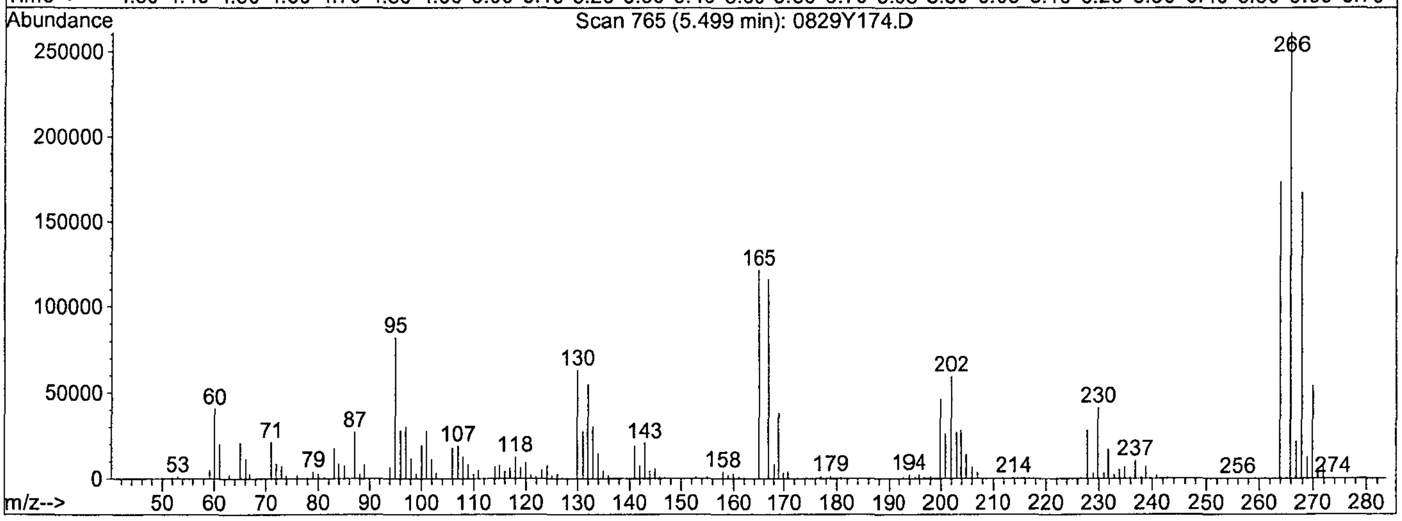
Breakdown **0.66**

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y174.D              Vial: 73
Acq On    : 10 Sep 18   9:52                         Operator: MA
Sample    : SV TUNE 03/07/18                         Inst     : Yoda
Misc      :                                          Multiplr: 1.00
Quant Time: Sep 10 10:04 2018              Quant Results File: temp.res

Method        : M:\YODA\DATA\Y180825\DFTPP2.M (Chemstation Integrator)
Title         :
Last Update   : Mon Sep 10 10:03:56 2018
Response via  : Single Level Calibration
```





TIC: 0829Y174.D

(5) Pentachlorophenol

5.50min 0.0000

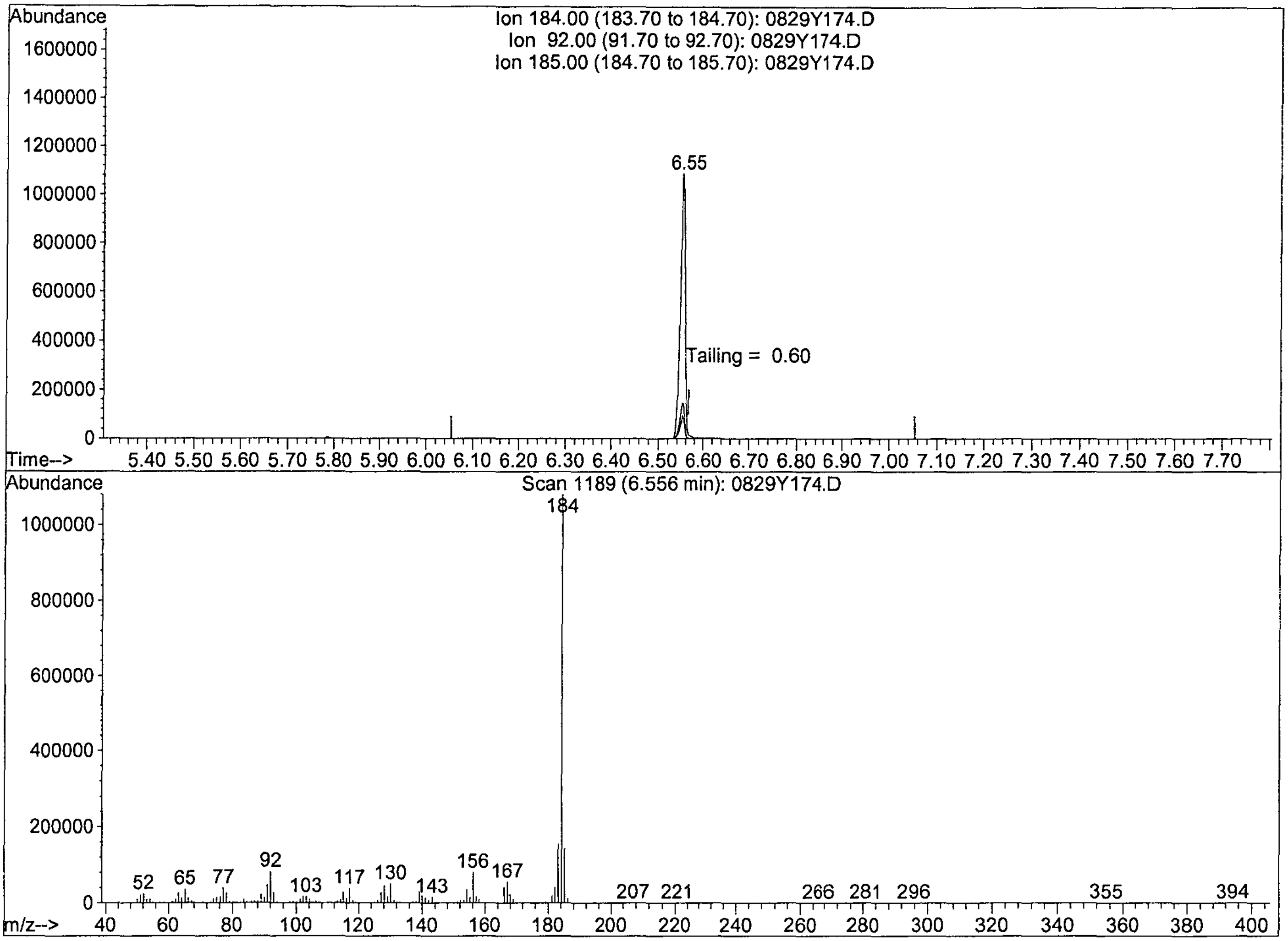
response 1583504

Ion	Exp%	Act%
266.00	100	100
264.00	66.30	65.85
268.00	63.90	63.98
0.00	0.00	0.00

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y174.D            Vial: 73
Acq On    : 10 Sep 18   9:52                       Operator: MA
Sample    : SV TUNE 03/07/18                       Inst    : Yoda
Misc      :                                        Multiplr: 1.00
Quant Time: Sep 10 10:04 2018             Quant Results File: temp.res

Method        : M:\YODA\DATA\Y180825\DFTPP2.M (Chemstation Integrator)
Title         :
Last Update   : Mon Sep 10 10:03:56 2018
Response via  : Single Level Calibration
```



TIC: 0829Y174.D

(6) Benzidine

6.56min 0.0000

response 8555957

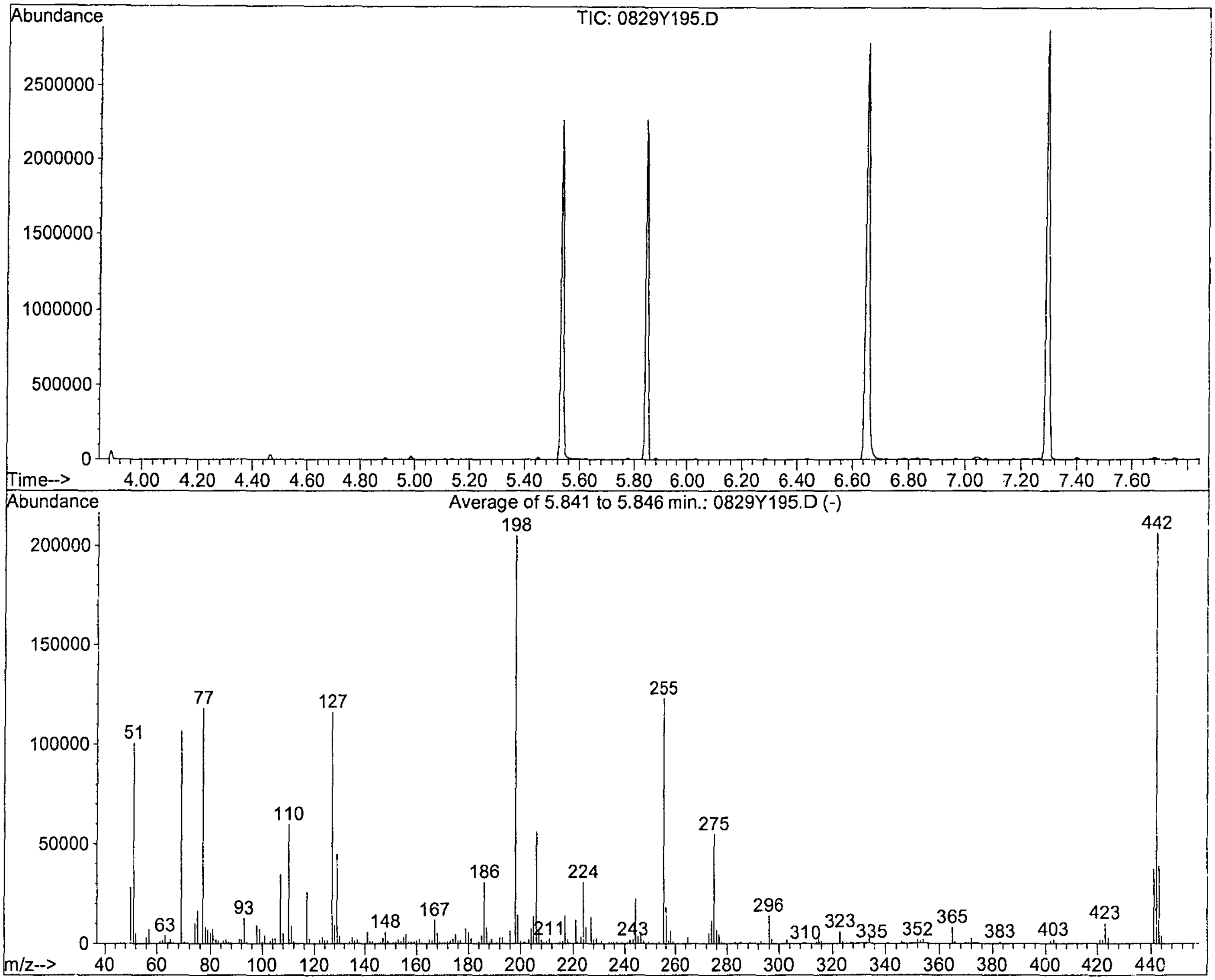
Ion	Exp%	Act%
184.00	100	100
92.00	8.80	7.94
185.00	13.60	13.70
0.00	0.00	0.00

DFTPP

Data File : M:\YODA\DATA\Y180829\0829Y195.D
Acq On : 11 Sep 18 9:32
Sample : SV TUNE 03/07/18
Misc :

Vial: 95
Operator: MA
Inst : Yoda
Multiplr: 1.00

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C



AutoFind: Scans 902, 903, 904; Background Corrected with Scan 894

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	49.0	100499	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.7	725	PASS
127	198	10	80	56.7	116120	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	204971	PASS
199	198	5	9	6.9	14237	PASS
275	198	10	60	26.7	54720	PASS
365	198	1	100	3.9	8034	PASS
441	442	0.01	24	17.8	36803	PASS
442	198	50	150	100.7	206360	PASS
443	442	15	24	18.8	38728	PASS

Data File Name:	**0829Y195.D**
Data File Path:	**M:\YODA\DATA\Y180829**
Operator:	**MA**
Date Acquired:	**11 Sep 2018 09:32**
Method File:	**DFTPP2.M**
Sample Name:	**SV TUNE 03/07/18**
Vial Number:	**95**
Instrument Name:	**Yoda**

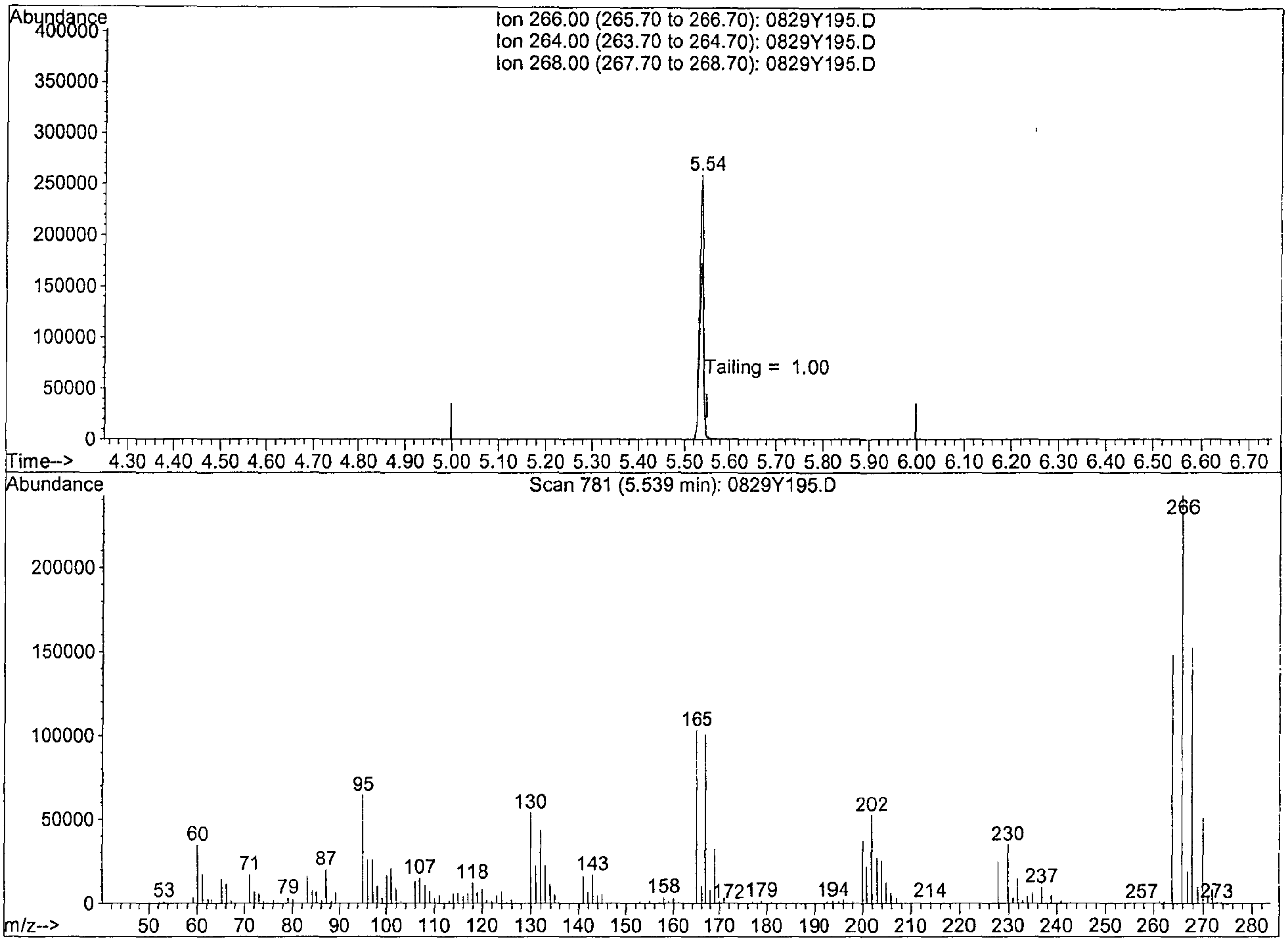
#	Name	Ret Time	Target Response
1)	DDT	7.16	22390600
2)	DDD	6.95	8477
3)	DDE	7.04	180655

Breakdown **0.84**

Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y195.D   Vial: 95
Acq On : 11 Sep 18 9:32   Operator: MA
Sample : SV TUNE 03/07/18   Inst : Yoda
Misc :   Multiplr: 1.00
Quant Time: Sep 11 10:28 2018   Quant Results File: temp.res

Method : M:\YODA\DATA\Y180825\DFTPP2.M (Chemstation Integrator)
Title :
Last Update : Mon Sep 10 10:03:56 2018
Response via : Single Level Calibration



TIC: 0829Y195.D

(5) Pentachlorophenol

5.54min 0.0000

response 1693916

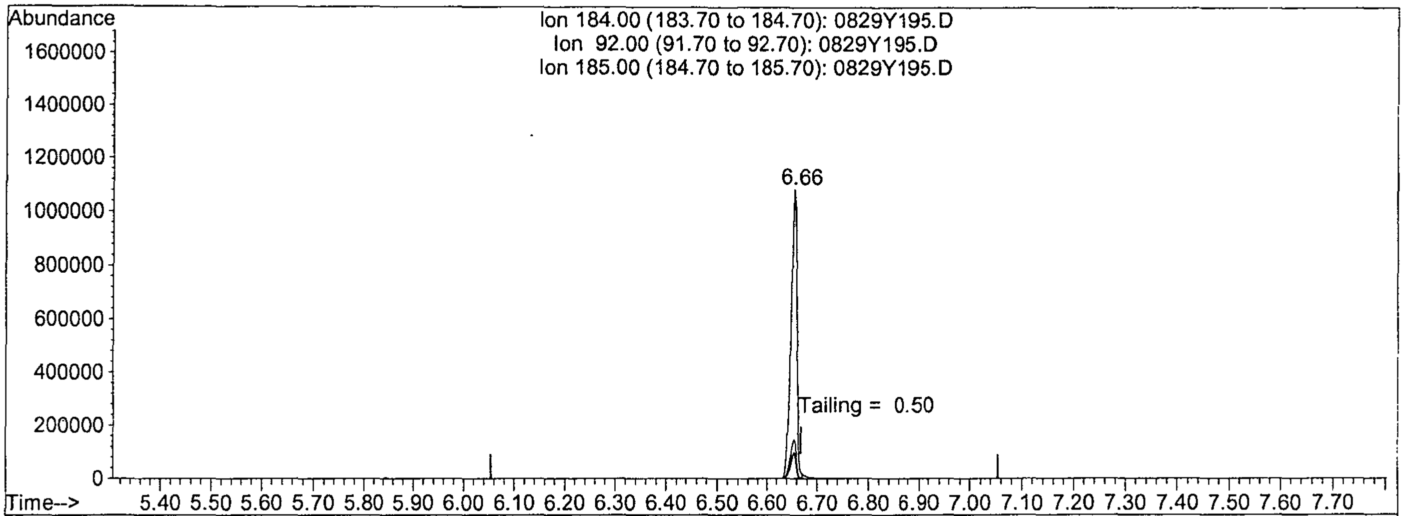
Ion	Exp%	Act%
266.00	100	100
264.00	66.30	62.07
268.00	63.90	64.46
0.00	0.00	0.00

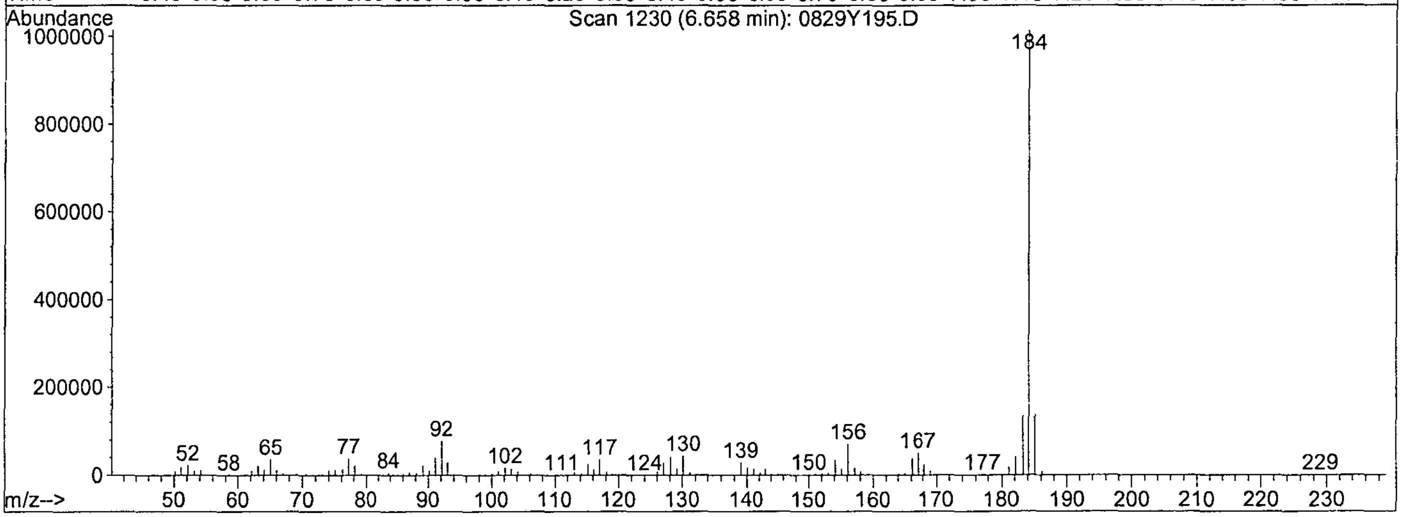
Quantitation Report

Data File : M:\YODA\DATA\Y180829\0829Y195.D
Acq On : 11 Sep 18 9:32
Sample : SV TUNE 03/07/18
Misc :
Quant Time: Sep 11 10:28 2018

Vial: 95
Operator: MA
Inst : Yoda
Multiplr: 1.00
Quant Results File: temp.res

Method : M:\YODA\DATA\Y180825\DFTPP2.M (Chemstation Integrator)
Title :
Last Update : Mon Sep 10 10:03:56 2018
Response via : Single Level Calibration





TIC: 0829Y195.D

(6) Benzidine

6.66min 0.0000

response 8866107

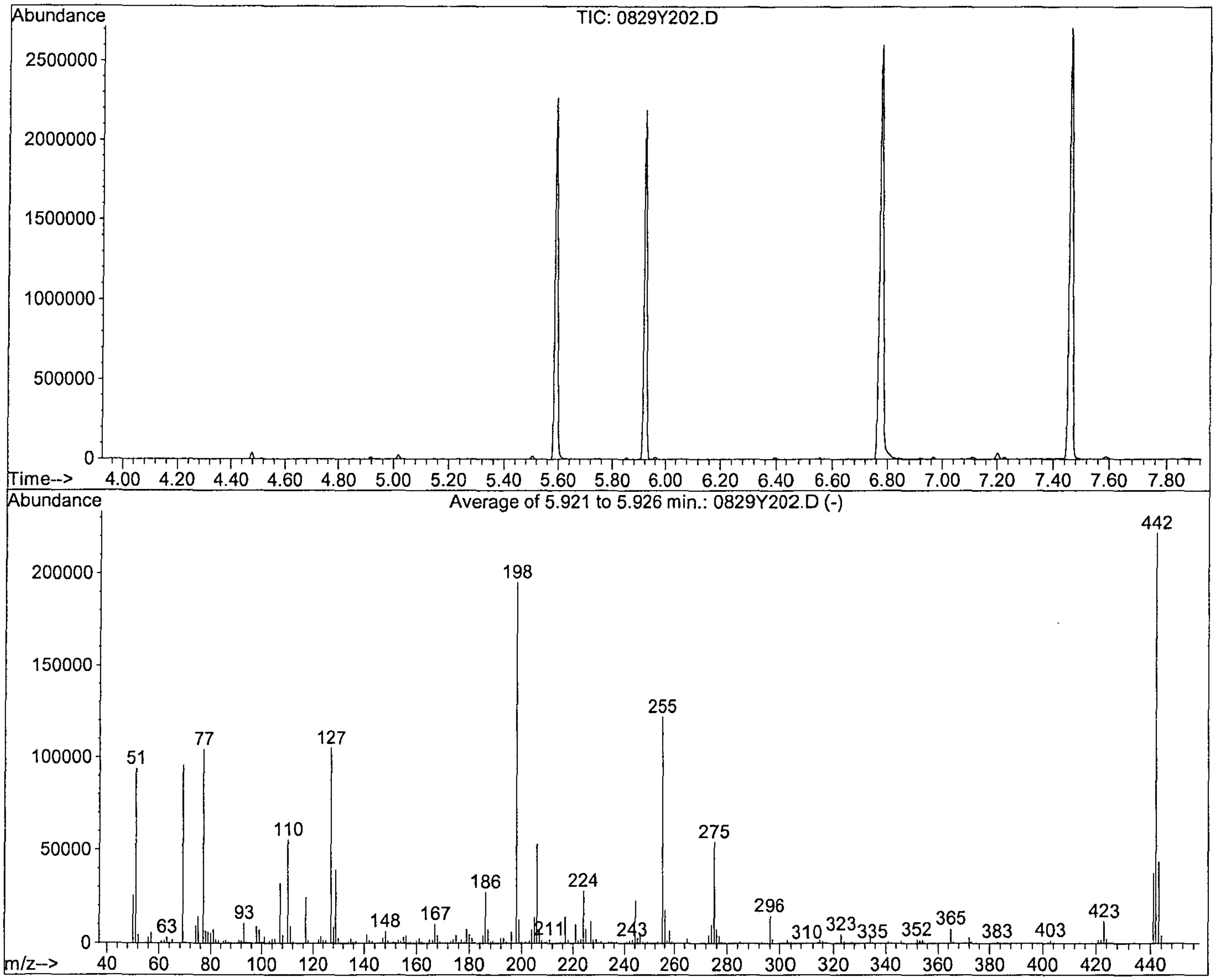
Ion	Exp%	Act%
184.00	100	100
92.00	8.80	8.37
185.00	13.60	14.03
0.00	0.00	0.00

DFTPP

Data File : M:\YODA\DATA\Y180829\0829Y202.D
Acq On : 11 Sep 18 15:02
Sample : SV TUNE 03/07/18
Misc :

Vial: 2
Operator: MA
Inst : Yoda
Multiplr: 1.00

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C



AutoFind: Scans 935, 936, 937; Background Corrected with Scan 926

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	48.2	94115	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.5	463	PASS
127	198	10	80	53.8	105056	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	195307	PASS
199	198	5	9	6.5	12618	PASS
275	198	10	60	27.8	54235	PASS
365	198	1	100	4.0	7729	PASS
441	442	0.01	24	17.0	37648	PASS
442	198	50	150	113.7	222059	PASS
443	442	15	24	19.7	43779	PASS

Data File Name:	**0829Y202.D**
Data File Path:	**M:\YODA\DATA\Y180829**
Operator:	**MA**
Date Acquired:	**11 Sep 2018 15:02**
Method File:	**DFTPP2.M**
Sample Name:	**SV TUNE 03/07/18**
Vial Number:	**2**
Instrument Name:	**Yoda**

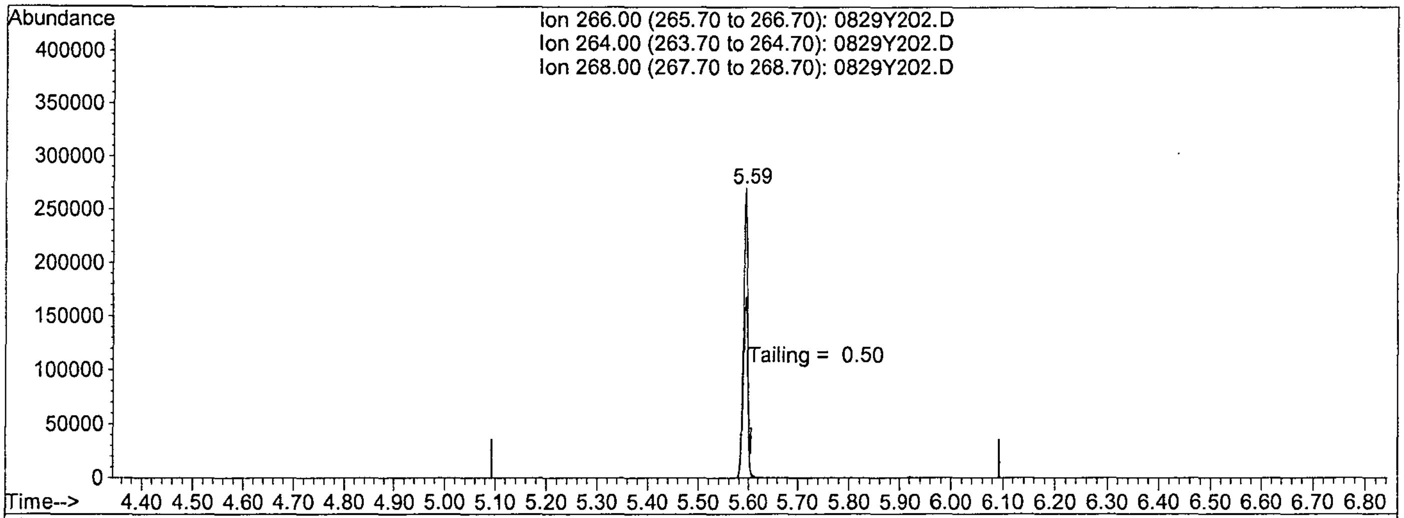
#	Name	Ret Time	Target Response
1)	DDT	7.46	23019800
2)	DDD	7.23	296681
3)	DDE	7.33	0

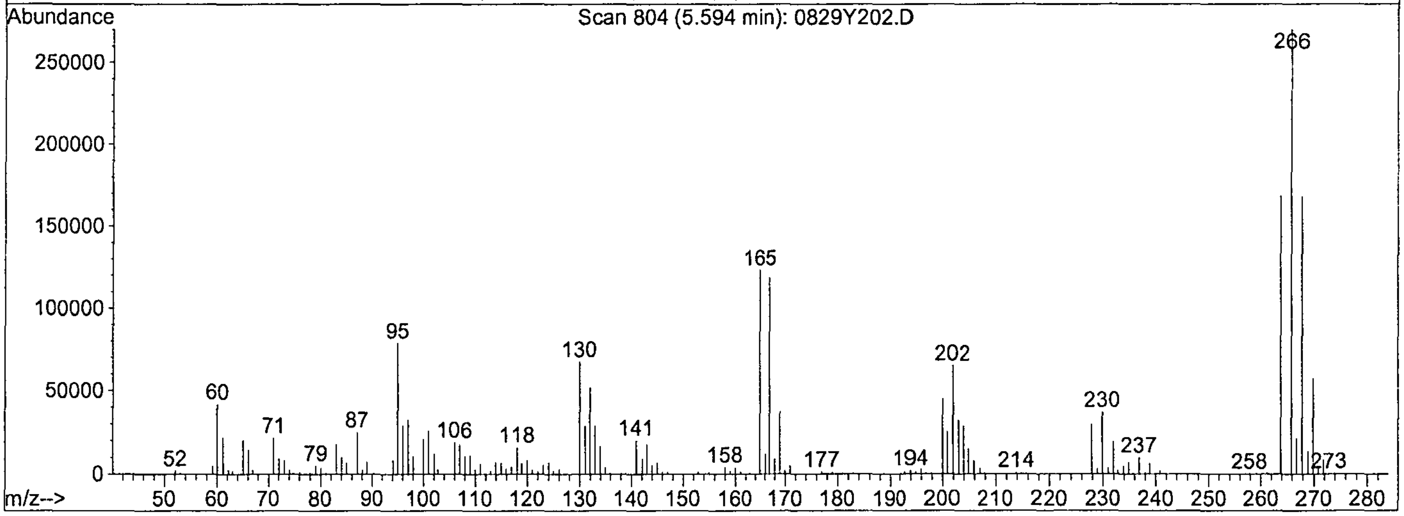
Breakdown **1.27**

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y202.D           Vial: 2
Acq On    : 11 Sep 18  15:02                       Operator: MA
Sample    : SV TUNE 03/07/18                       Inst     : Yoda
Misc      :                                        Multiplr: 1.00
Quant Time: Sep 11 15:10 2018              Quant Results File: temp.res

Method         : M:\YODA\DATA\Y180829\DFTPP2.M (Chemstation Integrator)
Title          :
Last Update    : Tue Sep 11 15:10:29 2018
Response via   : Single Level Calibration
```





TIC: 0829Y202.D

(5) Pentachlorophenol

5.59min 0.0000

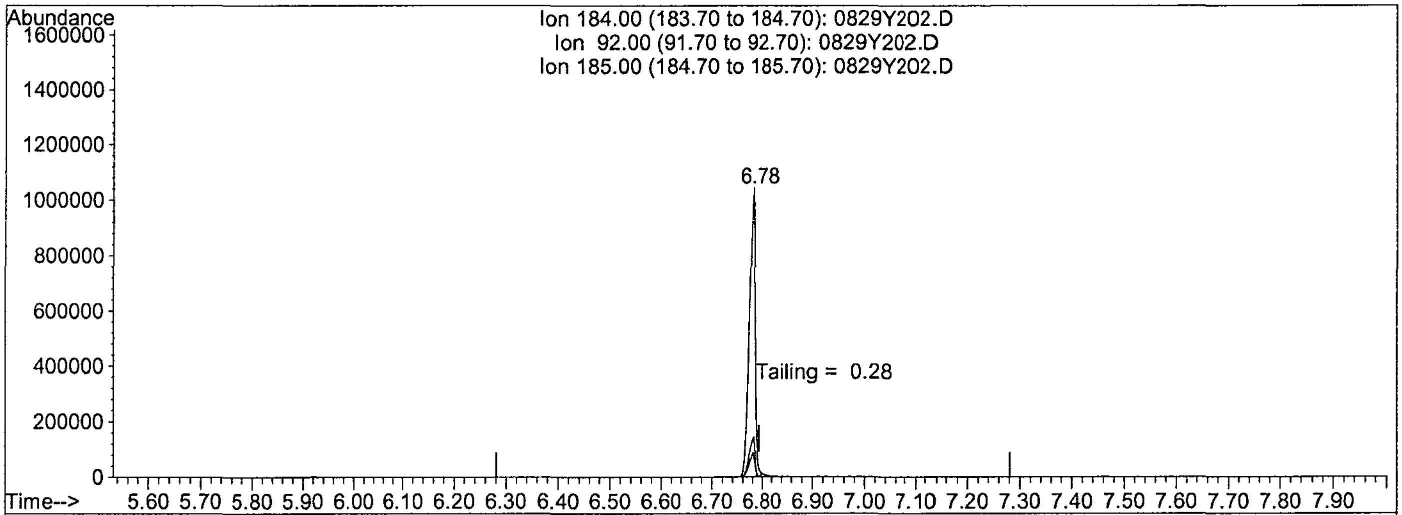
response 1763914

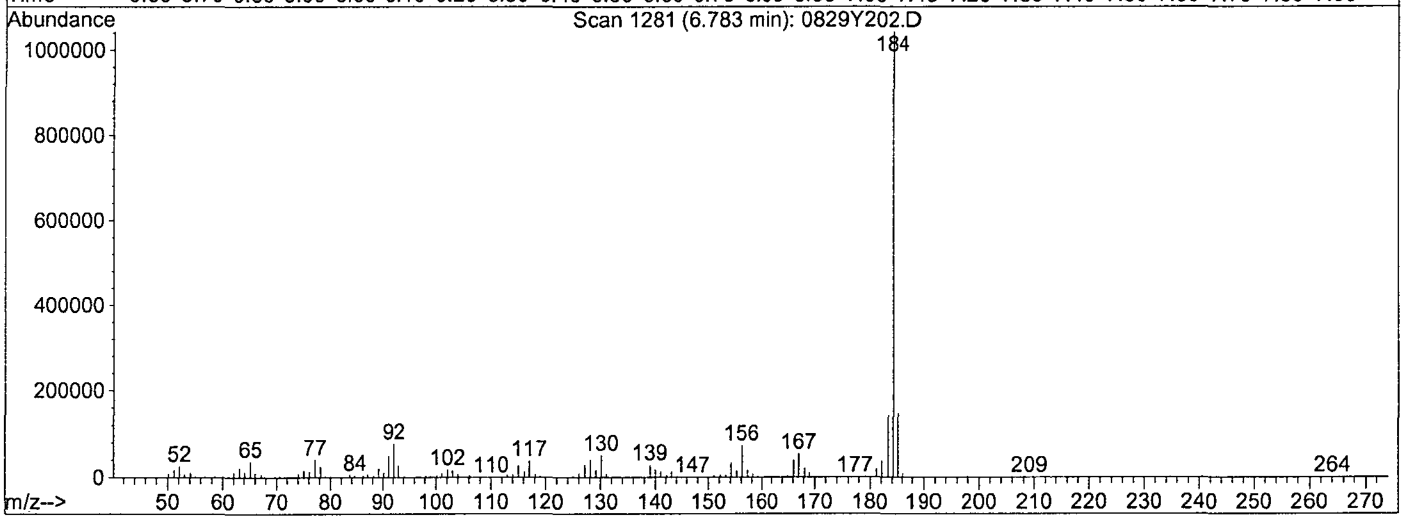
Ion	Exp%	Act%
266.00	100	100
264.00	62.20	62.87
268.00	62.10	64.00
0.00	0.00	0.00

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y202.D              Vial: 2
Acq On    : 11 Sep 18  15:02                        Operator: MA
Sample    : SV TUNE 03/07/18                        Inst     : Yoda
Misc      :                                         Multiplr: 1.00
Quant Time: Sep 11 15:10 2018                  Quant Results File: temp.res

Method        : M:\YODA\DATA\Y180829\DFTPP2.M (Chemstation Integrator)
Title         :
Last Update   : Tue Sep 11 15:10:29 2018
Response via  : Single Level Calibration
```





TIC: 0829Y202.D

(6) Benzidine

6.78min 0.0000

response 9070789

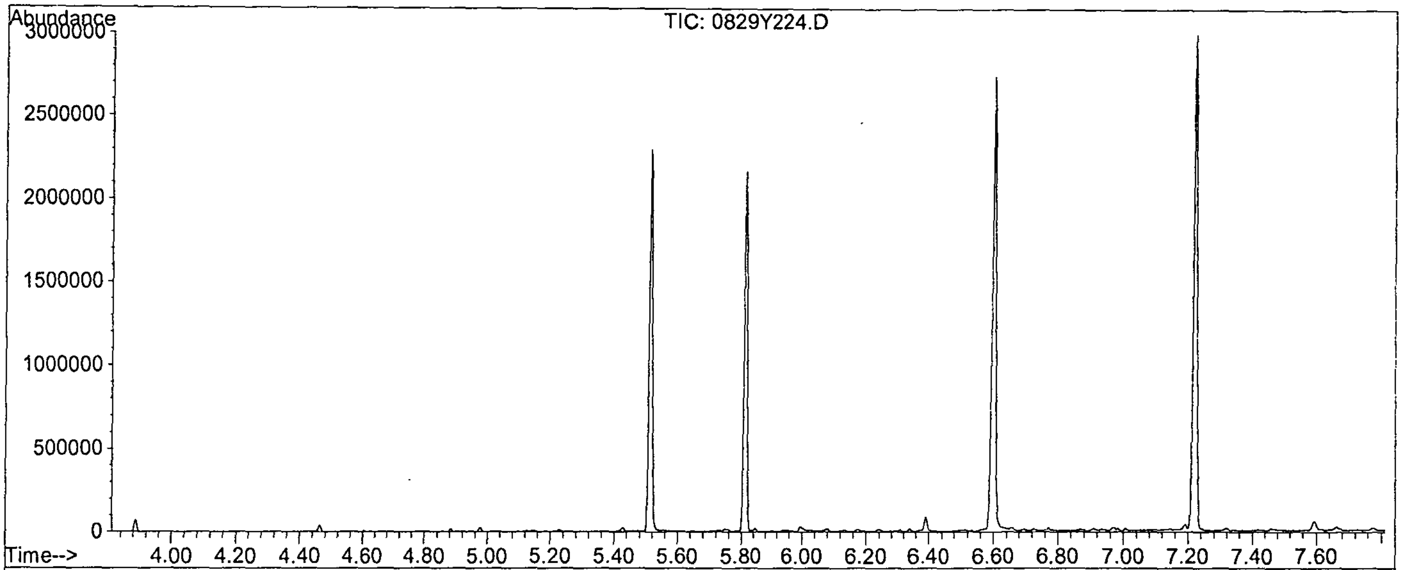
Ion	Exp%	Act%
184.00	100	100
92.00	7.30	7.99
185.00	14.10	14.17
0.00	0.00	0.00

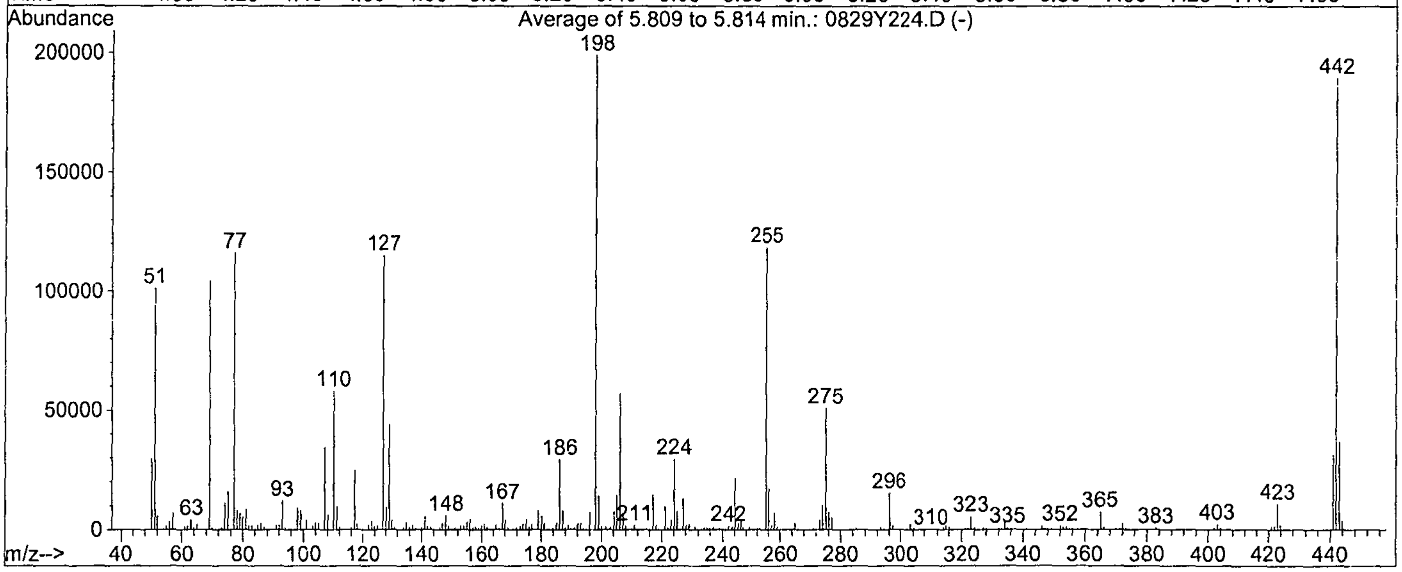
DFTPP

Data File : M:\YODA\DATA\Y180829\0829Y224.D
Acq On : 12 Sep 18 8:46
Sample : SV TUNE 03/07/18
Misc :

Vial: 24
Operator: MA
Inst : Yoda
Multiplr: 1.00

Method : M:\YODA\DATA\Y180825\Y0829NC.M (RTE Integrator)
Title : EPA 8270C





AutoFind: Scans 889, 890, 891; Background Corrected with Scan 880

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	50.9	101245	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.7	686	PASS
127	198	10	80	57.8	115088	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	199061	PASS
199	198	5	9	7.1	14051	PASS
275	198	10	60	25.5	50760	PASS
365	198	1	100	3.7	7306	PASS
441	442	0.01	24	16.5	31256	PASS
442	198	50	150	95.2	189485	PASS
443	442	15	24	19.3	36565	PASS

Data File Name:	**0829Y224.D**
Data File Path:	**M:\YODA\DATA\Y180829**
Operator:	**MA**
Date Acquired:	**12 Sep 2018 08:46**
Method File:	**DFTPP2.M**
Sample Name:	**SV TUNE 03/07/18**
Vial Number:	**24**
Instrument Name:	**Yoda**

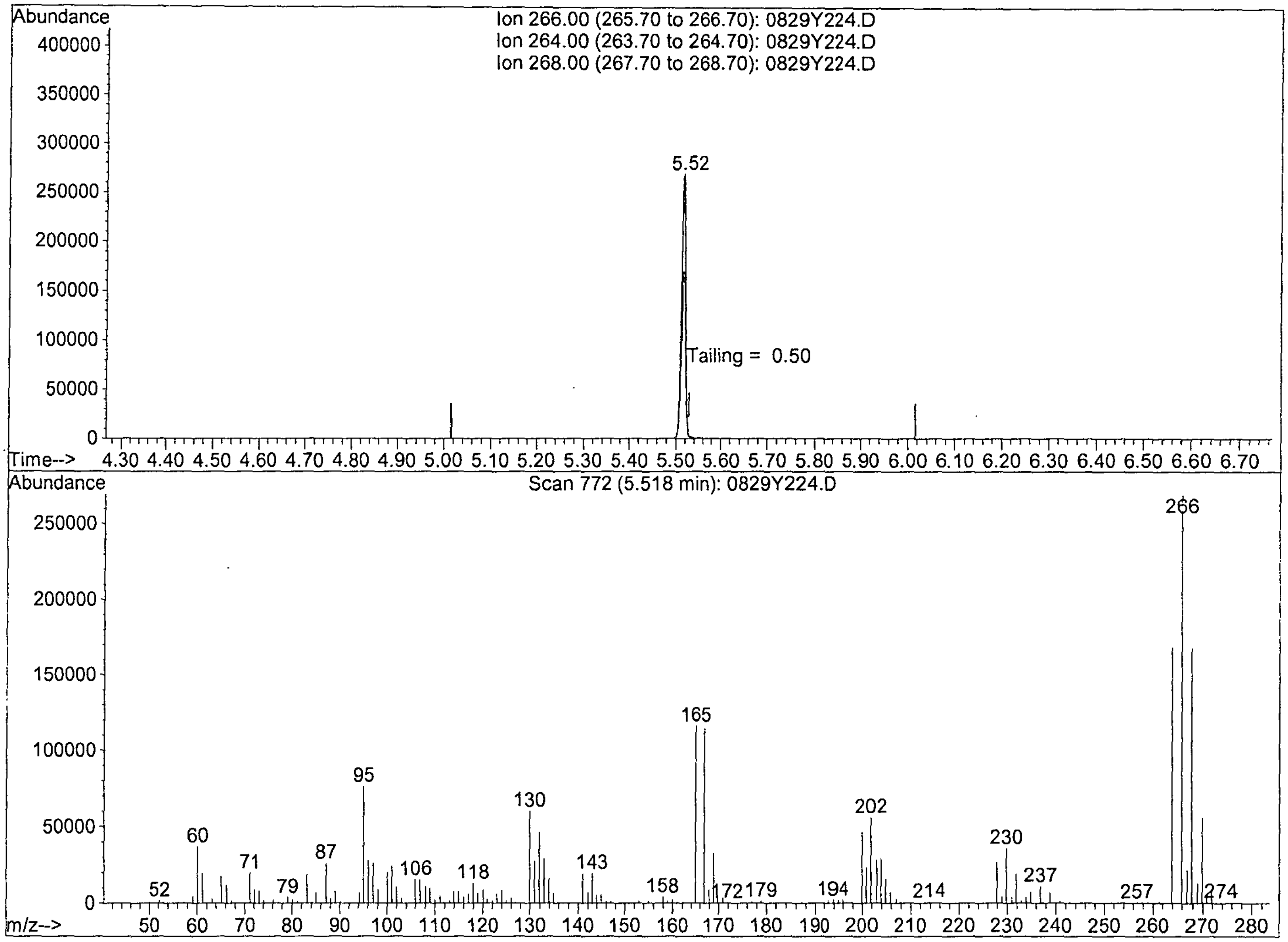
#	Name	Ret Time	Target Response
1)	DDT	7.22	22113500
2)	DDD	7.01	104540
3)	DDE	7.16	36474

Breakdown **0.63**

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y224.D                Vial: 24
Acq On    : 12 Sep 18   8:46                            Operator: MA
Sample    : SV TUNE 03/07/18                            Inst    : Yoda
Misc      :                                             Multiplr: 1.00
Quant Time: Sep 12  9:34 2018                  Quant Results File: temp.res

Method         : M:\YODA\DATA\Y180829\DFTPP2.M (Chemstation Integrator)
Title          :
Last Update    : Wed Sep 12 09:34:07 2018
Response via   : Single Level Calibration
```



TIC: 0829Y224.D

(5) Pentachlorophenol

5.52min 0.0000

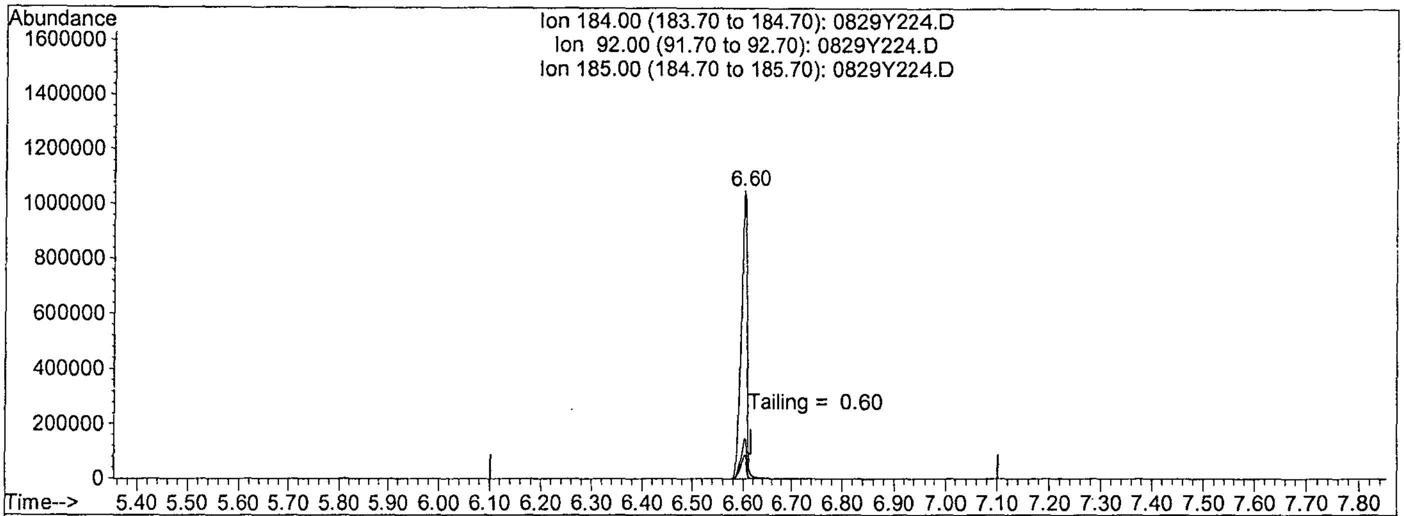
response 1747524

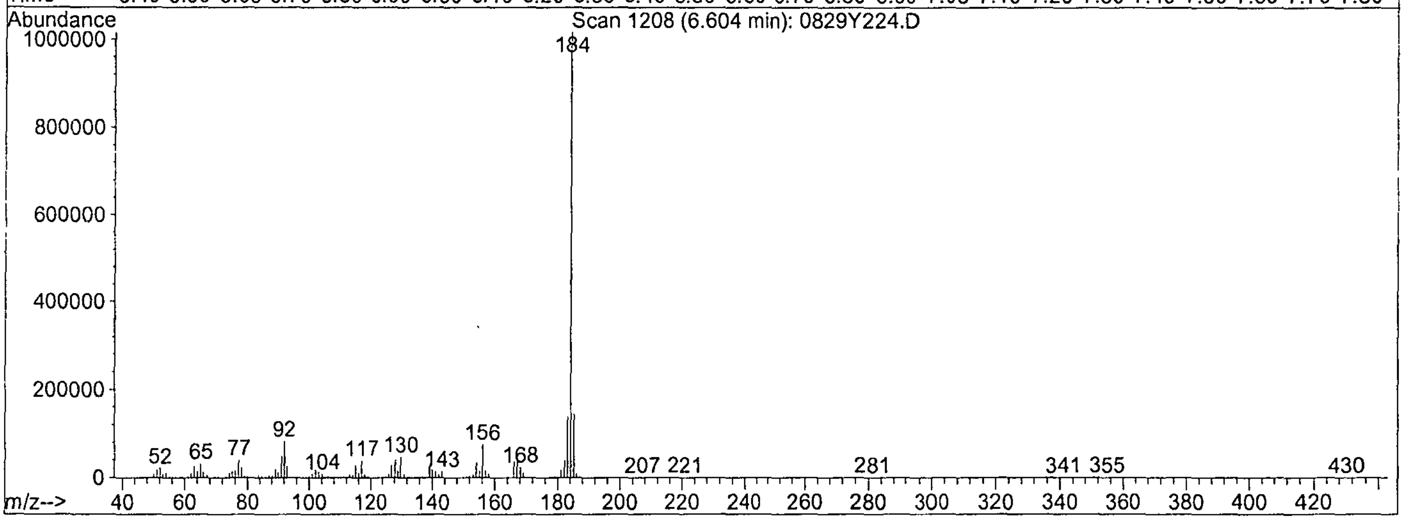
Ion	Exp%	Act%
266.00	100	100
264.00	62.40	62.22
268.00	62.30	62.51
0.00	0.00	0.00

Quantitation Report

```
Data File : M:\YODA\DATA\Y180829\0829Y224.D              Vial: 24
Acq On    : 12 Sep 18   8:46                         Operator: MA
Sample    : SV TUNE 03/07/18                         Inst    : Yoda
Misc      :                                          Multiplr: 1.00
Quant Time: Sep 12  9:34 2018               Quant Results File: temp.res

Method        : M:\YODA\DATA\Y180829\DFTPP2.M (Chemstation Integrator)
Title         :
Last Update   : Wed Sep 12 09:34:07 2018
Response via  : Single Level Calibration
```





TIC: 0829Y224.D

(6) Benzidine

6.60min 0.0000

response 8214841

Ion	Exp%	Act%
184.00	100	100
92.00	8.40	8.04
185.00	14.10	14.26
0.00	0.00	0.00

Name of Final Standard 8270 Full Scan Standard Curve **Prep'd By (Initials)** GA

Prep Date 08/16/18

Exp Date 12/19/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from container Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc (range)
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	4 uL	200uL	MC 56258 192uL	4 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	4 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	4 uL	*	*	*
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	5 uL	200uL	MC 56258 190uL	5 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	5 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	4 uL	*	*	*
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	5 uL	100uL	MC 56258 90uL	10 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	5 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	2 uL	*	*	*
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	10 uL	100uL	MC 56258 80 uL	20 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	10 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	2 uL	*	*	*
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	20 uL	100uL	MC 56258 60 uL	40 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	20 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	2 uL	*	*	*
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	50 uL	200 uL	MC 56258 100 uL	50 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	50 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	4 uL	*	*	*
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	30 uL	100uL	MC 56258 40 uL	60 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	30 uL	*	*	*

SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	2 uL	*	*	*
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	40 uL	100uL	MC 56258 20 uL	80 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	40 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	2 uL	*	*	*
8270 Stock	APPL	8270 Stock	200 ug/mL	12/19/17	12/19/18	50 uL	100uL	na	100 ug/mL
8270 Surrogate	APPL	8270 Surrogate	200/400 ug/mL	06/13/18	05/29/19	50 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	2 uL	*	*	*

Name of Final Standard 8270 Full Scan Second Source **Prep'd By (Initials)** GA
Prep Date 08/16/18
Exp Date 02/16/19

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from container Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc (range)
8270 SS Stock	o2si	8270 SS Stock	200 ug/mL	04/19/18	04/19/19	50 uL	200uL	MC 56258 150uL	50 ug/mL
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	08/16/18	08/16/19	4 uL	*	*	*

Name of Final Standard 8270 Internal Standard (Ampule) **Prep'd By (Initials)** GA
Prep Date 08/16/18
Exp Date 08/16/19

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from contianer Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc (range)
Semivolatile Internal Standard	Restek	31206	2mg/mL	A0130603 - 38563 38564	08/16/19	2 mL	2 mL	NA	2mg/mL

8270 Full Scan Stock

:	12/19/17 -GA				:		
8270 Source Stock							
Exp:	12/19/18						
		Conc.		Date	Exp.		
Supplier	ID #	µg/mL	Lot #	Code	Date	µL	
Absolute	10001	2000	012317-38399 012317-38400	12/19/17	12/19/18	2000	
Absolute	10002	2000	062216-37964 062216-37965	12/19/17	12/19/18	2000	
Absolute	10004	2000	012516-38188 012516-38508	12/19/17	12/19/18	2000	G34
Absolute	10005	2000	110314-38248 110314-38249	12/19/17	12/19/18	2000	
Absolute	10006	2000	021717-38253 021717-38254	12/19/17	12/19/18	2000	
Absolute	10007	2000	080116-38258 080116-38259	12/19/17	12/19/18	2000	
Absolute	10018	2000	090216-38192 090216-38192	12/19/17	12/19/18	2000	G34
Absolute	70023	1000	091217-038263 091217-038264	12/19/17	12/19/18	2000	
Absolute	82705	2000	041217-38268 041217-38269	12/19/17	12/19/18	2000	
Absolute	94552	various	102017-38402 102017-38403	12/19/17	12/19/18	2000	
				Final Vol.		20000	

Name of Final Standard	8270 Surrogate 200/400 ppm
Prep Date	06/13/18
Exp Date	05/29/19

Prep'd By (Initials) **GA**

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from contianer Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc (range)
8270 Acid Surrogate Mix	Restek	33029	10,000 ug/mL	**A0130078-38378**	**05/29/19**	200 uL	5 mL	**MC 56258**	400 ug/mL
8270 B/N Surrogate Mix	Restek	31086	5000 ug/mL	**A0130555-38549**	**06/04/19**	200 uL	*	*	200 ug/mL

Name of Final Standard	8270 SS STOCK	Prep'd By (Initials)	OA
Prep Date	04/19/18		
Exp Date	04/19/19		

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from contianer Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc (range)
	Absolute	10001	2000	G34-081717-38180	04/19/19	1.0 mL	10 mL	**NA**	2000 ug/mL
	Absolute	10002	2000	G34-020217-38183	04/19/19	1.0 mL	*	*	2000 ug/mL
	Absolute	10004	2000	010815-38624	04/19/19	1.0 mL	*	*	2000 ug/mL
	Absolute	10005	2000	041317-37803	04/19/19	1.0 mL	*	*	2000 ug/mL
	Absolute	10006	2000	011718-38826	04/19/19	1.0 mL	*	*	2000 ug/mL
	Absolute	10007	2000	020515-38628	04/19/19	1.0 mL	*	*	2000 ug/mL
	Absolute	10018	2000	G34-030216-38198	04/19/19	1.0 mL	*	*	2000 ug/mL
	Absolute	70023	1000	013118-38829	04/19/19	1.0 mL	*	*	1000 ug/mL
	Absolute	82705	2000	090617-38831	04/19/19	1.0 mL	*	*	2000 ug/mL
	Absolute	94552	various	013118-38824	04/19/19	1.0 mL	*	*	various

Name of Final Standard	**8270 Full Scan Spike**	**Prep'd By (Initials)**	**GA**
Prep Date	**08/10/18**		
Exp Date	**06/22/19**		

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from contianer Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc.(range)
10001	Absolute	10001	2000	012317-38888 051018 - 39429	08/10/19	2.0 mL	20 mL	NA	2000 ug/mL
10002	Absolute	10002	2000	062216-38893 051018 - 39434	06/22/19 08/10//19	2.0 mL	*	*	2000 ug/mL
10004	Absolute	10004	2000	012516-38897 38898	08/10/19	2.0 mL	*	*	2000 ug/mL
10005	Absolute	10005	2000	110314-38936 38937	08/10/19	2.0 mL	*	*	2000 ug/mL
10006	Absolute	10006	2000	092017-38619 071318 - 39444	08/10/19	2.0 mL	*	*	2000 ug/mL
10007	Absolute	10007	2000	080116-38944 38945	08/10/19	2.0 mL	*	*	2000 ug/mL
10018	Absolute	10018	2000	030118-38950 38951	08/10/19	2.0 mL	*	*	2000 ug/mL

70023	Absolute	70023	1000	091217-38532 020818 - 39454	08/10/19	2.0 mL	*	*	1000 ug/mL
82705	Absolute	82705	2000	090617-39225 39226	08/10/19	2.0 mL	*	*	2000 ug/mL
94552	Absolute	94552	various	102017-38954 38955	08/10/19	2.0 mL	*	*	various

Name of Final Standard	8270 Surrogate 100/200 ppm
Prep'd By (Initials)	GA
Prep Date	08/09/18
Exp Date	07/11/19

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from contianer Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc (range)
8270 Acid Surrogate Mix	Restek	33029	10,000 ug/mL	**A0132399-&38918**	**07/11/19**	5.0 mL	250 mL	**Acetone #030817A**	200 ug/mL
8270 B/N Surrogate Mix	Restek	31086	5000 ug/mL	**A0135243-39163 39164**	**07/11/19 08/09/19**	5.0 mL	250 mL	*	100 ug/mL

% Moisture

Batch: QCG 180906-M007262

Method: CLP 4.0

Date: 09/06/18 14:38

Sample	Container	Pan (g)	Pan+Wet (g)	Pan+Dry 1 (g)	Pan+Dry 2 (g)	Moisture (%)	Comments
AZ79155D		0.8223 09/06/18 14:38	6.7341 09/06/18 14:40	6.4896 09/07/18 10:15	6.4898 09/07/18 10:15	4.132	
AZ79155		0.8163 09/06/18 14:37	6.7747 09/06/18 14:38	6.5220 09/07/18 10:15	6.5219 09/07/18 10:15	4.243	
AZ79154		0.8030 09/06/18 14:35	6.8273 09/06/18 14:37	6.6361 09/07/18 10:15	6.6362 09/07/18 10:15	3.172	
AZ79153		0.8065 09/06/18 14:34	7.9595 09/06/18 14:35	7.7716 09/07/18 10:15	7.7714 09/07/18 10:15	2.630	
AZ79152		0.8034 09/06/18 14:32	7.0327 09/06/18 14:33	6.7636 09/07/18 10:14	6.7635	4.322	
AZ79151		0.8128 09/06/18 14:29	7.0694 09/06/18 14:31	6.7677	6.7680 09/07/18 10:14	4.817	
AZ79150		0.8167 09/06/18 14:27	7.0608 09/06/18 14:29	6.7581 09/07/18 10:14	6.7583 09/07/18 10:14	4.845	
AZ79149		0.8148 09/06/18 14:25	7.1259 09/06/18 14:26	6.8591 09/07/18 10:13	6.8591 09/07/18 10:13	4.227	
AZ79148		0.8320 09/06/18 14:21	7.4912 09/06/18 14:23	7.2822 09/07/18 10:11	7.2822 09/07/18 10:11	3.139	
AZ79147		0.8291 09/06/18 14:19	6.8807 09/06/18 14:20	6.6434	6.6443 09/07/18 10:11	3.906	
AZ79146		0.8170 09/06/18 14:17	7.4152 09/06/18 14:18	7.1495 09/07/18 10:10	7.1496 09/07/18 10:10	4.025	

Date/Time InOven@104°C	Date/Time OutOven@104°C	Date/Time InOven@104°C	Date/Time OutOven@104°C
09/06/18 2:40:00 PM			09/07/18 10:10:00 AM

% Moisture

Batch: QCG 180906-M007263

Method: CLP 4.0

Date: 09/06/18 15:15

Sample	Container	Pan (g)	Pan+Wet (g)	Pan+Dry 1 (g)	Pan+Dry 2 (g)	Moisture (%)	Comments
AZ79165D		0.8220	6.5877	5.7650	5.7652	14.265	
		09/06/18 15:15	09/06/18 15:16		09/07/18 10:30		
AZ79165		0.8251	6.6987	5.9480	5.9480	12.781	
		09/06/18 15:13	09/06/18 15:14	09/07/18 10:29	09/07/18 10:29		
AZ79164		0.8176	8.2642	8.0129	8.0129	3.375	
		09/06/18 15:12	09/06/18 15:13	09/07/18 10:29			
AZ79163		0.8212	7.8240	7.5719	7.5718	3.601	
		09/06/18 15:11	09/06/18 15:12	09/07/18 10:29	09/07/18 10:29		
AZ79162		0.8226	6.7279	6.2791	6.2792	7.598	
		09/06/18 15:10	09/06/18 15:11	09/07/18 10:28			
AZ79161		0.8231	7.0625	6.5009	6.5011	8.998	
		09/06/18 15:09	09/06/18 15:10	09/07/18 10:28	09/07/18 10:28		
AZ79160		0.8249	8.7822	8.5983	8.5984	2.310	
		09/06/18 15:08	09/06/18 15:09	09/07/18 10:28	09/07/18 10:28		
AZ79159		0.8172	8.3062	8.1567	8.1569	1.994	
		09/06/18 15:02	09/06/18 15:07	09/07/18 10:26	09/07/18 10:26		
AZ79158		0.8132	7.8800	7.7276	7.7275	2.158	
		09/06/18 15:00	09/06/18 15:02	09/07/18 10:26	09/07/18 10:26		
AZ79157		0.8343	7.0685	6.7183	6.7184	5.616	
		09/06/18 14:58	09/06/18 15:00	09/07/18 10:26	09/07/18 10:26		
AZ79156		0.8094	6.7552	6.4964	6.4963	4.354	
		09/06/18 14:57	09/06/18 14:58	09/07/18 10:25	09/07/18 10:25		

Date/Time InOven@104°C	Date/Time OutOven@104°C	Date/Time InOven@104°C	Date/Time OutOven@104°C
09/06/18 3:16:00 PM			09/07/18 10:25:00 AM

% Moisture

Batch: QCG 180906-M007264

Method: CLP 4.0

Date: 09/06/18 15:30

Sample	Container	Pan (g)	Pan+Wet (g)	Pan+Dry 1 (g)	Pan+Dry 2 (g)	Moisture (%)	Comments
AZ79175		0.8341 09/06/18 15:30	9.6531 09/06/18 15:31	8.4863 09/07/18 10:38	8.4863 09/07/18 10:38	13.231	
AZ79174		0.8229 09/06/18 15:29	9.0933 09/06/18 15:30	8.9267 09/07/18 10:38	8.9268	2.013	
AZ79173		0.8192 09/06/18 15:27	7.2727 09/06/18 15:29	6.0464 09/07/18 10:37	6.0465	19.001	
AZ79172		0.8261 09/06/18 15:26	7.1389 09/06/18 15:27	5.9157 09/07/18 10:37	5.9157	19.377	
AZ79171		0.8257 09/06/18 15:25	7.8465 09/06/18 15:26	7.5585	7.5587 09/07/18 10:37	4.099	
AZ79170		0.8201 09/06/18 15:24	7.2025 09/06/18 15:25	6.8949 09/07/18 10:36	6.8948 09/07/18 10:36	4.821	
AZ79169		0.8357 09/06/18 15:23	8.4088 09/06/18 15:24	7.7783	7.7790 09/07/18 10:36	8.316	
AZ79168		0.8261 09/06/18 15:22	7.5117 09/06/18 15:23	6.7076 09/07/18 10:36	6.7075 09/07/18 10:36	12.029	
AZ79167		0.8288 09/06/18 15:21	6.6608 09/06/18 15:22	5.7738	5.7744 09/07/18 10:35	15.199	
AZ79166D		0.8310 09/06/18 15:20	8.3289 09/06/18 15:21	7.8407 09/07/18 10:34	7.8407 09/07/18 10:34	6.511	
AZ79166		0.8148 09/06/18 15:19	8.3446 09/06/18 15:19	7.8399 09/07/18 10:33	7.8399 09/07/18 10:33	6.703	

Date/Time InOven@104°C	Date/Time OutOven@104°C	Date/Time InOven@104°C	Date/Time OutOven@104°C
09/06/18 3:31:00 PM			09/07/18 10:33:00 AM

% Moisture

Batch: QCG 180906-M007265

Method: CLP 4.0

Date: 09/06/18 15:37

Sample	Container	Pan (g)	Pan+Wet (g)	Pan+Dry 1 (g)	Pan+Dry 2 (g)	Moisture (%)	Comments
AZ79178D		0.8194	7.5328	7.1882	7.1886	5.127	
		09/06/18 15:37	09/06/18 15:39		09/07/18 10:41		
AZ79178		0.8205	7.5080	7.1255	7.1256	5.718	
		09/06/18 15:35	09/06/18 15:37	09/07/18 10:40	09/07/18 10:40		
AZ79177		0.8268	6.9798	6.7417	6.7417	3.870	
		09/06/18 15:34	09/06/18 15:35	09/07/18 10:40			
AZ79176		0.8215	8.0579	7.6819	7.6827	5.185	
		09/06/18 15:33	09/06/18 15:34		09/07/18 10:39		

Date/Time InOven@104°C	Date/Time OutOven@104°C	Date/Time InOven@104°C	Date/Time OutOven@104°C
09/06/18 3:39:00 PM			09/07/18 10:39:00 AM

_SON009WE

Organic Extraction Worksheet

Method	8270 Son Ext. Methylene c 3550B Wet MIS	Extraction Set	180907A	Extraction Method	SON009WETIS	Units	mL

Spiked ID 1	8270T Spike 8-10-18 exp 6-22-19		Surrogate ID 1	8270 Surrogate 8-9-18 exp 7-11-19	
Spiked ID 2	PAH SIMPCP 9-7-18 exp 9-7-19		Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	09/07/18 13:10	
Spiked ID 8			Ext. End Time:	09/10/18 15:40	
			GC Requires Extract By:	**09/19/18 0:00**	

pH1			Water Bath Temp Criteria	73,75 °C
pH2				
pH3				

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907A Blk				1	1 equip	30.54g E-S1.1 E-WB5	1	NA	09/07/18 13:10	
2	180907A LCS-1		0.250	1	1	1 equip	30.31g E-S1.2 E-WB5	1	NA	09/07/18 13:10	
3	180907A LCS-2		0.050	2	1	1 equip	30.25g E-S2 E-WB5	1	NA	09/07/18 13:10	
4	180907A LCSD-1		0.250	1	1	1 equip	30.85g E-S6 E-WB5	1	NA	09/07/18 13:10	
5	180907A LCSD-2		0.050	2	1	1 equip	30.13g E-S7 E-WB5	1	NA	09/07/18 13:10	
6	AZ79146	AZ79146S01			1	1 equip	30.36g e-s8 E-WB5	1	NA	09/07/18 13:10	86766
7	AZ79147	AZ79147S01			1	1 equip	30.19g E-S1.1 E-WB5	1	NA	09/07/18 13:10	86766
8	AZ79148	AZ79148S01			1	1 equip	30.31g E-S1.2 E-WB5	1	NA	09/07/18 13:10	86766
9	AZ79149	AZ79149S01			1	1 equip	30.35g E-S2 E-WB5	1	NA	09/07/18 13:10	86766
10	AZ79150 MS-1	AZ79150S01	0.250	1	1	1 equip	30.20G E-S1.2 E-WB6	1	NA	09/07/18 15:00	86766
11	AZ79150 MSD-1	AZ79150S01	0.250	1	1	1 equip	30.04G E-S2 E-WB6	1	NA	09/07/18 15:00	86766
12	AZ79150 MS-2	AZ79150S01	0.0250	2	1	1 equip	30.09G E-S6 E-WB6	1	NA	09/07/18 15:00	86766
13	AZ79150 MSD-2	AZ79150S01	0.0250	2	1	1 equip	30.07G E-S7 E-WB6	1	NA	09/07/18 15:00	86766
14	AZ79150	AZ79150S01			1	1 equip	30.70g E-S6 E-WB5	1	NA	09/07/18 13:10	86766
15	AZ79151	AZ79151S01			1	1 equip	30.51g E-S7 E-WB5	1	NA	09/07/18 13:10	86766
16	AZ79152	AZ79152S01			1	1 equip	30.59g e-s8 E-WB5	1	NA	09/07/18 13:10	86766

Solvent and Lot#	
B.Na2SO4	18D105205
SAND	18C025203
FILTER PAPER	15751144
MC	58059
A.Na2SO4	6-28-18

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	OA
Date	09/10/18
Time	13:00
Refrigerator	EE-C

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/11/18 1:11:47 PM

Reviewed By: KY **Date** 9/11/18

Organic Extraction Worksheet

Method	8270 Son Ext. Methylene c 3550B Wet MIS	Extraction Set	180907A	Extraction Method	SON009WETIS	Units	mL

Spiked ID 1	8270T Spike 8-10-18 exp 6-22-19		Surrogate ID 1	8270 Surrogate 8-9-18 exp 7-11-19	
Spiked ID 2	PAH SIMPCP 9-7-18 exp 9-7-19		Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	09/07/18 13:10	
Spiked ID 8			Ext. End Time:	09/10/18 15:40	
			GC Requires Extract By:	**09/19/18 0:00**	

pH1			Water Bath Temp Criteria	73,75 °C
pH2				
pH3				

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
17	AZ79153	AZ79153S01			1	1	30.31g	1	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB6				
18	AZ79154	AZ79154S01			1	1	30.75g	1	NA	09/07/18 13:10	86766
						equip	E-S1.2 E-WB6				
19	AZ79155	AZ79155S01			1	1	30.41g	1	NA	09/07/18 13:10	86766
						equip	E-S2 E-WB6				
20	AZ79156	AZ79156S01			1	1	30.55g	1	NA	09/07/18 13:10	86766
						equip	E-S6 E-WB6				
21	AZ79157	AZ79157S01			1	1	30.36g	1	NA	09/07/18 13:10	86766
						equip	E-S7 E-WB6				
22	AZ79158	AZ79158S01			1	1	30.14g	1	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB6				
23	AZ79159	AZ79159S01			1	1	30.37g	1	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB6				
24	AZ79160	AZ79160S01			1	1	30.70g	1	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB6				

KY 9/11/18

Solvent and Lot#	
B.Na2SO4	18D105205
SAND	18C025203
FILTER PAPER	15751144
MC	58059
A.Na2SO4	6-28-18

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/11/18 1:11:47 PM

Reviewed By: KY **Date** 9/11/18

_SEP004

Organic Extraction Worksheet

Method	625/8270 Separatory Funnel Extra 3510C	Extraction Set	180907A	Extraction Method	SEP004	Units	mL

Spiked ID 1	8270T Spike 8-10-18 EXP 6-22-19	Surrogate ID 1	8270 Surrogate 8-9-18 EXP 7-11-19	
Spiked ID 2	PAH SIMPCP 9-7-18 EXP 9-7-19	Surrogate ID 2		
Spiked ID 3		Surrogate ID 3		
Spiked ID 4		Surrogate ID 4		
Spiked ID 5		Surrogate ID 5		
Spiked ID 6		Sufficient Vol for Matrix QC:	no	
Spiked ID 7		Ext. Start Time:	09/07/18 10:28	
Spiked ID 8		Ext. End Time:	09/07/18 15:50	
		GC Requires Extract By:	**09/19/18 0:00**	

pH1	2	9/07/18 10:35:00 AM	Water Bath Temp Criteria	78 °C
pH2	14	9/07/18 12:10:00 PM		
pH3				

Spiked By: SS **Date** 09/07/18 **Witnessed By:** EL **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907A Blk				1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
2	180907A LCS-1		0.250	1	1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
3	180907A LCS-2		0.050	2	1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
4	180907A LCSd-1		0.250	1	1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
5	180907A LCSd-2		0.050	2	1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
6	AZ79179	AZ79179W03			1	1	910	1	2/1	09/07/18 10:28	86766
						equip	E-WB6				

Key 9/10/18

Solvent and Lot#	
ph strip	HC 727135
1+1 Sulfuric Acid	7-3-18
Dichloromethane (DCM)	58059
Filter Paper	400138
Acidified Na2SO4	6-28-18
10N NaOH	9-6-18
B. Na2SO4	18D105205

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	OA
Date	09/10/18
Time	9:25
Refrigerator	GC_C

	Technician's Initials
Scanned By	SS
Sample Preparation	SS,EL
Extraction	FM,SS,EL
Concentration	SS
Modified	09/10/18 3:42:54 PM

Reviewed By: Key 987 **Date** 9/10/18

09/10/18 3:43:39 PM Ext_ID 60242

Injection Log

Directory: M:\YODA\DATA\Y180829\

Vial	FileName	Multiplier	SampleName	Misc Info	Injected
2	0829Y002.D	1	SV Tune 03/07/18		29 Aug 18 5:57
3	0829Y003.D	1	4ug/ml 8270 08/16/18		29 Aug 18 6:24
4	0829Y004.D	1	5ug/ml 8270 08/16/18		29 Aug 18 6:52
5	0829Y005.D	1	10ug/ml 8270 08/16/18		29 Aug 18 7:20
6	0829Y006.D	1	20ug/ml 8270 08/16/18		29 Aug 18 7:47
7	0829Y007.D	1	40ug/ml 8270 08/16/18		29 Aug 18 8:15
8	0829Y008.D	1	50ug/ml 8270 08/16/18		29 Aug 18 8:43
9	0829Y009.D	1	60ug/ml 8270 08/16/18		29 Aug 18 9:11
10	0829Y010.D	1	80ug/ml 8270 08/16/18		29 Aug 18 9:39
11	0829Y011.D	1	100ug/ml 8270 08/16/18		29 Aug 18 10:07
12	0829Y012.D	1	SSug/ml 8270 08/16/18		29 Aug 18 10:35
73	0829Y174.D	1	SV TUNE 03/07/18		10 Sep 18 9:52
74	0829Y175.D	1	50ug/ml 8270 08/16/18 (1)		10 Sep 18 10:07
77	0829Y178.D	1	180907A Blk 1/1000		10 Sep 18 11:47
80	0829Y181.D	1.0989	AZ79179W03 1/910		10 Sep 18 13:10
90	0829Y191.D	1	50ug/ml 8270 08/16/18 (1)		10 Sep 18 20:06
95	0829Y195.D	1	SV TUNE 03/07/18		11 Sep 18 9:32
96	0829Y196.D	1	50ug/ml 8270 08/16/18 (1)		11 Sep 18 9:47
99	0829Y199.D	658.762	AZ79146SO1 1/30.36G		11 Sep 18 12:13
1	0829Y201.D	1	180907A LCS-1 1/1000		11 Sep 18 13:33
2	0829Y202.D	1	SV TUNE 03/07/18		11 Sep 18 15:02
3	0829Y203.D	1	50ug/ml 8270 08/16/18 (1)		11 Sep 18 15:17
4	0829Y204.D	32.7439	180907A BLK 1/30.54G		11 Sep 18 15:45
5	0829Y205.D	32.9924	180907A LCS-1 1/30.31G		11 Sep 18 16:14
7	0829Y207.D	662.471	AZ79147S01 1/30.19G df20		11 Sep 18 17:10
8	0829Y208.D	659.848	AZ79148S01 1/30.31G df20		11 Sep 18 17:38
9	0829Y209.D	658.979	AZ79149S01 1/30.35G df20		11 Sep 18 18:06
12	0829Y212.D	651.466	AZ79150S01 1/30.70G df20		11 Sep 18 19:30
13	0829Y213.D	655.523	AZ79151S01 1/30.51G df20		11 Sep 18 19:58
15	0829Y215.D	1319.7	AZ79153S01 1/30.31G df40		11 Sep 18 20:54
16	0829Y216.D	650.407	AZ79154S01 1/30.75G df20		11 Sep 18 21:22
17	0829Y217.D	657.678	AZ79155S01 1/30.41G df20		11 Sep 18 21:50
18	0829Y218.D	654.664	AZ79156S01 1/30.55G df20		11 Sep 18 22:18
19	0829Y219.D	1317.52	AZ79157S01 1/30.36G df40		11 Sep 18 22:46
21	0829Y221.D	658.545	AZ79159S01 1/30.37G df20		11 Sep 18 23:42
24	0829Y224.D	1	SV TUNE 03/07/18		12 Sep 18 8:46
25	0829Y225.D	1	50ug/ml 8270 08/16/18 (1)		12 Sep 18 9:01
27	0829Y227.D	665.779	AZ79150S01 MSD-1 1/30.04G DF20		12 Sep 18 10:33
28	0829Y228.D	1307.62	AZ79152S01 1/30.59G DF40		12 Sep 18 11:01
29	0829Y229.D	663.57	AZ79158S01 1/30.14G DF20		12 Sep 18 11:29
30	0829Y230.D	651.466	AZ79160S01 1/30.70G DF20		12 Sep 18 11:57
31	0829Y231.D	662.252	AZ79150S01 MS-1 1/30.20G DF20		12 Sep 18 12:25
40	0829Y240.D	1	50ug/ml 8270 08/16/18 (2)		12 Sep 18 17:10

ORGANICS
Calibration Data

APPL, INC.

PAH by GCMS SIM
EPA 8270 SIM

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Initial Cal. Date: 09/17/18
Matrix: Instrument: Linus Initials:

		Compound	0.1	0.2	0.5	2.5	5	25	50				Avg	%RSD	Type	r^2	Q	MRF
			0917L003.D	0917L004.D	0917L005.D	0917L006.D	0917L007.D	0917L008.D	0917L009.D									
1	I	Napthalene-D8(IS)																
2	S	Surrogate Recovery (NBZ)	0.3520	0.3113	0.3551	0.2735	0.2863	0.2969	0.2893				0.31	10	S			
3	TM	Naphthalene	1.052	0.8587	1.075	1.079	0.9959	0.9289	0.8401				0.98	10	TM			0.700
4	S	2-methylnaphthalene-D10 (2M	1.089	0.9288	1.111	1.095	1.117	1.024	0.9426				1.0	7.7	S			
5	TM	2-Methylnaphthalene	0.5685	0.4631	0.5857	0.5999	0.5490	0.4865	0.4370				0.53	12	TM			0.400
6	TM	1-Methylnaphthalene	0.6976	0.5853	0.7284	0.7346	0.6654	0.5849	0.5283				0.65	12	TM			
7	I	Acenaphthene-D10(IS)																
8	S	Surrogate Recovery (FBP)	1.507	1.282	1.541	1.531	1.565	1.477	1.410				1.5	6.7	S			
9	TM	Acenaphthylene	4.643	3.724	4.711	5.014	4.613	4.378	4.055				4.4	9.8	TM			0.900
10	*TM	Acenaphthene	1.588	1.246	1.483	1.511	1.366	1.240	1.184				1.4	11	*TM			0.900
11	TM	Fluorene	1.568	1.272	1.606	1.693	1.572	1.404	1.389				1.5	9.9	TM			0.900
12	TML	Pentachlorophenol		0.0475	0.0592	0.1311	0.1690	0.2785	0.3043				0.16	66	TML	0.998		0.050
13	I	Phenanthrene-D10(IS)																
14	TM	Phenanthrene	1.322	1.061	1.307	1.314	1.227	1.103	1.005				1.2	11	TM			0.700
15	TM	Anthracene	1.113	0.8858	1.148	1.231	1.170	1.034	0.9777				1.1	11	TM			0.700
16	S	Fluoranthene-D10 (FRT)	1.340	1.095	1.377	1.389	1.489	1.458	1.422				1.4	9.5	S			
17	*TM	Fluoranthene	1.610	1.281	1.643	1.780	1.696	1.559	1.447				1.6	11	*TM			0.600
18	I	Chrysene-D12(IS)																
19	TM	Pyrene	1.335	1.077	1.354	1.405	1.313	1.264	1.188				1.3	8.8	TM			0.600
20	S	Surrogate Recovery (TPH)	0.9195	0.6074	0.7507	0.7105	0.7429	0.7319	0.7143				0.74	13	S			
21	TM	Benz (a) anthracene	1.198	0.9031	1.102	1.168	1.116	1.145	1.093				1.1	8.7	TM			0.800
22	TM	Chrysene	1.290	1.012	1.263	1.298	1.210	1.138	1.061				1.2	9.6	TM			0.700
23	TML	Indeno (1,2,3-cd) pyrene	1.126	0.4453	0.5847	0.7226	0.7289	0.8792	0.9378				0.77	29	TML	0.999		0.500
24	I	Perylene-D12(IS)																
25	TM	Benzo (b) fluoranthene	1.007	0.7825	1.039	1.111	1.077	1.110	1.035				1.0	11	TM			0.700
26	TM	Benzo (k) fluoranthene	1.336	1.055	1.309	1.395	1.298	1.207	1.113				1.2	10.0	TM			0.700
27	*TM	Benzo (a) pyrene	0.8467	0.6539	0.8823	1.033	1.013	1.031	0.9750				0.92	15	*TM			0.700
28	TM	Dibenz (a,h) anthracene	0.8269	0.7151	0.8594	0.9849	0.9375	1.040	0.9902				0.91	12	TM			0.400
29	TM	Benzo (g,h,i) perylene	0.9682	0.7440	0.9693	1.085	1.051	1.056	1.003				0.98	12	TM			0.500
30																		
31																		
32																		
33																		
34																		
35																		

Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L003.D Vial: 3
Acq On : 17 Sep 18 9:48 Operator: MA
Sample : 0.1ug/mL SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 17 13:56 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 13:56:14 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19174	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8642	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.95	188	16645	2.50000 ppb	-0.01
18) Chrysene-D12(IS)	14.39	240	20201	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.17	264	20166	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	270	0.12877 ppb	0.00
Spiked Amount 5.000			Recovery	= 2.580%	
4) 2-methylnaphthalene-D10 (2	4.99	152	835	0.12094 ppb	0.04
Spiked Amount 5.000			Recovery	= 2.420%	
8) Surrogate Recovery (FBP)	5.46	172	521	0.11851 ppb	0.00
Spiked Amount 5.000			Recovery	= 2.380%	
16) Fluoranthene-D10 (FRT)	10.12	212	892	0.11411 ppb	-0.11
Spiked Amount 5.000			Recovery	= 2.280%	
20) Surrogate Recovery (TPH)	11.40	244	743	0.87582 ppb	-0.08
Spiked Amount 5.000			Recovery	= 17.520%	
Target Compounds					Qvalue
3) Naphthalene	4.21	128	807	0.12397 ppb	98
5) 2-Methylnaphthalene	5.02	141	436	0.12438 ppb	93
6) 1-Methylnaphthalene	5.13	141	535	0.12419 ppb	100
9) Acenaphthylene	6.06	152	1605	0.12039 ppb	100
10) Acenaphthene	6.25	154	549	0.13235 ppb	91
11) Fluorene	6.86	166	542	0.12070 ppb	98
12) Pentachlorophenol	7.76	266	108	1.53327 ppb	74
14) Phenanthrene	7.99	178	880	0.12774 ppb	98
15) Anthracene	8.06	178	741	0.11977 ppb	98
17) Fluoranthene	10.17	202	1072	0.11884 ppb	96
19) Pyrene	10.79	202	1079	0.12046 ppb	96
21) Benz (a) anthracene	14.37	228	968	0.12480 ppb	99
22) Chrysene	14.47	228	1042	0.12558 ppb	99
23) Indeno (1,2,3-cd) pyrene	20.49	276	910	1.23460 ppb #	94
25) Benzo (b) fluoranthene	17.29	252	812	0.73870 ppb	97
26) Benzo (k) fluoranthene	17.36	252	1078	0.12397 ppb	97
27) Benzo (a) pyrene	18.04	252	683	0.78612 ppb	99
28) Dibenz (a,h) anthracene	20.55	278	667	0.10519 ppb	96
29) Benzo (g,h,i) perylene	20.98	276	781	0.77670 ppb #	92

(#) = qualifier out of range (m) = manual integration

Quantitation Report

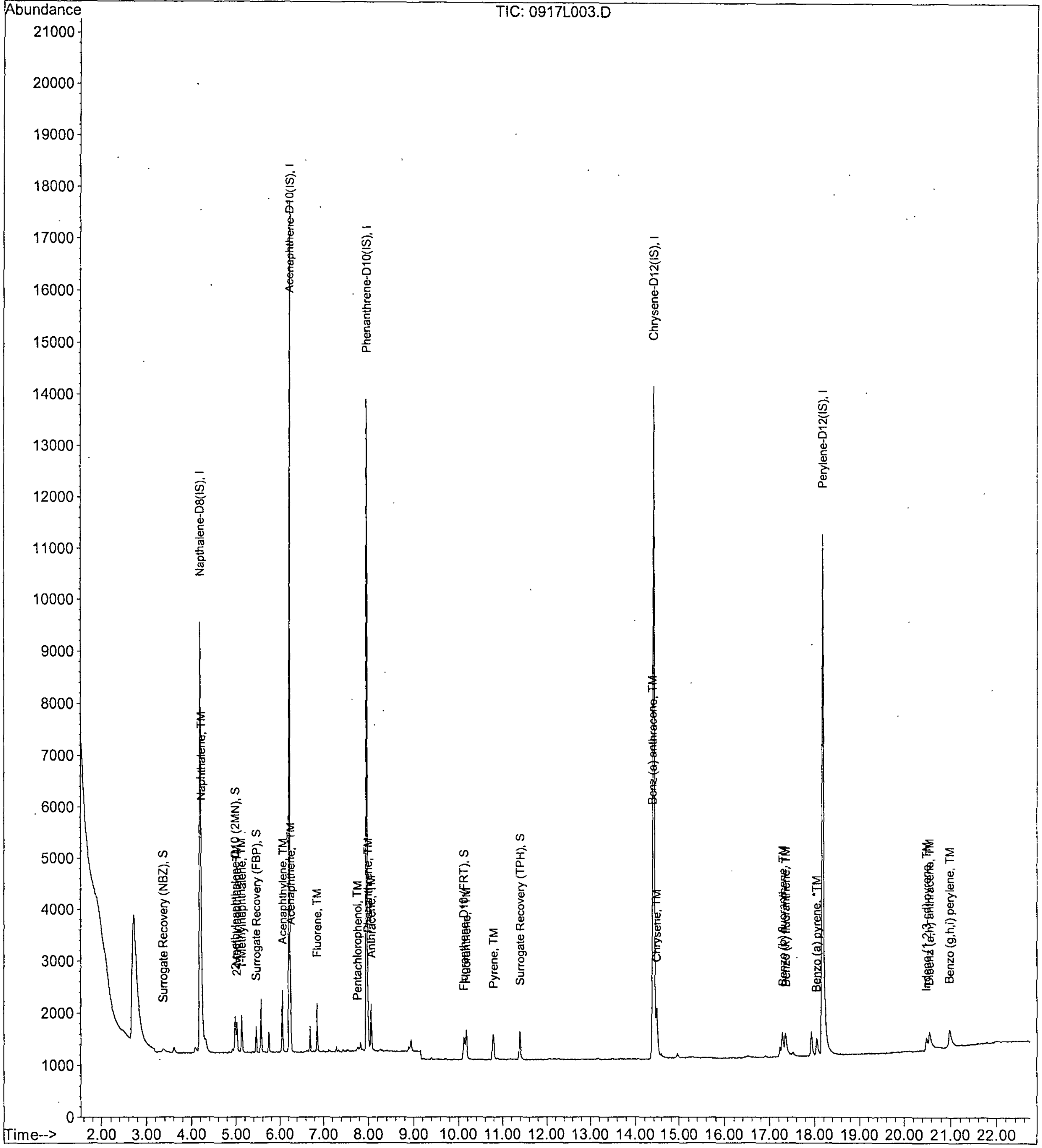
Data File : M:\LINUS\DATA\L180917P\0917L003.D
Acq On : 17 Sep 18 9:48
Sample : 0.1ug/mL SIM PCP 09/09/18
Misc :

Vial: 3
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 17 13:56 2018

Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 14:01:10 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

```
Data File : M:\LINUS\DATA\L180917P\0917L004.D          Vial: 4
Acq On    : 17 Sep 18  10:17                       Operator: MA
Sample    : 0.2 SIM PCP 09/09/18                   Inst    : Linus
Misc      :                                        Multiplr: 1.00

Quant Time: Sep 17 13:54 2018             Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title        : EPA 8270
Last Update  : Mon Sep 17 13:54:45 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19434	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8676	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.95	188	17005	2.50000 ppb	-0.01
18) Chrysene-D12(IS)	14.39	240	20209	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.17	264	19841	2.50000 ppb	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
2) Surrogate Recovery (NBZ)	3.38	82	484	0.22774 ppb	0.00
Spiked Amount 5.000			Recovery	= 4.560%	
4) 2-methylnaphthalene-D10 (2	4.99	152	1444	0.20634 ppb	0.04
Spiked Amount 5.000			Recovery	= 4.120%	
8) Surrogate Recovery (FBP)	5.46	172	890	0.20166 ppb	0.00
Spiked Amount 5.000			Recovery	= 4.040%	
16) Fluoranthene-D10 (FRT)	10.12	212	1490	0.18657 ppb	-0.11
Spiked Amount 5.000			Recovery	= 3.740%	
20) Surrogate Recovery (TPH)	11.40	244	982	0.91643 ppb	-0.08
Spiked Amount 5.000			Recovery	= 18.320%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) Naphthalene	4.21	128	1335	0.20234 ppb		99
5) 2-Methylnaphthalene	5.02	141	720	0.20265 ppb		93
6) 1-Methylnaphthalene	5.13	141	910	0.20841 ppb		99
9) Acenaphthylene	6.06	152	2585	0.19314 ppb		99
10) Acenaphthene	6.25	154	865	0.20771 ppb		91
11) Fluorene	6.86	166	883	0.19586 ppb		93
12) Pentachlorophenol	7.77	266	33	1.46812 ppb	#	66
14) Phenanthrene	7.99	178	1444	0.20517 ppb		99
15) Anthracene	8.06	178	1205	0.19065 ppb		99
17) Fluoranthene	10.17	202	1743	0.18913 ppb		97
19) Pyrene	10.78	202	1742	0.19441 ppb		98
21) Benz (a) anthracene	14.37	228	1460	0.18816 ppb		99
22) Chrysene	14.47	228	1636	0.19708 ppb		99
23) Indeno (1,2,3-cd) pyrene	20.49	276	720	1.20972 ppb	#	92
25) Benzo (b) fluoranthene	17.29	252	1242	0.79133 ppb		98
26) Benzo (k) fluoranthene	17.36	252	1675	0.19578 ppb		97
27) Benzo (a) pyrene	18.04	252	1038	0.83234 ppb		96
28) Dibenz (a,h) anthracene	20.56	278	1135	0.18193 ppb		98
29) Benzo (g,h,i) perylene	20.98	276	1181	0.82743 ppb		96

(#) = qualifier out of range (m) = manual integration

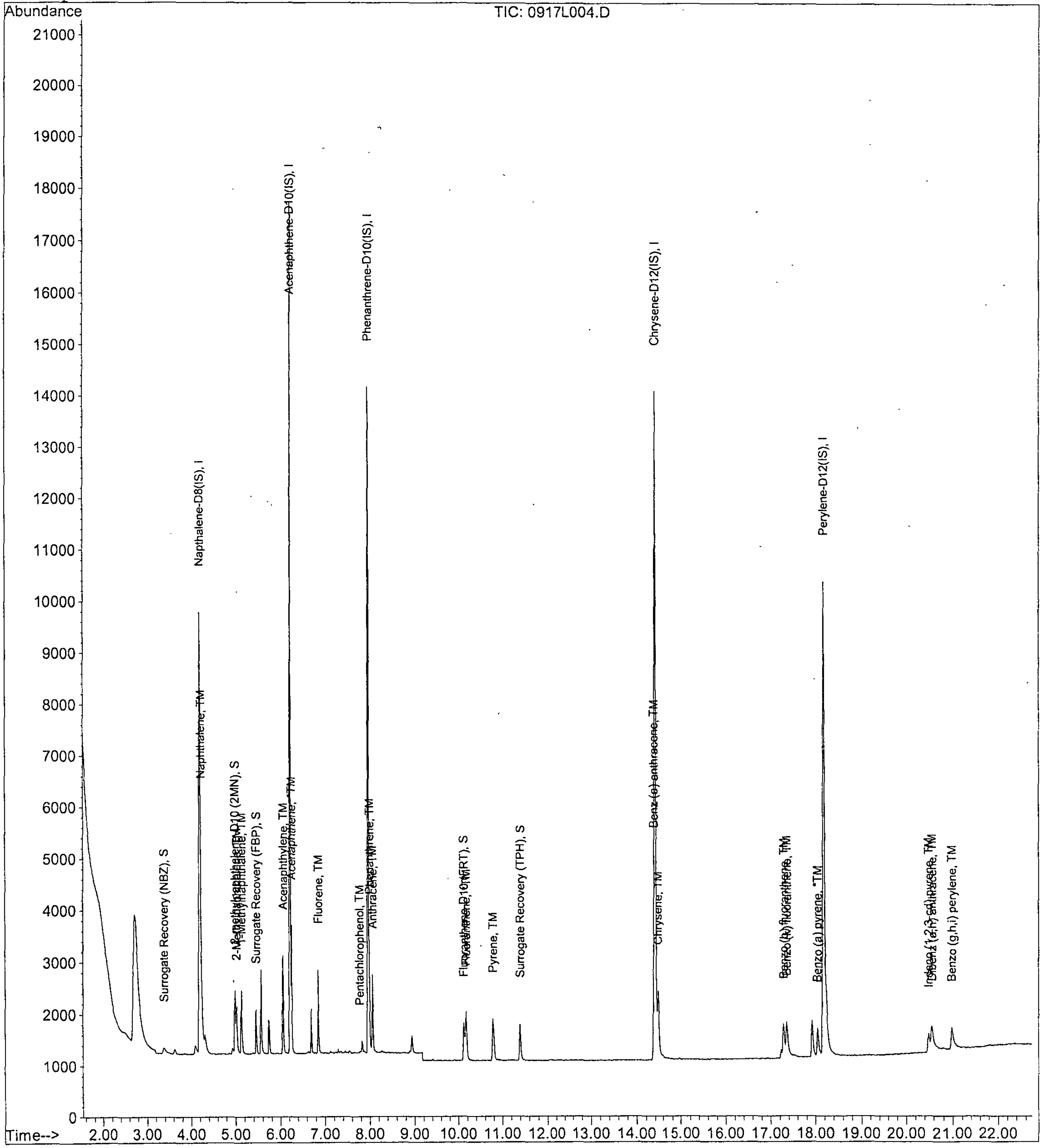
Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L004.D
Acq On : 17 Sep 18 10:17
Sample : 0.2 SIM PCP 09/09/18
Misc :

Vial: 4
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 17 13:54 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 14:01:10 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L005.D Vial: 5
Acq On : 17 Sep 18 10:46 Operator: MA
Sample : 0.5 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 17 13:53 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 13:53:14 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	18993	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8451	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16529	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.39	240	19787	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.17	264	19251	2.50000 ppb	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
2) Surrogate Recovery (NBZ)	3.37	82	1349	0.56747 ppb	0.00
Spiked Amount 5.000			Recovery	= 11.340%	
4) 2-methylnaphthalene-D10 (2	4.99	152	4222	0.53145 ppb	0.04
Spiked Amount 5.000			Recovery	= 10.620%	
8) Surrogate Recovery (FBP)	5.46	172	2605	0.53566 ppb	0.00
Spiked Amount 5.000			Recovery	= 10.720%	
16) Fluoranthene-D10 (FRT)	10.12	212	4552	0.51262 ppb	-0.11
Spiked Amount 5.000			Recovery	= 10.260%	
20) Surrogate Recovery (TPH)	11.40	244	2971	0.48188 ppb	-0.08
Spiked Amount 5.000			Recovery	= 9.640%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) Naphthalene	4.21	128	4084	0.55773 ppb		99
5) 2-Methylnaphthalene	5.02	141	2225	0.56401 ppb		93
6) 1-Methylnaphthalene	5.13	141	2767	0.57170 ppb		100
9) Acenaphthylene	6.05	152	7963	0.54544 ppb		98
10) Acenaphthene	6.25	154	2506	0.55628 ppb		93
11) Fluorene	6.86	166	2714	0.55281 ppb		95
12) Pentachlorophenol	7.77	266	100	1.10182 ppb		73
14) Phenanthrene	7.99	178	4321	0.56243 ppb		99
15) Anthracene	8.06	178	3795	0.54748 ppb		100
17) Fluoranthene	10.17	202	5430	0.53767 ppb		96
19) Pyrene	10.78	202	5360	0.54031 ppb		98
21) Benz (a) anthracene	14.37	228	4362	0.50408 ppb		100
22) Chrysene	14.47	228	5000	0.54643 ppb		99
23) Indeno (1,2,3-cd) pyrene	20.48	276	2314	0.55835 ppb	#	93
25) Benzo (b) fluoranthene	17.28	252	4000	0.13662 ppb		98
26) Benzo (k) fluoranthene	17.36	252	5038	0.52793 ppb		99
27) Benzo (a) pyrene	18.04	252	3397	0.16682 ppb		100
28) Dibenz (a,h) anthracene	20.55	278	3309	0.45799 ppb		99
29) Benzo (g,h,i) perylene	20.97	276	3732	0.14717 ppb		97

(#) = qualifier out of range (m) = manual integration

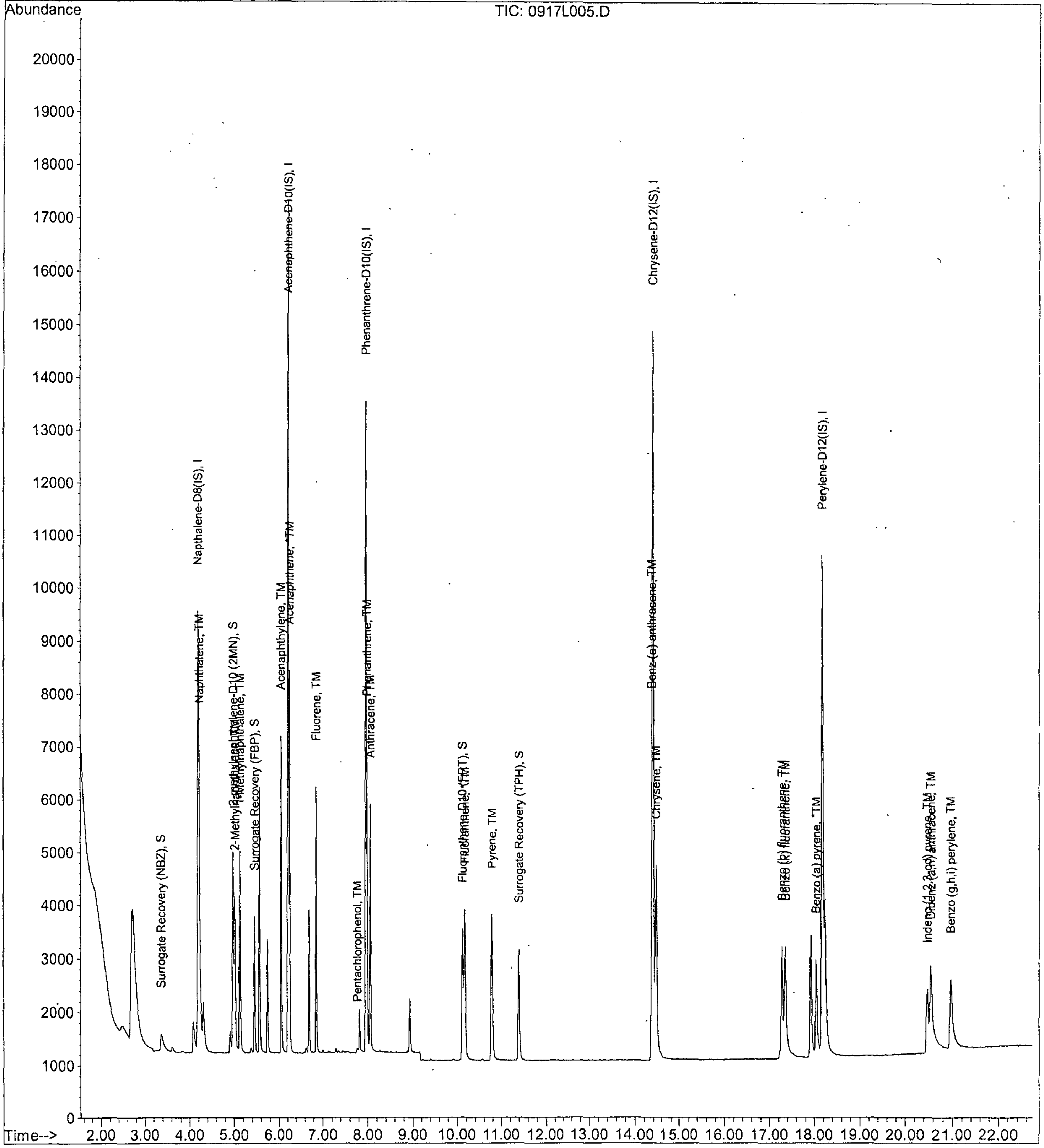
Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L005.D
Acq On : 17 Sep 18 10:46
Sample : 0.5 SIM PCP 09/09/18
Misc :

Vial: 5
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 17 13:53 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 14:01:10 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L006.D Vial: 6
Acq On : 17 Sep 18 11:15 Operator: MA
Sample : 2.5 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 17 12:11 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 12:09:56 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19882	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8750	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.95	188	17009	2.50000 ppb	-0.01
18) Chrysene-D12(IS)	14.39	240	21511	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.17	264	20591	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	5437	2.03669 ppb	0.00
Spiked Amount 5.000			Recovery	= 40.740%	
4) 2-methylnaphthalene-D10 (2	4.99	152	21772	2.46735 ppb	0.04
Spiked Amount 5.000			Recovery	= 49.340%	
8) Surrogate Recovery (FBP)	5.46	172	13393	2.95303 ppb	0.00
Spiked Amount 5.000			Recovery	= 59.060%	
16) Fluoranthene-D10 (FRT)	10.12	212	23621	2.73367 ppb	-0.11
Spiked Amount 5.000			Recovery	= 54.680%	
20) Surrogate Recovery (TPH)	11.40	244	15283	2.44534 ppb	-0.08
Spiked Amount 5.000			Recovery	= 48.900%	
Target Compounds					Qvalue
3) Naphthalene	4.21	128	21444	3.14299 ppb	100
5) 2-Methylnaphthalene	5.02	141	11927	3.26681 ppb	94
6) 1-Methylnaphthalene	5.13	141	14605	3.29457 ppb	100
9) Acenaphthylene	6.05	152	43871	3.64919 ppb	98
10) Acenaphthene	6.25	154	13219	3.68319 ppb	92
11) Fluorene	6.86	166	14818	3.71756 ppb	97
12) Pentachlorophenol	7.75	266	1147	2.17774 ppb	98
14) Phenanthrene	7.99	178	22357	3.45112 ppb	99
15) Anthracene	8.06	178	20942	3.53766 ppb	99
17) Fluoranthene	10.16	202	30282	3.32075 ppb	99
19) Pyrene	10.78	202	30222	2.99265 ppb	97
21) Benz (a) anthracene	14.37	228	25119	2.64751 ppb	100
22) Chrysene	14.47	228	27925	2.96878 ppb	99
23) Indeno (1,2,3-cd) pyrene	20.47	276	15544	1.89233 ppb	# 96
25) Benzo (b) fluoranthene	17.28	252	22884	2.09320 ppb	98
26) Benzo (k) fluoranthene	17.35	252	28728	2.77379 ppb	99
27) Benzo (a) pyrene	18.04	252	21264	2.18692 ppb	98
28) Dibenz (a,h) anthracene	20.54	278	20280	2.09739 ppb	99
29) Benzo (g,h,i) perylene	20.96	276	22333	2.15315 ppb	100

(#) = qualifier out of range (m) = manual integration

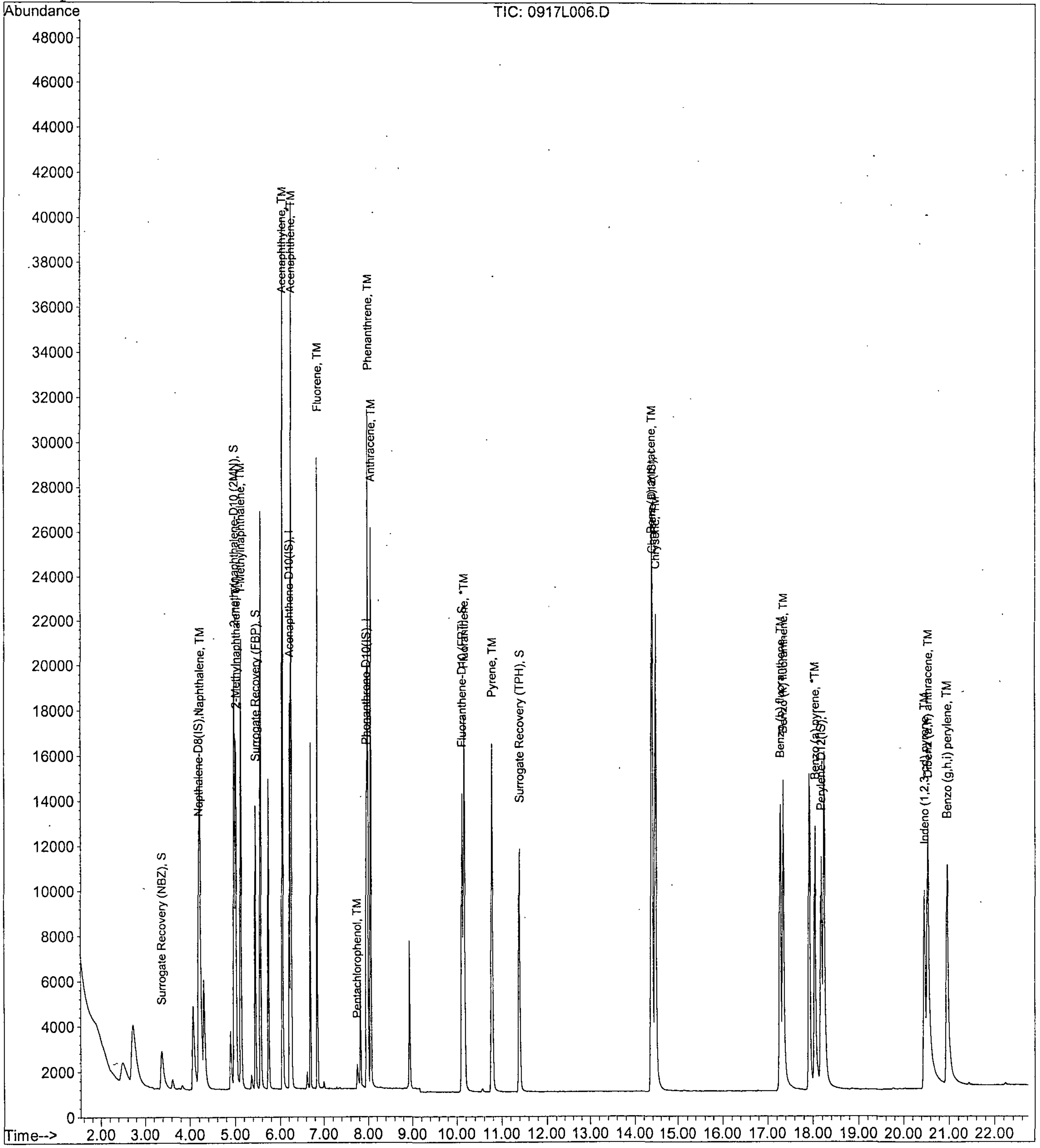
Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L006.D
Acq On : 17 Sep 18 11:15
Sample : 2.5 SIM PCP 09/09/18
Misc :

Vial: 6
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 17 12:11 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 14:01:10 2018
Response via : Initial Calibration



998

Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L007.D Vial: 7
Acq On : 17 Sep 18 11:45 Operator: MA
Sample : 5.0 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 17 12:11 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 12:10:47 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19112	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8336	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16064	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.39	240	20792	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.17	264	20089	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	10942	4.31152 ppb	0.00
Spiked Amount 5.000			Recovery	= 86.240%	
4) 2-methylnaphthalene-D10 (2	4.99	152	42699	5.04190 ppb	0.00
Spiked Amount 5.000			Recovery	= 100.840%	
8) Surrogate Recovery (FBP)	5.46	172	26095	5.88215 ppb	0.00
Spiked Amount 5.000			Recovery	= 117.640%	
16) Fluoranthene-D10 (FRT)	10.12	212	47845	5.75360 ppb	0.00
Spiked Amount 5.000			Recovery	= 115.080%	
20) Surrogate Recovery (TPH)	11.40	244	30894	5.58183 ppb	0.00
Spiked Amount 5.000			Recovery	= 111.640%	
Target Compounds					Qvalue
3) Naphthalene	4.21	128	38068	5.72553 ppb	100
5) 2-Methylnaphthalene	5.02	141	20986	5.87921 ppb	100
6) 1-Methylnaphthalene	5.13	141	25434	5.87074 ppb	100
9) Acenaphthylene	6.05	152	76907	6.47064 ppb	100
10) Acenaphthene	6.25	154	22782	6.40467 ppb	100
11) Fluorene	6.86	166	26215	6.62196 ppb	100
12) Pentachlorophenol	7.75	266	2817	4.37531 ppb	100
14) Phenanthrene	7.99	178	39430	6.25185 ppb	100
15) Anthracene	8.06	178	37588	6.49000 ppb	100
17) Fluoranthene	10.16	202	54500	6.11522 ppb	100
19) Pyrene	10.78	202	54580	5.48116 ppb	100
21) Benz (a) anthracene	14.37	228	46398	5.02198 ppb	100
22) Chrysene	14.47	228	50297	5.40899 ppb	100
23) Indeno (1,2,3-cd) pyrene	20.47	276	30310	4.06674 ppb	100
25) Benzo (b) fluoranthene	17.28	252	43262	4.44941 ppb	100
26) Benzo (k) fluoranthene	17.35	252	52136	5.13756 ppb	100
27) Benzo (a) pyrene	18.04	252	40701	4.68232 ppb	100
28) Dibenz (a,h) anthracene	20.54	278	37668	4.09913 ppb	100
29) Benzo (g,h,i) perylene	20.96	276	42207	4.60669 ppb	100

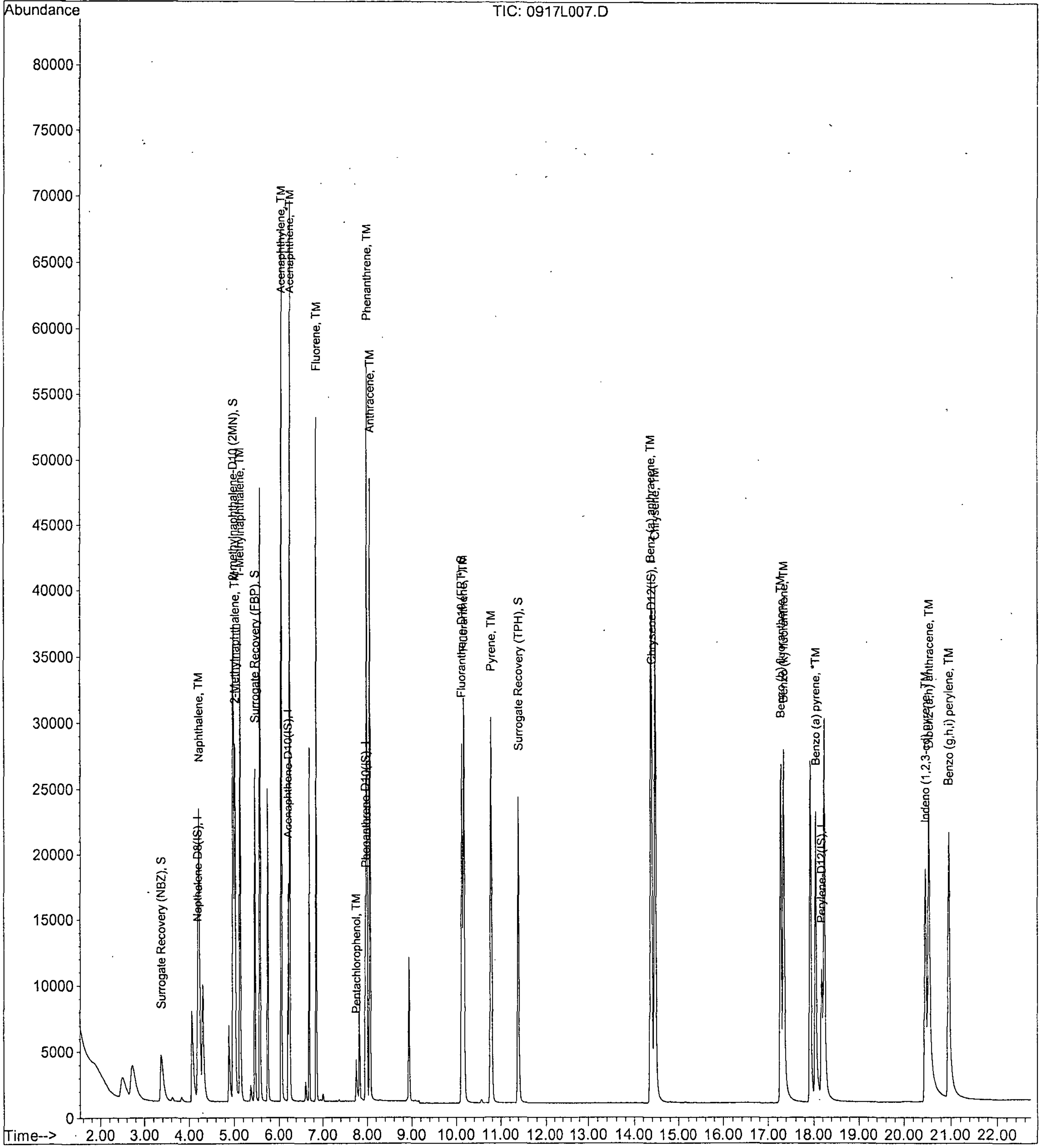
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L007.D Vial: 7
Acq On : 17 Sep 18 11:45 Operator: MA
Sample : 5.0 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 17 12:11 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 14:01:10 2018
Response via : Initial Calibration



1000

Quantitation Report (Not Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L008.D Vial: 8
Acq On : 17 Sep 18 12:14 Operator: MA
Sample : 25 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 17 13:04 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 12:09:56 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19465	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8166	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16121	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.41	240	20851	2.50000 ppb	0.02
24) Perylene-D12(IS)	18.18	264	20558	2.50000 ppb	0.01
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	57799	23.85531 ppb	0.00
Spiked Amount 5.000			Recovery =	477.100%	
4) 2-methylnaphthalene-D10 (2	4.99	152	199284	25.06649 ppb	0.04
Spiked Amount 5.000			Recovery =	501.320%	
8) Surrogate Recovery (FBP)	5.46	172	120586	27.54846 ppb	0.00
Spiked Amount 5.000			Recovery =	550.960%	
16) Fluoranthene-D10 (FRT)	10.13	212	235124	29.13249 ppb	-0.10
Spiked Amount 5.000			Recovery =	582.640%	
20) Surrogate Recovery (TPH)	11.41	244	152618	29.56604 ppb	-0.07
Spiked Amount 5.000			Recovery =	591.320%	

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
3) Naphthalene	4.21	128	180818	24.76844 ppb	99
5) 2-Methylnaphthalene	5.02	141	94699	24.19509 ppb	93
6) 1-Methylnaphthalene	5.13	141	113850	23.74219 ppb	100
9) Acenaphthylene	6.06	152	357521	27.14793 ppb	100
10) Acenaphthene	6.25	154	101275	24.76934 ppb	95
11) Fluorene	6.86	166	114680	25.85802 ppb	95
12) Pentachlorophenol	7.75	266	22741	30.98836 ppb	99
14) Phenanthrene	8.00	178	177819	25.06541 ppb	98
15) Anthracene	8.06	178	166727	26.18733 ppb	99
17) Fluoranthene	10.18	202	251295	27.32159 ppb	97
19) Pyrene	10.79	202	263516	26.16088 ppb	98
21) Benz (a) anthracene	14.39	228	238839	27.05451 ppb	99
22) Chrysene	14.49	228	237235	25.69078 ppb	99
23) Indeno (1,2,3-cd) pyrene	20.49	276	183323	23.45753 ppb	96
25) Benzo (b) fluoranthene	17.29	252	228220	23.39247 ppb	99
26) Benzo (k) fluoranthene	17.37	252	248167	24.54080 ppb	99
27) Benzo (a) pyrene	18.06	252	211979	24.40803 ppb	97
28) Dibenz (a,h) anthracene	20.56	278	213813	27.03793 ppb	96
29) Benzo (g,h,i) perylene	20.98	276	217183	23.68442 ppb	98

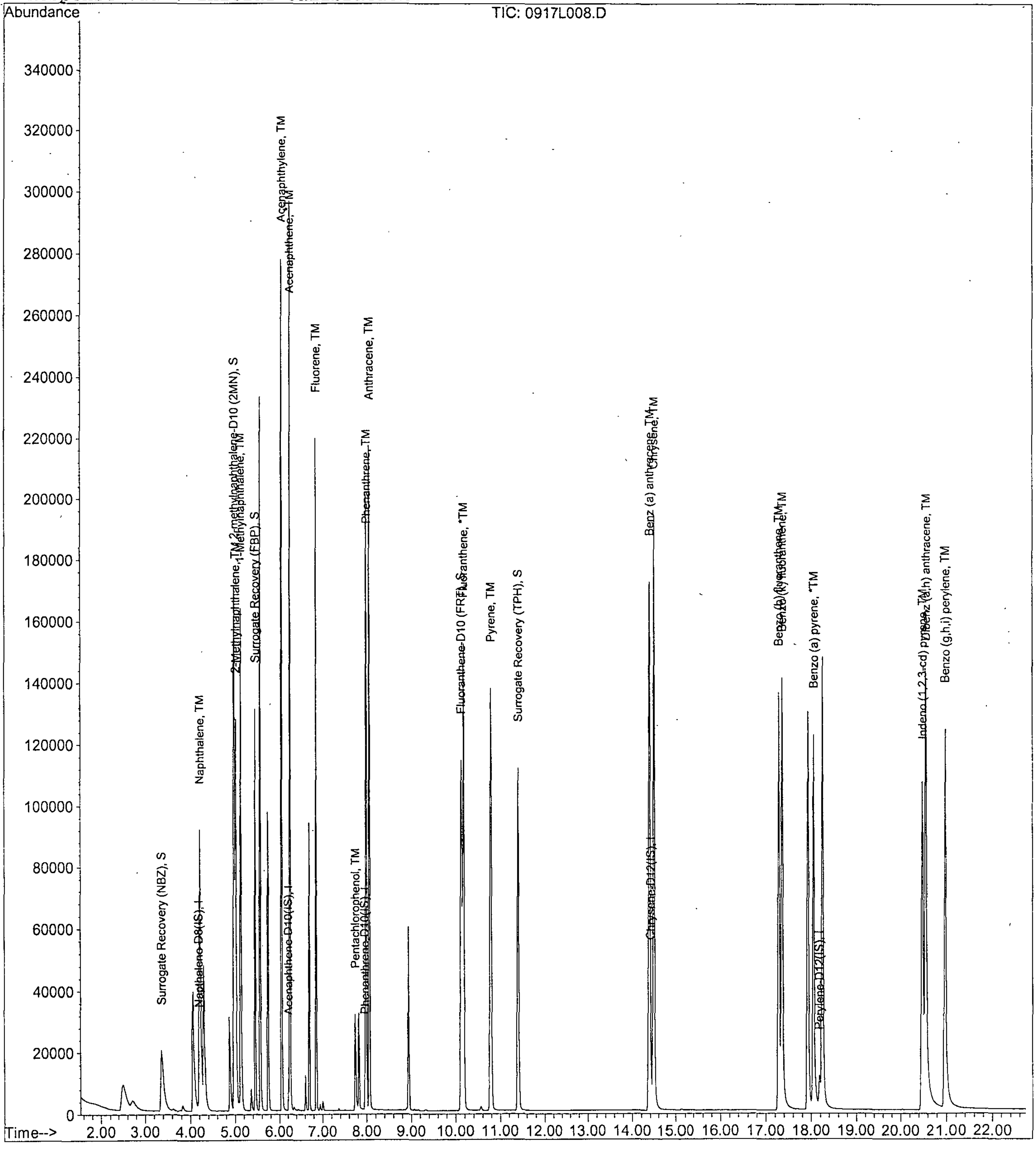
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L008.D   Vial: 8
Acq On : 17 Sep 18 12:14   Operator: MA
Sample : 25 SIM PCP 09/09/18   Inst : Linus
Misc :   Multiplr: 1.00

Quant Time: Sep 17 13:04 2018   Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 14:01:10 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L009.D Vial: 9
Acq On : 17 Sep 18 12:43 Operator: MA
Sample : 50 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 17 13:39 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 12:09:56 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19774	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8070	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	15972	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.42	240	20770	2.50000 ppb	0.03
24) Perylene-D12(IS)	18.20	264	20895	2.50000 ppb	0.02
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	114417	46.50789 ppb	0.00
Spiked Amount 5.000			Recovery	= 930.160%	
4) 2-methylnaphthalene-D10 (2	4.99	152	372780	45.76767 ppb	0.04
Spiked Amount 5.000			Recovery	= 915.360%	
8) Surrogate Recovery (FBP)	5.46	172	227560	50.95153 ppb	0.00
Spiked Amount 5.000			Recovery	= 1019.040%	
16) Fluoranthene-D10 (FRT)	10.14	212	454132	55.01123 ppb	-0.08
Spiked Amount 5.000			Recovery	= 1100.220%	
20) Surrogate Recovery (TPH)	11.42	244	296728	56.66079 ppb	-0.06
Spiked Amount 5.000			Recovery	= 1133.220%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) Naphthalene	4.21	128	332258	44.06989 ppb		99
5) 2-Methylnaphthalene	5.02	141	172835	42.72699 ppb		94
6) 1-Methylnaphthalene	5.13	141	208945	42.16798 ppb		99
9) Acenaphthylene	6.06	152	654534	48.54199 ppb		100
10) Acenaphthene	6.27	154	191042	45.91615 ppb		83
11) Fluorene	6.87	166	224208	49.68785 ppb		100
12) Pentachlorophenol	7.75	266	49108	63.33049 ppb		98
14) Phenanthrene	8.00	178	320887	44.33731 ppb		99
15) Anthracene	8.08	178	312302	48.07317 ppb		99
17) Fluoranthene	10.21	202	462177	48.89158 ppb		94
19) Pyrene	10.80	202	493484	48.09997 ppb		98
21) Benz (a) anthracene	14.40	228	453872	50.56504 ppb		100
22) Chrysene	14.51	228	440801	46.70425 ppb		99
23) Indeno (1,2,3-cd) pyrene	20.51	276	389574	50.14646 ppb		92
25) Benzo (b) fluoranthene	17.31	252	432650	44.55380 ppb		97
26) Benzo (k) fluoranthene	17.39	252	464995	44.86609 ppb		99
27) Benzo (a) pyrene	18.09	252	407460	46.67009 ppb		98
28) Dibenz (a,h) anthracene	20.59	278	413788	52.05872 ppb		97
29) Benzo (g,h,i) perylene	21.01	276	419117	45.67949 ppb	#	93

(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\LINUS\DATA\L180917P\0917L009.D          Vial: 9
Acq On    : 17 Sep 18  12:43                       Operator: MA
Sample    : 50 SIM PCP 09/09/18                    Inst    : Linus
Misc      :                                        Multiplr: 1.00

Quant Time: Sep 17 13:39 2018             Quant Results File: L0917PCP.RES

Method        : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title         : EPA 8270
Last Update   : Mon Sep 17 14:01:10 2018
Response via  : Initial Calibration
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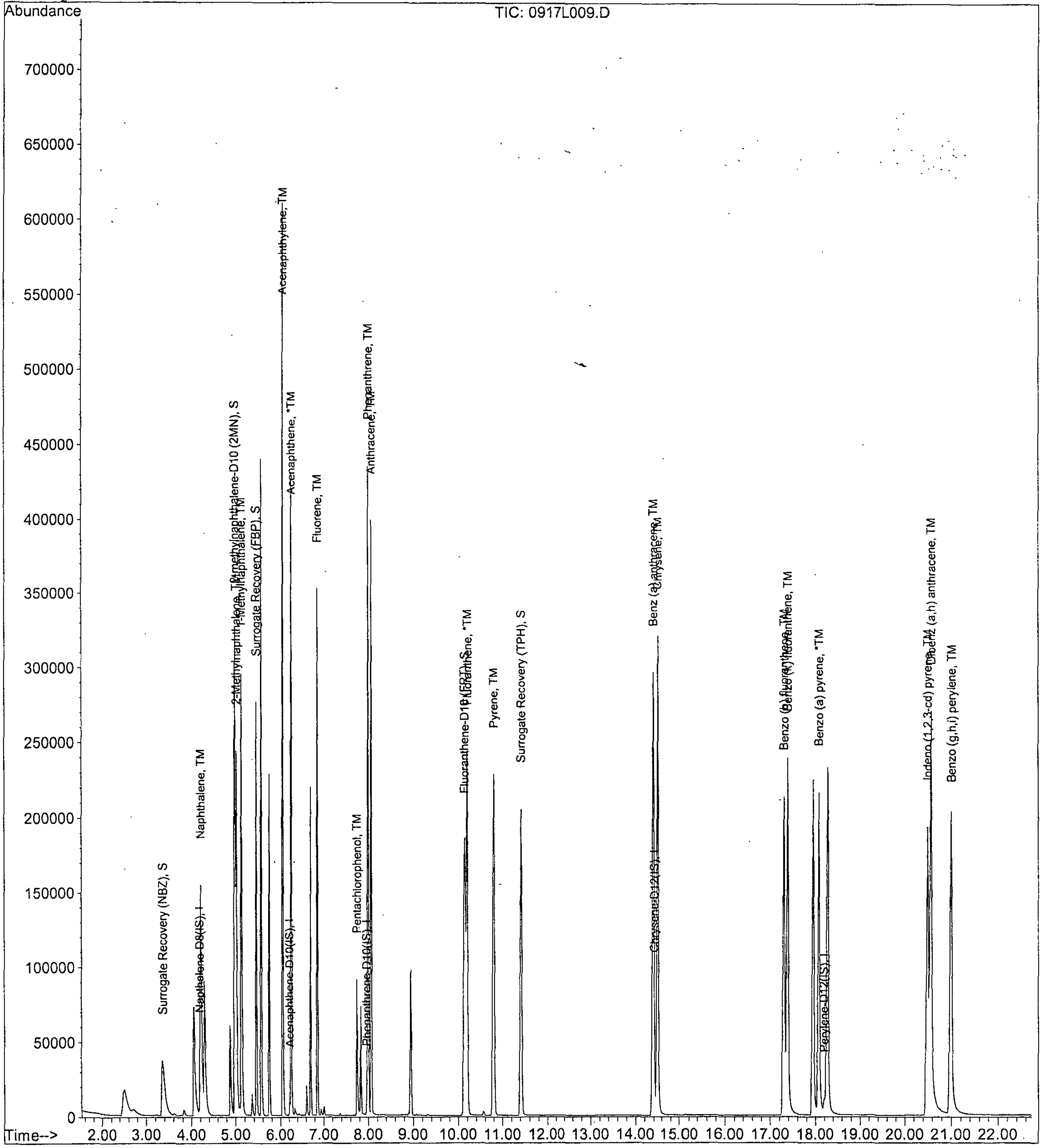

PAH by GCMS SIM
EPA 8270 SIM

Form 7

Second Source Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/17/18
Instrument: Linus
Initial Cal. Date: 09/17/18
Data File: 0917L010.D

		Compound	MEAN	CCRF	%D		%Drift
1	TM	Naphthalene	0.9757	0.9975	2.2	TM	
2	TM	2-Methylnaphthalene	0.5271	0.5499	4.3	TM	
3	TM	1-Methylnaphthalene	0.6464	0.6785	5.0	TM	
4	TM	Acenaphthylene	4.448	4.575	2.9	TM	
5	*TM	Acenaphthene	1.374	1.363	0.80	*TM	
6	TM	Fluorene	1.501	1.574	4.9	TM	
7	TML	Pentachlorophenol	0.1649	0.1932	17	TML	13
8	TM	Phenanthrene	1.191	1.201	0.78	TM	
9	TM	Anthracene	1.080	1.133	4.9	TM	
10	*TM	Fluoranthene	1.574	1.617	2.7	*TM	
11	TM	Pyrene	1.277	1.287	0.79	TM	
12	TM	Benz (a) anthracene	1.104	1.073	2.8	TM	
13	TM	Chrysene	1.182	1.185	0.25	TM	
14	TML	Indeno (1,2,3-cd) pyrene	0.7750	0.7119	8.1	TML	14
15	TM	Benzo (b) fluoranthene	1.023	1.071	4.6	TM	
16	TM	Benzo (k) fluoranthene	1.245	1.250	0.42	TM	
17	*TM	Benzo (a) pyrene	0.9193	0.9929	8.0	*TM	
18	TM	Dibenz (a,h) anthracene	0.9077	0.9270	2.1	TM	
19	TM	Benzo (g,h,i) perylene	0.9823	1.030	4.9	TM	
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			4.1		

Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L010.D
Acq On : 17 Sep 18 13:43
Sample : SS SIM PCP 09/09/18
Misc :

Vial: 10
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 17 14:32 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 14:01:10 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	17489	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	7705	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	15192	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	19627	2.50000 ppb	0.01
24) Perylene-D12(IS)	18.18	264	18725	2.50000 ppb	0.01

System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	0.00	82	0d	0.00000 ppb	
Spiked Amount 5.000			Recovery	= 0.000%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0d	0.00000 ppb	
Spiked Amount 5.000			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	0.00	172	0d	0.00000 ppb	
Spiked Amount 5.000			Recovery	= 0.000%	
16) Fluoranthene-D10 (FRT)	0.00	212	0d	0.00000 ppb	
Spiked Amount 5.000			Recovery	= 0.000%	
20) Surrogate Recovery (TPH)	0.00	244	0d	0.00000 ppb	
Spiked Amount 5.000			Recovery	= 0.000%	

Target Compounds					Qvalue
3) Naphthalene	4.21	128	34890	5.11188 ppb	100
5) 2-Methylnaphthalene	5.02	141	19234	5.21606 ppb	96
6) 1-Methylnaphthalene	5.13	141	23732	5.24851 ppb	99
9) Acenaphthylene	6.06	152	70505	5.14258 ppb	100
10) Acenaphthene	6.25	154	21004	4.95992 ppb	97
11) Fluorene	6.86	166	24259	5.24485 ppb	94
12) Pentachlorophenol	7.75	266	2977	4.32590 ppb	75
14) Phenanthrene	7.99	178	36479	5.03877 ppb	100
15) Anthracene	8.06	178	34421	5.24492 ppb	99
17) Fluoranthene	10.17	202	49122	5.13648 ppb	98
19) Pyrene	10.79	202	50510	5.03957 ppb	95
21) Benz (a) anthracene	14.38	228	42102	4.85957 ppb	100
22) Chrysene	14.48	228	46499	5.01235 ppb	98
23) Indeno (1,2,3-cd) pyrene	20.47	276	27945	4.28389 ppb #	87
25) Benzo (b) fluoranthene	17.28	252	40094	5.23224 ppb	99
26) Benzo (k) fluoranthene	17.36	252	46809	5.02096 ppb	100
27) Benzo (a) pyrene	18.04	252	37185	5.40068 ppb	99
28) Dibenz (a,h) anthracene	20.55	278	34716	5.10620 ppb	98
29) Benzo (g,h,i) perylene	20.96	276	38572	5.24266 ppb	97

(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\LINUS\DATA\L180917P\0917L010.D          Vial: 10
Acq On    : 17 Sep 18  13:43                       Operator: MA
Sample    : SS  SIM PCP 09/09/18                   Inst    : Linus
Misc      :                                        Multiplr: 1.00

Quant Time: Sep 17 14:32 2018            Quant Results File: L0917PCP.RES

Method         : M:\LINUS\DATA\L180917P\L0917PCP.M (RTE Integrator)
Title          : EPA 8270
Last Update    : Mon Sep 17 14:01:10 2018
Response via   : Initial Calibration
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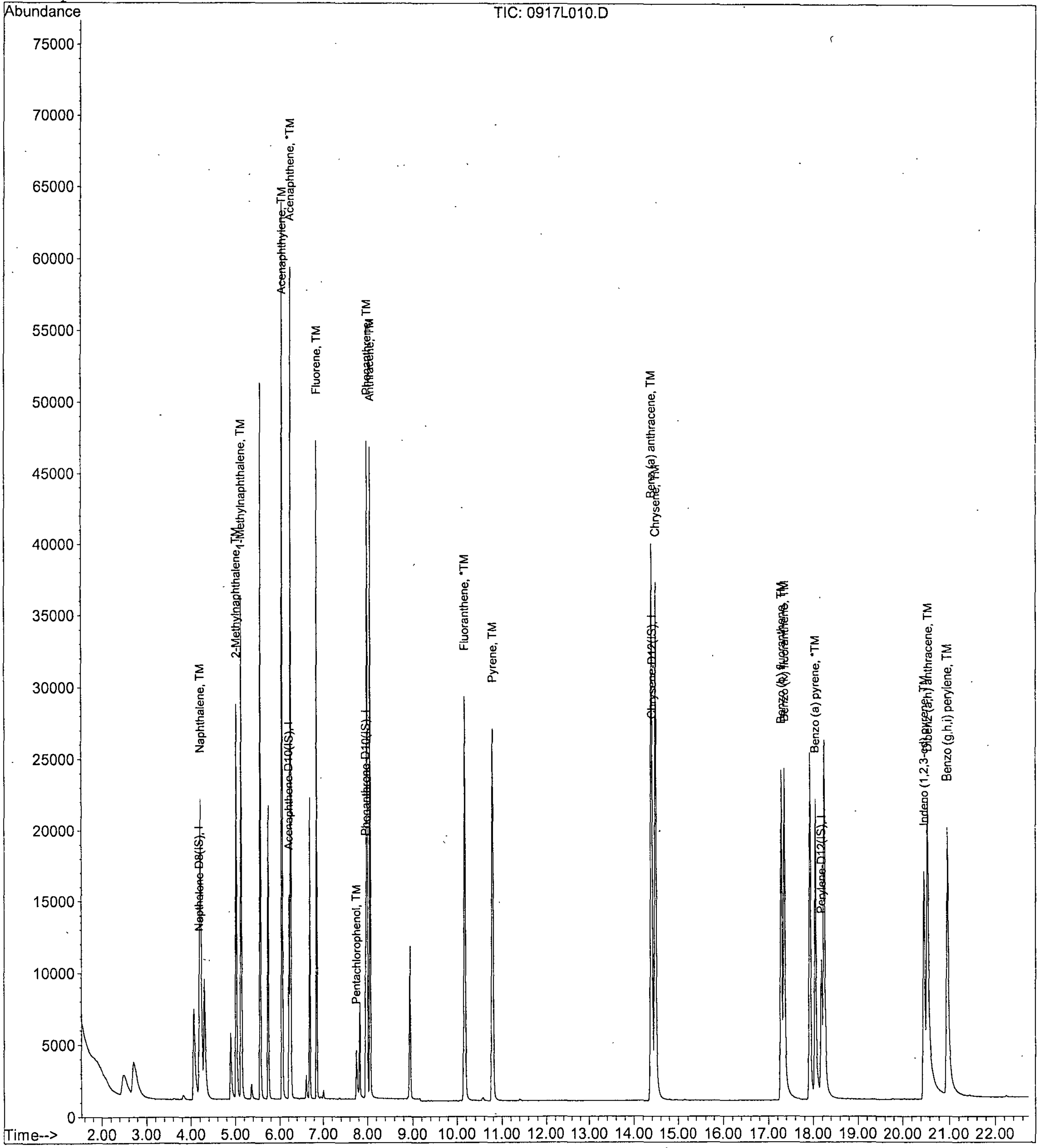


PAH by GCMS SIM
EPA 8270 SIM

Form 6
Initial Calibration

Lab Name: APPL, Inc. SDG No: ______
Case No: ______ Initial Cal. Date: 09/18/18
Matrix: ______ Instrument: Linus Initials: ______

		Compound	0.1	0.2	0.5	2.5	5	25	50				Avg	%RSD	Type	r^2	Q	MRF
			0918L003.D	0918L004.D	0918L005.D	0918L006.D	0918L007.D	0918L008.D	0918L009.D									
1	I	Napthalene-D8(IS)																
2	SL	Surrogate Recovery (NBZ)	0.4477	0.2675	0.3009	0.2768	0.2893	0.2985	0.2989				0.31	20	SL	1.00		
3	TM	Naphthalene	1.065	0.8867	1.087	1.092	1.001	0.9277	0.8661				0.99	9.7	TM			0.700
4	S	2-methylnaphthalene-D10 (2M	1.097	0.9148	1.123	1.102	1.133	1.023	0.9625				1.1	8.1	S			
5	TM	2-Methylnaphthalene	0.5751	0.4603	0.5869	0.6040	0.5511	0.4823	0.4422				0.53	12	TM			0.400
6	TM	1-Methylnaphthalene	0.7346	0.5867	0.7272	0.7367	0.6631	0.5783	0.5353				0.65	13	TM			
7	I	Acenaphthene-D10(IS)																
8	S	Surrogate Recovery (FBP)	1.466	1.285	1.567	1.518	1.563	1.469	1.389				1.5	6.9	S			
9	TM	Acenaphthylene	4.677	3.751	4.695	4.929	4.641	4.415	4.041				4.4	9.3	TM			0.900
10	*TM	Acenaphthene	1.538	1.238	1.495	1.489	1.368	1.211	1.172				1.4	11	*TM			0.900
11	TM	Fluorene	1.590	1.274	1.623	1.717	1.583	1.396	1.342				1.5	11	TM			0.900
12	TML	Pentachlorophenol		0.0502	0.0585	0.1408	0.1721	0.2740	0.2954				0.17	63	TML	0.998		0.050
13	I	Phenanthrene-D10(IS)																
14	TM	Phenanthrene	1.353	1.064	1.308	1.327	1.209	1.103	0.9936				1.2	12	TM			0.700
15	TM	Anthracene	1.158	0.8927	1.159	1.254	1.153	1.045	0.9501				1.1	12	TM			0.700
16	S	Fluoranthene-D10 (FRT)	1.396	1.088	1.394	1.407	1.470	1.458	1.394				1.4	9.4	S			
17	*TM	Fluoranthene	1.693	1.288	1.660	1.807	1.673	1.562	1.426				1.6	11	*TM			0.600
18	I	Chrysene-D12(IS)																
19	TM	Pyrene	1.442	1.077	1.342	1.396	1.318	1.272	1.187				1.3	9.7	TM			0.600
20	SL	Surrogate Recovery (TPH)	1.295	0.7933	0.8340	0.7309	0.7515	0.7415	0.7090				0.84	25	SL	1.000		
21	TM	Benz (a) anthracene	1.306	0.9379	1.124	1.185	1.118	1.156	1.099				1.1	9.7	TM			0.800
22	TM	Chrysene	1.363	1.018	1.275	1.309	1.214	1.145	1.060				1.2	11	TM			0.700
23	TML	Indeno (1,2,3-cd) pyrene	1.351	1.014	0.7115	0.8474	0.8073	0.9689	0.9613				0.95	22	TML	1.000		0.500
24	I	Perylene-D12(IS)																
25	TM	Benzo (b) fluoranthene	1.152	0.8516	1.059	1.154	1.104	1.116	1.073				1.1	9.7	TM			0.700
26	TM	Benzo (k) fluoranthene	1.461	1.030	1.275	1.375	1.275	1.202	1.063				1.2	13	TM			0.700
27	*TM	Benzo (a) pyrene	0.9427	0.7188	0.9314	1.086	1.039	1.039	0.9609				0.96	13	*TM			0.700
28	TM	Dibenz (a,h) anthracene	1.086	0.7879	0.9521	1.055	1.006	1.006	0.9875				0.98	9.8	TM			0.400
29	TM	Benzo (g,h,i) perylene	1.167	0.8584	1.068	1.152	1.075	1.072	0.9970				1.1	9.9	TM			0.500
30																		
31																		
32																		
33																		
34																		
35																		

Quantitation Report (Not Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L003.D
Acq On : 18 Sep 18 11:12
Sample : 0.1ug/mL SIM PCP 09/09/18
Misc :

Vial: 3
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 14:51 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 14:51:13 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19433	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8713	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16908	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	20487	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	20580	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	348	0.13468 ppb	0.00
Spiked Amount 5.000			Recovery	= 2.700%	
4) 2-methylnaphthalene-D10 (2	4.99	152	853	0.09885 ppb	0.00
Spiked Amount 5.000			Recovery	= 1.980%	
8) Surrogate Recovery (FBP)	5.46	172	511	0.11023 ppb	0.00
Spiked Amount 5.000			Recovery	= 2.200%	
16) Fluoranthene-D10 (FRT)	10.14	212	944	0.10809 ppb	0.02
Spiked Amount 5.000			Recovery	= 2.160%	
20) Surrogate Recovery (TPH)	11.41	244	1061	-0.31585 ppb	0.01
Spiked Amount 5.000			Recovery	= -6.320%	

Target Compounds Qvalue

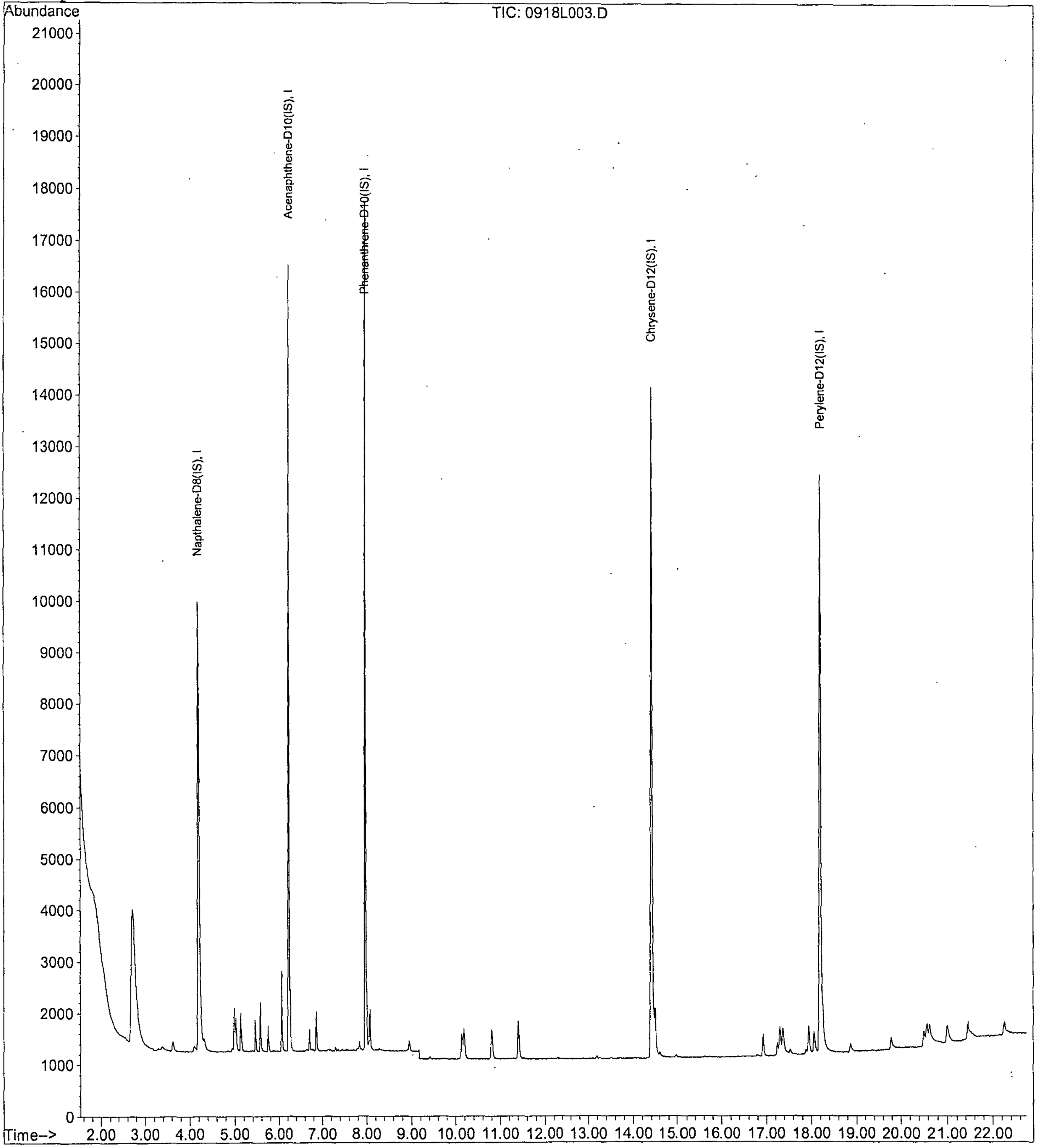
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L003.D Vial: 3
Acq On : 18 Sep 18 11:12 Operator: MA
Sample : 0.1ug/mL SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 18 14:51 2018 Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



Data File : M:\LINUS\DATA\L180918P\0918L004.D
Vial: 4
Acq On : 18 Sep 18 11:41
Operator: MA
Sample : 0.2 SIM PCP 09/09/18
Inst : Linus
Misc :
Multiplr: 1.00

Quant Time: Sep 18 14:52 2018
Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 14:51:13 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19580	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8714	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	17181	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	20405	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	20417	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	419	0.15853 ppb	0.01
Spiked Amount 5.000			Recovery	= 3.180%	
4) 2-methylnaphthalene-D10 (2	4.99	152	1433	0.16753 ppb	0.00
Spiked Amount 5.000			Recovery	= 3.360%	
8) Surrogate Recovery (FBP)	5.46	172	896	0.19143 ppb	0.00
Spiked Amount 5.000			Recovery	= 3.820%	
16) Fluoranthene-D10 (FRT)	10.13	212	1496	0.16719 ppb	0.01
Spiked Amount 5.000			Recovery	= 3.340%	
20) Surrogate Recovery (TPH)	11.40	244	1295	-0.27954 ppb	0.00
Spiked Amount 5.000			Recovery	= -5.600%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

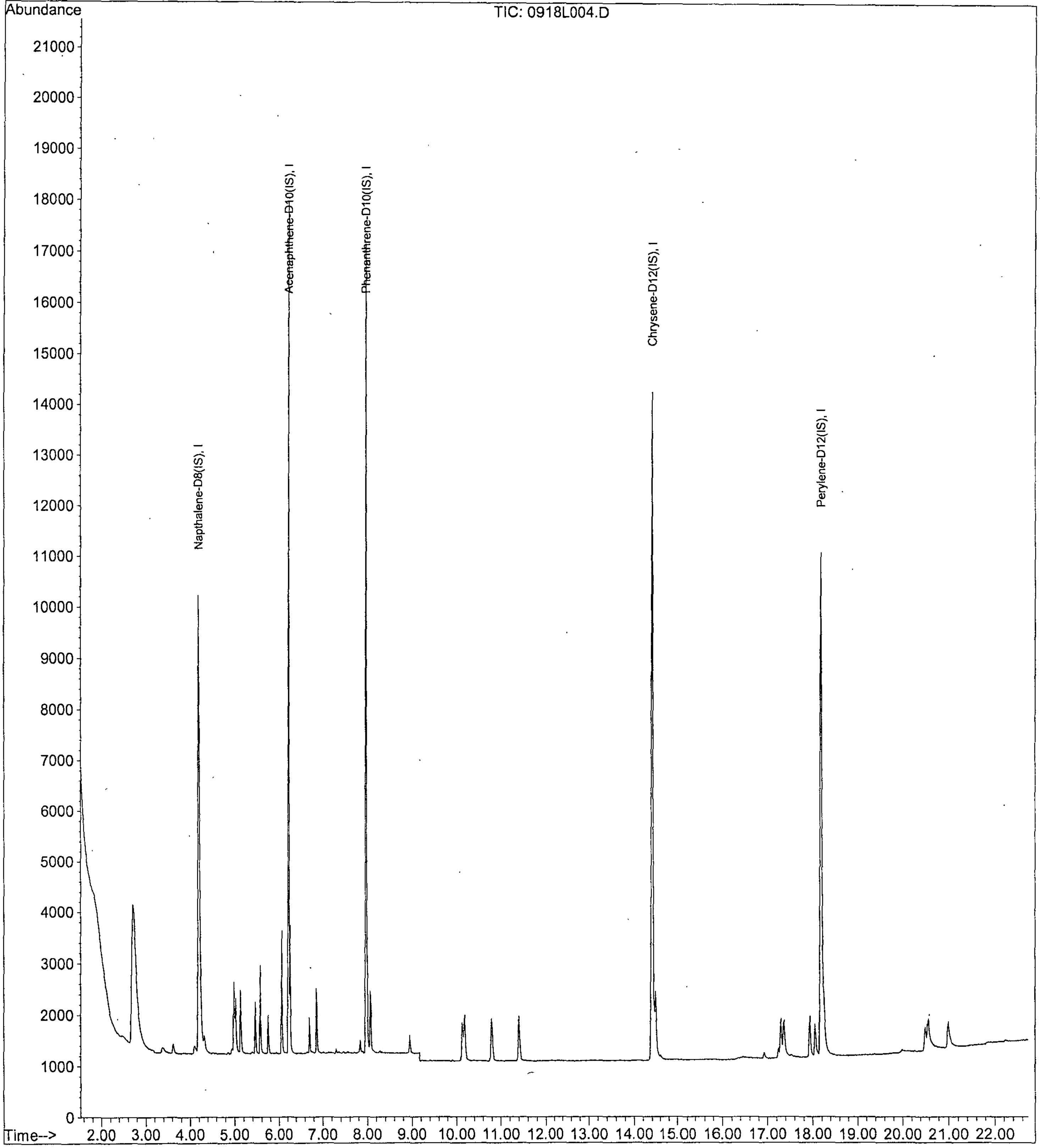
Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L004.D
Acq On : 18 Sep 18 11:41
Sample : 0.2 SIM PCP 09/09/18
Misc :

Vial: 4
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 14:52 2018 Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

```
Data File : M:\LINUS\DATA\L180918P\0918L005.D          Vial: 5
Acq On    : 18 Sep 18  12:10                       Operator: MA
Sample    : 0.5 SIM PCP 09/09/18                   Inst    : Linus
Misc      :                                        Multiplr: 1.00

Quant Time: Sep 18 15:18 2018            Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title        : EPA 8270
Last Update  : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19988	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8895	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	17121	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	20816	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	20507	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	1203	0.56388 ppb	0.00
Spiked Amount 5.000			Recovery	= 11.280%	
4) 2-methylnaphthalene-D10 (2	4.99	152	4490	0.53444 ppb	0.00
Spiked Amount 5.000			Recovery	= 10.680%	
8) Surrogate Recovery (FBP)	5.46	172	2788	0.53475 ppb	0.00
Spiked Amount 5.000			Recovery	= 10.700%	
16) Fluoranthene-D10 (FRT)	10.13	212	4775	0.50802 ppb	0.01
Spiked Amount 5.000			Recovery	= 10.160%	
20) Surrogate Recovery (TPH)	11.40	244	3472	0.39569 ppb	0.00
Spiked Amount 5.000			Recovery	= 7.920%	
Target Compounds					Qvalue
12) Pentachlorophenol	7.77	266	104m	1.19012 ppb	70

(#) = qualifier out of range (m) = manual integration

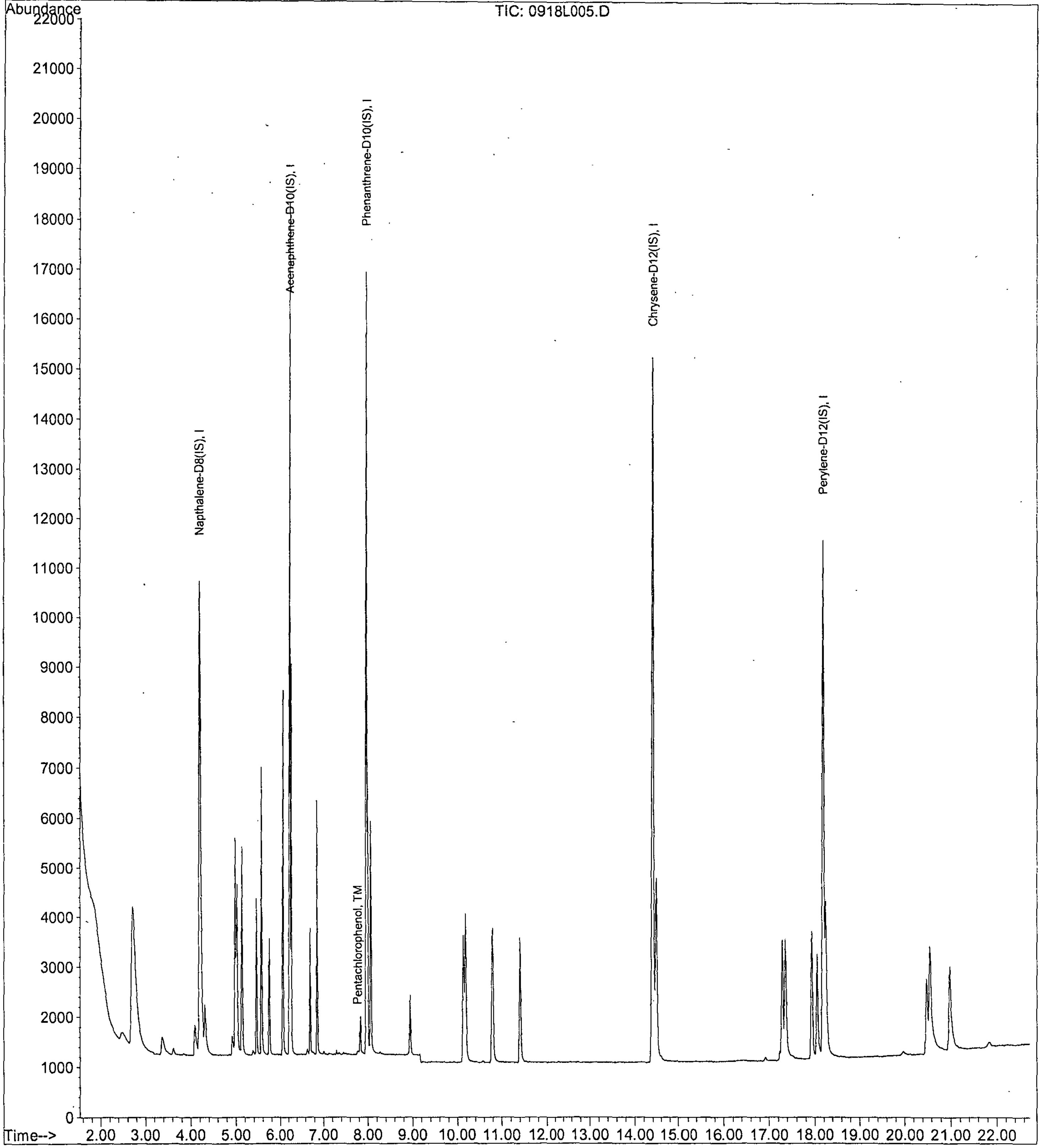
Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L005.D
Acq On : 18 Sep 18 12:10
Sample : 0.5 SIM PCP 09/09/18
Misc :

Vial: 5
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 15:18 2018 Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File	: M:\LINUS\DATA\L180918P\0918L006.D	Vial:	6
Acq On	: 18 Sep 18 12:39	Operator:	MA
Sample	: 2.5 SIM PCP 09/09/18	Inst	: Linus
Misc	:	Multiplr:	1.00

Quant Time: Sep 18 14:53 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 14:51:13 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19868	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8788	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16793	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	21507	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	20755	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	5499	2.19713 ppb	0.00
Spiked Amount 5.000			Recovery	= 43.940%	
4) 2-methylnaphthalene-D10 (2	4.99	152	21887	2.65180 ppb	0.00
Spiked Amount 5.000			Recovery	= 53.040%	
8) Surrogate Recovery (FBP)	5.46	172	13340	2.79749 ppb	0.00
Spiked Amount 5.000			Recovery	= 55.940%	
16) Fluoranthene-D10 (FRT)	10.12	212	23622	2.74266 ppb	0.00
Spiked Amount 5.000			Recovery	= 54.860%	
20) Surrogate Recovery (TPH)	11.40	244	15719	2.48417 ppb	0.00
Spiked Amount 5.000			Recovery	= 49.680%	

Target Compounds					Qvalue
3) Naphthalene	4.21	128	21689	2.91935 ppb	99
5) 2-Methylnaphthalene	5.02	141	12000	3.02972 ppb	99
6) 1-Methylnaphthalene	5.13	141	14637	3.00087 ppb	99
9) Acenaphthylene	6.06	152	43316	3.09044 ppb	100
10) Acenaphthene	6.25	154	13086	3.03157 ppb	99
11) Fluorene	6.86	166	15085	3.17889 ppb	99
12) Pentachlorophenol	7.76	266	1237	2.26809 ppb	96
14) Phenanthrene	7.99	178	22283	3.03943 ppb	100
15) Anthracene	8.06	178	21060	3.17569 ppb	100
17) Fluoranthene	10.17	202	30338	3.16651 ppb	99
19) Pyrene	10.78	202	30034	2.88867 ppb	98
21) Benz (a) anthracene	14.38	228	25477	2.75702 ppb	99
22) Chrysene	14.48	228	28157	2.95034 ppb	98
23) Indeno (1,2,3-cd) pyrene	20.48	276	18226	2.43838 ppb	94
25) Benzo (b) fluoranthene	17.28	252	23948	2.39691 ppb	99
26) Benzo (k) fluoranthene	17.35	252	28539	2.80732 ppb	99
27) Benzo (a) pyrene	18.04	252	22532	2.49519 ppb	99
28) Dibenz (a,h) anthracene	20.55	278	21904	2.56758 ppb	97
29) Benzo (g,h,i) perylene	20.96	276	23908	2.51683 ppb	96

(#) = qualifier out of range (m) = manual integration

Quantitation Report

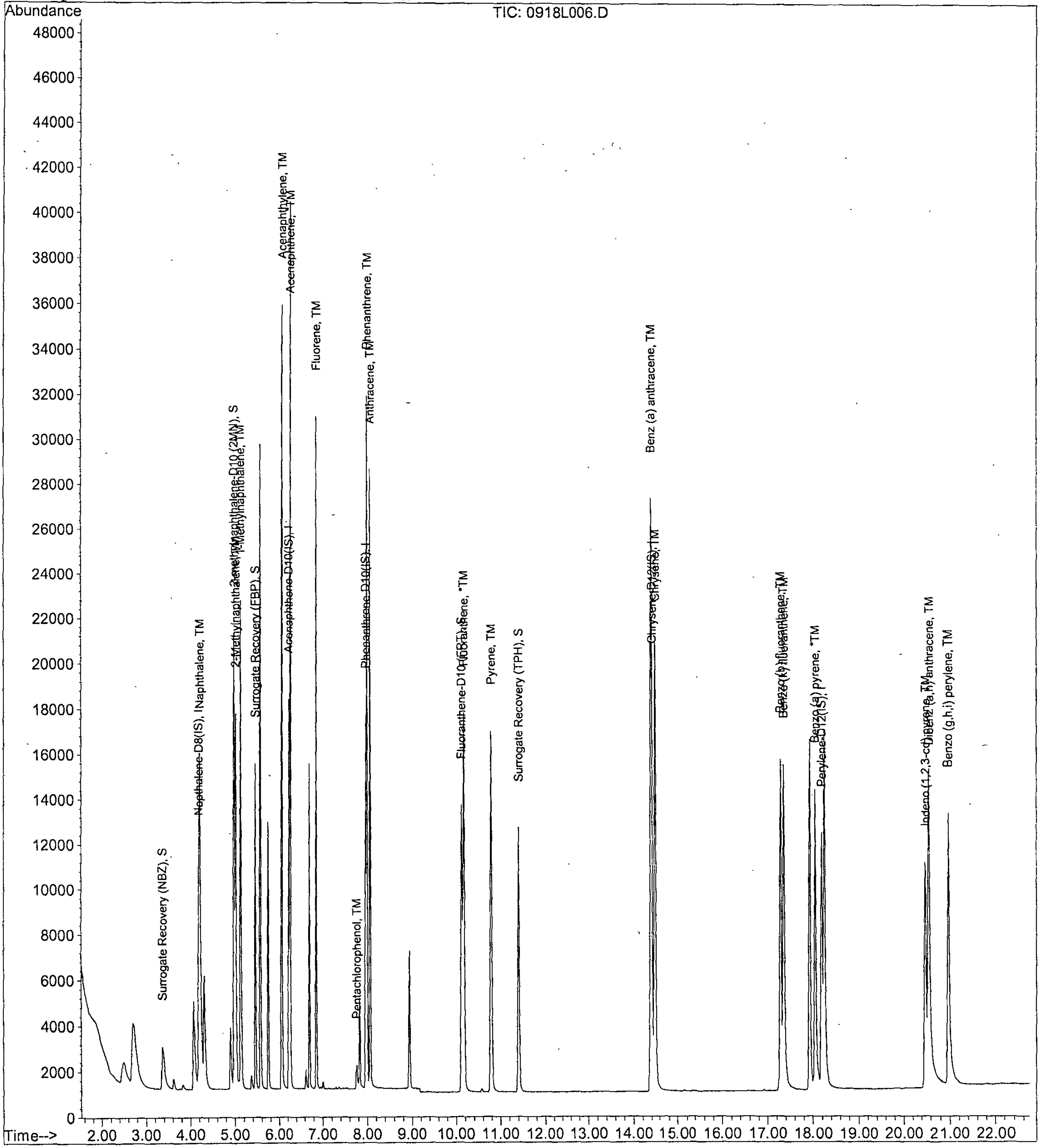
Data File : M:\LINUS\DATA\L180918P\0918L006.D
Acq On : 18 Sep 18 12:39
Sample : 2.5 SIM PCP 09/09/18
Misc :

Vial: 6
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 14:53 2018

Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L006.D
Acq On : 18 Sep 18 12:39
Sample : 2.5 SIM PCP 09/09/18
Misc :

Vial: 6
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 14:53 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 14:51:13 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19868	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8788	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16793	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	21507	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	20755	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	5499	2.19713 ppb	0.00
Spiked Amount 5.000			Recovery	= 43.940%	
4) 2-methylnaphthalene-D10 (2	4.99	152	21887	2.65180 ppb	0.00
Spiked Amount 5.000			Recovery	= 53.040%	
8) Surrogate Recovery (FBP)	5.46	172	13340	2.79749 ppb	0.00
Spiked Amount 5.000			Recovery	= 55.940%	
16) Fluoranthene-D10 (FRT)	10.12	212	23622	2.74266 ppb	0.00
Spiked Amount 5.000			Recovery	= 54.860%	
20) Surrogate Recovery (TPH)	11.40	244	15719	2.48417 ppb	0.00
Spiked Amount 5.000			Recovery	= 49.680%	
Target Compounds					Qvalue
3) Naphthalene	4.21	128	21689	2.91935 ppb	99
5) 2-Methylnaphthalene	5.02	141	12000	3.02972 ppb	99
6) 1-Methylnaphthalene	5.13	141	14637	3.00087 ppb	99
9) Acenaphthylene	6.06	152	43316	3.09044 ppb	100
10) Acenaphthene	6.25	154	13086	3.03157 ppb	99
11) Fluorene	6.86	166	15085	3.17889 ppb	99
12) Pentachlorophenol	7.76	266	1237	2.26809 ppb	96
14) Phenanthrene	7.99	178	22283	3.03943 ppb	100
15) Anthracene	8.06	178	21060	3.17569 ppb	100
17) Fluoranthene	10.17	202	30338	3.16651 ppb	99
19) Pyrene	10.78	202	30034	2.88867 ppb	98
21) Benz (a) anthracene	14.38	228	25477	2.75702 ppb	99
22) Chrysene	14.48	228	28157	2.95034 ppb	98
23) Indeno (1,2,3-cd) pyrene	20.48	276	18226	2.43838 ppb	94
25) Benzo (b) fluoranthene	17.28	252	23948	2.39691 ppb	99
26) Benzo (k) fluoranthene	17.35	252	28539	2.80732 ppb	99
27) Benzo (a) pyrene	18.04	252	22532	2.49519 ppb	99
28) Dibenz (a,h) anthracene	20.55	278	21904	2.56758 ppb	97
29) Benzo (g,h,i) perylene	20.96	276	23908	2.51683 ppb	96

(#) = qualifier out of range (m) = manual integration

Quantitation Report

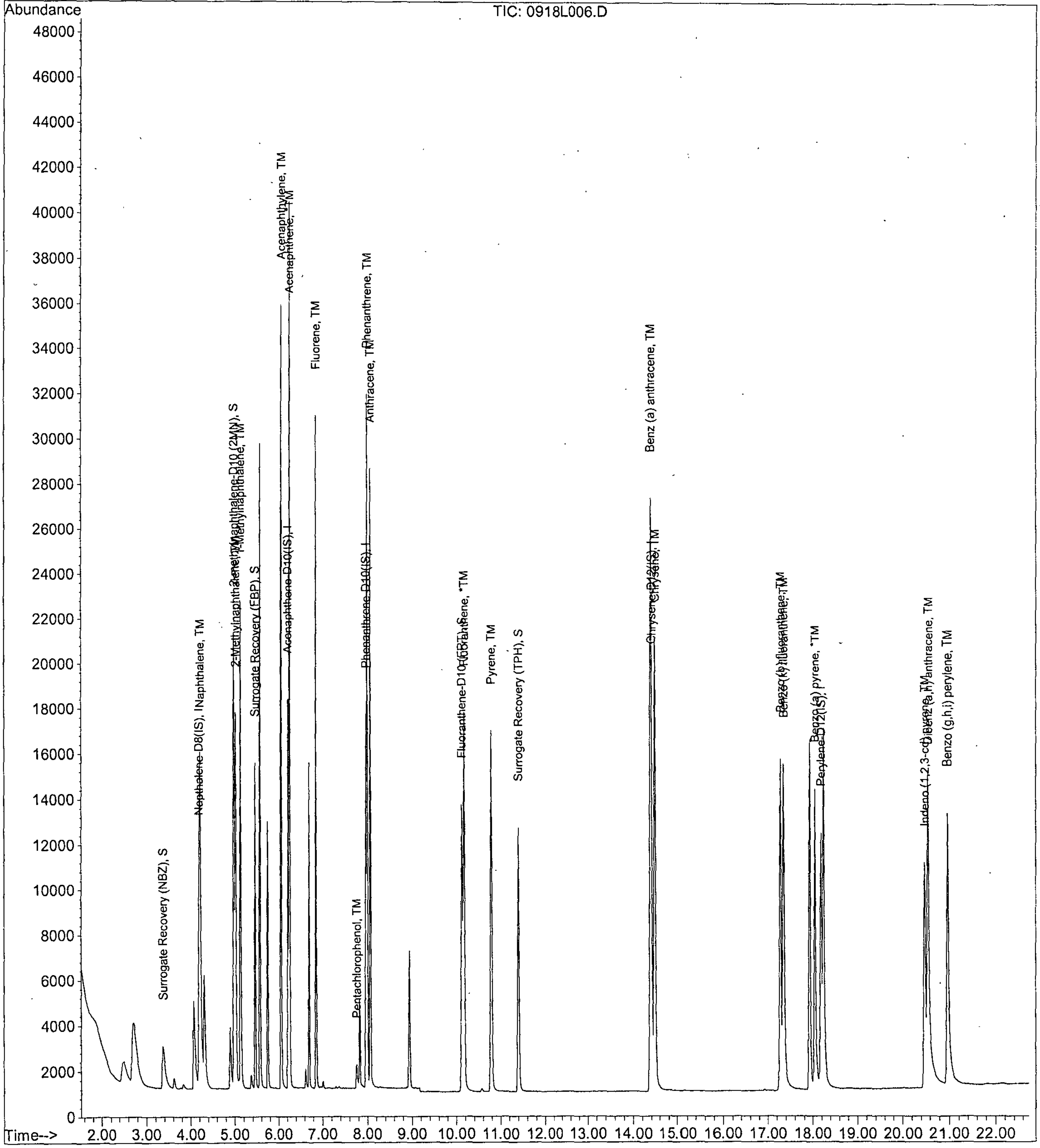
Data File : M:\LINUS\DATA\L180918P\0918L006.D
Acq On : 18 Sep 18 12:39
Sample : 2.5 SIM PCP 09/09/18
Misc :

Vial: 6
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 14:53 2018

Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

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Data File : M:\LINUS\DATA\L180918P\0918L007.D              Vial: 7
Acq On    : 18 Sep 18  13:09                           Operator: MA
Sample    : 5.0 SIM PCP 09/09/18                       Inst    : Linus
Misc      :                                            Multiplr: 1.00

Quant Time: Sep 18 14:51 2018              Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title        : EPA 8270
Last Update  : Tue Sep 18 14:51:13 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19194	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8369	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16285	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	20975	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	20323	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	11105	4.35139 ppb	0.00
Spiked Amount 5.000			Recovery	= 87.020%	
4) 2-methylnaphthalene-D10 (2	4.99	152	43507	5.10465 ppb	0.00
Spiked Amount 5.000			Recovery	= 102.100%	
8) Surrogate Recovery (FBP)	5.46	172	26158	5.87462 ppb	0.00
Spiked Amount 5.000			Recovery	= 117.500%	
16) Fluoranthene-D10 (FRT)	10.12	212	47879	5.69176 ppb	0.00
Spiked Amount 5.000			Recovery	= 113.840%	
20) Surrogate Recovery (TPH)	11.40	244	31524	5.64049 ppb	0.00
Spiked Amount 5.000			Recovery	= 112.800%	
Target Compounds					Qvalue
3) Naphthalene	4.21	128	38430	5.75040 ppb	100
5) 2-Methylnaphthalene	5.02	141	21154	5.89729 ppb	100
6) 1-Methylnaphthalene	5.13	141	25454	5.85368 ppb	100
9) Acenaphthylene	6.06	152	77681	6.50268 ppb	100
10) Acenaphthene	6.25	154	22895	6.40989 ppb	100
11) Fluorene	6.86	166	26490	6.65685 ppb	100
12) Pentachlorophenol	7.75	266	2881	4.43248 ppb	100
14) Phenanthrene	7.99	178	39389	6.17670 ppb	100
15) Anthracene	8.06	178	37608	6.42083 ppb	100
17) Fluoranthene	10.17	202	54412	6.03882 ppb	100
19) Pyrene	10.78	202	55195	5.49235 ppb	100
21) Benz (a) anthracene	14.38	228	46922	5.02362 ppb	100
22) Chrysene	14.47	228	50938	5.42394 ppb	100
23) Indeno (1,2,3-cd) pyrene	20.47	276	33867	4.41291 ppb	100
25) Benzo (b) fluoranthene	17.28	252	44880	4.54627 ppb	100
26) Benzo (k) fluoranthene	17.35	252	51837	5.06205 ppb	100
27) Benzo (a) pyrene	18.04	252	42236	4.78647 ppb	100
28) Dibenz (a,h) anthracene	20.54	278	40814	4.35378 ppb	100
29) Benzo (g,h,i) perylene	20.96	276	43961	4.72006 ppb	100

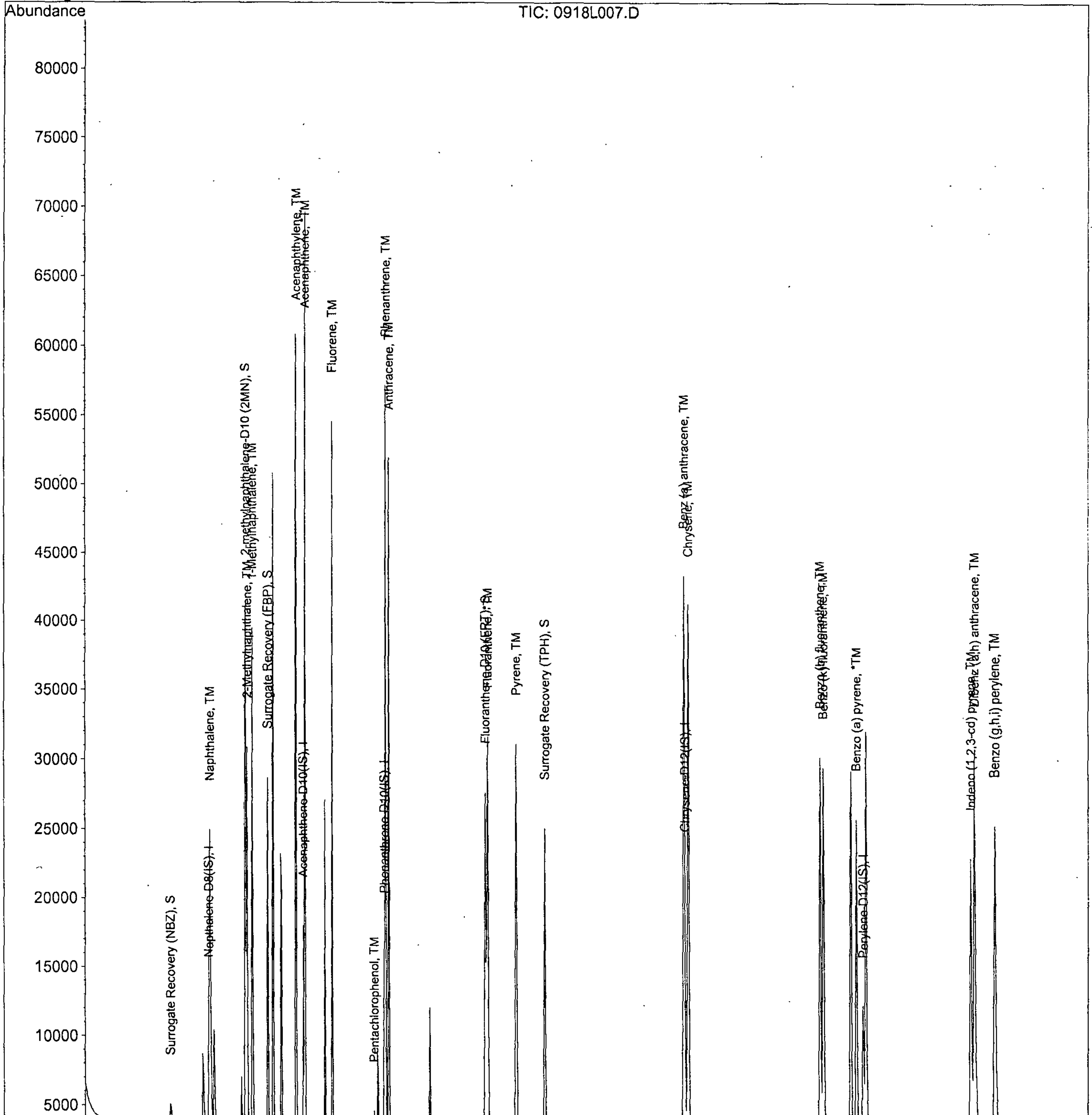
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L007.D Vial: 7
Acq On : 18 Sep 18 13:09 Operator: MA
Sample : 5.0 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 18 14:51 2018 Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L008.D Vial: 8
Acq On : 18 Sep 18 13:38 Operator: MA
Sample : 25 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 18 14:53 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 14:51:13 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	20356	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8529	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16698	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.41	240	21500	2.50000 ppb	0.01
24) Perylene-D12(IS)	18.20	264	21436	2.50000 ppb	0.01
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.36	82	60769	24.22722 ppb	-0.01
Spiked Amount 5.000			Recovery	= 484.540%	
4) 2-methylnaphthalene-D10 (2	4.99	152	208193	24.98177 ppb	0.00
Spiked Amount 5.000			Recovery	= 499.640%	
8) Surrogate Recovery (FBP)	5.46	172	125306	26.79288 ppb	0.00
Spiked Amount 5.000			Recovery	= 535.860%	
16) Fluoranthene-D10 (FRT)	10.14	212	243391	28.35730 ppb	0.02
Spiked Amount 5.000			Recovery	= 567.140%	
20) Surrogate Recovery (TPH)	11.41	244	159422	29.91438 ppb	0.01
Spiked Amount 5.000			Recovery	= 598.280%	
Target Compounds					Qvalue
3) Naphthalene	4.21	128	188851	24.17127 ppb	100
5) 2-Methylnaphthalene	5.02	141	98185	23.54670 ppb	99
6) 1-Methylnaphthalene	5.13	141	117718	22.93201 ppb	100
9) Acenaphthylene	6.06	152	376557	26.53462 ppb	100
10) Acenaphthene	6.25	154	103285	23.58508 ppb	98
11) Fluorene	6.86	166	119031	24.62629 ppb	100
12) Pentachlorophenol	7.75	266	23371	30.46385 ppb	96
14) Phenanthrene	8.00	178	184177	24.32257 ppb	99
15) Anthracene	8.06	178	174455	25.39154 ppb	99
17) Fluoranthene	10.18	202	260780	26.23180 ppb	98
19) Pyrene	10.79	202	273399	25.55370 ppb	99
21) Benz (a) anthracene	14.39	228	248483	26.38653 ppb	99
22) Chrysene	14.49	228	246081	24.92489 ppb	100
23) Indeno (1,2,3-cd) pyrene	20.49	276	208310	25.87436 ppb	96
25) Benzo (b) fluoranthene	17.29	252	239296	23.58996 ppb	98
26) Benzo (k) fluoranthene	17.37	252	257699	24.26473 ppb	99
27) Benzo (a) pyrene	18.06	252	222764	24.64914 ppb	99
28) Dibenz (a,h) anthracene	20.56	278	215654	24.86216 ppb	100
29) Benzo (g,h,i) perylene	20.98	276	229747	24.08878 ppb	94

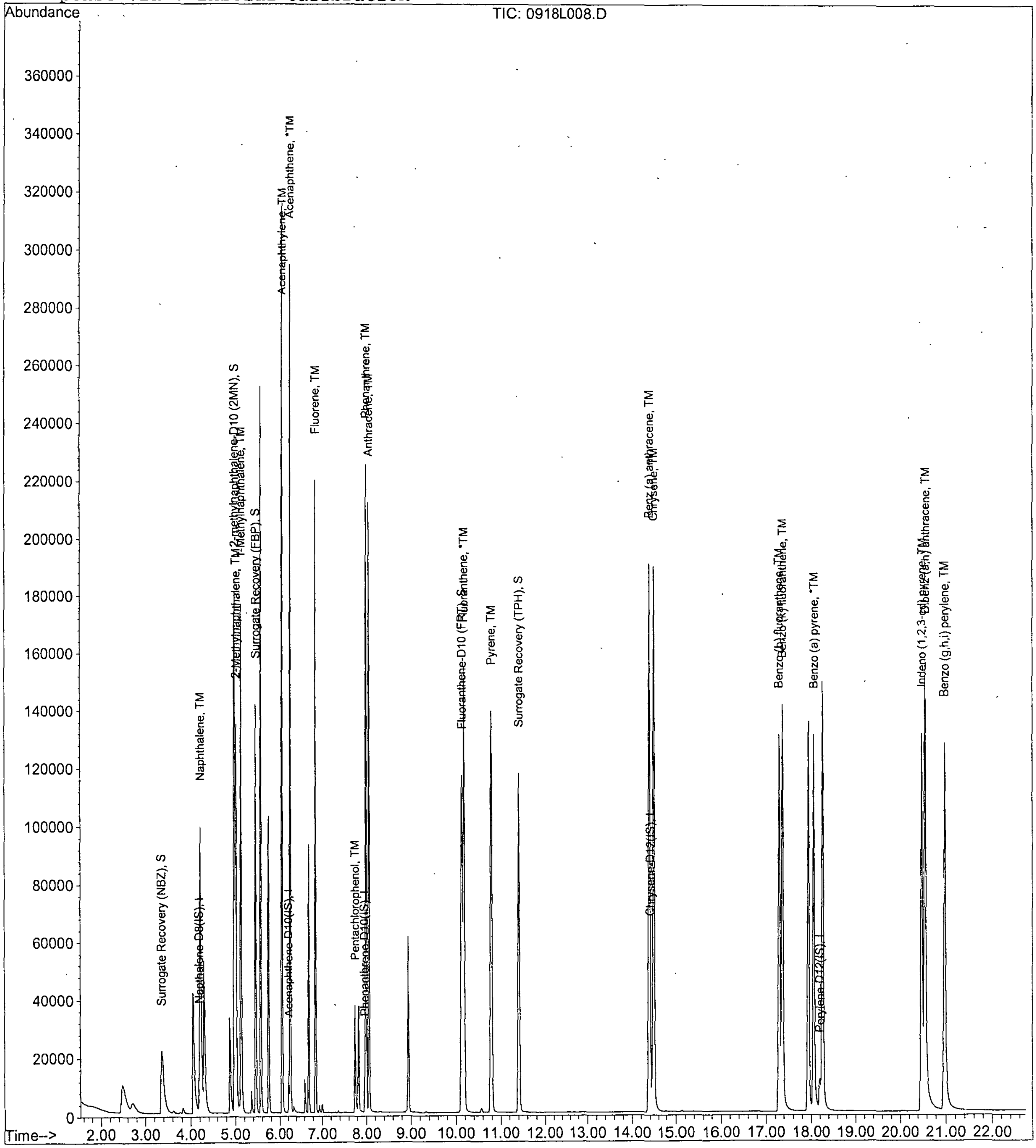
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L008.D Vial: 8
Acq On : 18 Sep 18 13:38 Operator: MA
Sample : 25 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 18 14:53 2018 Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L009.D Vial: 9
Acq On : 18 Sep 18 14:07 Operator: MA
Sample : 50 SIM PCP 09/09/18 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 18 14:54 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 14:51:13 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	19616	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8215	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16284	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.42	240	20924	2.50000 ppb	0.02
24) Perylene-D12(IS)	18.21	264	21277	2.50000 ppb	0.02
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.36	82	117283	48.50999 ppb	-0.01
Spiked Amount 5.000			Recovery	= 970.200%	
4) 2-methylnaphthalene-D10 (2	4.99	152	377614	46.63197 ppb	0.00
Spiked Amount 5.000			Recovery	= 932.640%	
8) Surrogate Recovery (FBP)	5.46	172	228180	49.13341 ppb	0.00
Spiked Amount 5.000			Recovery	= 982.660%	
16) Fluoranthene-D10 (FRT)	10.15	212	454088	52.59639 ppb	0.03
Spiked Amount 5.000			Recovery	= 1051.920%	
20) Surrogate Recovery (TPH)	11.42	244	296694	56.09660 ppb	0.02
Spiked Amount 5.000			Recovery	= 1121.940%	

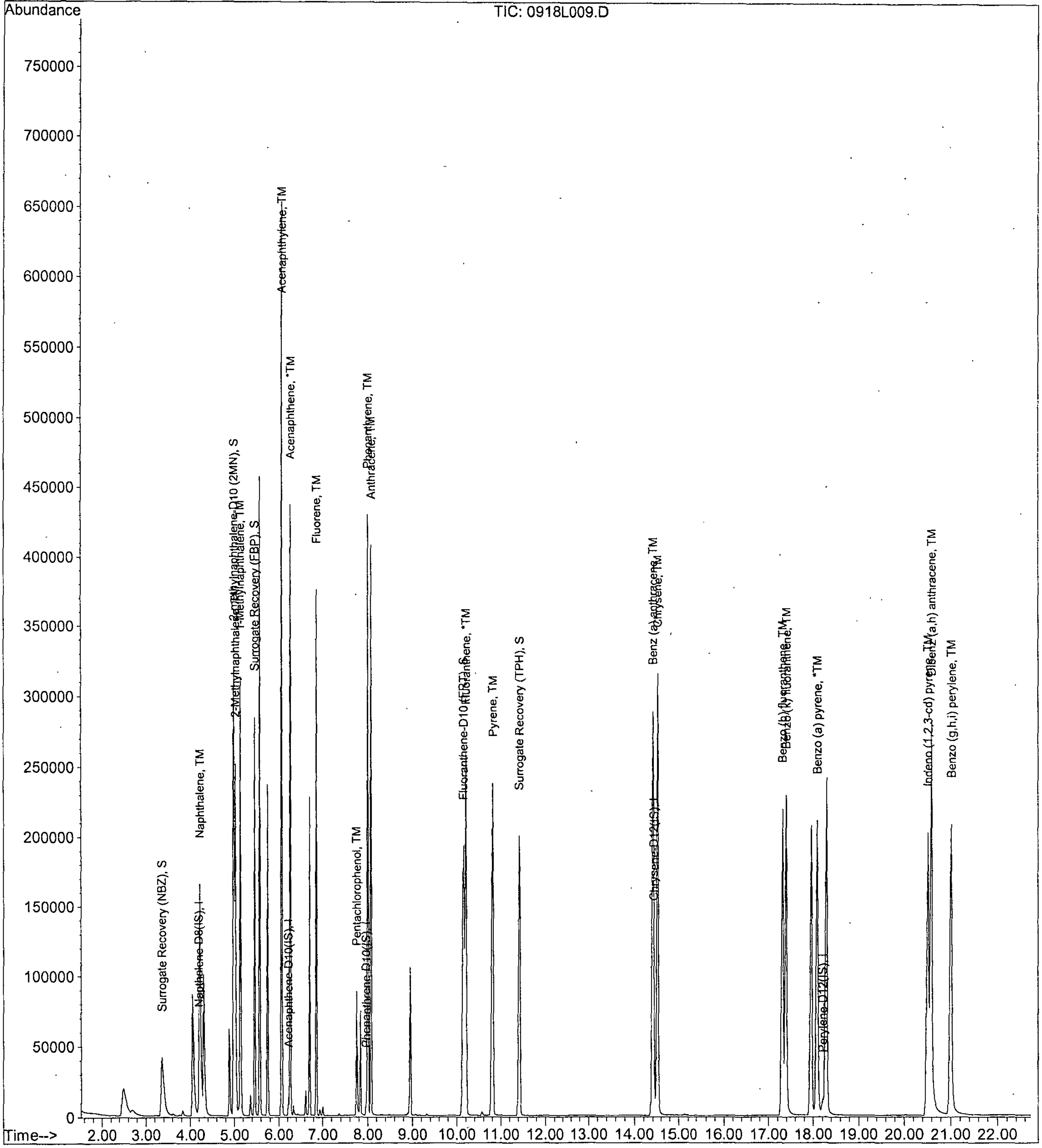
Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) Naphthalene	4.21	128	339769	44.41544 ppb		99
5) 2-Methylnaphthalene	5.02	141	173500	42.50387 ppb		100
6) 1-Methylnaphthalene	5.13	141	210019	41.81689 ppb		99
9) Acenaphthylene	6.06	152	663992	46.87963 ppb		99
10) Acenaphthene	6.27	154	192539	44.50243 ppb		90
11) Fluorene	6.87	166	220454	46.08882 ppb		96
12) Pentachlorophenol	7.75	266	48527	61.71339 ppb		99
14) Phenanthrene	8.00	178	323588	42.59227 ppb		99
15) Anthracene	8.08	178	309415	44.82798 ppb		99
17) Fluoranthene	10.21	202	464475	46.24075 ppb		99
19) Pyrene	10.81	202	496621	46.63475 ppb		98
21) Benz (a) anthracene	14.40	228	460092	49.15186 ppb		99
22) Chrysene	14.51	228	443672	45.00598 ppb		100
23) Indeno (1,2,3-cd) pyrene	20.51	276	402296	50.53749 ppb		94
25) Benzo (b) fluoranthene	17.31	252	456742	46.16794 ppb		99
26) Benzo (k) fluoranthene	17.40	252	452402	42.58733 ppb	#	96
27) Benzo (a) pyrene	18.09	252	408883	45.94805 ppb		99
28) Dibenz (a,h) anthracene	20.59	278	420203	49.56610 ppb		99
29) Benzo (g,h,i) perylene	21.01	276	424264	45.32098 ppb		98

(#) = qualifier out of range (m) = manual integration

Data File : M:\LINUS\DATA\L180918P\0918L009.D   Vial: 9
Acq On : 18 Sep 18 14:07   Operator: MA
Sample : 50 SIM PCP 09/09/18   Inst : Linus
Misc :   Multiplr: 1.00

Quant Time: Sep 18 14:54 2018   Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



PAH by GCMS SIM
EPA 8270 SIM

Form 7

Second Source Calibration

Lab Name: APPL, Inc. SDG No:
Case No: Date Analyzed: 09/18/18
Matrix: Instrument: Linus
Initial Cal. Date: 09/18/18
Data File: 0918L010.D

		Compound	MEAN	CCRF	%D		%Drift
1	TM	Naphthalene	0.9893	1.002	1.3	TM	
2	TM	2-Methylnaphthalene	0.5288	0.5602	5.9	TM	
3	TM	1-Methylnaphthalene	0.6517	0.6762	3.8	TM	
4	TM	Acenaphthylene	4.450	4.676	5.1	TM	
5	*TM	Acenaphthene	1.359	1.395	2.6	*TM	
6	TM	Fluorene	1.503	1.585	5.4	TM	
7	TML	Pentachlorophenol	0.1652	0.1759	6.5	TML	19
8	TM	Phenanthrene	1.194	1.195	0.12	TM	
9	TM	Anthracene	1.087	1.132	4.1	TM	
10	*TM	Fluoranthene	1.587	1.613	1.6	*TM	
11	TM	Pyrene	1.291	1.268	1.8	TM	
12	TM	Benz (a) anthracene	1.132	1.079	4.7	TM	
13	TM	Chrysene	1.198	1.182	1.3	TM	
14	TML	Indeno (1,2,3-cd) pyrene	0.9516	0.7622	20	TML	17
15	TM	Benzo (b) fluoranthene	1.073	1.075	0.21	TM	
16	TM	Benzo (k) fluoranthene	1.240	1.277	2.9	TM	
17	*TM	Benzo (a) pyrene	0.9597	1.027	7.0	*TM	
18	TM	Dibenz (a,h) anthracene	0.9830	0.9808	0.22	TM	
19	TM	Benzo (g,h,i) perylene	1.056	1.067	1.1	TM	
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			4.0		

Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L010.D
Acq On : 18 Sep 18 14:36
Sample : SS SIM PCP 09/09/18
Misc :

Vial: 10
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 15:24 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	17891	2.50000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	7912	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	15761	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	20529	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	19456	2.50000 ppb	0.00

System Monitoring Compounds	R.T.	QIon	Response	Conc Units
2) Surrogate Recovery (NBZ)	0.00	82	0d	0.06104 ppb
Spiked Amount 5.000			Recovery	= 1.220%
4) 2-methylnaphthalene-D10 (2	0.00	152	0d	0.00000 ppb
Spiked Amount 5.000			Recovery	= 0.000%
8) Surrogate Recovery (FBP)	0.00	172	0d	0.00000 ppb
Spiked Amount 5.000			Recovery	= 0.000%
16) Fluoranthene-D10 (FRT)	0.00	212	0d	0.00000 ppb
Spiked Amount 5.000			Recovery	= 0.000%
20) Surrogate Recovery (TPH)	0.00	244	0d	-0.18977 ppb
Spiked Amount 5.000			Recovery	= -3.800%

Target Compounds	R.T.	QIon	Response	Conc Units	Qvalue
3) Naphthalene	4.21	128	35853	5.06408 ppb	100
5) 2-Methylnaphthalene	5.02	141	20045	5.29656 ppb	100
6) 1-Methylnaphthalene	5.13	141	24194	5.18763 ppb	99
9) Acenaphthylene	6.06	152	73989	5.25369 ppb	100
10) Acenaphthene	6.25	154	22068	5.13208 ppb	100
11) Fluorene	6.86	166	25083	5.27203 ppb	99
12) Pentachlorophenol	7.75	266	2784	4.04216 ppb	78
14) Phenanthrene	7.99	178	37681	5.00586 ppb	100
15) Anthracene	8.06	178	35694	5.20714 ppb	99
17) Fluoranthene	10.17	202	50832	5.08057 ppb	99
19) Pyrene	10.78	202	52056	4.91169 ppb	100
21) Benz (a) anthracene	14.38	228	44301	4.76462 ppb	100
22) Chrysene	14.47	228	48533	4.93439 ppb	100
23) Indeno (1,2,3-cd) pyrene	20.47	276	31293	4.14613 ppb	99
25) Benzo (b) fluoranthene	17.28	252	41831	5.01036 ppb	99
26) Benzo (k) fluoranthene	17.35	252	49675	5.14617 ppb	100
27) Benzo (a) pyrene	18.04	252	39973	5.35225 ppb	99
28) Dibenz (a,h) anthracene	20.54	278	38165	4.98890 ppb	98
29) Benzo (g,h,i) perylene	20.96	276	41508	5.05282 ppb	99

(#) = qualifier out of range (m) = manual integration

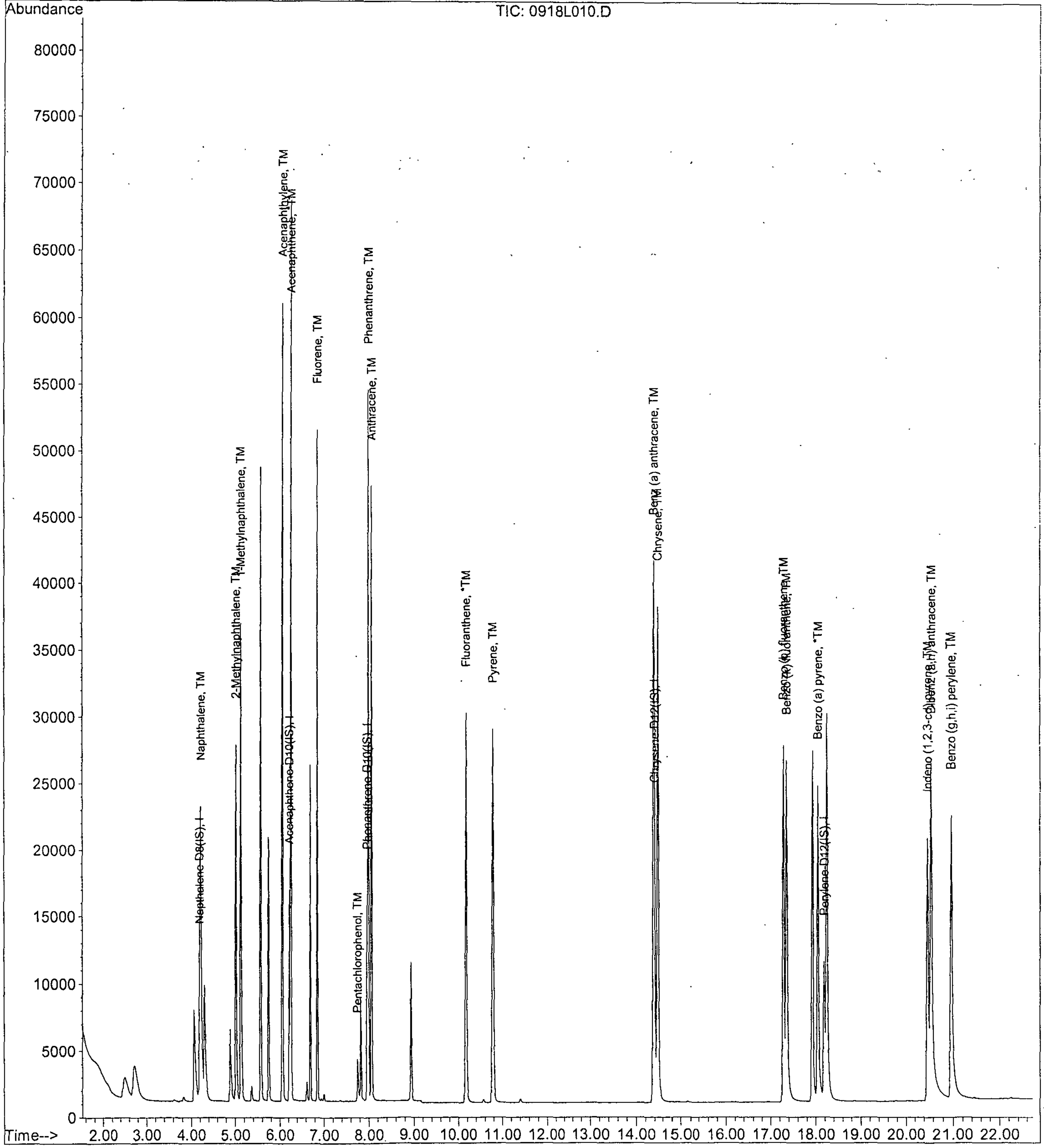
Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L010.D
Acq On : 18 Sep 18 14:36
Sample : SS SIM PCP 09/09/18
Misc :

Vial: 10
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 15:24 2018 Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration



PAH by GCMS SIM
EPA 8270 SIM

Form 7

Continuing Calibration

Lab Name: APPL, Inc.
Case No:
Matrix:

SDG No:
Date Analyzed: 09/19/18
Instrument: Linus
Initial Cal. Date: 09/18/18
Data File: 0918L029.D

		Compound	MEAN	CCRF	%D		%Drift
1	I	Napthalene-D8(IS)	ISTD			I	
2	SL	Surrogate Recovery (NBZ)	0.3114	0.3150	1.2	SL	6.5
3	TM	Naphthalene	0.9893	1.023	3.4	TM	
4	S	2-methylnaphthalene-D10 (2MN)	1.051	1.128	7.3	S	
5	TM	2-Methylnaphthalene	0.5288	0.5697	7.7	TM	
6	TM	1-Methylnaphthalene	0.6517	0.6824	4.7	TM	
7	I	Acenaphthene-D10(IS)	ISTD			I	
8	S	Surrogate Recovery (FBP)	1.465	1.572	7.3	S	
9	TM	Acenaphthylene	4.450	4.822	8.4	TM	
10	*TM	Acenaphthene	1.359	1.410	3.8	*TM	
11	TM	Fluorene	1.503	1.641	9.1	TM	
12	TML	Pentachlorophenol	0.1661	0.2334	41	TML	0.06
13	I	Phenanthrene-D10(IS)	ISTD			I	
14	TM	Phenanthrene	1.194	1.237	3.6	TM	
15	TM	Anthracene	1.087	1.184	8.9	TM	
16	S	Fluoranthene-D10 (FRT)	1.372	1.503	9.5	S	
17	*TM	Fluoranthene	1.587	1.702	7.2	*TM	
18	I	Chrysene-D12(IS)	ISTD			I	
19	TM	Pyrene	1.291	1.347	4.3	TM	
20	SL	Surrogate Recovery (TPH)	0.8364	0.7680	8.2	SL	4.0
21	TM	Benz (a) anthracene	1.132	1.228	8.5	TM	
22	TM	Chrysene	1.198	1.225	2.3	TM	
23	TML	Indeno (1,2,3-cd) pyrene	0.9516	1.032	8.5	TML	11
24	I	Perylene-D12(IS)	ISTD			I	
25	TM	Benzo (b) fluoranthene	1.073	1.208	13	TM	
26	TM	Benzo (k) fluoranthene	1.240	1.233	0.59	TM	
27	*TM	Benzo (a) pyrene	0.9597	1.097	14	*TM	
28	TM	Dibenz (a,h) anthracene	0.9830	1.086	11	TM	
29	TM	Benzo (g,h,i) perylene	1.056	1.141	8.1	TM	
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
		Average			8.4		

Quantitation Report (Not Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L029.D
Acq On : 19 Sep 18 10:54
Sample : 5.0 SIM PCP 09/09/18
Misc :

Vial: 29
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 19 11:20 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.18	136	20259	2.50000 ppb	-0.01
7) Acenaphthene-D10(IS)	6.22	164	8817	2.50000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	17581	2.50000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	22785	2.50000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	23381	2.50000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.35	82	12764	5.32495 ppb	-0.02
Spiked Amount 5.000			Recovery	= 106.500%	
4) 2-methylnaphthalene-D10 (2	4.97	152	45702	5.36706 ppb	-0.01
Spiked Amount 5.000			Recovery	= 107.340%	
8) Surrogate Recovery (FBP)	5.45	172	27721	5.36400 ppb	-0.01
Spiked Amount 5.000			Recovery	= 107.280%	
16) Fluoranthene-D10 (FRT)	10.13	212	52864	5.47715 ppb	0.01
Spiked Amount 5.000			Recovery	= 109.540%	
20) Surrogate Recovery (TPH)	11.40	244	34997	5.20152 ppb	0.00
Spiked Amount 5.000			Recovery	= 104.040%	
Target Compounds					Qvalue
3) Naphthalene	4.20	128	41457	5.17118 ppb	100
5) 2-Methylnaphthalene	5.01	141	23082	5.38615 ppb	98
6) 1-Methylnaphthalene	5.12	141	27648	5.23530 ppb	96
9) Acenaphthylene	6.05	152	85039	5.41852 ppb	98
10) Acenaphthene	6.25	154	24862	5.18839 ppb	96
11) Fluorene	6.86	166	28932	5.45686 ppb	99
12) Pentachlorophenol	7.75	266	4116	5.00301 ppb	76
14) Phenanthrene	7.99	178	43502	5.18091 ppb	100
15) Anthracene	8.06	178	41644	5.44624 ppb	100
17) Fluoranthene	10.17	202	59828	5.36068 ppb	98
19) Pyrene	10.78	202	61365	5.21675 ppb	98
21) Benz (a) anthracene	14.38	228	55974	5.42400 ppb	100
22) Chrysene	14.48	228	55837	5.11490 ppb	99
23) Indeno (1,2,3-cd) pyrene	20.48	276	47038	5.54310 ppb	95
25) Benzo (b) fluoranthene	17.28	252	56471	5.62842 ppb	98
26) Benzo (k) fluoranthene	17.36	252	57657	4.97037 ppb	99
27) Benzo (a) pyrene	18.05	252	51284	5.71402 ppb	99
28) Dibenz (a,h) anthracene	20.55	278	50801	5.52589 ppb	99
29) Benzo (g,h,i) perylene	20.97	276	53348	5.40394 ppb	99

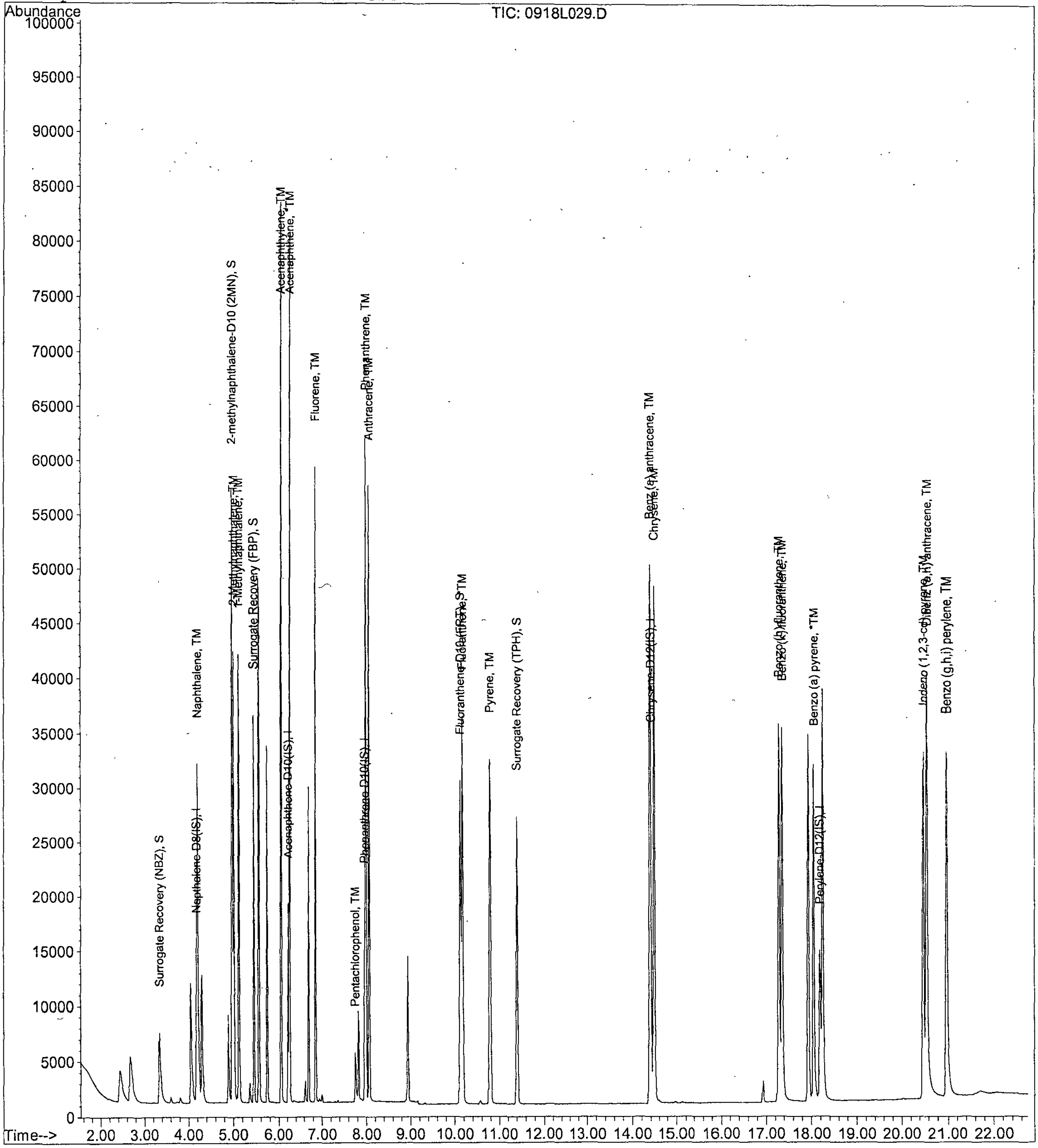
(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\LINUS\DATA\L180918P\0918L029.D          Vial: 29
Acq On    : 19 Sep 18  10:54                        Operator: MA
Sample    : 5.0 SIM PCP 09/09/18                    Inst    : Linus
Misc      :                                         Multiplr: 1.00

Quant Time: Sep 19 11:20 2018              Quant Results File: L0918PCP.RES

Method         : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title          : EPA 8270
Last Update    : Tue Sep 18 15:15:06 2018
Response via   : Initial Calibration
```



ORGANICS
Raw Data

APPL, INC.

Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L019.D Vial: 19
Acq On : 17 Sep 18 18:13 Operator: MA
Sample : AZ79146S01 1/30.36G df20 Inst : Linus
Misc : Multiplr: 658.76

Quant Time: Sep 19 9:25 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	29188	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	13433	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	27442	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	35601	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	35544	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	12023	2020.9834 ppb	0.00
Spiked Amount 164.690			Recovery	= 1227.141%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 164.690			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	28614	2707.2742 ppb	0.00
Spiked Amount 164.690			Recovery	= 1643.857%	
16) Fluoranthene-D10 (FRT)	10.22	212	8	0.3780 ppb	0.00
Spiked Amount 164.690			Recovery	= 0.230%	
20) Surrogate Recovery (TPH)	11.40	244	35950	2419.4059 ppb	-0.09
Spiked Amount 164.690			Recovery	= 1469.063%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

Quantitation Report

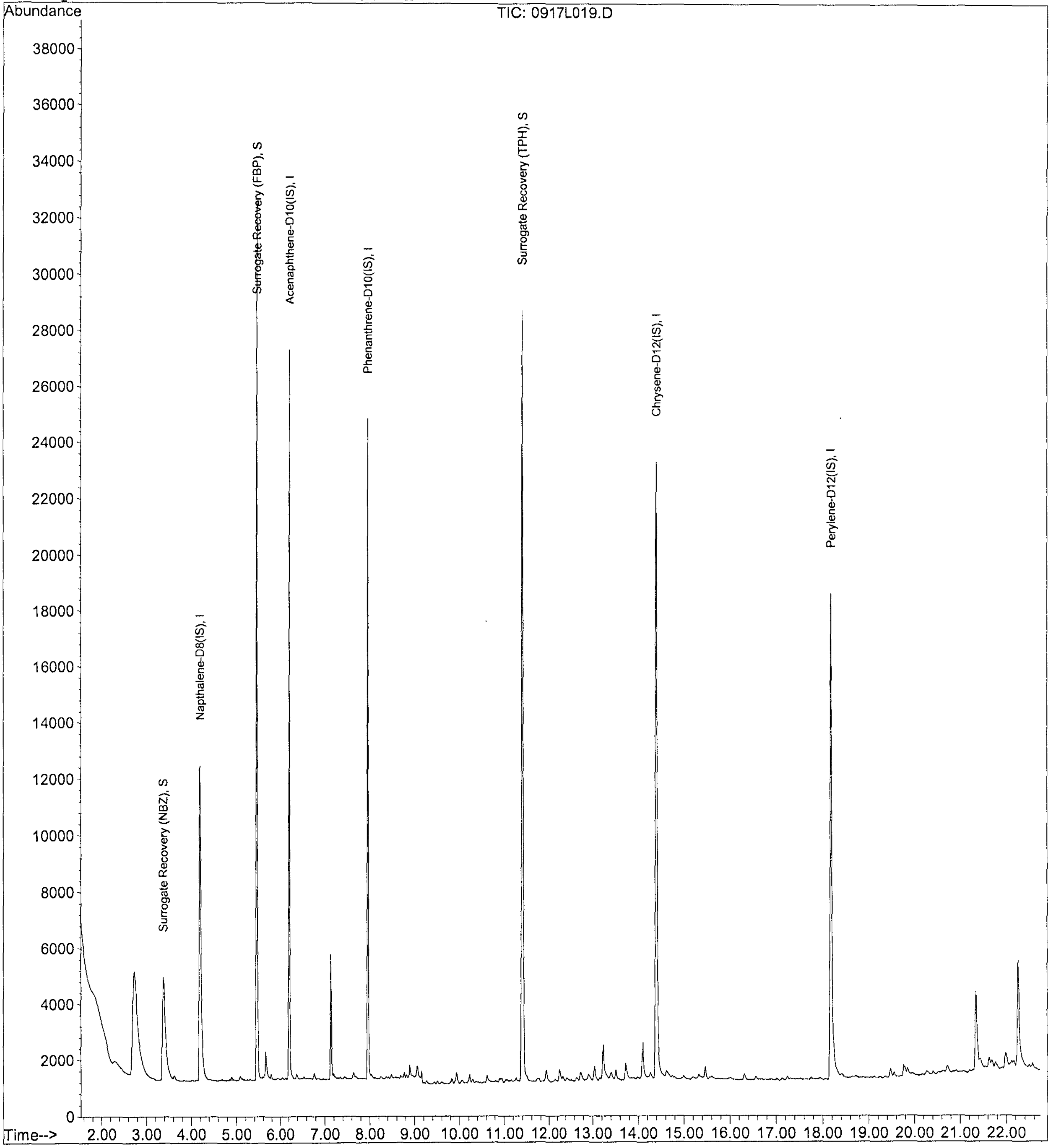
Data File : M:\LINUS\DATA\L180917P\0917L019.D
Acq On : 17 Sep 18 18:13
Sample : AZ79146S01 1/30.36G df20
Misc :

Vial: 19
Operator: MA
Inst : Linus
Multiplr: 658.76

Quant Time: Sep 19 9:25 2018

Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L020.D Vial: 20
Acq On : 17 Sep 18 18:42 Operator: MA
Sample : AZ79147S01 1/30.19G df20 Inst : Linus
Misc : Multiplr: 662.47

Quant Time: Sep 19 9:25 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	27658	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	12572	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	25362	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	31295	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	31302	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	10842	1934.1101 ppb	0.00
Spiked Amount 165.618			Recovery	= 1167.816%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 165.618			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	25917	2634.7862 ppb	0.00
Spiked Amount 165.618			Recovery	= 1590.884%	
16) Fluoranthene-D10 (FRT)	10.21	212	8	0.4113 ppb	-0.02
Spiked Amount 165.618			Recovery	= 0.248%	
20) Surrogate Recovery (TPH)	11.40	244	32716	2529.7371 ppb	-0.09
Spiked Amount 165.618			Recovery	= 1527.455%	

Target Compounds Qvalue

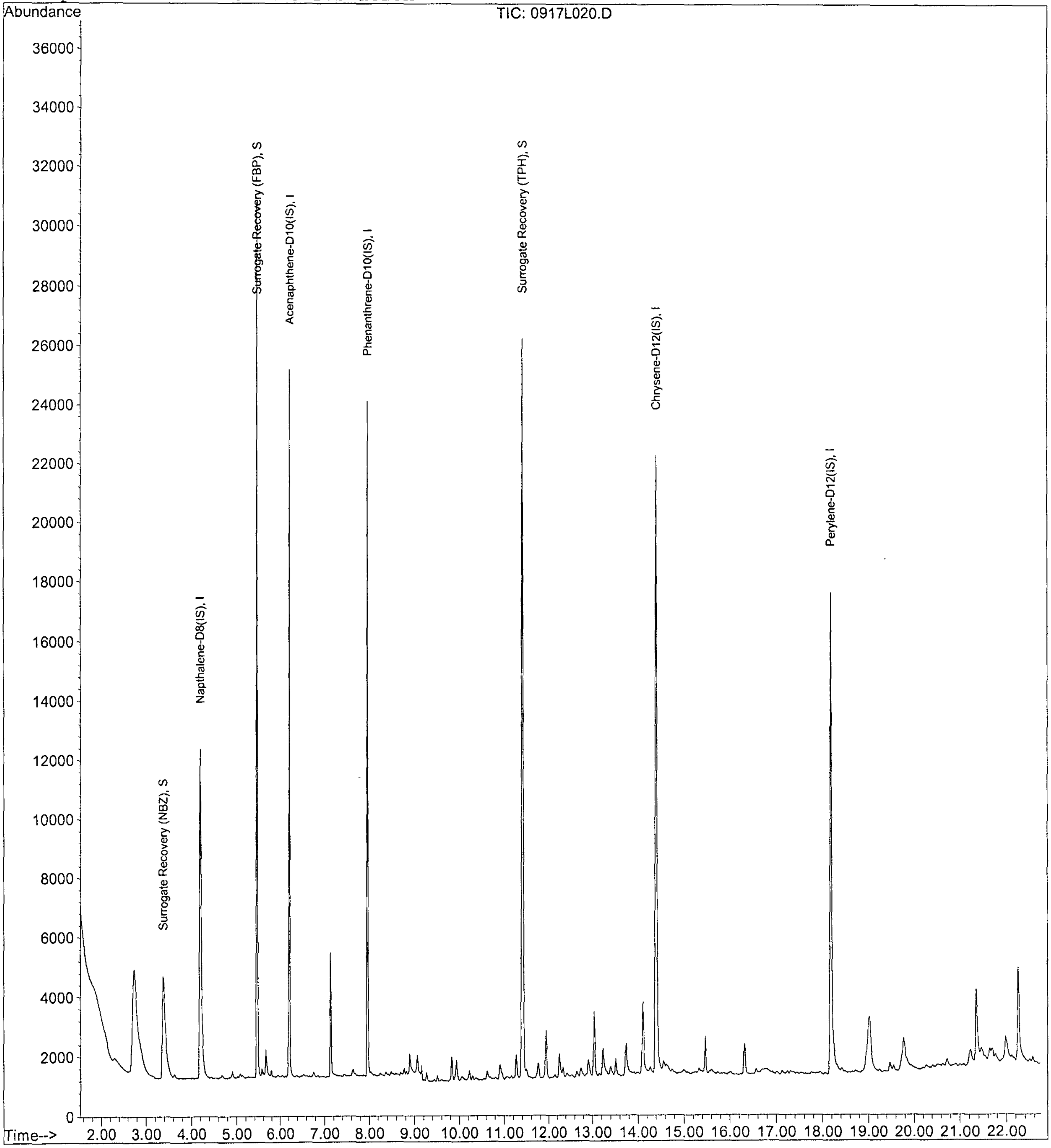
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L020.D   Vial: 20
Acq On : 17 Sep 18 18:42   Operator: MA
Sample : AZ79147S01 1/30.19G df20   Inst : Linus
Misc :   Multiplr: 662.47

Quant Time: Sep 19 9:25 2018   Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

```
Data File : M:\LINUS\DATA\L180917P\0917L021.D          Vial: 21
Acq On    : 17 Sep 18  19:11                        Operator: MA
Sample    : AZ79148S01 1/30.31G df20                Inst    : Linus
Misc      :                                         Multiplr: 659.85

Quant Time: Sep 19  9:21 2018                Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title        : EPA 8270
Last Update  : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	15474	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	7191	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16745	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	22268	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	22138	2.5000 ppb	0.00

System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	9833	3122.8638 ppb	0.00
Spiked Amount 164.962			Recovery	= 1893.080%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 164.962			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	22678	4014.7408 ppb	0.00
Spiked Amount 164.962			Recovery	= 2433.736%	
16) Fluoranthene-D10 (FRT)	10.30	212	3	0.2327 ppb	0.08
Spiked Amount 164.962			Recovery	= 0.141%	
20) Surrogate Recovery (TPH)	11.40	244	29159	3234.1185 ppb	-0.09
Spiked Amount 164.962			Recovery	= 1960.523%	

Target Compounds Qvalue

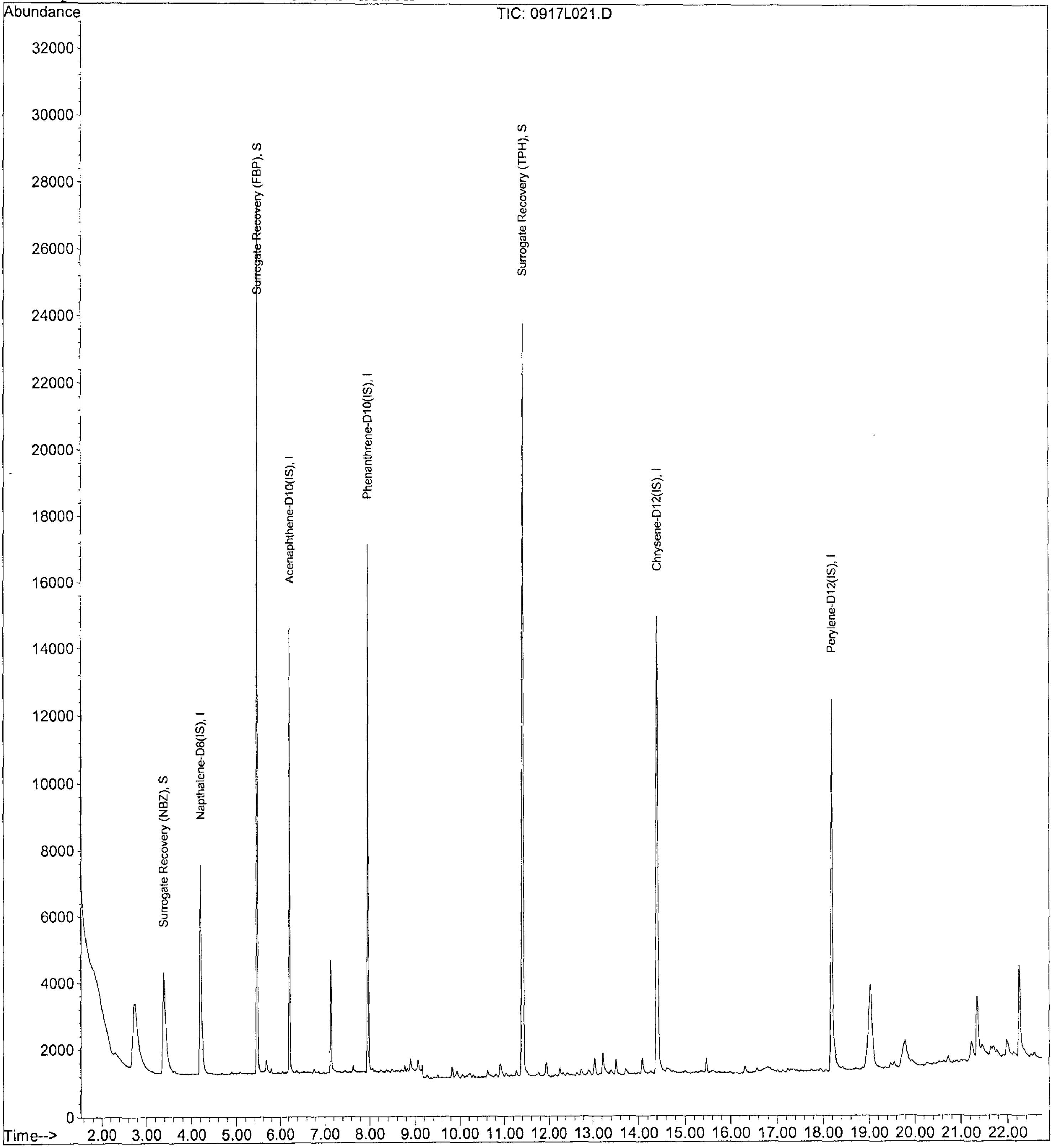
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L021.D   Vial: 21
Acq On : 17 Sep 18 19:11   Operator: MA
Sample : AZ79148S01 1/30.31G df20   Inst : Linus
Misc :   Multiplr: 659.85

Quant Time: Sep 19 9:21 2018   Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L022.D Vial: 22
Acq On : 17 Sep 18 19:40 Operator: MA
Sample : AZ79149S01 1/30.35G df20 Inst : Linus
Misc : Multiplr: 658.98

Quant Time: Sep 19 9:20 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	30678	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	14083	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	27852	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	35338	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	34764	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	11159	1785.2354 ppb	0.00
Spiked Amount 164.745			Recovery	= 1083.638%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 164.745			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	26611	2402.3470 ppb	0.00
Spiked Amount 164.745			Recovery	= 1458.225%	
16) Fluoranthene-D10 (FRT)	10.24	212	2	0.0931 ppb	0.01
Spiked Amount 164.745			Recovery	= 0.056%	
20) Surrogate Recovery (TPH)	11.40	244	33681	2267.0199 ppb	-0.09
Spiked Amount 164.745			Recovery	= 1376.081%	

Target Compounds Qvalue

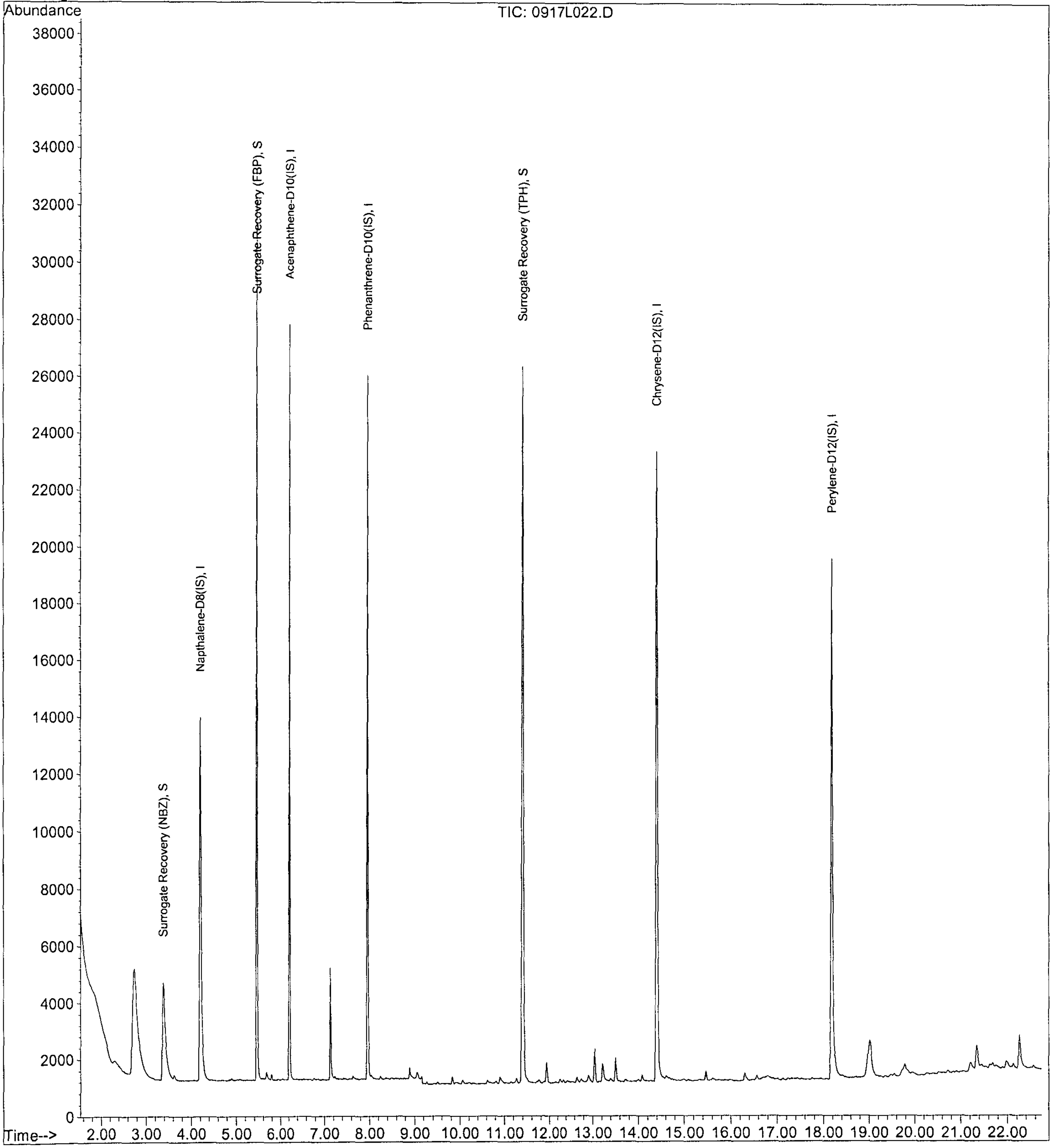
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L022.D Vial: 22
Acq On : 17 Sep 18 19:40 Operator: MA
Sample : AZ79149S01 1/30.35G df20 Inst : Linus
Misc : Multiplr: 658.98

Quant Time: Sep 19 9:20 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

```
Data File : M:\LINUS\DATA\L180917P\0917L025.D          Vial: 25
Acq On    : 17 Sep 18  21:08                        Operator: MA
Sample    : AZ79150S01 1/30.70G df20                Inst    : Linus
Misc      :                                         Multiplr: 651.47

Quant Time: Sep 19  9:19 2018              Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title        : EPA 8270
Last Update  : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	29113	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	13409	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	26575	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	34459	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	34739	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	10277	1712.7613 ppb	0.00
Spiked Amount 162.866			Recovery	= 1051.635%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 162.866			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	24237	2271.8119 ppb	0.00
Spiked Amount 162.866			Recovery	= 1394.893%	
16) Fluoranthene-D10 (FRT)	10.22	212	3	0.1448 ppb	0.00
Spiked Amount 162.866			Recovery	= 0.089%	
20) Surrogate Recovery (TPH)	11.40	244	30903	2090.7737 ppb	-0.09
Spiked Amount 162.866			Recovery	= 1283.735%	

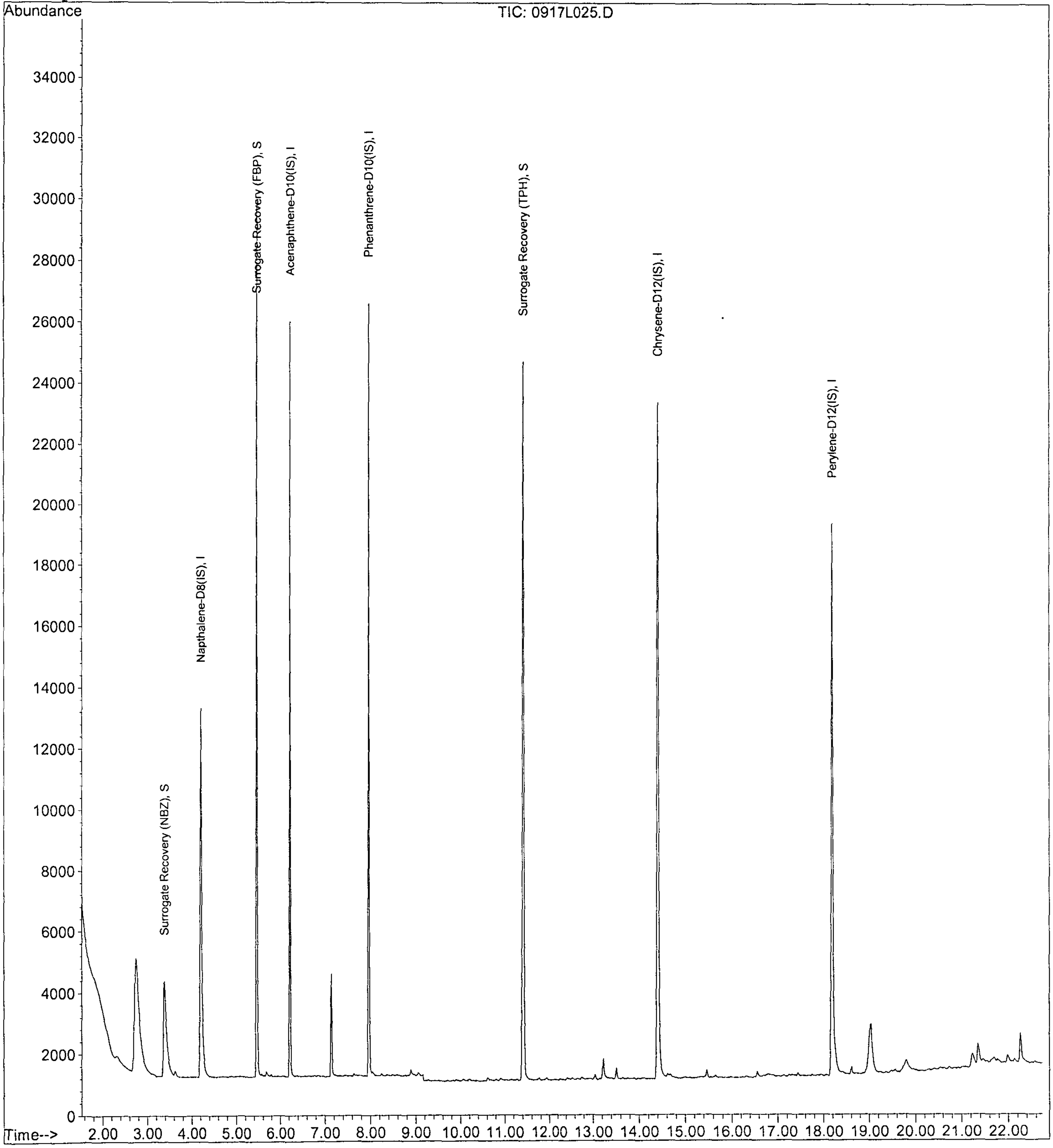
Target Compounds Qvalue

Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L025.D Vial: 25
Acq On : 17 Sep 18 21:08 Operator: MA
Sample : AZ79150S01 1/30.70G df20 Inst : Linus
Misc : Multiplr: 651.47

Quant Time: Sep 19 9:19 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

```
Data File : M:\LINUS\DATA\L180917P\0917L026.D          Vial: 26
Acq On    : 17 Sep 18  21:37                          Operator: MA
Sample    : AZ79151S01 1/30.51G df20                  Inst    : Linus
Misc      :                                           Multiplr: 655.52

Quant Time: Sep 19  9:19 2018              Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title        : EPA 8270
Last Update  : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards                 R.T. QIon  Response  Conc Units   Dev(Min)
----------------------------------------------------------------------------
  1) Napthalene-D8(IS)             4.20  136    28370     2.5000 ppb     0.01
  7) Acenaphthene-D10(IS)          6.22  164    13175     2.5000 ppb     0.00
 13) Phenanthrene-D10(IS)          7.97  188    26010     2.5000 ppb     0.00
 18) Chrysene-D12(IS)             14.40  240    32745     2.5000 ppb     0.00
 24) Perylene-D12(IS)             18.18  264    32696     2.5000 ppb     0.00

System Monitoring Compounds
  2) Surrogate Recovery (NBZ)      3.38   82    10816  1861.3197 ppb     0.00
  Spiked Amount    163.881                    Recovery   = 1135.777%
  4) 2-methylnaphthalene-D10 (2    0.00  152        0     0.0000 ppb
  Spiked Amount    163.881                    Recovery   =    0.000%
  8) Surrogate Recovery (FBP)      5.46  172    25331  2431.5757 ppb     0.00
  Spiked Amount    163.881                    Recovery   = 1483.748%
 16) Fluoranthene-D10 (FRT)       10.28  212        3     0.1488 ppb     0.06
  Spiked Amount    163.881                    Recovery   =    0.091%
 20) Surrogate Recovery (TPH)     11.40  244    31535  2281.8415 ppb    -0.09
  Spiked Amount    163.881                    Recovery   = 1392.379%

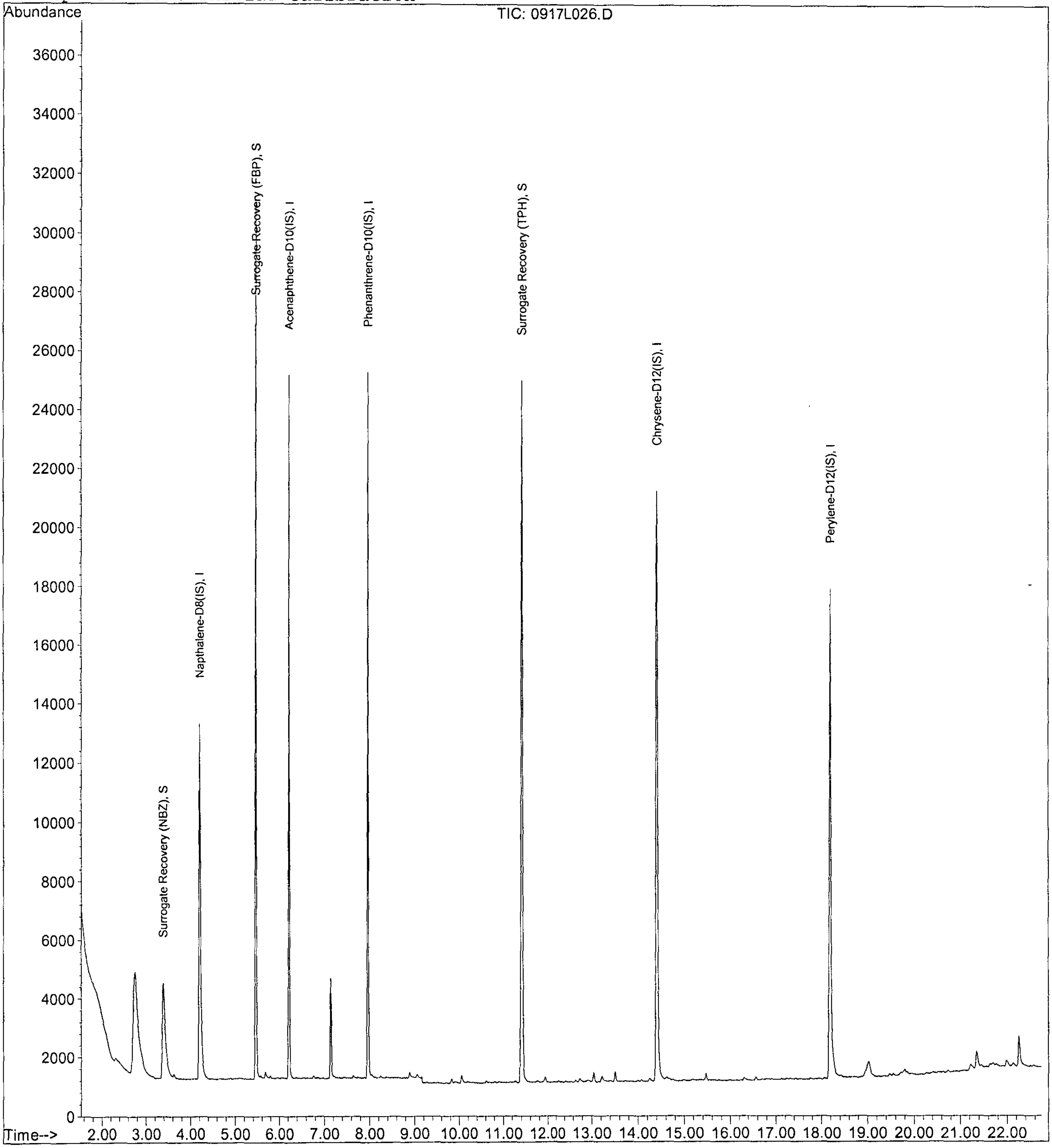
Target Compounds                                                  Qvalue
```

Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L026.D   Vial: 26
Acq On : 17 Sep 18 21:37   Operator: MA
Sample : AZ79151S01 1/30.51G df20   Inst : Linus
Misc :   Multiplr: 655.52

Quant Time: Sep 19 9:19 2018   Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L027.D Vial: 27
Acq On : 17 Sep 18 22:07 Operator: MA
Sample : AZ79152S01 1/30.59G df40 Inst : Linus
Misc : Multiplr: 1307.62

Quant Time: Sep 19 9:18 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	26025	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	12451	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	25360	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	32378	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	32079	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.39	82	5313	1988.1828 ppb	0.02
Spiked Amount 163.452			Recovery	= 1216.370%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 163.452			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	12695	2572.2204 ppb	0.00
Spiked Amount 163.452			Recovery	= 1573.684%	
16) Fluoranthene-D10 (FRT)	10.24	212	3	0.3045 ppb	0.01
Spiked Amount 163.452			Recovery	= 0.186%	
20) Surrogate Recovery (TPH)	11.40	244	15515	1957.4959 ppb	-0.09
Spiked Amount 163.452			Recovery	= 1197.596%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

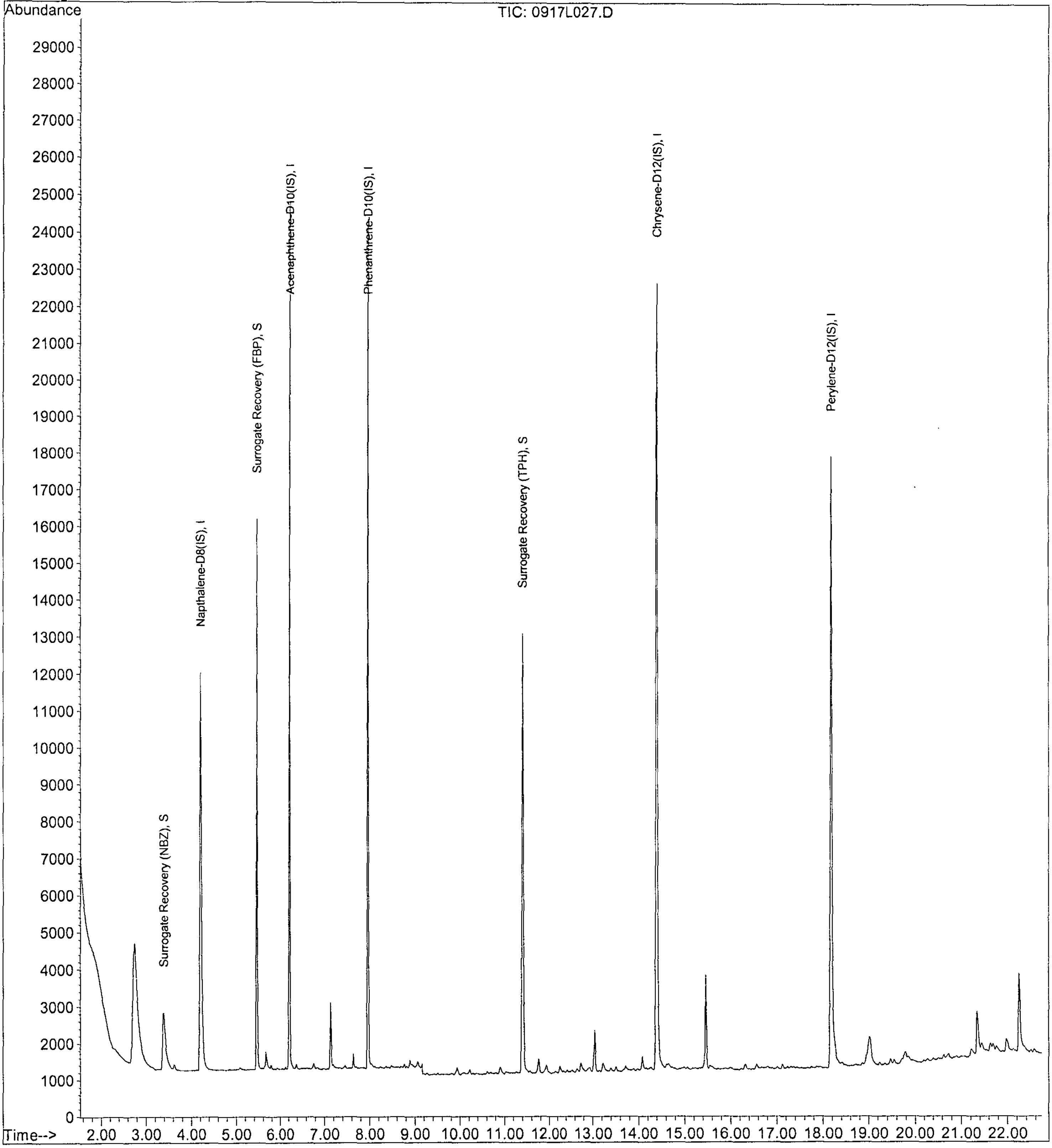
Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L027.D
Acq On : 17 Sep 18 22:07
Sample : AZ79152S01 1/30.59G df40
Misc :

Vial: 27
Operator: MA
Inst : Linus
Multiplr: 1307.62

Quant Time: Sep 19 9:18 2018
Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L028.D Vial: 28
Acq On : 17 Sep 18 22:36 Operator: MA
Sample : AZ79153S01 1/30.31G df40 Inst : Linus
Misc : Multiplr: 1319.70

Quant Time: Sep 19 9:12 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	26749	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	12751	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	25083	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	31700	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	31298	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	4980	1829.8804 ppb	0.00
Spiked Amount 164.962			Recovery	= 1109.273%	
4) 2-methylnaphthalene-D10 (2	4.88	152	43	4.7800 ppb	-0.07
Spiked Amount 164.962			Recovery	= 2.898%	
8) Surrogate Recovery (FBP)	5.46	172	12064	2408.9093 ppb	0.00
Spiked Amount 164.962			Recovery	= 1460.281%	
16) Fluoranthene-D10 (FRT)	10.21	212	10	1.0357 ppb	-0.02
Spiked Amount 164.962			Recovery	= 0.628%	
20) Surrogate Recovery (TPH)	11.40	244	15282	1991.2643 ppb	-0.09
Spiked Amount 164.962			Recovery	= 1207.104%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

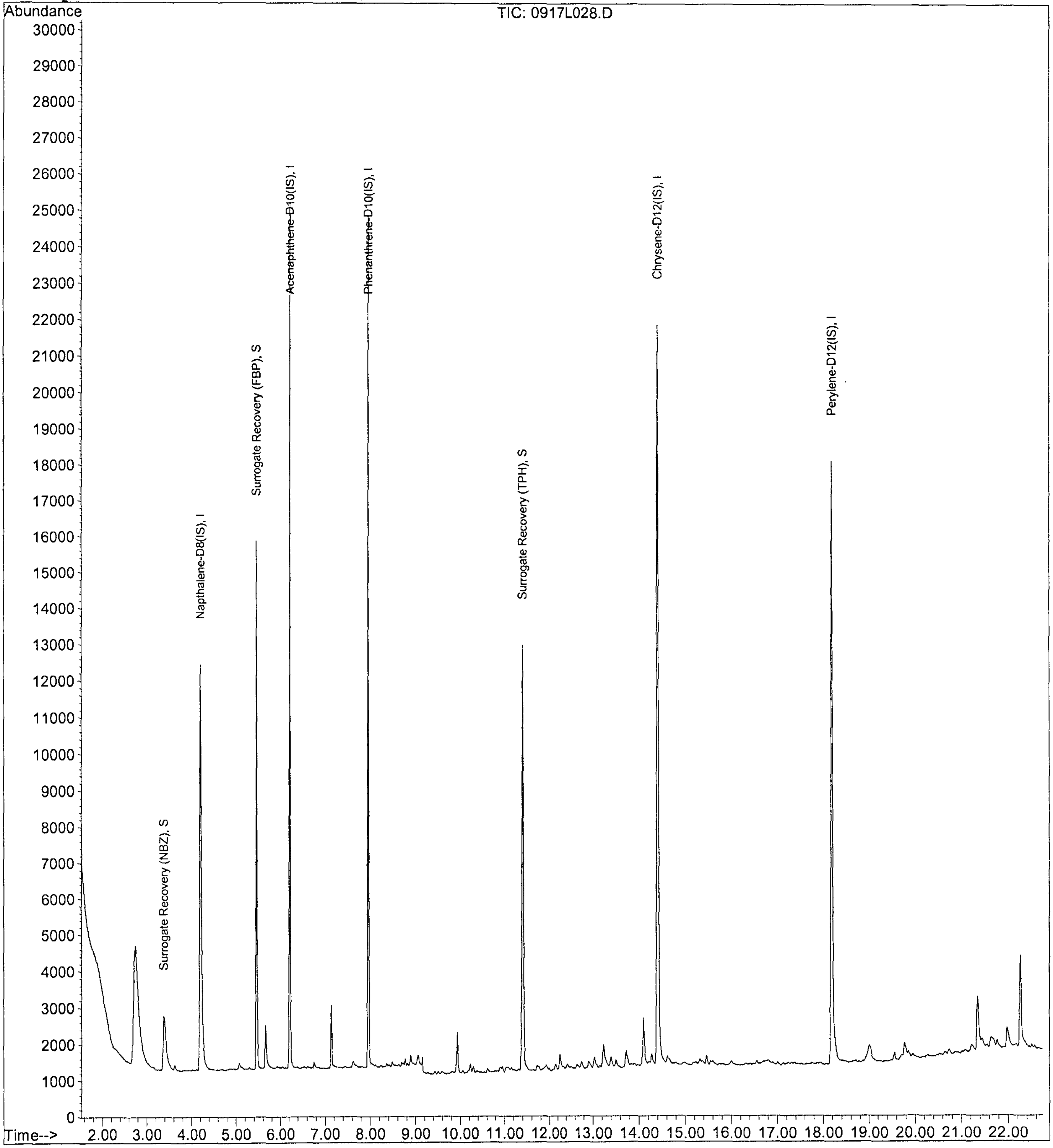
Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L028.D
Acq On : 17 Sep 18 22:36
Sample : AZ79153S01 1/30.31G df40
Misc :

Vial: 28
Operator: MA
Inst : Linus
Multiplr: 1319.70

Quant Time: Sep 19 9:12 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L029.D Vial: 29
Acq On : 17 Sep 18 23:05 Operator: MA
Sample : AZ79154S01 1/30.75G df20 Inst : Linus
Misc : Multiplr: 650.41

Quant Time: Sep 19 9:10 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	23606	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	11077	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	21895	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	27572	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	27444	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	9143	1876.1917 ppb	0.00
Spiked Amount 162.602			Recovery	= 1153.858%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 162.602			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	21248	2407.0175 ppb	0.00
Spiked Amount 162.602			Recovery	= 1480.316%	
16) Fluoranthene-D10 (FRT)	10.14	212	272	15.9051 ppb	-0.08
Spiked Amount 162.602			Recovery	= 9.782%	
20) Surrogate Recovery (TPH)	11.40	244	28107	2414.3241 ppb	-0.09
Spiked Amount 162.602			Recovery	= 1484.809%	
Target Compounds					Qvalue
12) Pentachlorophenol	7.76	266	50	522.9679 ppb	87
21) Benz (a) anthracene	14.38	228	408	21.8209 ppb	96

(#) = qualifier out of range (m) = manual integration

Quantitation Report

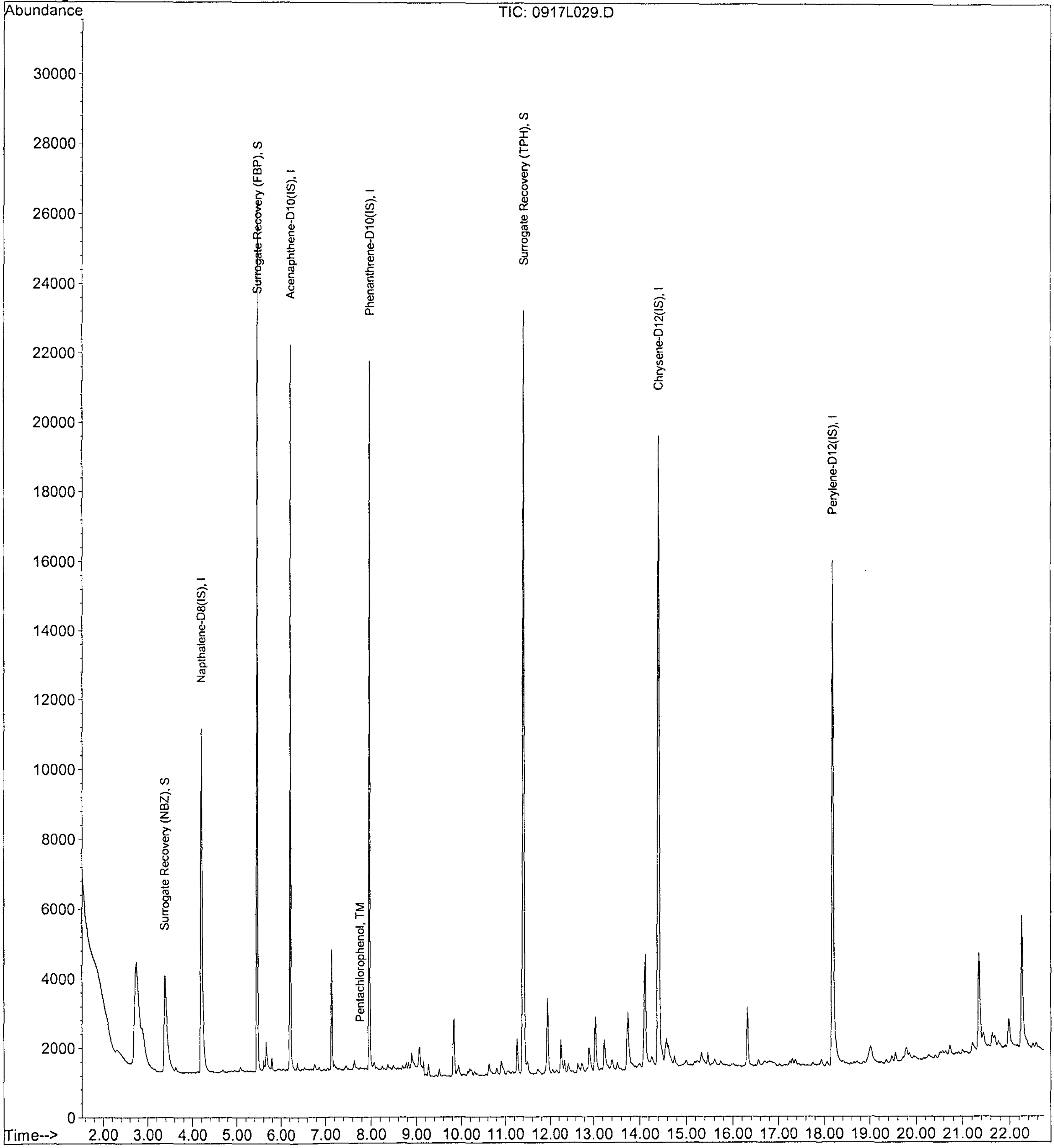
Data File : M:\LINUS\DATA\L180917P\0917L029.D
Acq On : 17 Sep 18 23:05
Sample : AZ79154S01 1/30.75G df20
Misc :

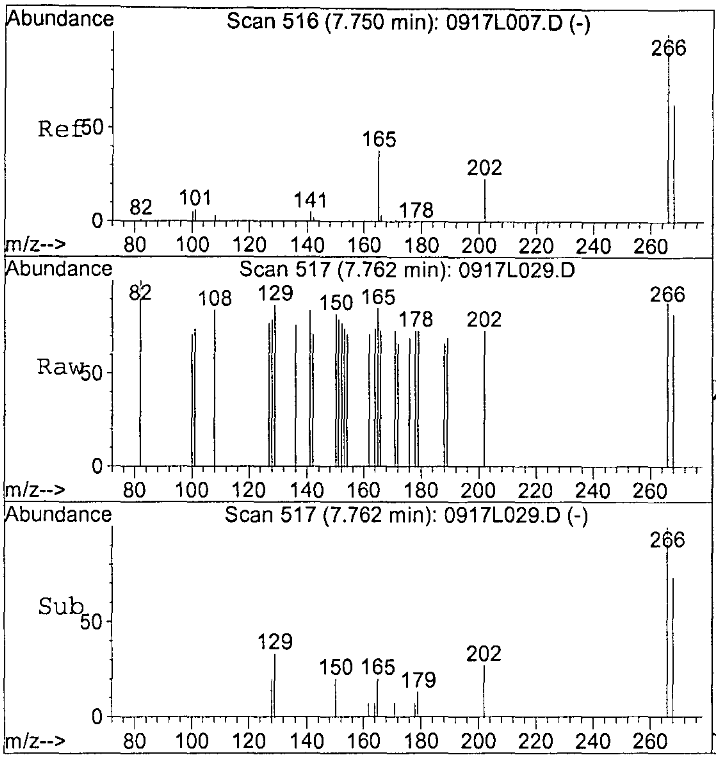
Vial: 29
Operator: MA
Inst : Linus
Multiplr: 650.41

Quant Time: Sep 19 9:10 2018

Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration

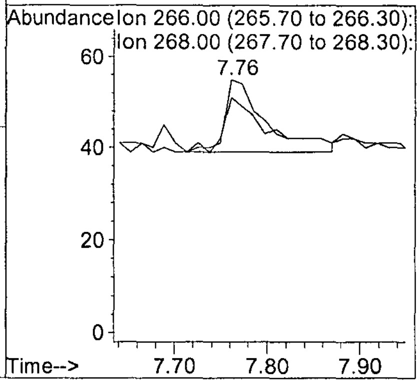


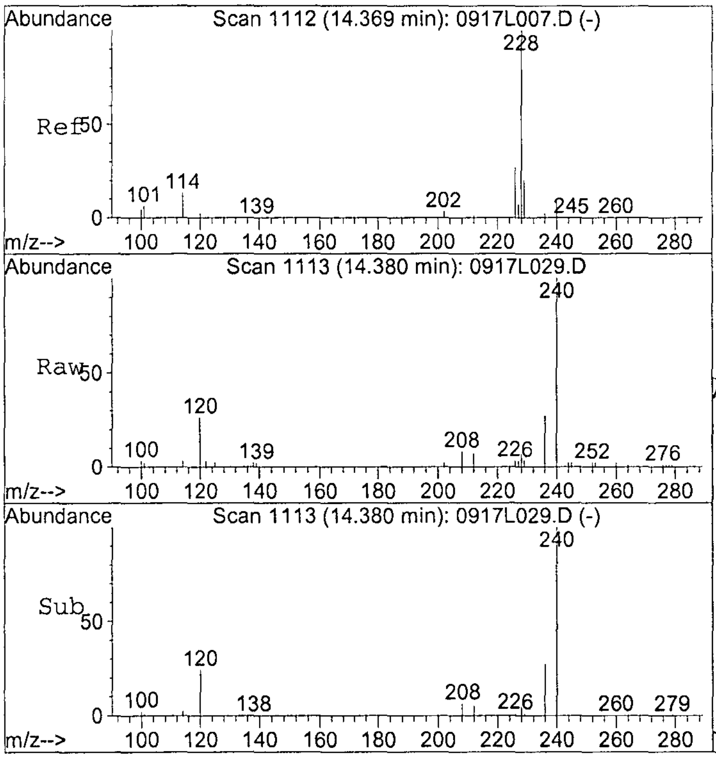


#12
Pentachlorophenol
Concen: 522.9679 ppb
RT: 7.76 min Scan# 517
Delta R.T. 0.04 min
Lab File: 0917L029.D
Acq: 17 Sep 18 23:05

Tgt Ion:266 Resp: 50

Ion	Ratio	Lower	Upper
266	100		
268	75.0	45.5	84.5

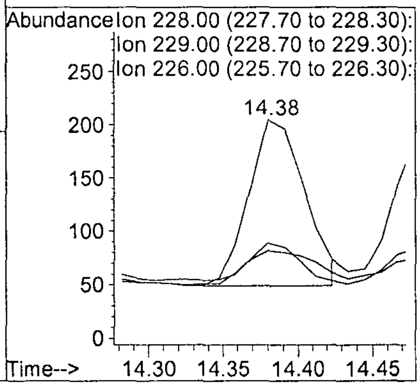




#21
Benz (a) anthracene
Concen: 21.8209 ppb
RT: 14.38 min Scan# 1113
Delta R.T. 0.01 min
Lab File: 0917L029.D
Acq: 17 Sep 18 23:05

Tgt Ion:228 Resp: 408

Ion	Ratio	Lower	Upper
228	100		
229	17.3	13.7	25.5
226	25.0	18.7	34.7



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L030.D Vial: 30
Acq On : 17 Sep 18 23:34 Operator: MA
Sample : AZ79155S01 1/30.41G df20 Inst : Linus
Misc : Multiplr: 657.68

Quant Time: Sep 19 9:04 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.20	136	27787	2.5000 ppb	0.01
7) Acenaphthene-D10(IS)	6.22	164	13052	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	25758	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	32699	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	32722	2.5000 ppb	0.00

System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	10083	1777.4079 ppb	0.00
Spiked Amount 164.420			Recovery	= 1081.020%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 164.420			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	23549	2289.3219 ppb	0.00
Spiked Amount 164.420			Recovery	= 1392.366%	
16) Fluoranthene-D10 (FRT)	10.29	212	3	0.1508 ppb	0.07
Spiked Amount 164.420			Recovery	= 0.092%	
20) Surrogate Recovery (TPH)	11.40	244	29672	2139.3577 ppb	-0.09
Spiked Amount 164.420			Recovery	= 1301.158%	

Target Compounds Qvalue

Quantitation Report

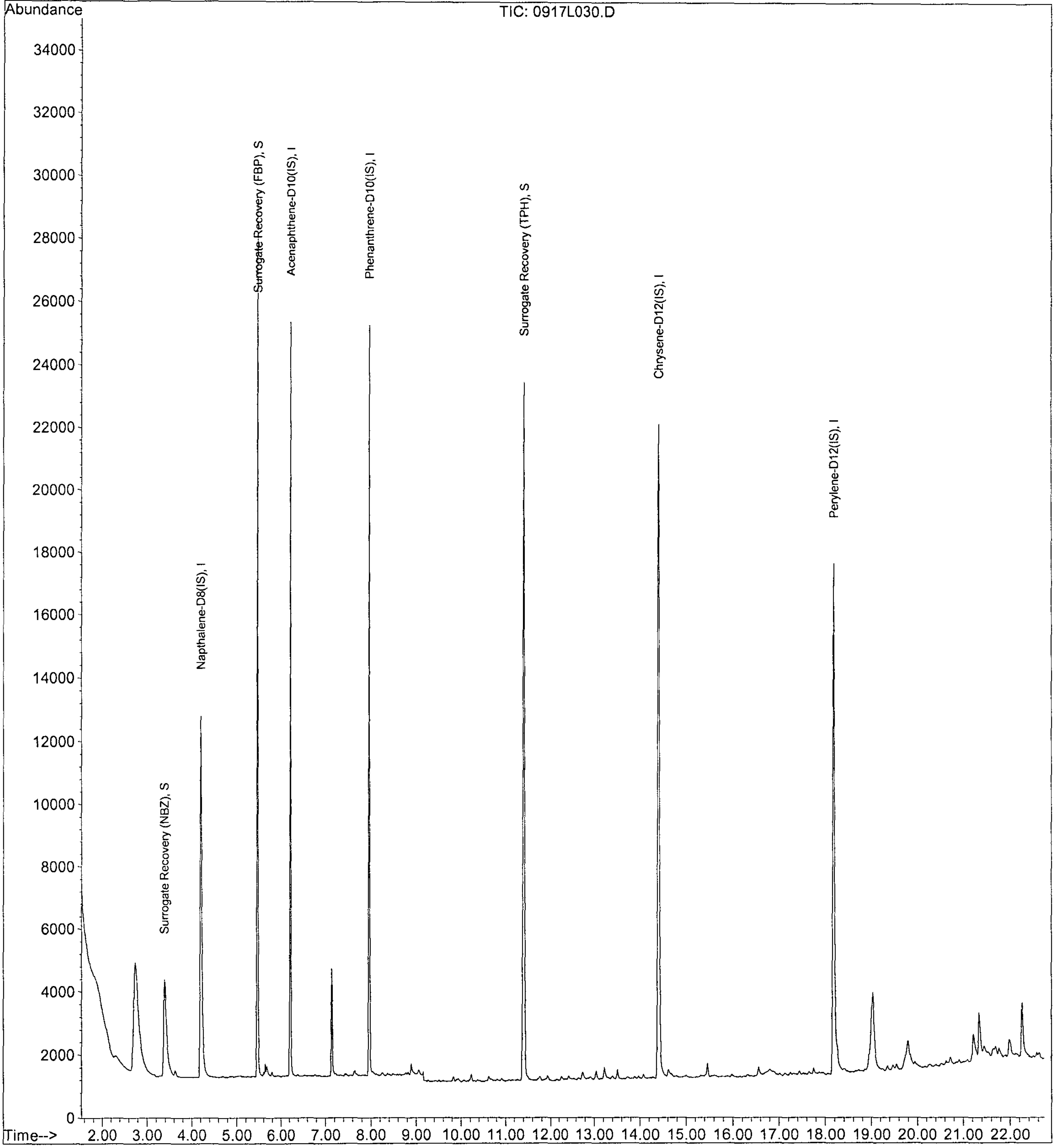
Data File : M:\LINUS\DATA\L180917P\0917L030.D
Acq On : 17 Sep 18 23:34
Sample : AZ79155S01 1/30.41G df20
Misc :

Vial: 30
Operator: MA
Inst : Linus
Multiplr: 657.68

Quant Time: Sep 19 9:04 2018

Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L030.D
Acq On : 19 Sep 18 11:31
Sample : AZ79156S01 1/30.55G DF20
Misc :

Vial: 30
Operator: MA
Inst : Linus
Multiplr: 654.66

Quant Time: Sep 20 8:52 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.18	136	20586	2.5000 ppb	-0.01
7) Acenaphthene-D10(IS)	6.22	164	9294	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	18183	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.41	240	22870	2.5000 ppb	0.01
24) Perylene-D12(IS)	18.20	264	23613	2.5000 ppb	0.01
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.35	82	9508	2566.2033 ppb	-0.02
Spiked Amount 163.666			Recovery	= 1567.950%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 163.666			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	21972	2640.4978 ppb	0.00
Spiked Amount 163.666			Recovery	= 1613.344%	
16) Fluoranthene-D10 (FRT)	10.14	212	61	4.0006 ppb	0.02
Spiked Amount 163.666			Recovery	= 2.445%	
20) Surrogate Recovery (TPH)	11.41	244	27773	2666.2908 ppb	0.01
Spiked Amount 163.666			Recovery	= 1629.104%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
17) Fluoranthene	10.18	202	1608	91.2007 ppb		96
19) Pyrene	10.80	202	1465	81.2303 ppb		99
21) Benz (a) anthracene	14.39	228	1095	69.2068 ppb		98
23) Indeno (1,2,3-cd) pyrene	20.51	276	619	178.9968 ppb	#	96
26) Benzo (k) fluoranthene	17.37	252	608	33.9759 ppb		98
27) Benzo (a) pyrene	18.06	252	785	56.6970 ppb		99
29) Benzo (g,h,i) perylene	21.00	276	585	38.4130 ppb		97

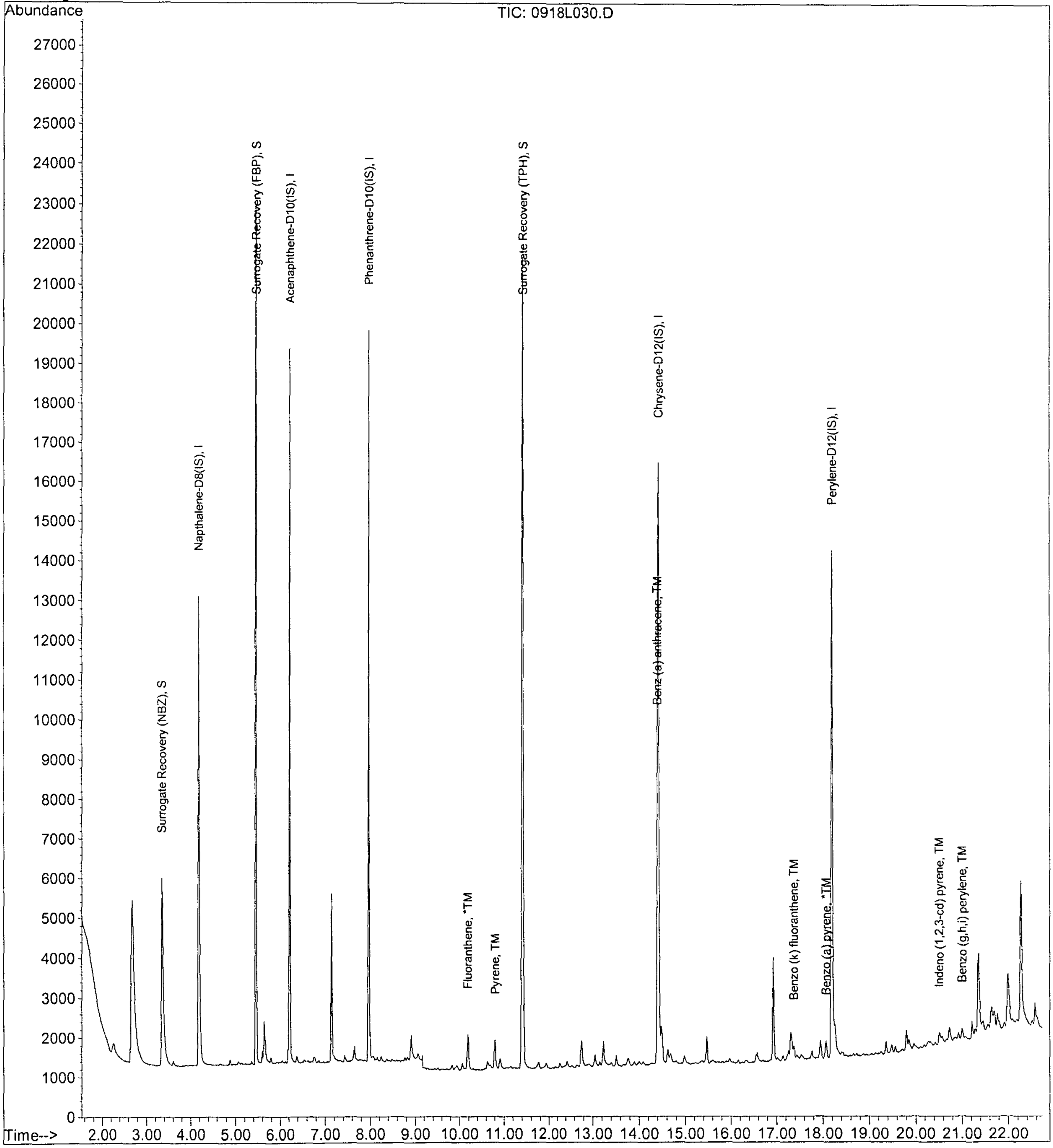
(#) = qualifier out of range (m) = manual integration

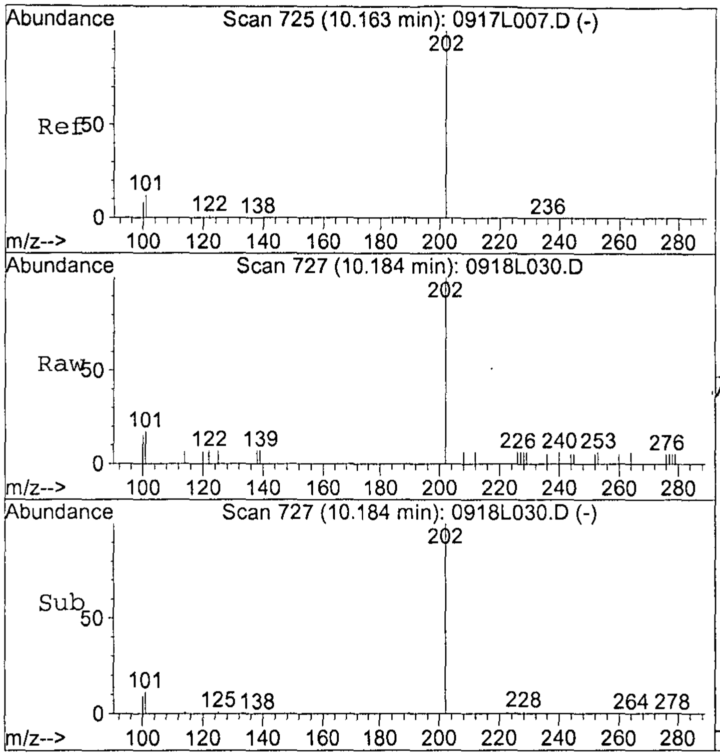
Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L030.D　　Vial: 30
Acq On : 19 Sep 18 11:31　　Operator: MA
Sample : AZ79156S01 1/30.55G DF20　　Inst : Linus
Misc : 　　Multiplr: 654.66

Quant Time: Sep 20 8:52 2018　　Quant Results File: L0918PCP.RES

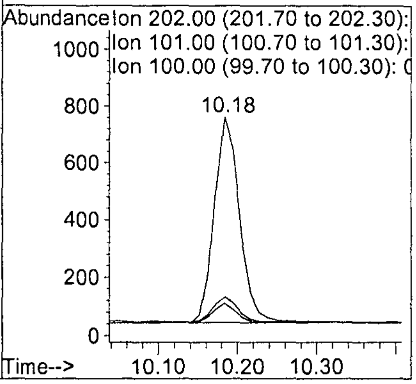
Method : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration

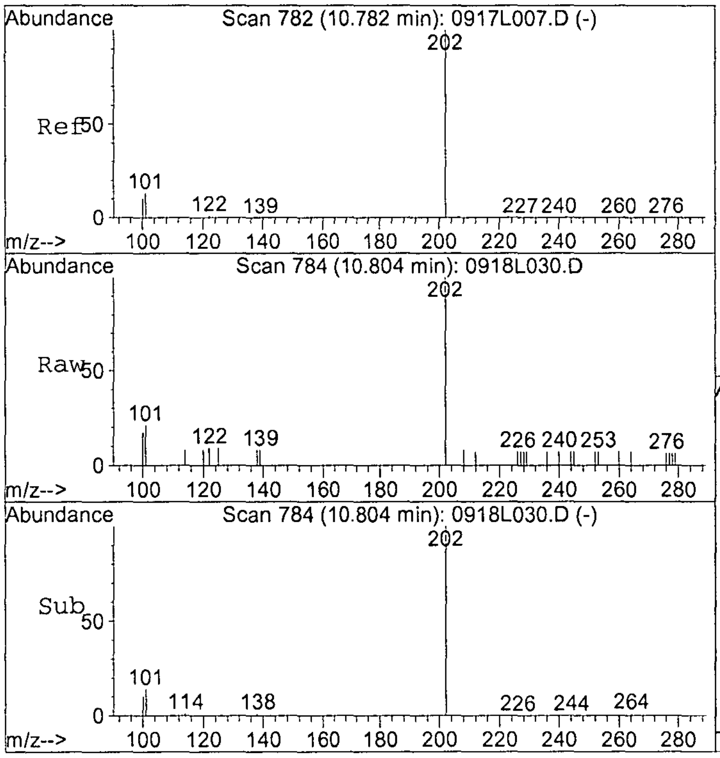




#17
Fluoranthene
Concen: 91.2007 ppb
RT: 10.18 min Scan# 727
Delta R.T. 0.01 min
Lab File: 0918L030.D
Acq: 19 Sep 18 11:31

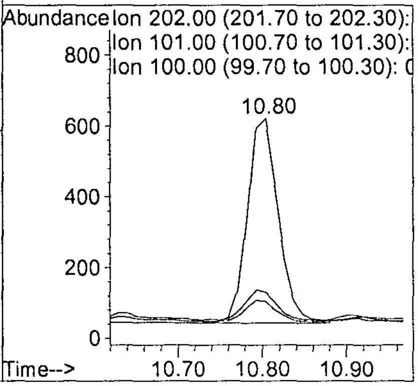
Tgt	Ion:202	Resp:	1608
Ion	Ratio	Lower	Upper
202	100		
101	11.8	7.4	13.8
100	9.2	5.3	9.7

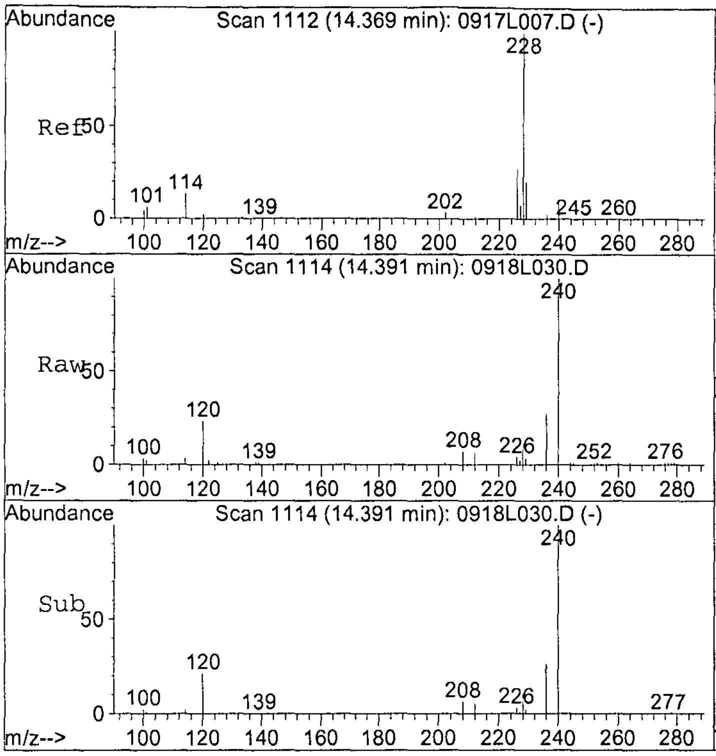




#19
Pyrene
Concen: 81.2303 ppb
RT: 10.80 min Scan# 784
Delta R.T. 0.02 min
Lab File: 0918L030.D
Acq: 19 Sep 18 11:31

Tgt	Ion:202	Resp:	1465
Ion	Ratio	Lower	Upper
202	100		
101	13.5	9.2	17.0
100	9.8	6.9	12.9

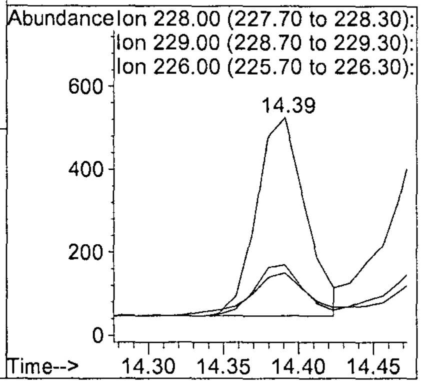


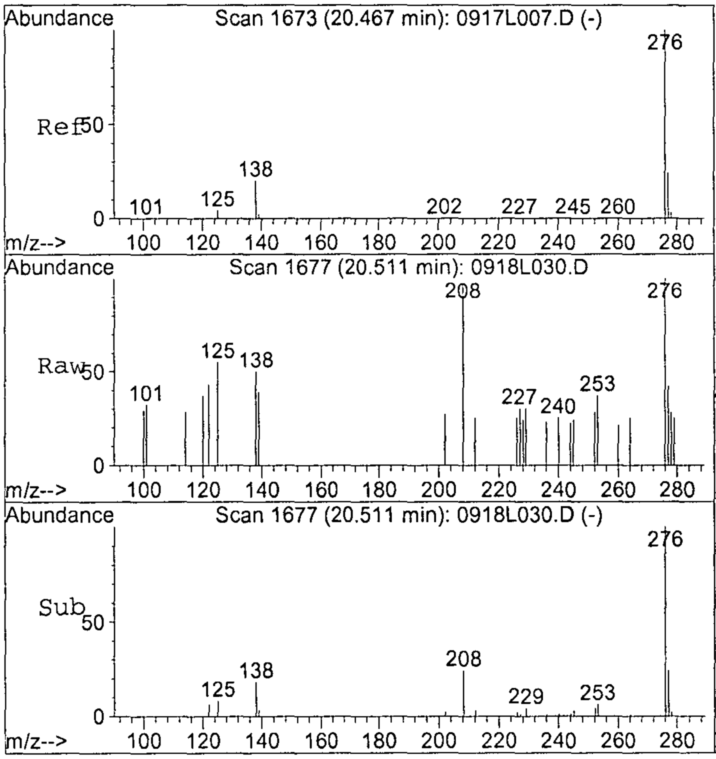


#21
Benz (a) anthracene
Concen: 69.2068 ppb
RT: 14.39 min Scan# 1114
Delta R.T. 0.01 min
Lab File: 0918L030.D
Acq: 19 Sep 18 11:31

Tgt Ion:228 Resp: 1095

Ion	Ratio	Lower	Upper
228	100		
229	20.9	13.7	25.5
226	25.7	18.3	33.9

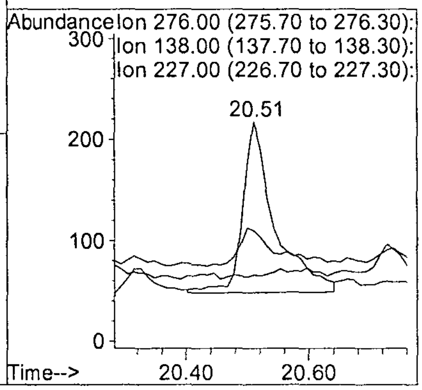


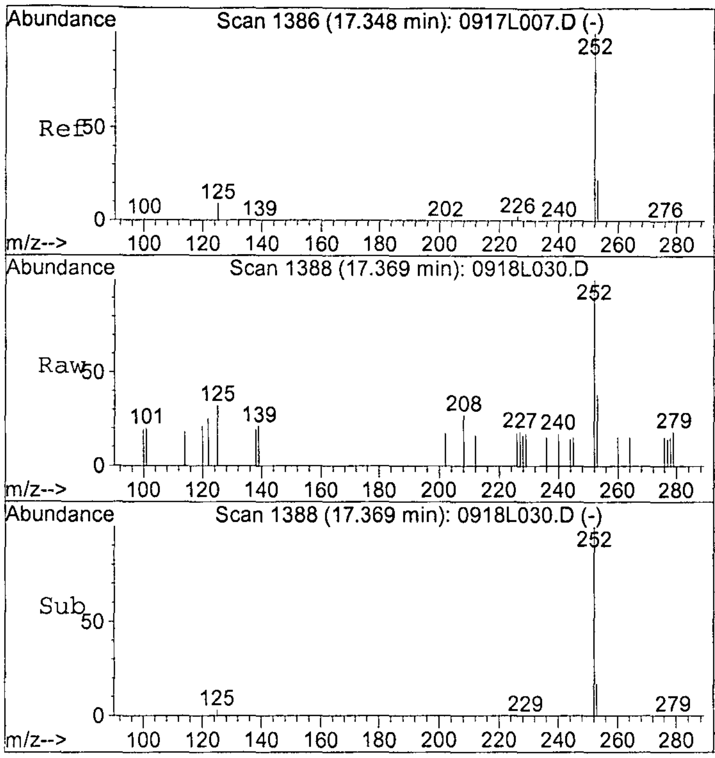


#23
Indeno (1,2,3-cd) pyrene
Concen: 178.9968 ppb
RT: 20.51 min Scan# 1677
Delta R.T. 0.04 min
Lab File: 0918L030.D
Acq: 19 Sep 18 11:31

Tgt Ion:276 Resp: 619

Ion	Ratio	Lower	Upper
276	100		
138	19.2	14.8	27.4
227	0.6	0.1	0.1#

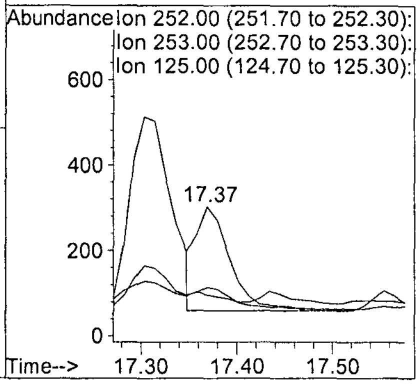


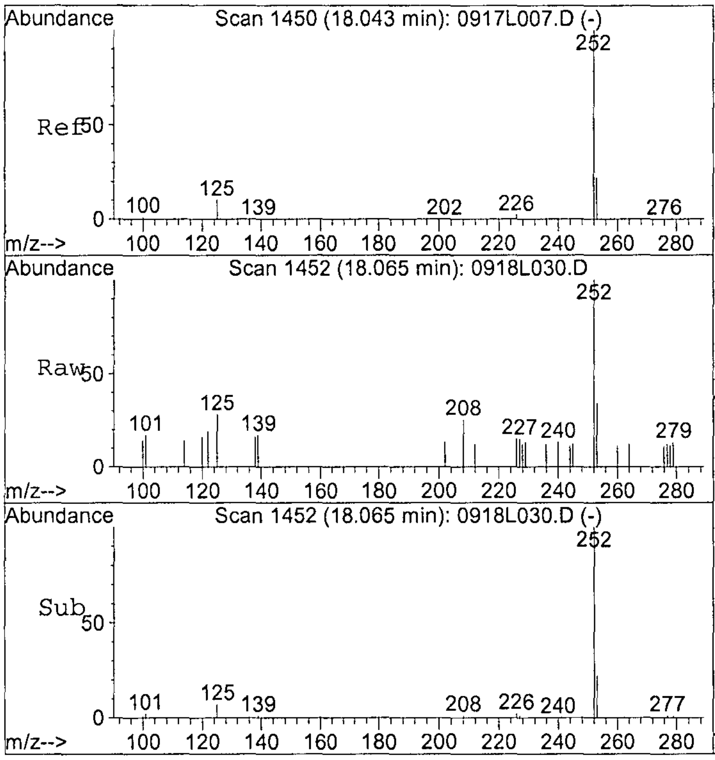


#26
Benzo (k) fluoranthene
Concen: 33.9759 ppb
RT: 17.37 min Scan# 1388
Delta R.T. 0.02 min
Lab File: 0918L030.D
Acq: 19 Sep 18 11:31

Tgt Ion:252 Resp: 608

Ion	Ratio	Lower	Upper
252	100		
253	21.3	15.1	28.0
125	8.6	7.4	13.8

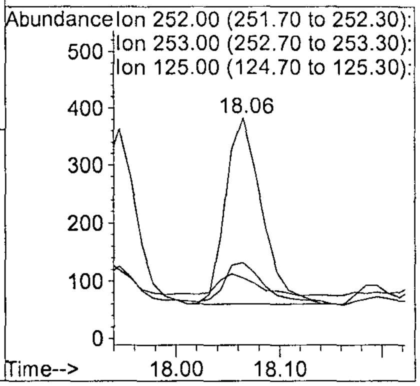


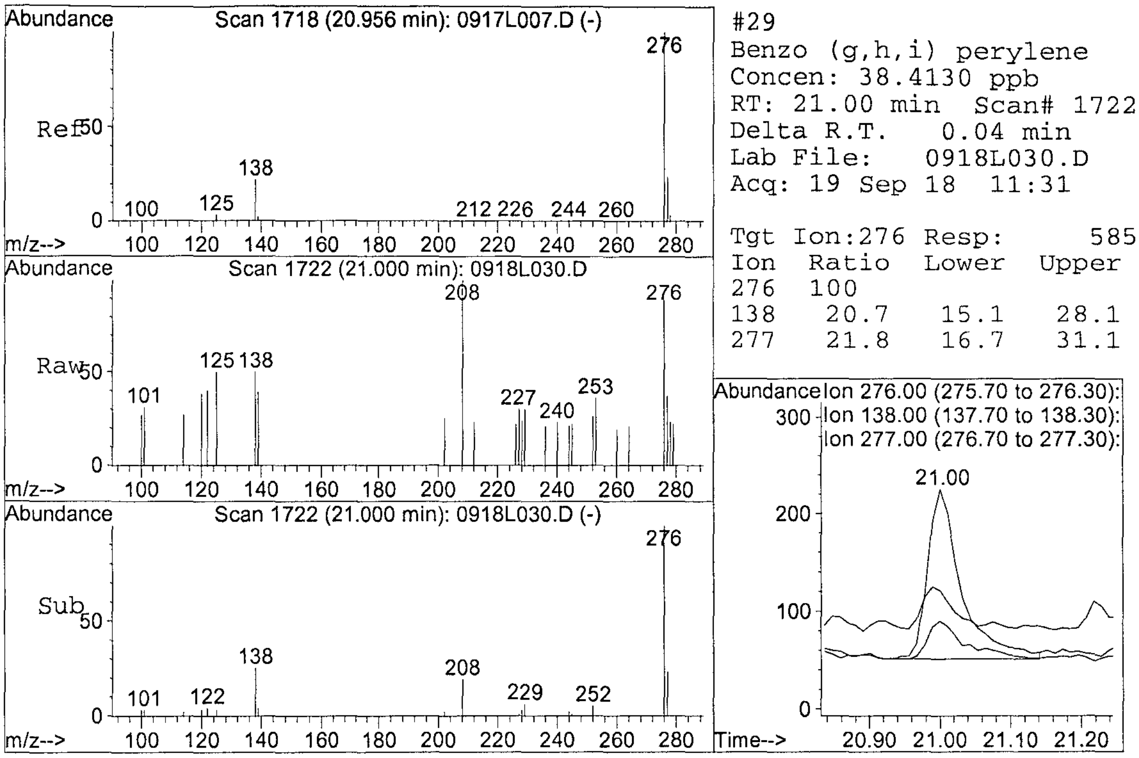


#27
Benzo (a) pyrene
Concen: 56.6970 ppb
RT: 18.06 min Scan# 1452
Delta R.T. 0.02 min
Lab File: 0918L030.D
Acq: 19 Sep 18 11:31

Tgt Ion:252 Resp: 785

Ion	Ratio	Lower	Upper
252	100		
253	22.0	15.3	28.5
125	9.6	7.4	13.7





#29
Benzo (g,h,i) perylene
Concen: 38.4130 ppb
RT: 21.00 min Scan# 1722
Delta R.T. 0.04 min
Lab File: 0918L030.D
Acq: 19 Sep 18 11:31

Tgt Ion:276 Resp: 585

Ion	Ratio	Lower	Upper
276	100		
138	20.7	15.1	28.1
277	21.8	16.7	31.1

Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L019.D   Vial: 19
Acq On : 18 Sep 18 19:11   Operator: MA
Sample : AZ79157S01 1/30.36G DF40   Inst : Linus
Misc :   Multiplr: 1317.52

Quant Time: Sep 19 9:43 2018   Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	26402	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	12038	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	23829	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	30097	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	29675	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	5507	2376.4350 ppb	0.01
Spiked Amount 164.690			Recovery	= 1442.971%	
4) 2-methylnaphthalene-D10 (2	5.11	152	36	4.2741 ppb	0.12
Spiked Amount 164.690			Recovery	= 2.595%	
8) Surrogate Recovery (FBP)	5.46	172	13768	2570.8348 ppb	0.00
Spiked Amount 164.690			Recovery	= 1561.011%	
16) Fluoranthene-D10 (FRT)	10.14	212	49	4.9350 ppb	0.02
Spiked Amount 164.690			Recovery	= 2.997%	
20) Surrogate Recovery (TPH)	11.40	244	17181	2389.9114 ppb	0.00
Spiked Amount 164.690			Recovery	= 1451.154%	

Target Compounds   Qvalue

(#) = qualifier out of range (m) = manual integration

Quantitation Report

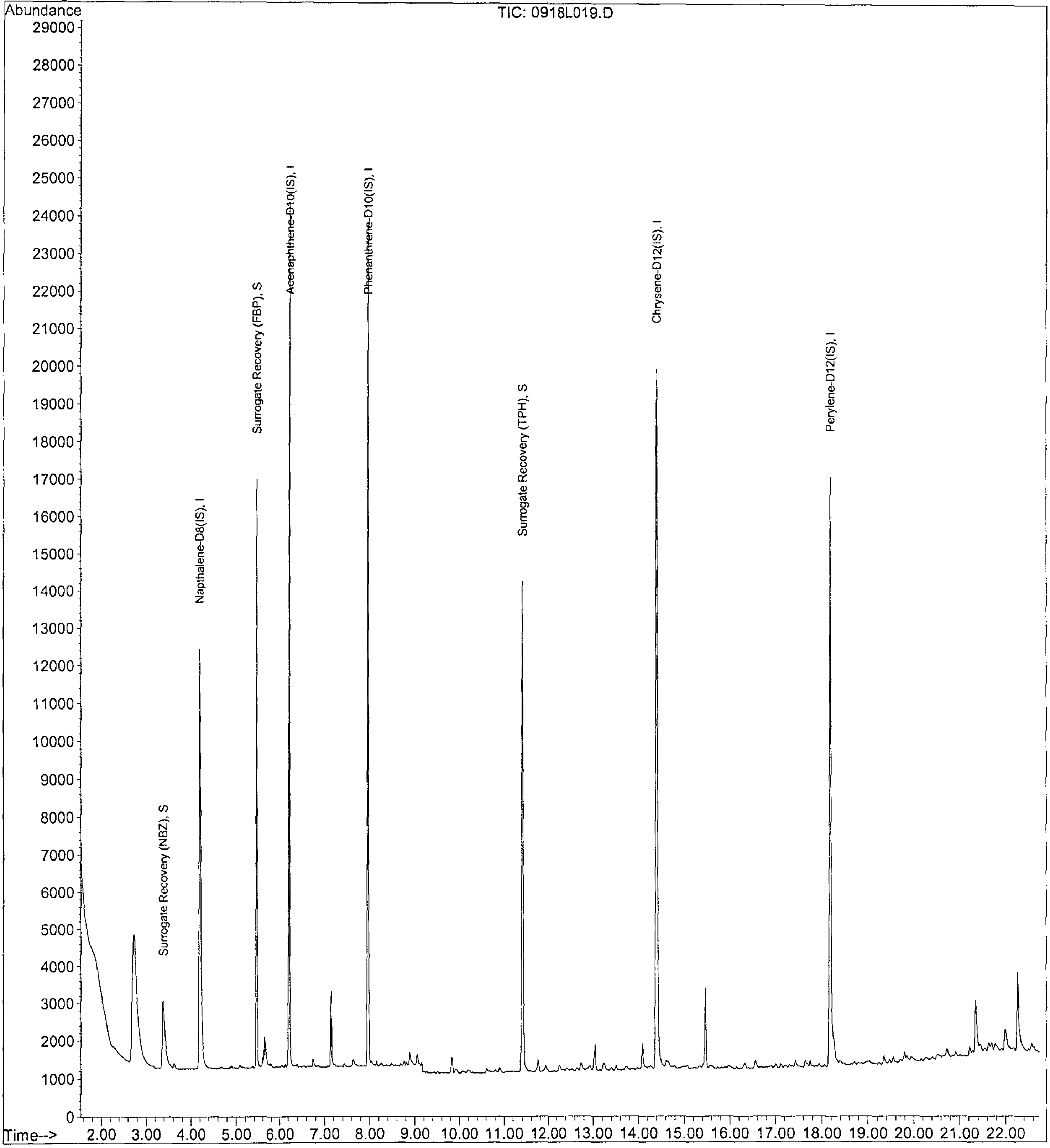
Data File : M:\LINUS\DATA\L180918P\0918L019.D
Acq On : 18 Sep 18 19:11
Sample : AZ79157S01 1/30.36G DF40
Misc :

Vial: 19
Operator: MA
Inst : Linus
Multiplr: 1317.52

Quant Time: Sep 19 9:43 2018

Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L020.D
Acq On : 18 Sep 18 19:40
Sample : AZ79158S01 1/30.14G DF20
Misc :

Vial: 20
Operator: MA
Inst : Linus
Multiplr: 663.57

Quant Time: Sep 19 9:44 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	25511	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	12130	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	24901	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	31814	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	31888	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	11392	2516.2078 ppb	0.00
Spiked Amount 165.893			Recovery	= 1516.770%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 165.893			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	27082	2527.5929 ppb	0.00
Spiked Amount 165.893			Recovery	= 1523.633%	
16) Fluoranthene-D10 (FRT)	10.14	212	61	2.9610 ppb	0.02
Spiked Amount 165.893			Recovery	= 1.785%	
20) Surrogate Recovery (TPH)	11.40	244	34379	2391.0137 ppb	0.00
Spiked Amount 165.893			Recovery	= 1441.303%	

Target Compounds Qvalue

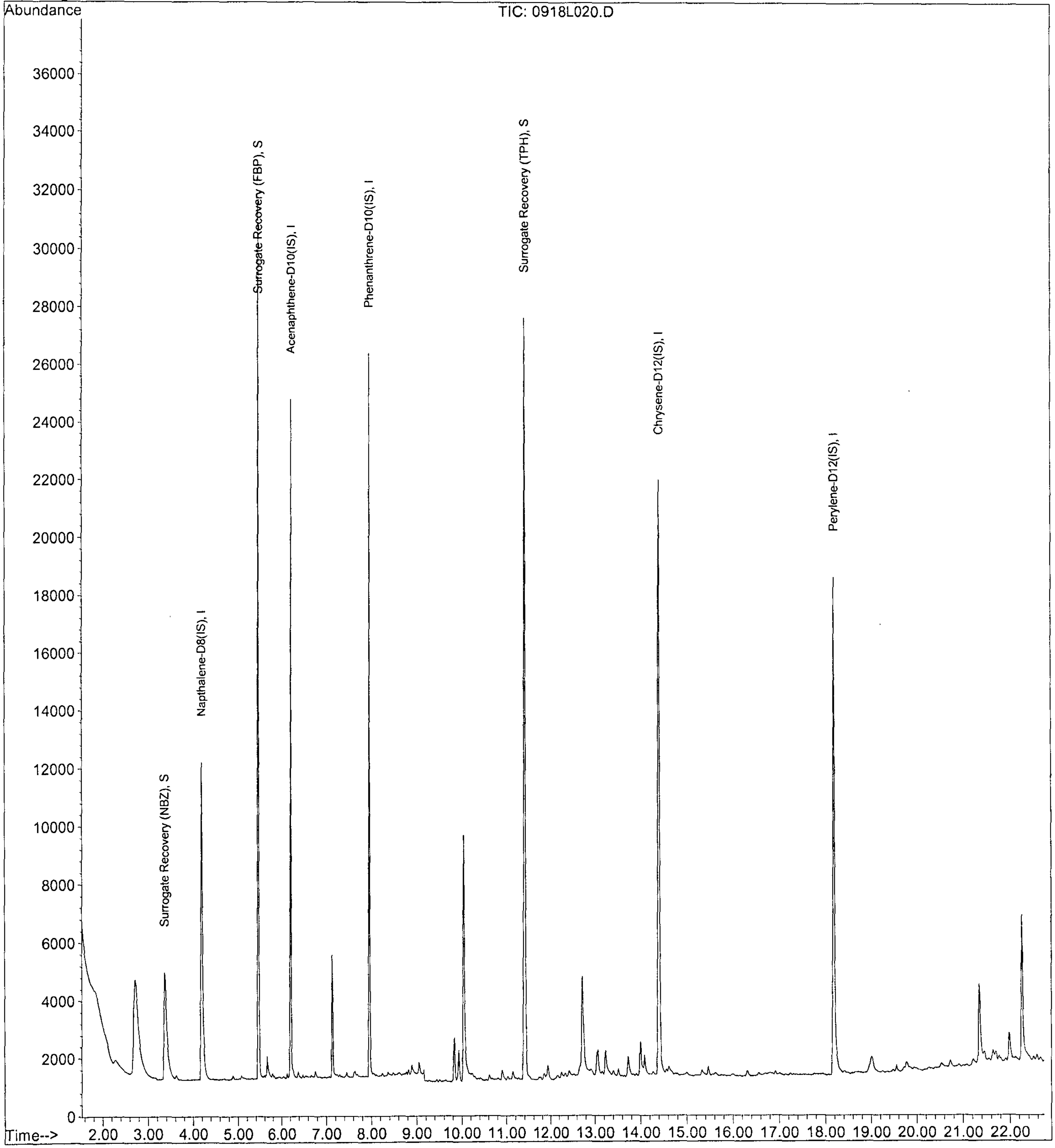
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L020.D Vial: 20
Acq On : 18 Sep 18 19:40 Operator: MA
Sample : AZ79158S01 1/30.14G DF20 Inst : Linus
Misc : Multiplr: 663.57

Quant Time: Sep 19 9:44 2018 Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L021.D Vial: 21
Acq On : 18 Sep 18 20:09 Operator: MA
Sample : AZ79159S01 1/30.37G DF20 Inst : Linus
Misc : Multiplr: 658.54

Quant Time: Sep 19 9:45 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	28137	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	13347	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	26142	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	34188	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	34127	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	11620	2312.4307 ppb	0.00
Spiked Amount 164.636			Recovery	= 1404.571%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 164.636			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	27468	2312.2193 ppb	0.00
Spiked Amount 164.636			Recovery	= 1404.442%	
16) Fluoranthene-D10 (FRT)	10.14	212	48	2.2026 ppb	0.02
Spiked Amount 164.636			Recovery	= 1.338%	
20) Surrogate Recovery (TPH)	11.40	244	35213	2255.8427 ppb	0.00
Spiked Amount 164.636			Recovery	= 1370.199%	

Target Compounds Qvalue

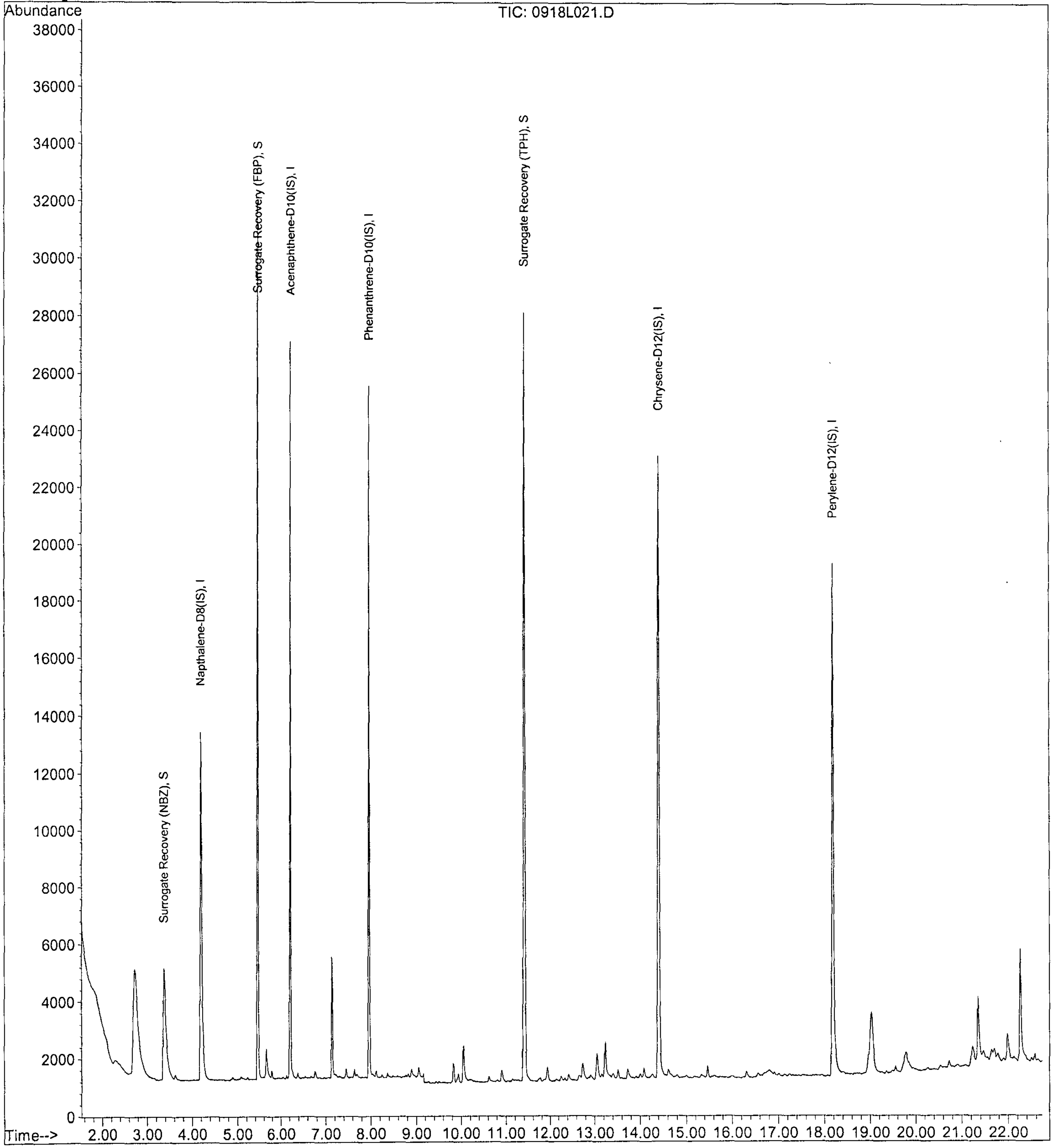
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L021.D   Vial: 21
Acq On : 18 Sep 18 20:09   Operator: MA
Sample : AZ79159S01 1/30.37G DF20   Inst : Linus
Misc :   Multiplr: 658.54

Quant Time: Sep 19 9:45 2018   Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L022.D
Acq On : 18 Sep 18 20:39
Sample : AZ79160S01 1/30.70G DF20
Misc :

Vial: 22
Operator: MA
Inst : Linus
Multiplr: 651.47

Quant Time: Sep 19 9:45 2018

Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	21225	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	10201	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	22862	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	30225	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	30218	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.38	82	9272	2417.4636 ppb	0.01
Spiked Amount 162.866			Recovery	= 1484.323%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 162.866			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	21944	2390.9203 ppb	0.00
Spiked Amount 162.866			Recovery	= 1468.025%	
16) Fluoranthene-D10 (FRT)	10.15	212	40	2.0762 ppb	0.03
Spiked Amount 162.866			Recovery	= 1.275%	
20) Surrogate Recovery (TPH)	11.40	244	27842	1982.7517 ppb	0.00
Spiked Amount 162.866			Recovery	= 1217.410%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

Quantitation Report

```
Data File : M:\LINUS\DATA\L180918P\0918L022.D          Vial: 22
Acq On    : 18 Sep 18  20:39                       Operator: MA
Sample    : AZ79160S01 1/30.70G DF20               Inst    : Linus
Misc      :                                        Multiplr: 651.47

Quant Time: Sep 19  9:45 2018           Quant Results File: L0918PCP.RES

Method         : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title          : EPA 8270
Last Update    : Tue Sep 18 11:06:06 2018
Response via   : Initial Calibration
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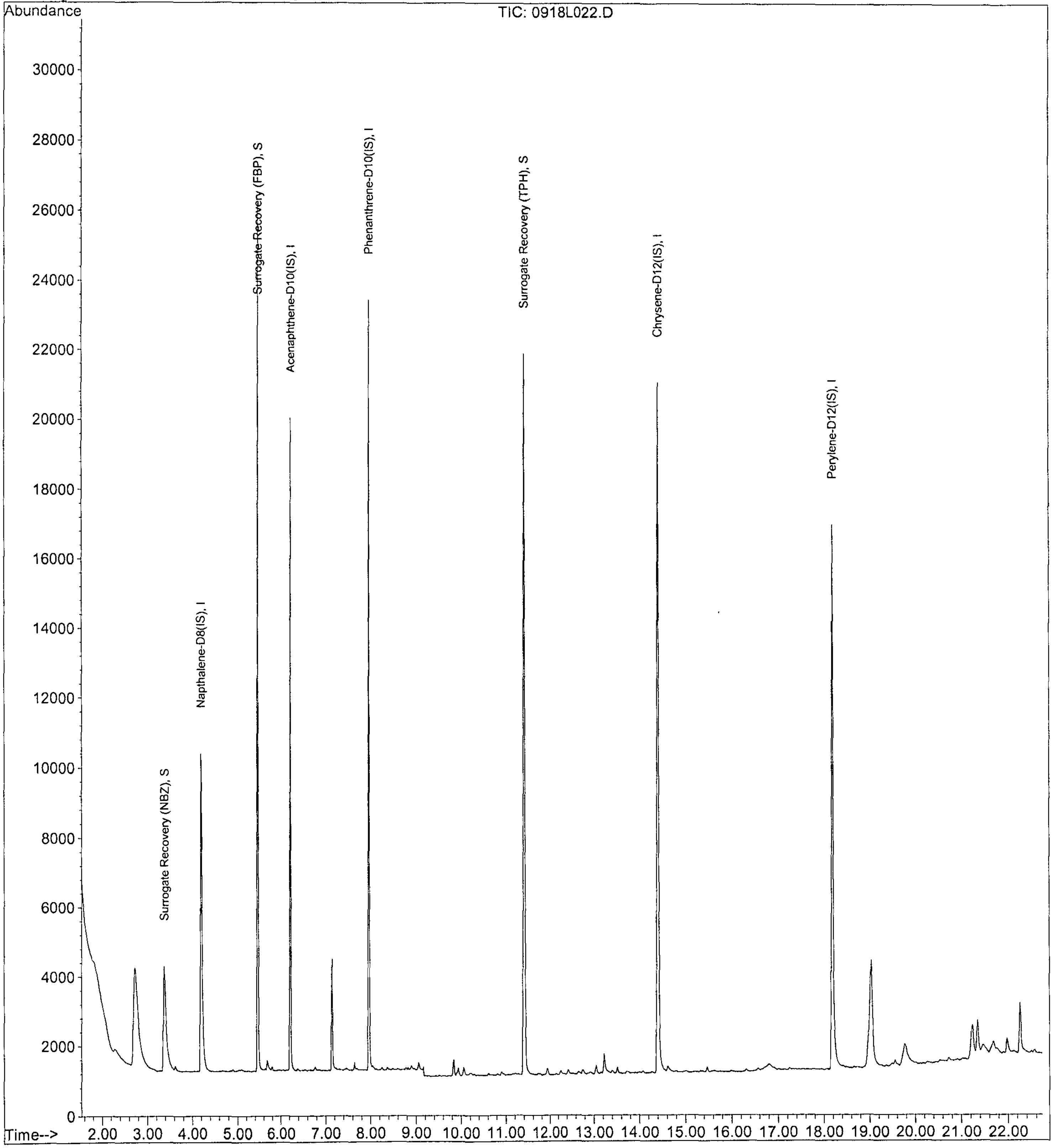


Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L015.D Vial: 15
Acq On : 17 Sep 18 16:16 Operator: MA
Sample : AZ79179W03 1/910 Inst : Linus
Misc : Multiplr: 1.10

Quant Time: Sep 19 17:03 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 12:09:56 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	0.00	136	0m	2.5000 ppb	-4.19
7) Acenaphthene-D10(IS)	6.22	164	12068	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	23276	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	29416	2.5000 ppb	0.01
24) Perylene-D12(IS)	18.17	264	28415	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	167573	0.0000 ppb	0.00
Spiked Amount 5.495			Recovery	= 0.000%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 5.495			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	281345	49.4265 ppb	0.00
Spiked Amount 5.495			Recovery	= 899.571%	
16) Fluoranthene-D10 (FRT)	10.26	212	1	0.0001 ppb	0.03
Spiked Amount 5.495			Recovery	= 0.000%	
20) Surrogate Recovery (TPH)	11.43	244	464154	70.5820 ppb	-0.04
Spiked Amount 5.495			Recovery	= 1284.592%	

Target Compounds Qvalue

(#) = qualifier out of range (m) = manual integration

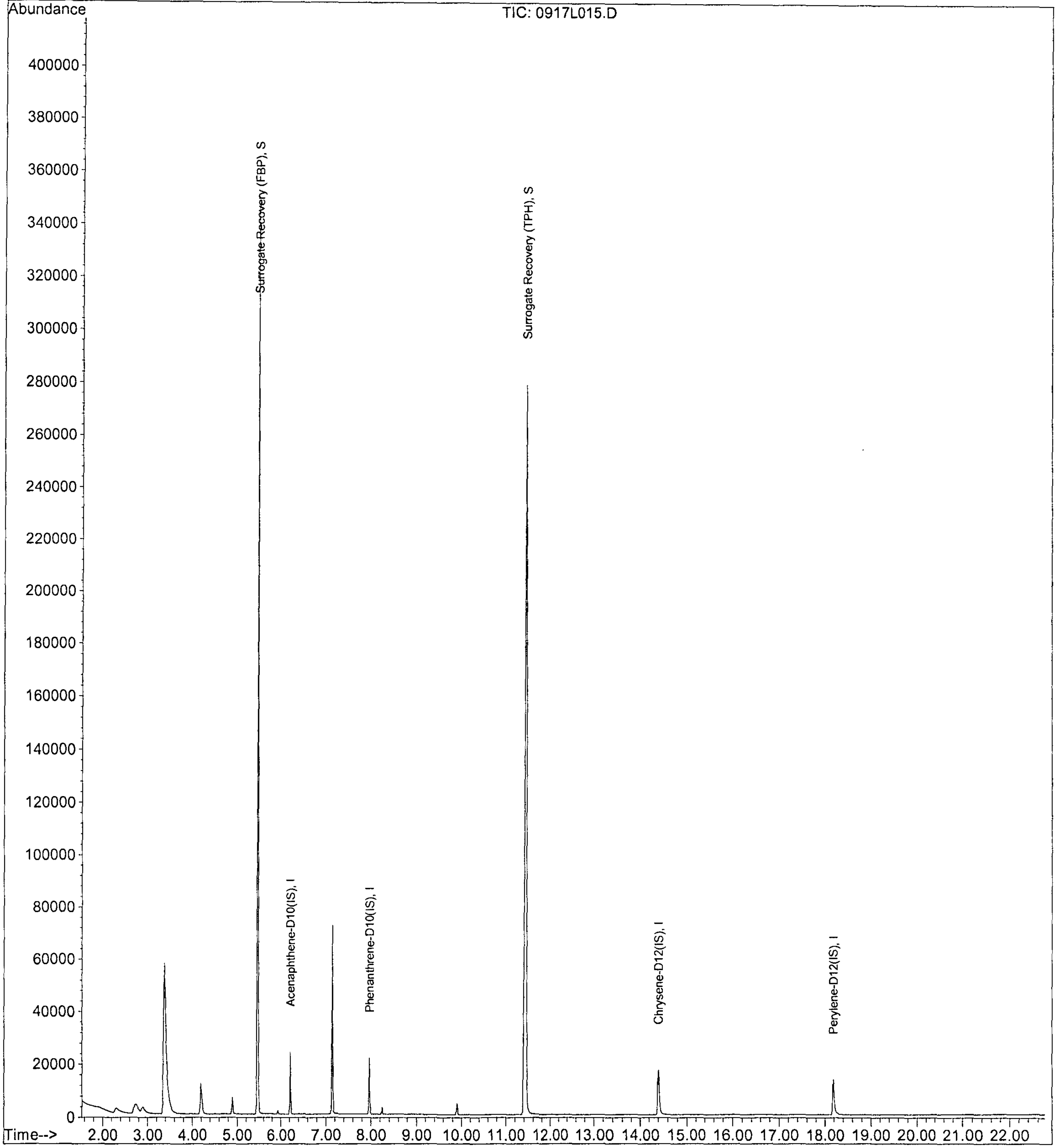
Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L015.D
Acq On : 17 Sep 18 16:16
Sample : AZ79179W03 1/910
Misc :

Vial: 15
Operator: MA
Inst : Linus
Multiplr: 1.10

Quant Time: Sep 19 17:03 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

```
Data File : M:\LINUS\DATA\L180917P\0917L016.D          Vial: 16
Acq On    : 17 Sep 18  16:45                        Operator: MA
Sample    : 180907A BLK 1/30.54G                    Inst    : Linus
Misc      :                                         Multiplr: 32.74

Quant Time: Sep 18 10:03 2018              Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title        : EPA 8270
Last Update  : Mon Sep 17 12:09:56 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	25036	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	11673	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	25372	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	33360	2.5000 ppb	0.01
24) Perylene-D12(IS)	18.18	264	32093	2.5000 ppb	0.01
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	260995	2542.2797 ppb	0.00
Spiked Amount 163.720			Recovery	= 1552.825%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 163.720			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	496983	2689.5994 ppb	0.00
Spiked Amount 163.720			Recovery	= 1642.807%	
16) Fluoranthene-D10 (FRT)	10.26	212	1	0.0025 ppb	0.03
Spiked Amount 163.720			Recovery	= 0.002%	
20) Surrogate Recovery (TPH)	11.46	244	691050	2765.8199 ppb	-0.02
Spiked Amount 163.720			Recovery	= 1689.363%	

Target Compounds   Qvalue

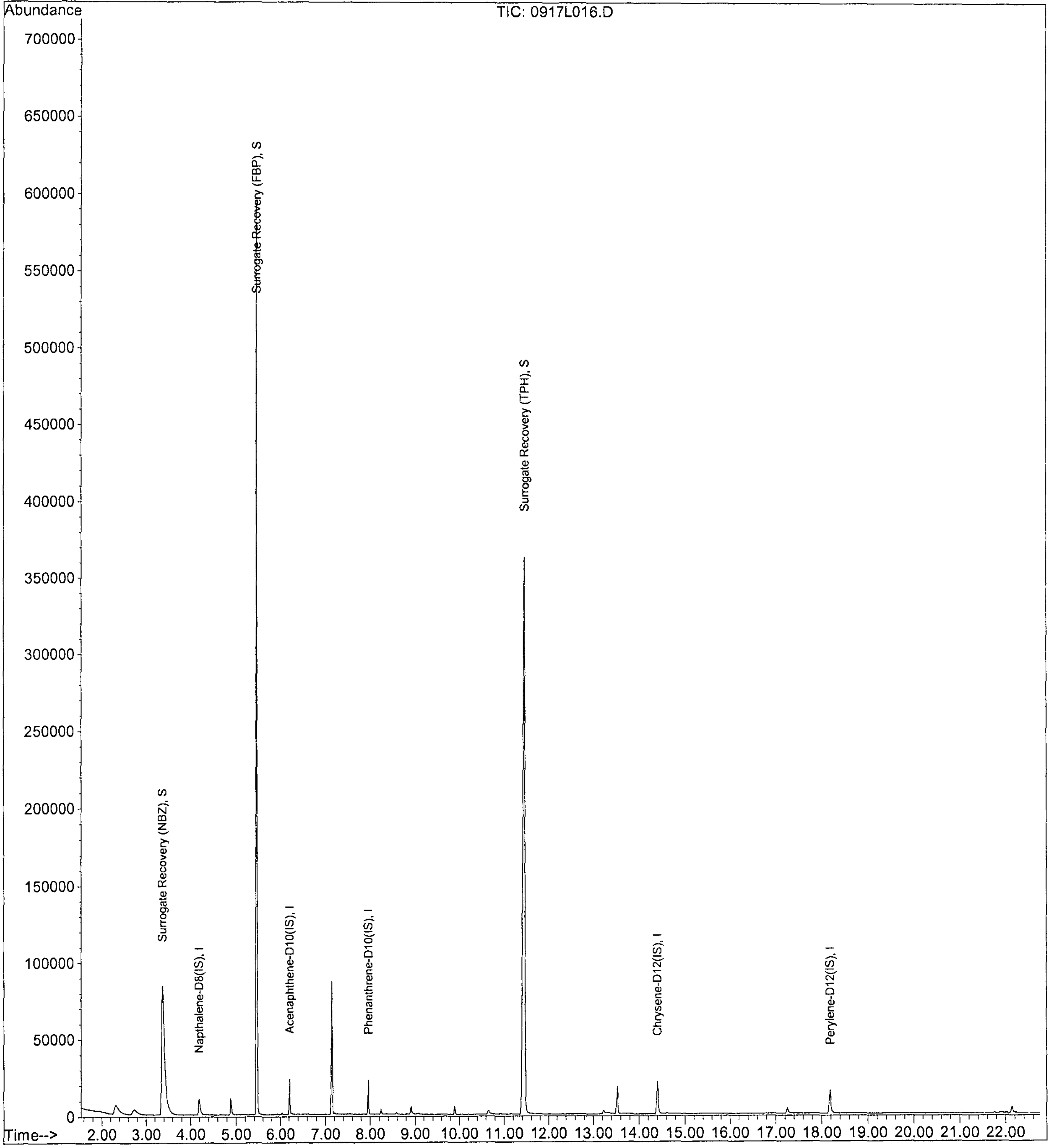
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180917P\0917L016.D Vial: 16
Acq On : 17 Sep 18 16:45 Operator: MA
Sample : 180907A BLK 1/30.54G Inst : Linus
Misc : Multiplr: 32.74

Quant Time: Sep 18 10:03 2018 Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data File : M:\LINUS\DATA\L180917P\0917L012.D Vial: 12
Acq On : 17 Sep 18 14:48 Operator: MA
Sample : 180907A BLK 1/1000 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 18 8:41 2018 Quant Results File: L0917PCP.RES

Quant Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Mon Sep 17 12:09:56 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	22452	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	10074	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	19625	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	23942	2.5000 ppb	0.01
24) Perylene-D12(IS)	18.18	264	23292	2.5000 ppb	0.01
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	161041	53.4204 ppb	0.00
Spiked Amount 5.000			Recovery	= 1068.400%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 5.000			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	249828	47.8451 ppb	0.00
Spiked Amount 5.000			Recovery	= 956.900%	
16) Fluoranthene-D10 (FRT)	10.22	212	3	0.0003 ppb	0.00
Spiked Amount 5.000			Recovery	= 0.000%	
20) Surrogate Recovery (TPH)	11.43	244	431097	73.3606 ppb	-0.04
Spiked Amount 5.000			Recovery	= 1467.220%	

Target Compounds Qvalue

Quantitation Report

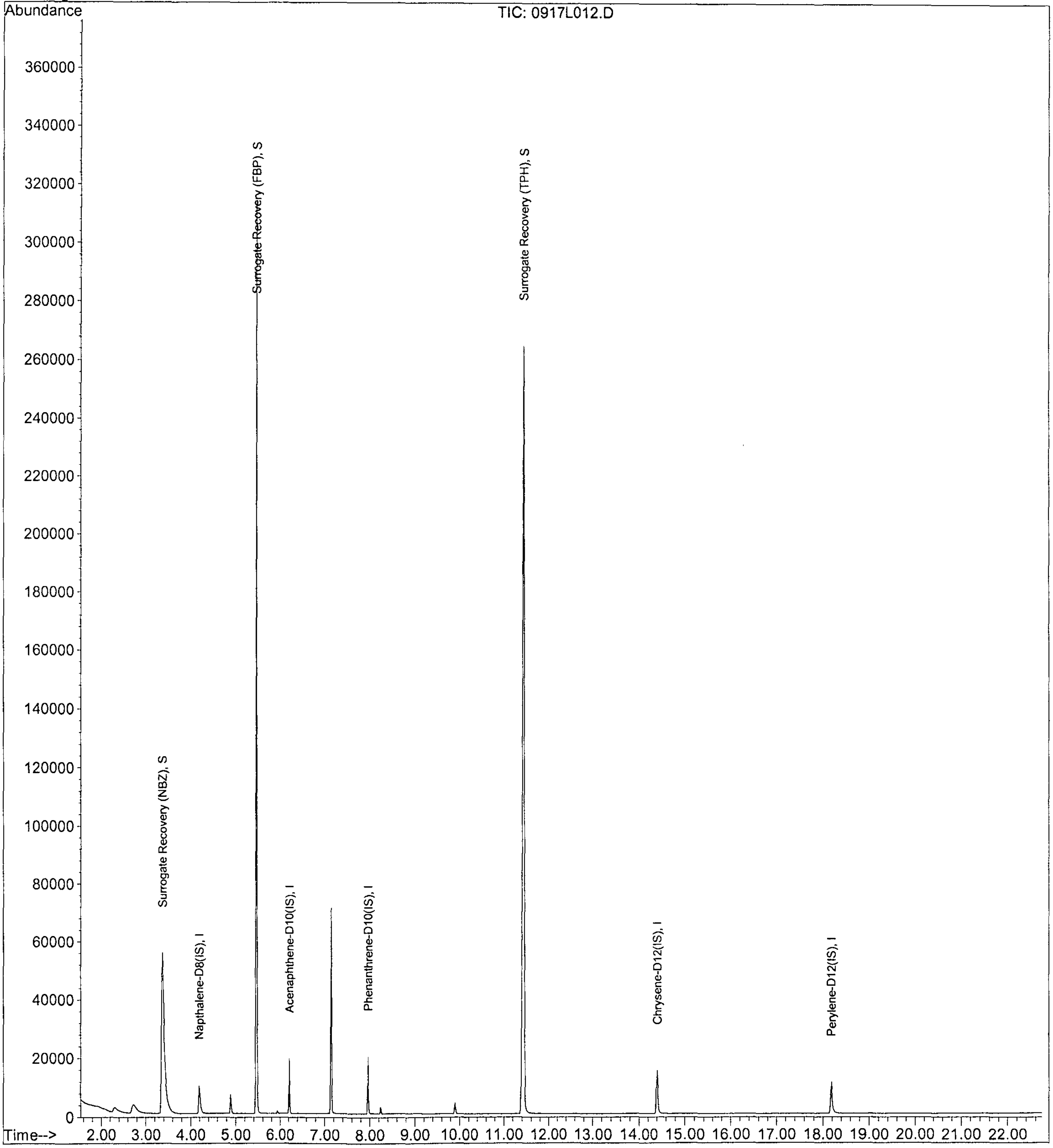
Data File : M:\LINUS\DATA\L180917P\0917L012.D
Acq On : 17 Sep 18 14:48
Sample : 180907A BLK 1/1000
Misc :

Vial: 12
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 8:41 2018

Quant Results File: L0917PCP.RES

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L014.D Vial: 14
Acq On : 18 Sep 18 16:45 Operator: MA
Sample : 180907A LCS-2 1/30.25G Inst : Linus
Misc : Multiplr: 33.06

Quant Time: Sep 19 7:47 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	16562	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	7606	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	14870	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	19844	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	19034	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	200434	3344.5295 ppb	0.00
Spiked Amount 165.289			Recovery	= 2023.441%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 165.289			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	373987	2773.1619 ppb	0.00
Spiked Amount 165.289			Recovery	= 1677.763%	
16) Fluoranthene-D10 (FRT)	10.12	212	67	0.2713 ppb	0.00
Spiked Amount 165.289			Recovery	= 0.164%	
20) Surrogate Recovery (TPH)	11.45	244	507138	2959.1212 ppb	0.04
Spiked Amount 165.289			Recovery	= 1790.268%	
Target Compounds					Qvalue
3) Naphthalene	4.21	128	31795	160.3726 ppb	100
5) 2-Methylnaphthalene	5.02	141	17787	167.8368 ppb	100
6) 1-Methylnaphthalene	5.13	141	21733	166.4092 ppb	99
9) Acenaphthylene	6.05	152	65352	159.5735 ppb	98
10) Acenaphthene	6.25	154	19435	155.4246 ppb	98
11) Fluorene	6.86	166	22425	162.0823 ppb	99
12) Pentachlorophenol	7.75	266	2927	142.6800 ppb	77
14) Phenanthrene	7.99	178	33513	155.9973 ppb	100
15) Anthracene	8.06	178	31274	159.8583 ppb	100
17) Fluoranthene	10.17	202	46423	162.5758 ppb	99
19) Pyrene	10.78	202	48198	155.5259 ppb	99
21) Benz (a) anthracene	14.38	228	42007	154.5074 ppb	100
22) Chrysene	14.48	228	43798	152.2872 ppb	98
23) Indeno (1,2,3-cd) pyrene	20.47	276	29958	135.8090 ppb	95
25) Benzo (b) fluoranthene	17.28	252	40285	163.0468 ppb	99
26) Benzo (k) fluoranthene	17.35	252	46241	161.8720 ppb	99
27) Benzo (a) pyrene	18.04	252	35061	158.6324 ppb	99
28) Dibenz (a,h) anthracene	20.54	278	34965	154.4440 ppb	99
29) Benzo (g,h,i) perylene	20.96	276	37377	153.7463 ppb	99

(#) = qualifier out of range (m) = manual integration

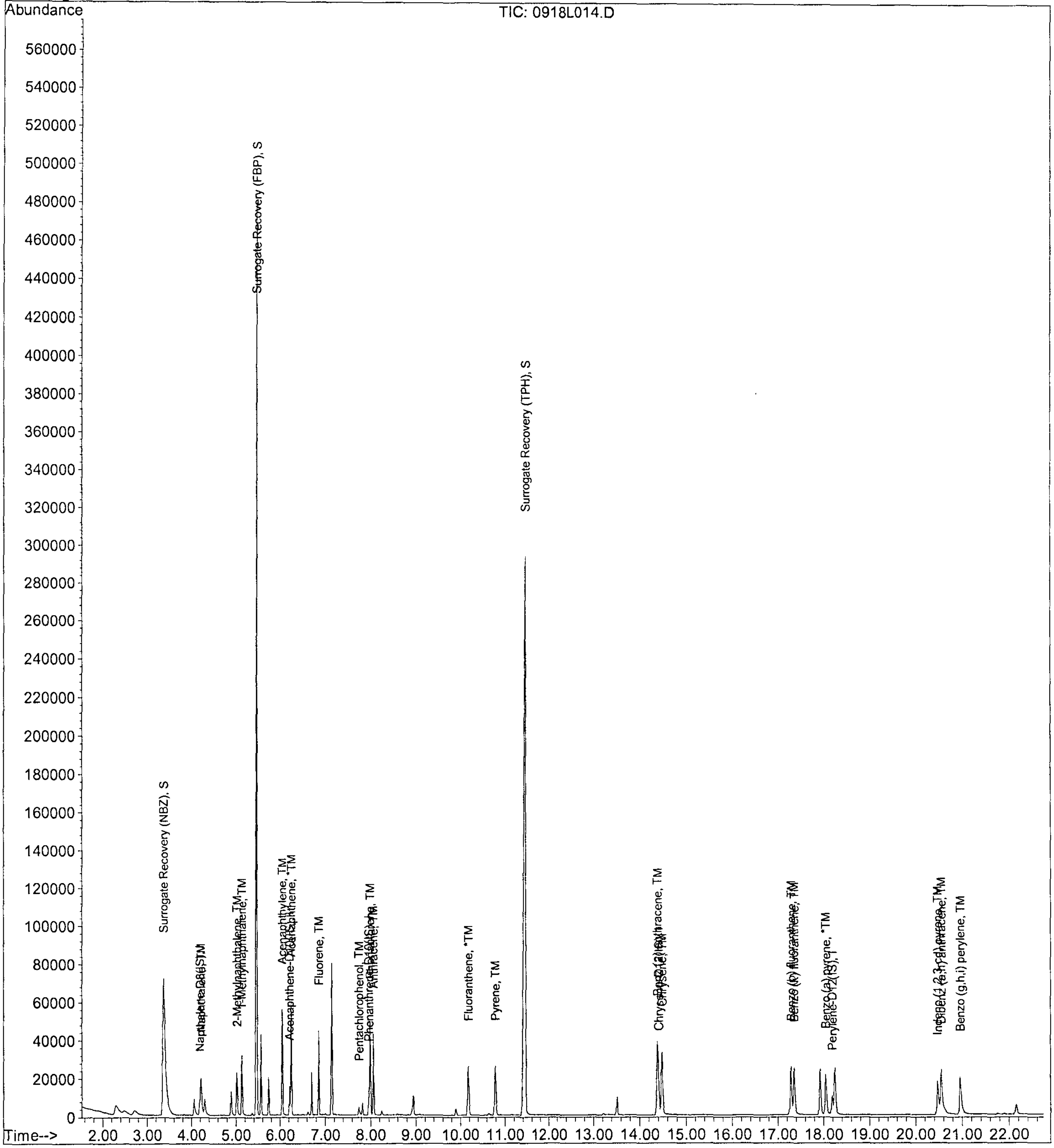
Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L014.D
Acq On : 18 Sep 18 16:45
Sample : 180907A LCS-2 1/30.25G
Misc :

Vial: 14
Operator: MA
Inst : Linus
Multiplr: 33.06

Quant Time: Sep 19 7:47 2018
Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L012.D
Acq On : 18 Sep 18 15:46
Sample : 180907A LCS-2 1/1000
Misc :

Vial: 12
Operator: MA
Inst : Linus
Multiplr: 1.00

Quant Time: Sep 18 16:30 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	18088	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8160	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16822	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.40	240	21843	2.5000 ppb	0.00
24) Perylene-D12(IS)	18.18	264	21169	2.5000 ppb	0.00
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	170239	78.6947 ppb	0.00
Spiked Amount 5.000			Recovery	= 1573.900%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 5.000			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	265975	55.6098 ppb	0.00
Spiked Amount 5.000			Recovery	= 1112.200%	
16) Fluoranthene-D10 (FRT)	10.13	212	53	0.0057 ppb	0.01
Spiked Amount 5.000			Recovery	= 0.120%	
20) Surrogate Recovery (TPH)	11.45	244	458539	73.4945 ppb	0.04
Spiked Amount 5.000			Recovery	= 1469.900%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) Naphthalene	4.21	128	17271	2.4129 ppb		100
5) 2-Methylnaphthalene	5.02	141	8667	2.2652 ppb		100
6) 1-Methylnaphthalene	5.13	141	11341	2.4052 ppb		98
9) Acenaphthylene	6.06	152	42960	2.9577 ppb		99
10) Acenaphthene	6.25	154	12144	2.7383 ppb		99
11) Fluorene	6.86	166	15372	3.1327 ppb		99
12) Pentachlorophenol	7.75	266	2220	3.3713 ppb		77
14) Phenanthrene	7.99	178	25246	3.1424 ppb		99
15) Anthracene	8.06	178	22921	3.1329 ppb		99
17) Fluoranthene	10.17	202	35498	3.3242 ppb		98
19) Pyrene	10.79	202	36232	3.2130 ppb		98
21) Benz (a) anthracene	14.38	228	31724	3.2067 ppb		100
22) Chrysene	14.48	228	34207	3.2686 ppb		98
23) Indeno (1,2,3-cd) pyrene	20.48	276	21935	2.8008 ppb	#	95
25) Benzo (b) fluoranthene	17.28	252	29438	3.2407 ppb		99
26) Benzo (k) fluoranthene	17.36	252	36467	3.4722 ppb		98
27) Benzo (a) pyrene	18.04	252	26554	3.2678 ppb		98
28) Dibenz (a,h) anthracene	20.55	278	26700	3.2078 ppb		99
29) Benzo (g,h,i) perylene	20.96	276	29164	3.2629 ppb		95

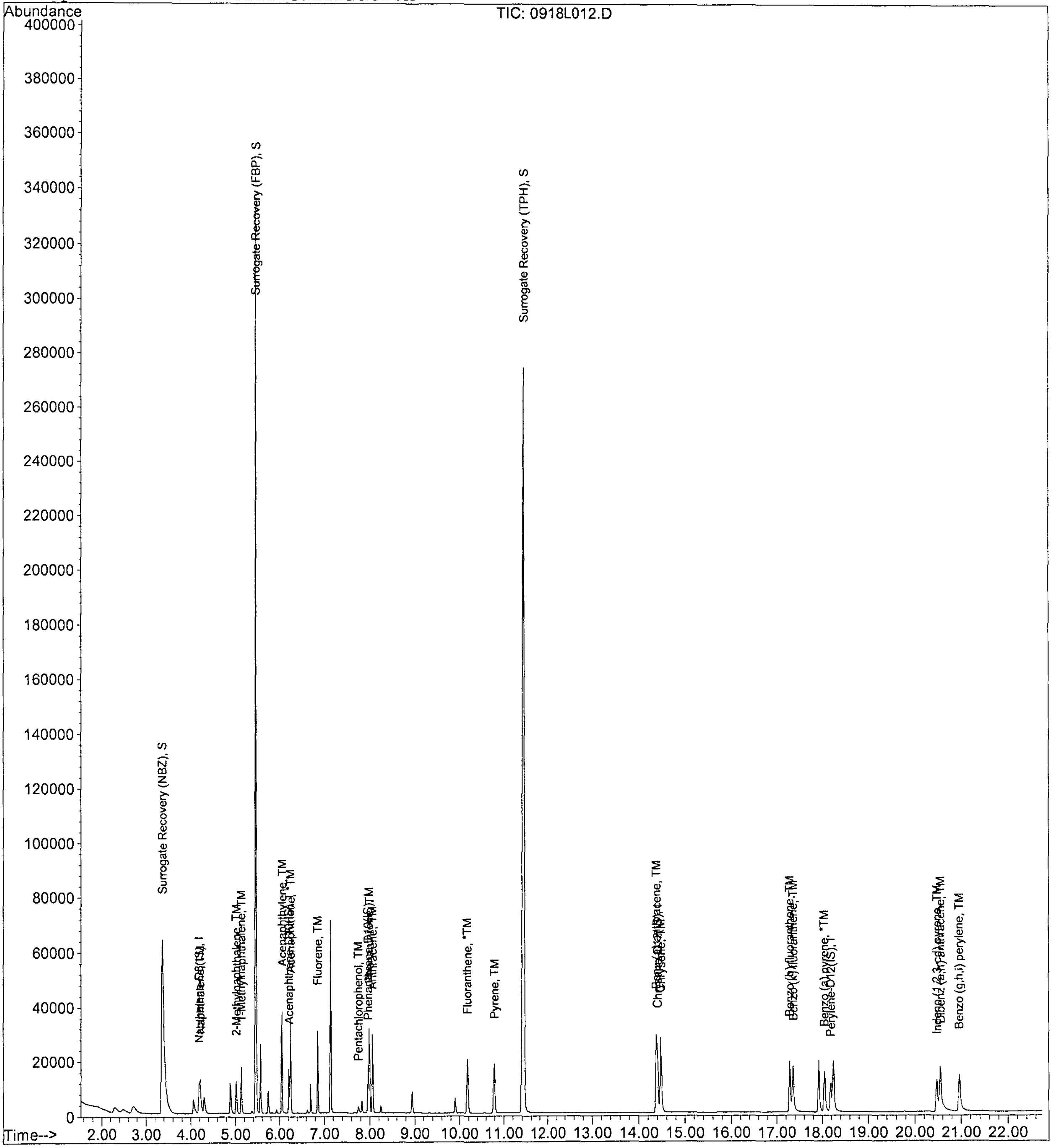
(#) = qualifier out of range (m) = manual integration

Quantitation Report

Data File : M:\LINUS\DATA\L180918P\0918L012.D Vial: 12
Acq On : 18 Sep 18 15:46 Operator: MA
Sample : 180907A LCS-2 1/1000 Inst : Linus
Misc : Multiplr: 1.00

Quant Time: Sep 18 16:30 2018 Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

```
Data File : M:\LINUS\DATA\L180918P\0918L023.D          Vial: 23
Acq On    : 18 Sep 18  21:08                        Operator: MA
Sample    : AZ79150S01 MS-2 1/30.09G                Inst    : Linus
Misc      :                                         Multiplr: 33.23

Quant Time: Sep 19  9:45 2018              Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title        : EPA 8270
Last Update  : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA
```

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	18524	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	8341	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	16669	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.41	240	21669	2.5000 ppb	0.01
24) Perylene-D12(IS)	18.20	264	22406	2.5000 ppb	0.01

System Monitoring Compounds	R.T.	QIon	Response	Conc Units	Dev(Min)
2) Surrogate Recovery (NBZ)	3.37	82	189058	2835.8846 ppb	0.00
Spiked Amount 166.168			Recovery	= 1706.636%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 166.168			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	355609	2417.3127 ppb	0.00
Spiked Amount 166.168			Recovery	= 1454.739%	
16) Fluoranthene-D10 (FRT)	10.13	212	50	0.1816 ppb	0.01
Spiked Amount 166.168			Recovery	= 0.110%	
20) Surrogate Recovery (TPH)	11.45	244	483778	2598.0230 ppb	0.04
Spiked Amount 166.168			Recovery	= 1563.490%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) Naphthalene	4.21	128	30609	138.7720 ppb		99
5) 2-Methylnaphthalene	5.02	141	17120	145.2010 ppb		99
6) 1-Methylnaphthalene	5.13	141	20373	140.2148 ppb		98
9) Acenaphthylene	6.06	152	62298	139.4496 ppb		99
10) Acenaphthene	6.25	154	18084	132.5779 ppb		100
11) Fluorene	6.86	166	20973	138.9649 ppb		100
12) Pentachlorophenol	7.75	266	3047	138.0029 ppb		78
14) Phenanthrene	7.99	178	31453	131.3017 ppb		100
15) Anthracene	8.06	178	28745	131.7706 ppb		100
17) Fluoranthene	10.17	202	44145	138.6465 ppb		97
19) Pyrene	10.79	202	45404	134.8843 ppb		95
21) Benz (a) anthracene	14.39	228	40272	136.3717 ppb		99
22) Chrysene	14.48	228	41261	132.0817 ppb		99
23) Indeno (1,2,3-cd) pyrene	20.48	276	29991	125.7325 ppb	#	89
25) Benzo (b) fluoranthene	17.29	252	39396	136.1727 ppb		98
26) Benzo (k) fluoranthene	17.36	252	40827	122.0565 ppb		99
27) Benzo (a) pyrene	18.05	252	35262	136.2522 ppb		98
28) Dibenz (a,h) anthracene	20.56	278	32694	123.3316 ppb		98
29) Benzo (g,h,i) perylene	20.98	276	34379	120.7709 ppb		98

(#) = qualifier out of range (m) = manual integration

Quantitation Report

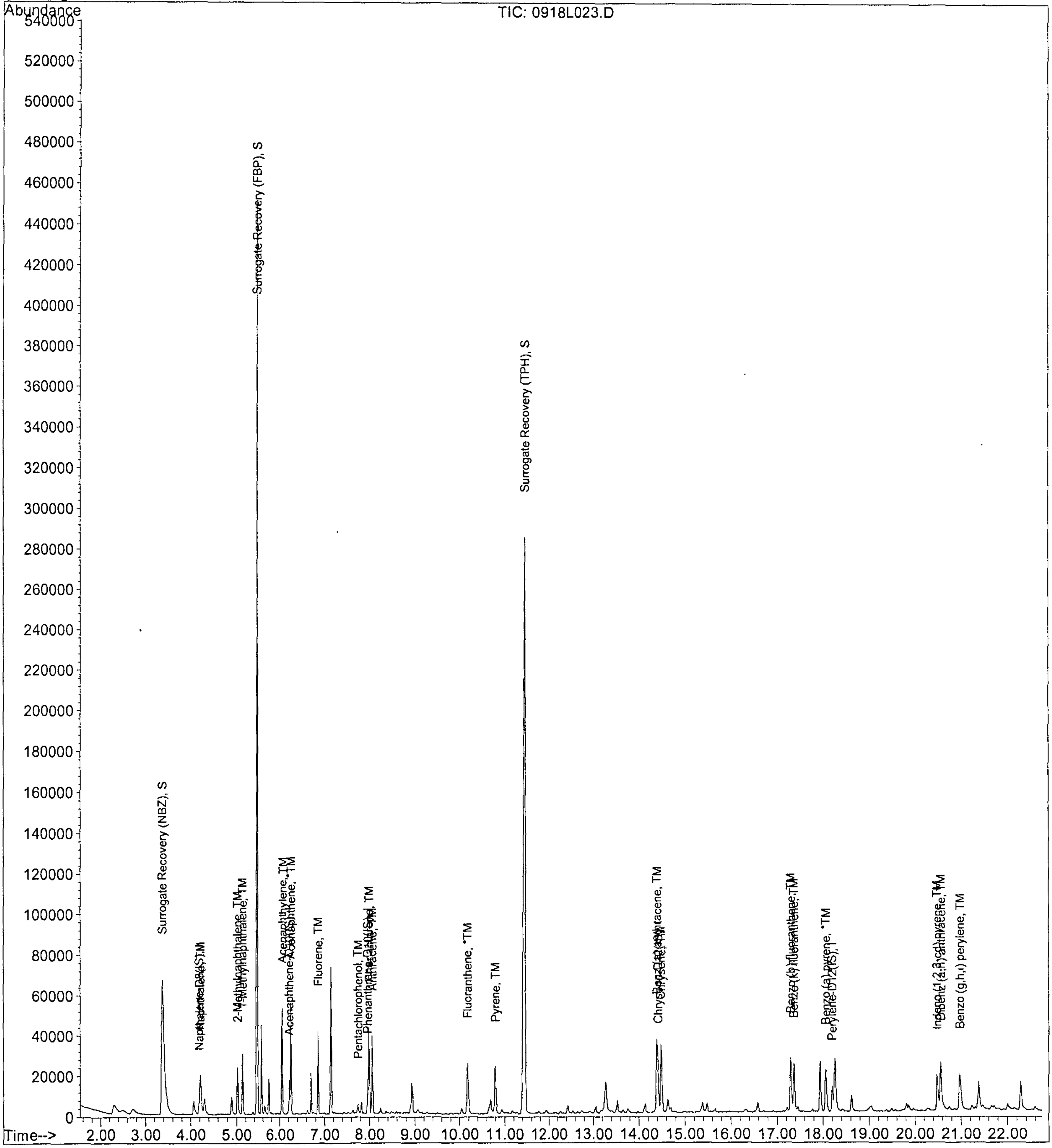
Data File : M:\LINUS\DATA\L180918P\0918L023.D
Acq On : 18 Sep 18 21:08
Sample : AZ79150S01 MS-2 1/30.09G
Misc :

Vial: 23
Operator: MA
Inst : Linus
Multiplr: 33.23

Quant Time: Sep 19 9:45 2018

Quant Results File: L0918PCP.RES

Method : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration



Quantitation Report (Not Reviewed)

Data File : M:\LINUS\DATA\L180918P\0918L024.D Vial: 24
Acq On : 18 Sep 18 21:37 Operator: MA
Sample : AZ79150S01 MSD-2 1/30.09G Inst : Linus
Misc : Multiplr: 33.23

Quant Time: Sep 19 9:46 2018 Quant Results File: L0918PCP.RES

Quant Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 15:15:06 2018
Response via : Initial Calibration
DataAcq Meth : SIM_2SA

Internal Standards	R.T.	QIon	Response	Conc Units	Dev(Min)
1) Napthalene-D8(IS)	4.19	136	16990	2.5000 ppb	0.00
7) Acenaphthene-D10(IS)	6.22	164	7763	2.5000 ppb	0.00
13) Phenanthrene-D10(IS)	7.97	188	15610	2.5000 ppb	0.00
18) Chrysene-D12(IS)	14.41	240	20574	2.5000 ppb	0.01
24) Perylene-D12(IS)	18.20	264	20940	2.5000 ppb	0.01
System Monitoring Compounds					
2) Surrogate Recovery (NBZ)	3.37	82	197352	3227.2954 ppb	0.00
Spiked Amount 166.168			Recovery	= 1942.186%	
4) 2-methylnaphthalene-D10 (2	0.00	152	0	0.0000 ppb	
Spiked Amount 166.168			Recovery	= 0.000%	
8) Surrogate Recovery (FBP)	5.46	172	371306	2711.9432 ppb	0.00
Spiked Amount 166.168			Recovery	= 1632.047%	
16) Fluoranthene-D10 (FRT)	10.13	212	63	0.2443 ppb	0.01
Spiked Amount 166.168			Recovery	= 0.147%	
20) Surrogate Recovery (TPH)	11.45	244	500069	2828.9992 ppb	0.04
Spiked Amount 166.168			Recovery	= 1702.492%	

Target Compounds	R.T.	QIon	Response	Conc Units		Qvalue
3) Naphthalene	4.21	128	32366	159.9864 ppb		100
5) 2-Methylnaphthalene	5.02	141	17889	165.4220 ppb		99
6) 1-Methylnaphthalene	5.13	141	21462	161.0462 ppb		99
9) Acenaphthylene	6.06	152	65561	157.6802 ppb		100
10) Acenaphthene	6.25	154	18872	148.6562 ppb		99
11) Fluorene	6.86	166	22407	159.5206 ppb		100
12) Pentachlorophenol	7.75	266	3238	152.4256 ppb		78
14) Phenanthrene	7.99	178	33368	148.7460 ppb		100
15) Anthracene	8.06	178	30856	151.0437 ppb		100
17) Fluoranthene	10.17	202	46402	155.6219 ppb		95
19) Pyrene	10.79	202	47847	149.7070 ppb		98
21) Benz (a) anthracene	14.39	228	42417	151.2799 ppb		100
22) Chrysene	14.49	228	43403	146.3331 ppb		98
23) Indeno (1,2,3-cd) pyrene	20.49	276	31022	136.3721 ppb	#	98
25) Benzo (b) fluoranthene	17.29	252	40957	151.4794 ppb		98
26) Benzo (k) fluoranthene	17.37	252	43674	139.7089 ppb		98
27) Benzo (a) pyrene	18.06	252	36839	152.3112 ppb		99
28) Dibenz (a,h) anthracene	20.56	278	33919	136.9106 ppb		100
29) Benzo (g,h,i) perylene	20.98	276	35447	133.2405 ppb		97

(#) = qualifier out of range (m) = manual integration

Quantitation Report

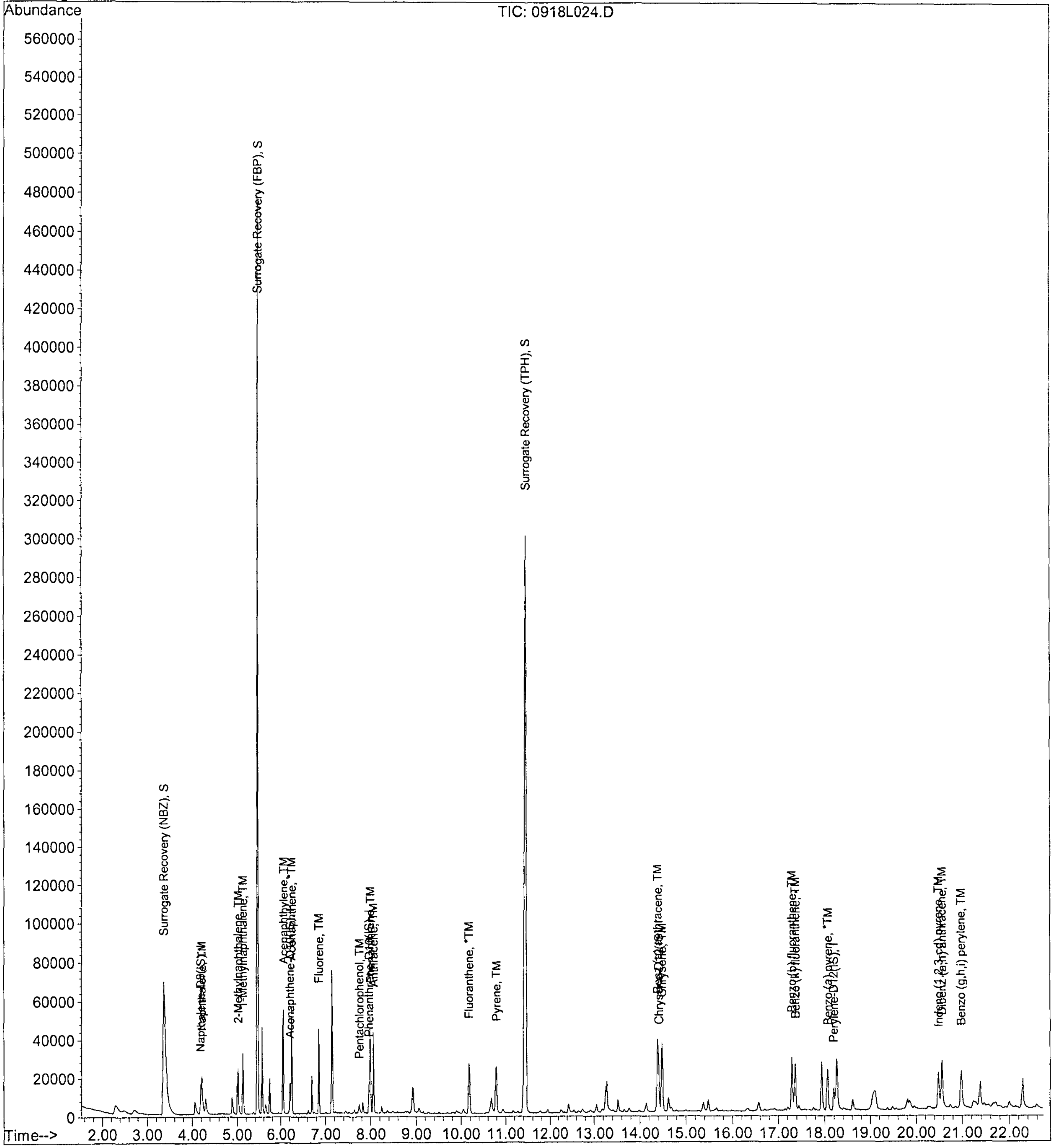
Data File : M:\LINUS\DATA\L180918P\0918L024.D
Acq On : 18 Sep 18 21:37
Sample : AZ79150S01 MSD-2 1/30.09G
Misc :

Vial: 24
Operator: MA
Inst : Linus
Multiplr: 33.23

Quant Time: Sep 19 9:46 2018

Quant Results File: L0918PCP.RES

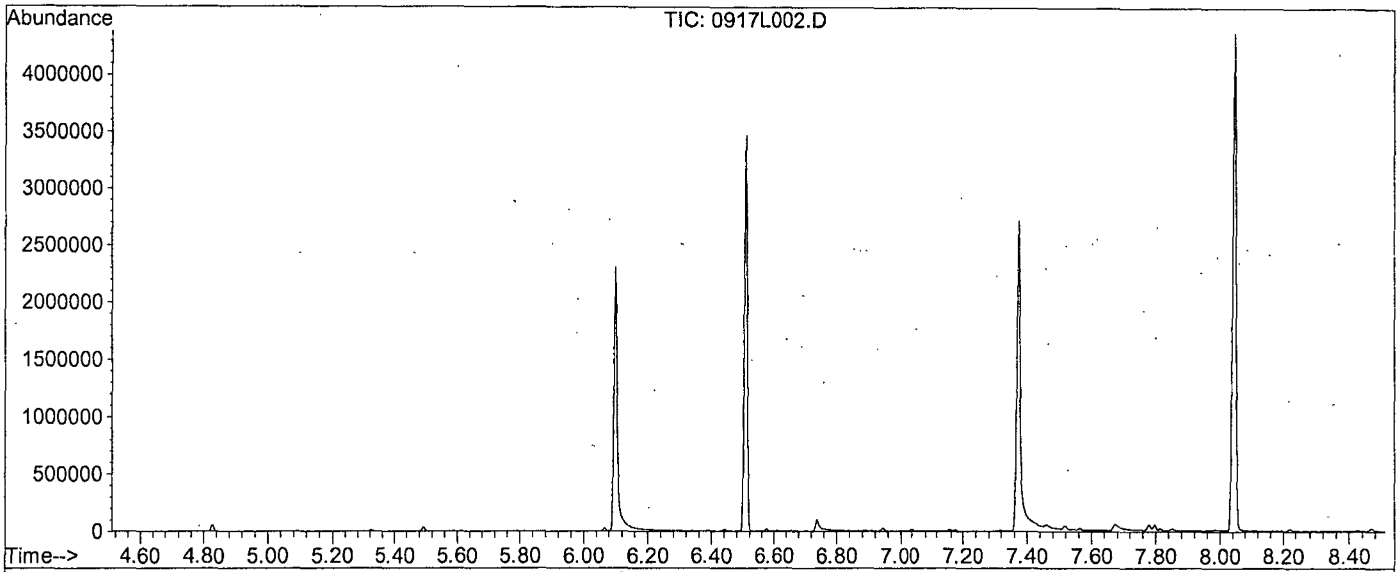
Method : M:\LINUS\DATA\L180524C\L0918PCP.M (RTE Integrator)
Title : EPA 8270
Last Update : Tue Sep 18 11:06:06 2018
Response via : Initial Calibration

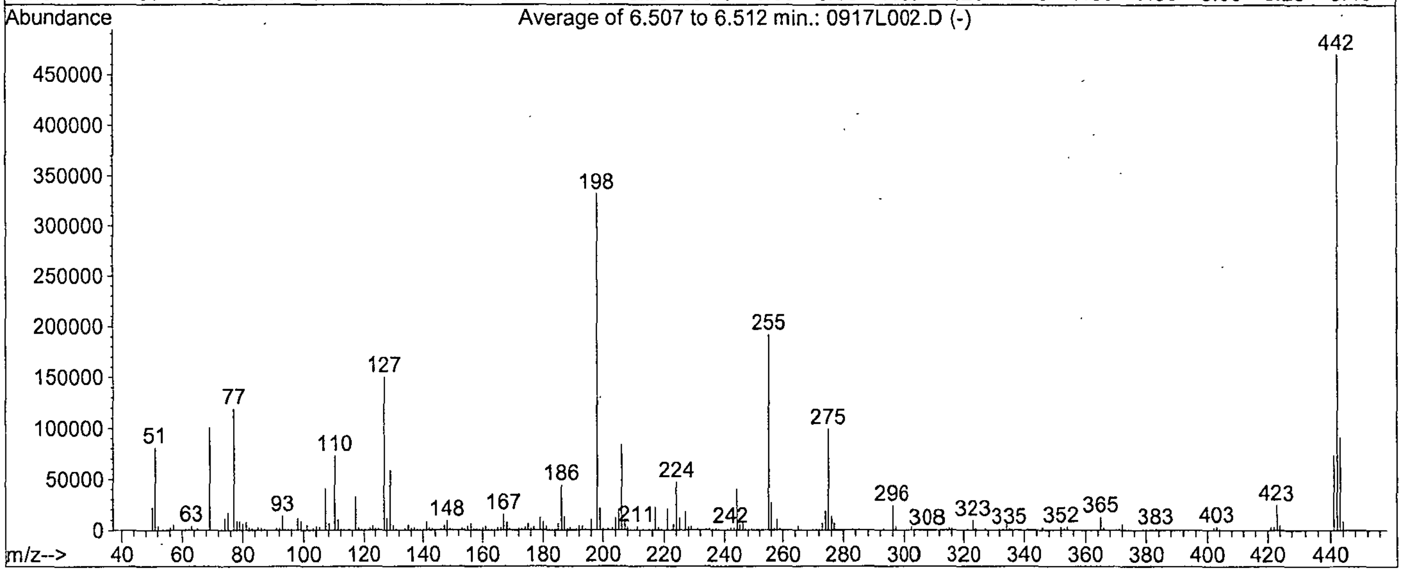


DFTPP

```
Data File : M:\LINUS\DATA\L180917P\0917L002.D          Vial: 2
Acq On    : 17 Sep 18   9:30                      Operator: MA
Sample    : SV Tune 03/07/18                      Inst    : Linus
Misc      :                                       Multiplr: 1.00

Method    : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title     : EPA 8270
```





AutoFind: Scans 1575, 1576, 1577; Background Corrected with Scan 1565

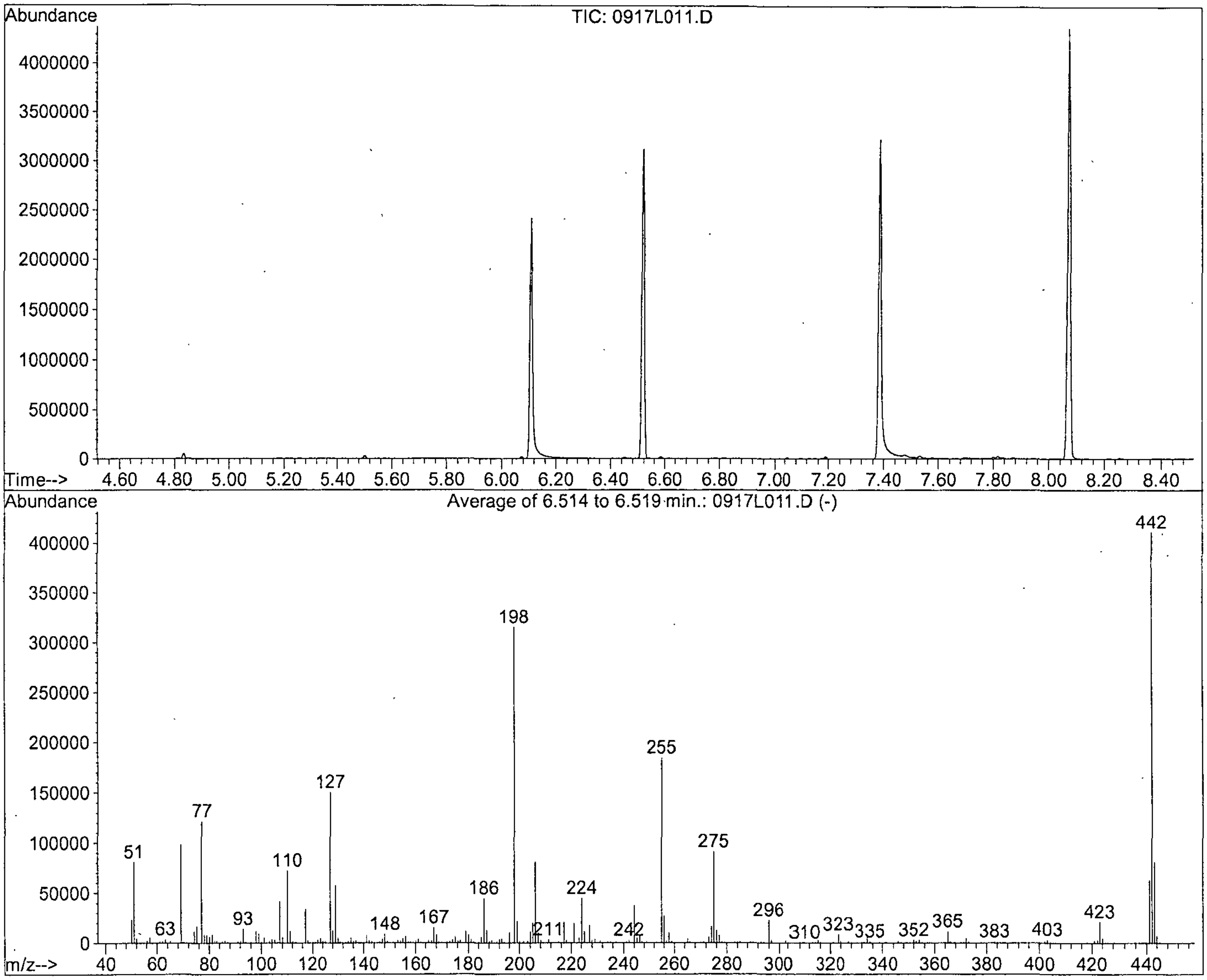
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	24.4	80905	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.7	726	PASS
127	198	10	80	45.3	150165	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	331627	PASS
199	198	5	9	6.4	21347	PASS
275	198	10	60	29.9	99029	PASS
365	198	1	100	3.9	12799	PASS
441	442	0.01	24	15.6	73600	PASS
442	198	50	150	141.8	470400	PASS
443	442	15	24	19.4	91221	PASS

DFTPP

Data File : M:\LINUS\DATA\L180917P\0917L011.D
Acq On : 17 Sep 18 14:27
Sample : SV TUNE 03/07/18
Misc :

Vial: 11
Operator: MA
Inst : Linus
Multiplr: 1.00

Method : M:\LINUS\DATA\L180524C\L0917PCP.M (RTE Integrator)
Title : EPA 8270



AutoFind: Scans 1578, 1579, 1580; Background Corrected with Scan 1569

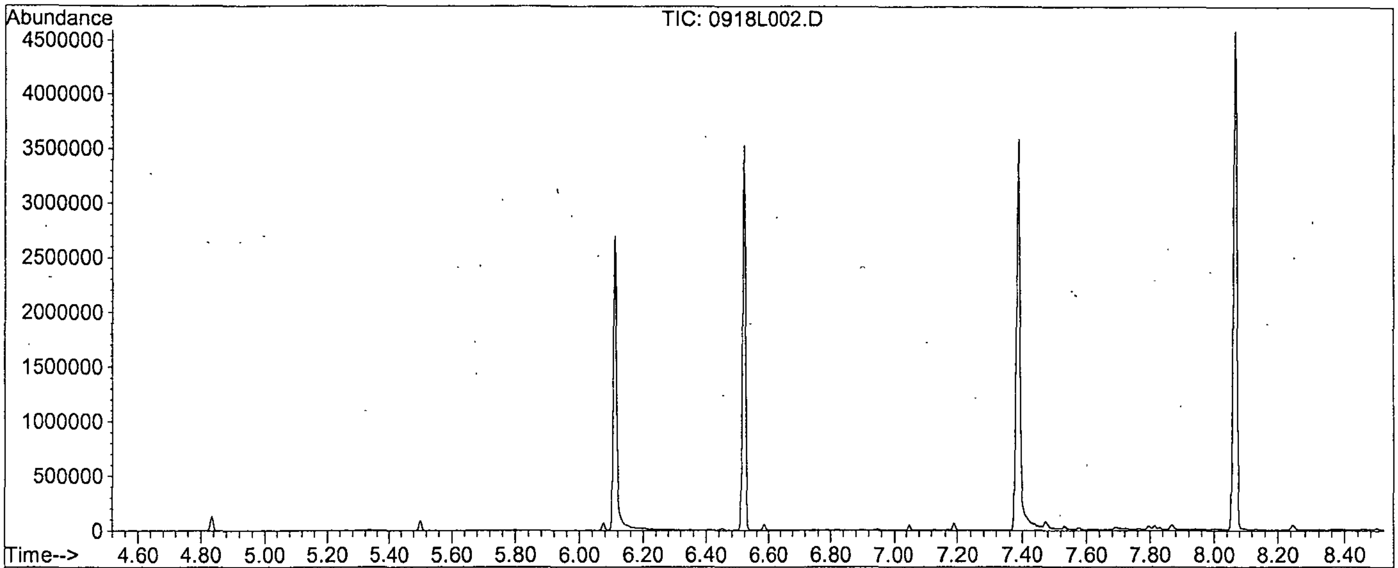
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	25.7	80881	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.6	566	PASS
127	198	10	80	47.6	150101	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	315093	PASS
199	198	5	9	6.9	21595	PASS
275	198	10	60	28.9	91163	PASS
365	198	1	100	3.7	11538	PASS
441	442	0.01	24	15.3	62901	PASS
442	198	50	150	130.5	411307	PASS
443	442	15	24	19.7	81080	PASS

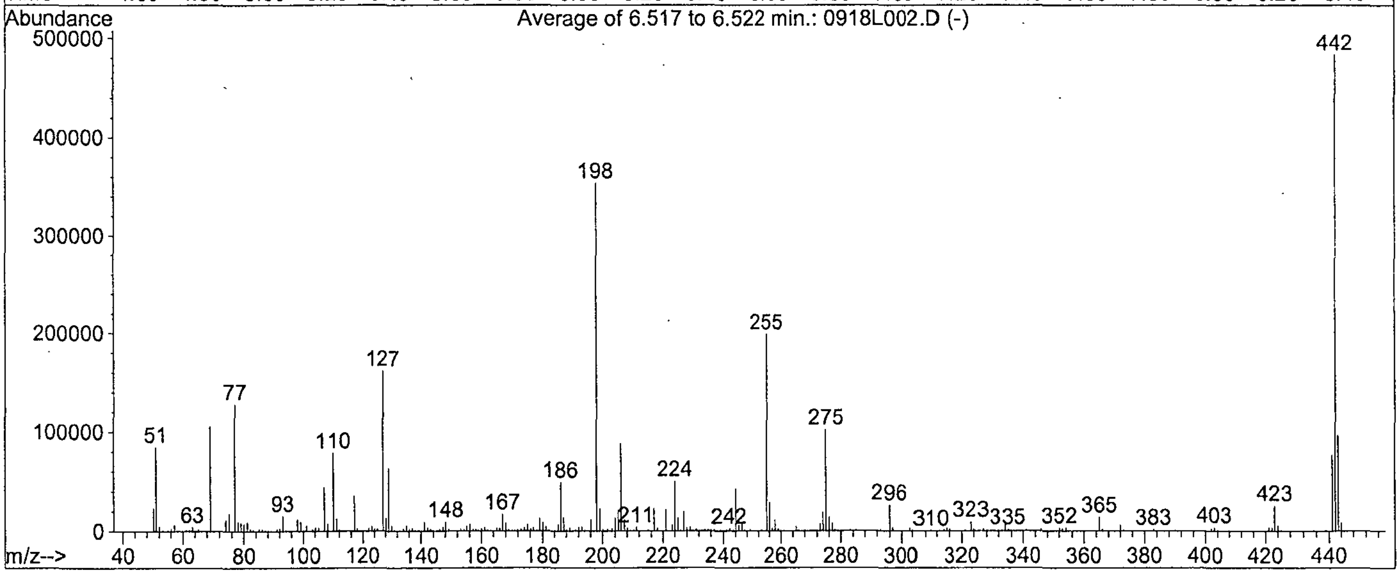
DFTPP

Data File : M:\LINUS\DATA\L180918P\0918L002.D
Acq On : 18 Sep 18 10:14
Sample : SV TUNE 03/07/18
Misc :

Vial: 36
Operator: MA
Inst : Linus
Multiplr: 1.00

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270





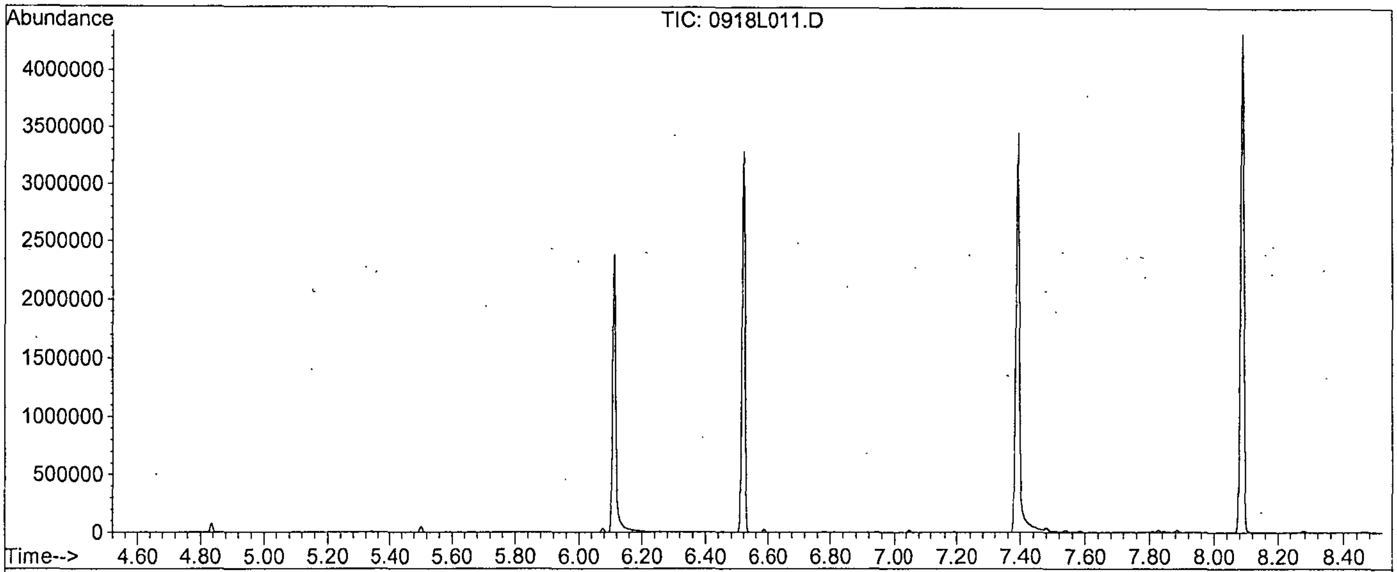
AutoFind: Scans 1579, 1580, 1581; Background Corrected with Scan 1570

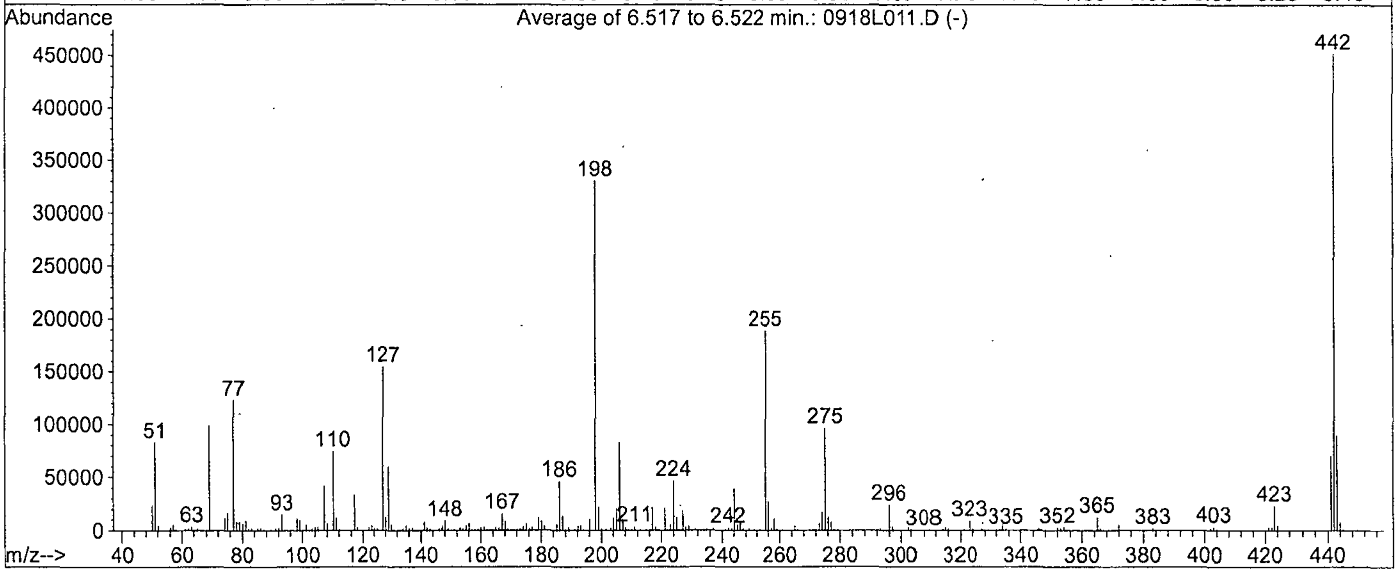
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	23.9	84666	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.7	726	PASS
127	198	10	80	45.7	161493	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	353621	PASS
199	198	5	9	6.5	22957	PASS
275	198	10	60	28.8	101701	PASS
365	198	1	100	3.9	13960	PASS
441	442	0.01	24	15.8	76523	PASS
442	198	50	150	136.7	483243	PASS
443	442	15	24	19.9	96200	PASS

DFTPP

Data File : M:\LINUS\DATA\L180918P\0918L011.D Vial: 11
Acq On : 18 Sep 18 15:27 Operator: MA
Sample : SV TUNE 03/07/18 Inst : Linus
Misc : Multiplr: 1.00

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270





AutoFind: Scans 1579, 1580, 1581; Background Corrected with Scan 1571

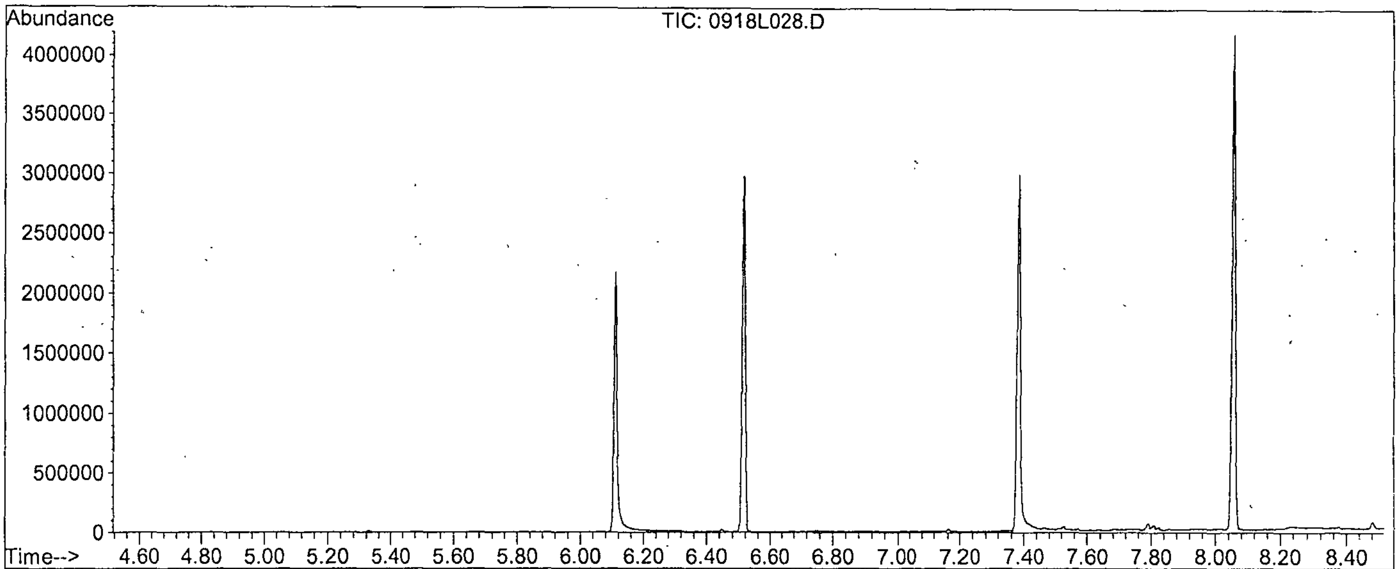
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	25.1	82743	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.5	492	PASS
127	198	10	80	46.8	154411	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	330069	PASS
199	198	5	9	6.7	22155	PASS
275	198	10	60	29.1	96059	PASS
365	198	1	100	3.8	12394	PASS
441	442	0.01	24	15.5	70115	PASS
442	198	50	150	137.0	452203	PASS
443	442	15	24	19.7	88893	PASS

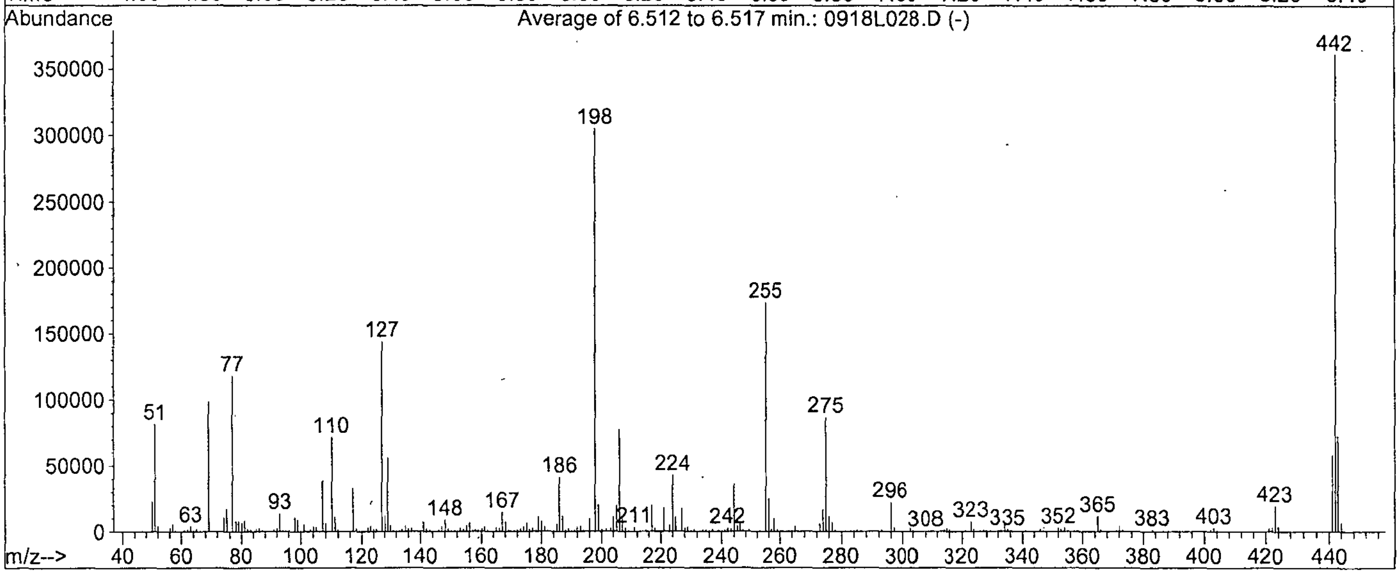
DFTPP

Data File : M:\LINUS\DATA\L180918P\0918L028.D
Acq On : 19 Sep 18 10:38
Sample : SV TUNE 03/17/18
Misc :

Vial: 28
Operator: MA
Inst : Linus
Multiplr: 1.00

Method : M:\LINUS\DATA\L180918P\L0918PCP.M (RTE Integrator)
Title : EPA 8270





AutoFind: Scans 1577, 1578, 1579; Background Corrected with Scan 1569

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	26.7	81400	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	0.2	206	PASS
127	198	10	80	47.2	143803	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	304576	PASS
199	198	5	9	6.7	20405	PASS
275	198	10	60	28.3	86307	PASS
365	198	1	100	3.8	11452	PASS
441	442	0.01	24	16.0	57771	PASS
442	198	50	150	118.6	361365	PASS
443	442	15	24	19.9	72019	PASS

Name of Final Standard SIM PCP Curve **Prep'd By (Initials)** GA

Prep Date 09/09/18
Exp Date 03/09/19

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from container Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc (range)
0.5 ug/mL SIM PCP	APPL	0.5 ug/mL SIM PCP	0.5 ug/mL	**09/09/18**	**03/09/19**	20 uL	100uL	**MC 56258** 80uL	0.1 ug/mL
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	**06/25/18**	**06/25/19**	2 uL	*	*	*
2.5 ug/mL SIM PCP	APPL	2.5 ug/mL SIM PCP	2.5 ug/mL	**09/09/18**	**03/09/19**	8 uL	100uL	**MC 56258** 92uL	0.2 ug/mL
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	**06/25/18**	**06/25/19**	2 uL	*	*	*
2.5 ug/mL SIM PCP	APPL	2.5 ug/mL SIM PCP	2.5 ug/mL	**09/09/18**	**03/09/19**	20 uL	100uL	**MC 56258** 80uL	0.5 ug/mL
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	**06/25/18**	**06/25/19**	2 uL	*	*	*
PAH SIMPCP	APPL	PAH SIMPCP	100 ug/mL	**09/07/18**	**09/07/19**	5 uL	200uL	**MC 56258** 190 uL	2.5 ug/mL
SIM 2S SURROGATE	APPL	SIM 2S SURROGATE	100 ug/mL	**06/07/18**	**06/01/19**	5 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	100 ug/mL	**06/25/18**	**06/25/19**	4 uL	*	*	*
PAH SIMPCP	APPL	PAH SIMPCP	100 ug/mL	**09/07/18**	**09/07/19**	10 uL	200uL	**MC 56258** 180 uL	5.0 ug/mL
SIM 2S SURROGATE	APPL	SIM 2S SURROGATE	100 ug/mL	**06/07/18**	**06/01/19**	10 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	**06/25/18**	**06/25/19**	4 uL	*	*	*

PAH SIMPCP	APPL	PAH SIMPCP	100 ug/mL	**09/07/18**	**09/07/19**	25 uL	100 uL	**MC 56258** **50 uL**	25 ug/mL
SIM 2S SURROGATE	APPL	SIM 2S SURROGATE	100 ug/mL	**06/07/18**	**06/01/19**	25 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	**06/25/18**	**06/25/19**	2 uL	*	*	*
PAH SIMPCP	APPL	PAH SIMPCP	100 ug/mL	**09/07/18**	**09/07/19**	50 uL	100uL	**na**	50 ug/mL
SIM 2S SURROGATE	APPL	SIM 2S SURROGATE	100 ug/mL	**06/07/18**	**06/01/19**	50 uL	*	*	*
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	**06/25/18**	**06/25/19**	2 uL	*	*	*

Name of Final Standard: **8270 PAH SIM PCP Second Source**

Prep'd By (Initials): **GA**

Prep Date: 09/09/18

Exp Date: 03/09/19

Initial Standard Information						Final Standard Information			
Name of Initial Standard (from container Label)	Supplier	Supplier P/N# (or APPL Mix Name)	Conc.(range)	Lot # with QA # (or reference to APPL prep date)	Exp Date	Aliquot from Stock	Final Volume	Final Solvent + Lot# (or APPL Prep Date)	Final Standard Conc (range)
PAH SIMPCP SS Stock	o2si	PAH SIMPCP SS Stock	100 ug/mL	**02/14/18**	**02/14/19**	10 uL	200uL	**MC 56258** **195uL**	5 ug/mL
SV Internal Standard	APPL	SV Internal Standard	2000 ug/mL	**06/25/18**	**06/25/19**	4 uL	*	*	*

Organic Extraction Worksheet

Method	8270 Son Ext. Methylene c 3550B Wet MIS	Extraction Set	180907A	Extraction Method	SON009WETIS	Units	mL

Spiked ID 1	8270T Spike 8-10-18 exp 6-22-19		Surrogate ID 1	8270 Surrogate 8-9-18 exp 7-11-19	
Spiked ID 2	PAH SIMPCP 9-7-18 exp 9-7-19		Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	09/07/18 13:10	
Spiked ID 8			Ext. End Time:	09/10/18 15:40	
			GC Requires Extract By:	**09/19/18 0:00**	

pH1			Water Bath Temp Criteria	73,75 °C
pH2				
pH3				

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907A Blk				1	1	30.54g	1	NA	09/07/18 13:10	
						equip	E-S1.1 E-WB5				
2	180907A LCS-1		0.250	1	1	1	30.31g	1	NA	09/07/18 13:10	
						equip	E-S1.2 E-WB5				
3	180907A LCS-2		0.050	2	1	1	30.25g	1	NA	09/07/18 13:10	
						equip	E-S2 E-WB5				
4	180907A LCSD-1		0.250	1	1	1	30.85g	1	NA	09/07/18 13:10	
						equip	E-S6 E-WB5				
5	180907A LCSD-2		0.050	2	1	1	30.13g	1	NA	09/07/18 13:10	
						equip	E-S7 E-WB5				
6	AZ79146	AZ79146S01			1	1	30.36g	1	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB5				
7	AZ79147	AZ79147S01			1	1	30.19g	1	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB5				
8	AZ79148	AZ79148S01			1	1	30.31g	1	NA	09/07/18 13:10	86766
						equip	E-S1.2 E-WB5				
9	AZ79149	AZ79149S01			1	1	30.35g	1	NA	09/07/18 13:10	86766
						equip	E-S2 E-WB5				
10	AZ79150 MS-1	AZ79150S01	0.250	1	1	1	30.20G	1	NA	09/07/18 15:00	86766
						equip	E-S1.2 E-WB6				
11	AZ79150 MSD-1	AZ79150S01	0.250	1	1	1	30.04G	1	NA	09/07/18 15:00	86766
						equip	E-S2 E-WB6				
12	AZ79150 MS-2	AZ79150S01	0.0250	2	1	1	30.09G	1	NA	09/07/18 15:00	86766
						equip	E-S6 E-WB6				
13	AZ79150 MSD-2	AZ79150S01	0.0250	2	1	1	30.07G	1	NA	09/07/18 15:00	86766
						equip	E-S7 E-WB6				
14	AZ79150	AZ79150S01			1	1	30.70g	1	NA	09/07/18 13:10	86766
						equip	E-S6 E-WB5				
15	AZ79151	AZ79151S01			1	1	30.51g	1	NA	09/07/18 13:10	86766
						equip	E-S7 E-WB5				
16	AZ79152	AZ79152S01			1	1	30.59g	1	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB5				

Solvent and Lot#	
B.Na2SO4	18D105205
SAND	18C025203
FILTER PAPER	15751144
MC	58059
A.Na2SO4	6-28-18

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	OA
Date	09/10/18
Time	13:00
Refrigerator	F6-C

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/11/18 1:11:47 PM

Reviewed By: Kty **Date** 9/11/18

Organic Extraction Worksheet

Method	8270 Son Ext. Methylene c 3550B Wet MIS	Extraction Set	180907A	Extraction Method	SON009WETIS	Units	mL

Spiked ID 1	8270T Spike 8-10-18 exp 6-22-19		Surrogate ID 1	8270 Surrogate 8-9-18 exp 7-11-19	
Spiked ID 2	PAH SIMPCP 9-7-18 exp 9-7-19		Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	09/07/18 13:10	
Spiked ID 8			Ext. End Time:	09/10/18 15:40	

GC Requires Extract By:	**09/19/18 0:00**			
pH1			Water Bath Temp Criteria	73,75 °C
pH2				
pH3				

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
17	AZ79153	AZ79153S01			1	1	30.31g	1	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB6				
18	AZ79154	AZ79154S01			1	1	30.75g	1	NA	09/07/18 13:10	86766
						equip	E-S1.2 E-WB6				
19	AZ79155	AZ79155S01			1	1	30.41g	1	NA	09/07/18 13:10	86766
						equip	E-S2 E-WB6				
20	AZ79156	AZ79156S01			1	1	30.55g	1	NA	09/07/18 13:10	86766
						equip	E-S6 E-WB6				
21	AZ79157	AZ79157S01			1	1	30.36g	1	NA	09/07/18 13:10	86766
						equip	E-S7 E-WB6				
22	AZ79158	AZ79158S01			1	1	30.14g	1	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB6				
23	AZ79159	AZ79159S01			1	1	30.37g	1	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB6				
24	AZ79160	AZ79160S01			1	1	30.70g	1	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB6				

KY 9/11/18

Solvent and Lot#	
B.Na2SO4	18D105205
SAND	18C025203
FILTER PAPER	15751144
MC	58059
A.Na2SO4	6-28-18

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/11/18 1:11:47 PM

Reviewed By: KY **Date** 9/11/18

Ext_ID 1090 60241

Organic Extraction Worksheet

Method	8270 Son Ext. Methylene c 3550B Wet MIS	Extraction Set	180907A	Extraction Method	SON009WETIS	Units	mL

Spiked ID 1	8270T Spike 8-10-18 exp 6-22-19		Surrogate ID 1	8270 Surrogate 8-9-18 exp 7-11-19	
Spiked ID 2	PAH SIMPCP 9-7-18 exp 9-7-19		Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	NO	
Spiked ID 7			Ext. Start Time:	09/07/18 13:10	
Spiked ID 8			Ext. End Time:	09/10/18 15:40	
			GC Requires Extract By:	**09/19/18 0:00**	

pH1			Water Bath Temp Criteria	73,75 °C
pH2				
pH3				

Spiked By: DL **Date** 09/07/18 **Witnessed By:** CFM **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
17	AZ79153	AZ79153S01			1	1	30.31g	1	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB6				
18	AZ79154	AZ79154S01			1	1	30.75g	1	NA	09/07/18 13:10	86766
						equip	E-S1.2 E-WB6				
19	AZ79155	AZ79155S01			1	1	30.41g	1	NA	09/07/18 13:10	86766
						equip	E-S2 E-WB6				
20	AZ79156	AZ79156S01			1	1	30.55g	1	NA	09/07/18 13:10	86766
						equip	E-S6 E-WB6				
21	AZ79157	AZ79157S01			1	1	30.36g	1	NA	09/07/18 13:10	86766
						equip	E-S7 E-WB6				
22	AZ79158	AZ79158S01			1	1	30.14g	1	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB6				
23	AZ79159	AZ79159S01			1	1	30.37g	1	NA	09/07/18 13:10	86766
						equip	E-S1.1 E-WB6				
24	AZ79160	AZ79160S01			1	1	30.70g	1	NA	09/07/18 13:10	86766
						equip	e-s8 E-WB6				

KY 9/11/18

Solvent and Lot#	
B.Na2SO4	18D105205
SAND	18C025203
FILTER PAPER	15751144
MC	58059
A.Na2SO4	6-28-18

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	
Date	
Time	
Refrigerator	

	Technician's Initials
Scanned By	DL
Sample Preparation	DL
Extraction	DL
Concentration	DL

Modified	09/11/18 1:11:47 PM

Reviewed By: KY 1091 **Date** 9/11/18

Organic Extraction Worksheet

Method	625/8270 Separatory Funnel Extra 3510C	Extraction Set	180907A	Extraction Method	SEP004	Units	mL

Spiked ID 1	8270T Spike 8-10-18 EXP 6-22-19		Surrogate ID 1	8270 Surrogate 8-9-18 EXP 7-11-19	
Spiked ID 2	PAH SIMPCP 9-7-18 EXP 9-7-19		Surrogate ID 2		
Spiked ID 3			Surrogate ID 3		
Spiked ID 4			Surrogate ID 4		
Spiked ID 5			Surrogate ID 5		
Spiked ID 6			Sufficient Vol for Matrix QC:	no	
Spiked ID 7			Ext. Start Time:	09/07/18 10:28	
Spiked ID 8			Ext. End Time:	09/07/18 15:50	
			GC Requires Extract By:	**09/19/18 0:00**	

pH1	2	9/07/18 10:35:00 AM	Water Bath Temp Criteria	78 °C
pH2	14	9/07/18 12:10:00 PM		
pH3				

Spiked By: SS **Date** 09/07/18 **Witnessed By:** EL **Date** 09/07/18

	Sample	Sample Container	Spike Amount	Spike ID	Surrogate Amount	Surrogate ID	Extract Amount	Final Volume	pH	Extract Date/Time	Comments
1	180907A Blk				1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
2	180907A LCS-1		0.250	1	1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
3	180907A LCS-2		0.050	2	1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
4	180907A LCSd-1		0.250	1	1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
5	180907A LCSd-2		0.050	2	1	1	1000	1	2/1	09/07/18 10:28	
						equip	E-WB6				
6	AZ79179	AZ79179W03			1	1	910	1	2/1	09/07/18 10:28	86766
						equip	E-WB6				

Key 9/10/18

Solvent and Lot#	
ph strip	HC 727135
1+1 Sulfuric Acid	7-3-18
Dichloromethane (DCM)	58059
Filter Paper	400138
Acidified Na2SO4	6-28-18
10N NaOH	9-6-18
B. Na2SO4	18D105205

Extraction COC Transfer	
Extraction lab employee Initials	KY
GC analyst's initials	OA
Date	09/10/18
Time	9:25
Refrigerator	GC_C

	Technician's Initials
Scanned By	SS
Sample Preparation	SS,EL
Extraction	FM,SS,EL
Concentration	SS

Modified	09/10/18 3:42:54 PM

Reviewed By: Key **Date** 9/10/18

Ext_ID 1092 60242

Injection Log

Directory: M:\LINUS\DATA\L180917P\

Line	Vial	FileName	Multiplier	SampleName	Misc Info	Injected
1	2	0917L002.D	1	SV Tune 03/07/18		17 Sep 18 9:30
2	3	0917L003.D	1	0.1ug/mL SIM PCP 09/09/18		17 Sep 18 9:48
3	4	0917L004.D	1	0.2 SIM PCP 09/09/18		17 Sep 18 10:17
4	5	0917L005.D	1	0.5 SIM PCP 09/09/18		17 Sep 18 10:46
5	6	0917L006.D	1	2.5 SIM PCP 09/09/18		17 Sep 18 11:15
6	7	0917L007.D	1	5.0 SIM PCP 09/09/18		17 Sep 18 11:45
7	8	0917L008.D	1	25 SIM PCP 09/09/18		17 Sep 18 12:14
8	9	0917L009.D	1	50 SIM PCP 09/09/18		17 Sep 18 12:43
9	10	0917L010.D	1	SS SIM PCP 09/09/18		17 Sep 18 13:43
10	11	0917L011.D	1	SV TUNE 03/07/18		17 Sep 18 14:27
11	12	0917L012.D	1	180907A BLK 1/1000		17 Sep 18 14:48
12	15	0917L015.D	1.0989	AZ79179W03 1/910		17 Sep 18 16:16
13	16	0917L016.D	32.7439	180907A BLK 1/30.54G		17 Sep 18 16:45
14	19	0917L019.D	658.762	AZ79146S01 1/30.36G df20		17 Sep 18 18:13
15	20	0917L020.D	662.471	AZ79147S01 1/30.19G df20		17 Sep 18 18:42
16	21	0917L021.D	659.848	AZ79148S01 1/30.31G df20		17 Sep 18 19:11
17	22	0917L022.D	658.979	AZ79149S01 1/30.35G df20		17 Sep 18 19:40
18	25	0917L025.D	651.466	AZ79150S01 1/30.70G df20		17 Sep 18 21:08
19	26	0917L026.D	655.523	AZ79151S01 1/30.51G df20		17 Sep 18 21:37
20	27	0917L027.D	1307.62	AZ79152S01 1/30.59G df40		17 Sep 18 22:07
21	28	0917L028.D	1319.7	AZ79153S01 1/30.31G df40		17 Sep 18 22:36
22	29	0917L029.D	650.407	AZ79154S01 1/30.75G df20		17 Sep 18 23:05
23	30	0917L030.D	657.678	AZ79155S01 1/30.41G df20		17 Sep 18 23:34
24	36	0918L002.D	1	SV TUNE 03/07/18		18 Sep 18 10:14
25	3	0918L003.D	1	0.1ug/mL SIM PCP 09/09/18		18 Sep 18 11:12
26	4	0918L004.D	1	0.2 SIM PCP 09/09/18		18 Sep 18 11:41
27	5	0918L005.D	1	0.5 SIM PCP 09/09/18		18 Sep 18 12:10
28	6	0918L006.D	1	2.5 SIM PCP 09/09/18		18 Sep 18 12:39
29	7	0918L007.D	1	5.0 SIM PCP 09/09/18		18 Sep 18 13:09
30	8	0918L008.D	1	25 SIM PCP 09/09/18		18 Sep 18 13:38
31	9	0918L009.D	1	50 SIM PCP 09/09/18		18 Sep 18 14:07
32	10	0918L010.D	1	SS SIM PCP 09/09/18		18 Sep 18 14:36
33	11	0918L011.D	1	SV TUNE 03/07/18		18 Sep 18 15:27
34	12	0918L012.D	1	180907A LCS-2 1/1000		18 Sep 18 15:46
35	14	0918L014.D	33.0579	180907A LCS-2 1/30.25G		18 Sep 18 16:45
36	19	0918L019.D	1317.52	AZ79157S01 1/30.36G DF40		18 Sep 18 19:11
37	20	0918L020.D	663.57	AZ79158S01 1/30.14G DF20		18 Sep 18 19:40
38	21	0918L021.D	658.545	AZ79159S01 1/30.37G DF20		18 Sep 18 20:09
39	22	0918L022.D	651.466	AZ79160S01 1/30.70G DF20		18 Sep 18 20:39
40	23	0918L023.D	33.2336	AZ79150S01 MS-2 1/30.09G		18 Sep 18 21:08
41	24	0918L024.D	33.2336	AZ79150S01 MSD-2 1/30.09G		18 Sep 18 21:37
42	28	0918L028.D	1	SV TUNE 03/17/18		19 Sep 18 10:38
43	29	0918L029.D	1	5.0 SIM PCP 09/09/18		19 Sep 18 10:54
44	30	0918L030.D	654.664	AZ79156S01 1/30.55G DF20		19 Sep 18 11:31

METALS

Calibration Data

APPL, INC.

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/13/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 12:40	%R(1)	True CCV1	Found 14:18	%R(1)	True CCV1	Found 16:13	%R(1)	
Silver (Ag)	25	23.7297	94.9	25	23.5389	94.2	25	24.1040	96.4	P
Arsenic (As)	50	49.2279	98.5	50	50.0580	100	50	50.5306	101	P
Beryllium (Be)	50	45.5318	91.1	50	49.3040	98.6	50	48.6169	97.2	P
Cadmium (Cd)	50	49.7156	99.4	50	50.4927	101	50	50.0117	100	P
Cobalt (Co)	50	49.9394	99.9	50	51.3905	103	50	49.9023	99.8	P
Chromium (Cr)	50	49.8914	99.8	50	51.2336	102	50	49.8931	99.8	P
Copper (Cu)	50	50.0794	100	50	50.9641	102	50	48.9206	97.8	P
Molybdenum (Mo)	50	47.4021	94.8	50	47.1095	94.2	50	48.4302	96.9	P
Nickel (Ni)	50	50.1872	100	50	51.2046	102	50	49.2325	98.5	P
Lead (Pb)	50	48.4564	96.9	50	48.9763	98.0	50	47.4406	94.9	P
Antimony (Sb)	50	50.6645	101	50	48.0603	96.1	50	48.1865	96.4	P
Selenium (Se)	50	52.2428	104	50	51.9453	104	50	50.7778	102	P
Thallium (Tl)	50	48.6556	97.3	50	50.3576	101	50	48.8602	97.7	P
Vanadium (V)	50	50.1291	100	50	51.4506	103	50	50.0856	100	P
Zinc (Zn)	50	49.0761	98.2	50	52.7718	106	50	51.4744	103	P

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/13/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 12:40	%R(1)	True CCV1	Found 17:01	%R(1)	True	Found	%R(1)	
Silver (Ag)	25	23.7297	94.9	25	23.7206	94.9				P
Arsenic (As)	50	49.2279	98.5	50	48.4298	96.9				P
Beryllium (Be)	50	45.5318	91.1	50	48.8700	97.7				P
Cadmium (Cd)	50	49.7156	99.4	50	49.1814	98.4				P
Cobalt (Co)	50	49.9394	99.9	50	49.8526	99.7				P
Chromium (Cr)	50	49.8914	99.8	50	49.5157	99.0				P
Copper (Cu)	50	50.0794	100	50	49.7636	99.5				P
Molybdenum (Mo)	50	47.4021	94.8	50	47.3762	94.8				P
Nickel (Ni)	50	50.1872	100	50	50.2894	101				P
Lead (Pb)	50	48.4564	96.9	50	49.3813	98.8				P
Antimony (Sb)	50	50.6645	101	50	48.4421	96.9				P
Selenium (Se)	50	52.2428	104	50	53.2834	107				P
Thallium (Tl)	50	48.6556	97.3	50	50.5649	101				P
Vanadium (V)	50	50.1291	100	50	49.2521	98.5				P
Zinc (Zn)	50	49.0761	98.2	50	49.9215	99.8				P

(1) Control Limits: Metals 90-110

ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/13/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 12:44	%R(1)	True CCV1	Found 14:18	%R(1)	True CCV1	Found 16:13	%R(1)	
Barium (Ba)	50	49.6756	99.4	50	49.0599	98.1	50	49.2987	98.6	P

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/13/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 12:44	%R(1)	True CCV1	Found 17:01	%R(1)	True	Found	%R(1)	
Barium (Ba)	50	49.6756	99.4	50	48.6220	97.2				P

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analysis Date: 09/13/18

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
	13:11		14:22		16:17		17:05		14:26		
Silver (Ag)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Arsenic (As)	2.50	U	2.50	U	2.50	U	2.50	U	.50	U	P
Barium (Ba)	1.25	U	1.25	U	1.25	U	1.25	U	.25	U	P
Beryllium (Be)	5.00	U	5.00	U	5.00	U	5.00	U	1.00	U	P
Cadmium (Cd)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Cobalt (Co)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Chromium (Cr)	2.50	U	2.50	U	2.50	U	2.50	U	.50	U	P
Copper (Cu)	12.50	U	12.50	U	12.50	U	12.50	U	2.50	U	P
Molybdenum (Mo)	1.00	U	1.00	U	1.00	U	1.00	U	.20	U	P
Nickel (Ni)	1.75	U	1.75	U	1.75	U	1.75	U	.35	U	P
Lead (Pb)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Antimony (Sb)	1.00	U	1.00	U	.40	J	1.00	U	.20	U	P
Selenium (Se)	2.50	U	2.50	U	2.50	U	2.50	U	.50	U	P
Thallium (Tl)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Vanadium (V)	2.50	U	2.50	U	2.50	U	2.50	U	.50	U	P
Zinc (Zn)	12.50	U	12.50	U	12.50	U	12.50	U	2.50	U	P

A.P.P.L. INC.
4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: A.P.P.L. INC. Contract: CDM Smith
ARF No.: 86766 SDG: 86766
ICP ID Number: Megatron ICS Source: Environmental Express

Analysis Date: 09/13/18 Concentration Units: ug/L

Analyte	True		Initial Found		
	Sol A	Sol AB	Sol A 13:15	Sol AB 13:19	%R(1)
Silver (Ag)		100	0.025766	90.09962	90.1
Arsenic (As)		50	0.069251	48.172597	96.3
Barium (Ba)		50	-0.065313	48.786632	97.6
Beryllium (Be)		50	-0.002218	50.946349	102
Cadmium (Cd)		100	0.128563	94.655362	94.7
Cobalt (Co)		50	0.019498	46.705475	93.4
Chromium (Cr)		50	0.084218	47.789818	95.6
Copper (Cu)		50	-0.321103	44.453968	88.9
Molybdenum (Mo)	1000	1000	985.936729	1033.485911	103
Nickel (Ni)		100	0.077861	90.000438	90.0
Lead (Pb)		100	0.094576	93.320884	93.3
Antimony (Sb)		50	0.067654	50.017827	100
Selenium (Se)		50	0.017358	49.031366	98.1
Thallium (Tl)		50	0.002314	47.273033	94.5
Vanadium (V)		50	0.001639	48.775603	97.6
Zinc (Zn)		100	-0.538548	89.064274	89.1

(1) Control Limits: Metals 80-120

Low Level ICV

Sample Name	Acq Date Time	Run Sequence	Analyte	Actual Conc (ug/L)	Spiked Conc (ug/L)	Control Limits	% Recovery	QC Flag
0.5ppb LLICV	09/13/18 12:53	180913B.b	Beryllium	0.54	0.5	80-120%	107	
1.0ppb LLICV	09/13/18 12:57	180913B.b	Sodium	23.86	25	80-120%	95	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Magnesium	24.09	25	80-120%	96	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Aluminum	11.35	10	80-120%	113	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Potassium	9.63	10	80-120%	96	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Calcium	22.37	25	80-120%	89	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Vanadium	0.50	0.5	80-120%	101	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Chromium	0.51	0.5	80-120%	102	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Manganese	0.56	0.5	80-120%	112	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Iron	10.19	10	80-120%	102	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Cobalt	0.53	0.5	80-120%	106	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Nickel	0.59	0.5	80-120%	118	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Copper	0.58	0.5	80-120%	116	
2.0ppb LLICV	09/13/18 13:01	180913B.b	Zinc	2.30	2	80-120%	115	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Arsenic	0.54	0.5	80-120%	108	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Selenium	0.55	0.5	80-120%	110	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Strontium	0.52	0.5	80-120%	103	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Molybdenum	0.51	0.5	80-120%	102	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Silver	0.26	0.25	80-120%	105	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Cadmium	0.54	0.5	80-120%	108	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Tin	0.44	0.5	80-120%	88	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Antimony	0.60	0.5	80-120%	119	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Barium	0.44	0.5	80-120%	87	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Thallium	0.51	0.5	80-120%	102	
0.5ppb LLICV	09/13/18 12:53	180913B.b	Lead	0.43	0.5	80-120%	86	

Analyte	0.5ppb LLICV	1.0ppb LLICV	2.0ppb LLICV	4.0ppb LLICV	10ppb LLICV	Standard 2
Beryllium	0.5	1	2	4	10	1
Sodium	12.5	25	50	100	250	25
Magnesium	25	50	100	200	500	50
Aluminum	10	20	40	80	200	20
Potassium	10	20	40	80	200	20
Calcium	25	50	100	200	500	50
Vanadium	0.5	1	2	4	10	1
Chromium	0.5	1	2	4	10	1
Manganese	0.5	1	2	4	10	1
Iron	10	20	40	80	200	20
Cobalt	0.5	1	2	4	10	1
Nickel	0.5	1	2	4	10	1
Copper	0.5	1	2	4	10	1
Zinc	0.5	1	2	4	10	1
Arsenic	0.5	1	2	4	10	1
Selenium	0.5	1	2	4	10	1
Strontium	0.5	1	2	4	10	1
Molybdenum	0.5	1	2	4	10	1
Silver	0.25	0.5	1	2	5	0.5
Cadmium	0.5	1	2	4	10	1
Tin	0.5	1	2	4	10	1
Antimony	0.5	1	2	4	10	1
Barium	0.5	1	2	4	10	1
Thallium	0.5	1	2	4	10	1
Lead	0.5	1	2	4	10	1

A.P.P.L. INC.
5B
POST DIGEST SPIKE SAMPLE RECOVERY

CLIENT SAMPLE NO.
B06-SB-01

Lab Name: A.P.P.L. INC. Contract: CDM Smith
ARF No.: 86766 SDG: 86766

Analysis Date: 09/13/18 Concentration Units: mg/kg

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver (Ag)	80-120	46.668815		0.085591		50.000	93.2		
Arsenic (As)	80-120	132.889848		1.521652		125.000	105		
Beryllium (Be)	80-120	27.668932		0.236158		25.000	110		
Cadmium (Cd)	80-120	27.302272		0.375196		25.000	108		
Nickel (Ni)	80-120	133.508716		5.182826		125.000	103		
Antimony (Sb)	80-120	133.137825		1.103747		125.000	106		
Selenium (Se)	80-120	131.385122		0.171503		125.000	105		
Thallium (Tl)	80-120	127.88656		0.058399		125.000	102		

Comments:
09/13/18 14:53 AZ79166S01 DF10
09/13/18 15:13 AZ79166S01-A DF10

Sample Report

Sample Table

Sample Name	AZ79166S01-A DF10
Data File Name	044SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T15:13:16-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	27.669	27.669	3.30	126393	0.70	10000	
B	11	45	NoGas	116.164	116.164	1.82	525974	0.70	10000	
Na	23	72	He	11881.781	11881.781	1.71	8037332	0.72	1000000	
Mg	24	45	He	14058.368	14058.368	2.17	4145343	1.74	1000000	
Al	27	45	He	8569.758	8569.758	2.03	703584	1.75	1000000	
P	31	45	He	3272.036	3272.036	2.12	18651	3.46	500000	
K	39	45	He	3076.113	3076.113	0.66	528499	3.26	500000	
Ca	40	45	H2	14994.067	14994.067	1.61	97177474	0.50	500000	
Ti	47	45	He	425.050	425.050	1.40	35518	2.99	10000	
V	51	45	He	153.319	153.319	1.86	511132	2.85	10000	
Cr	52	45	He	138.895	138.895	2.24	630423	1.85	10000	
Mn	55	45	He	217.933	217.933	4.01	426745	0.95	50000	
Fe	56	45	He	14238.611	14238.611	4.60	52871923	1.19	1000000	
Co	59	45	He	133.268	133.268	5.63	1064232	1.85	10000	
Ni	60	45	He	133.509	133.509	6.27	309090	2.60	10000	
Cu	63	45	He	618.350	618.350	6.11	4005051	2.31	10000	
Zn	66	115	He	294.812	294.812	1.03	288843	1.29	50000	
As	75	115	He	132.890	132.890	1.37	72697	1.09	2000	
Se	78	72	H2	131.385	131.385	3.16	87038	1.03	10000	
Se	78	115	He	128.117	128.117	0.89	3751	1.01	10000	
Sr	88	115	NoGas	148.813	148.813	2.24	6968322	1.29	50000	
Mo	95	115	NoGas	154.199	154.199	1.48	1483229	1.06	10000	
Ag	107	115	NoGas	46.669	46.669	4.25	1230427	3.19	5000	
Cd	111	115	He	27.302	27.302	1.37	35275	1.12	10000	
Sn	118	115	He	141.187	141.187	0.17	303331	0.42	10000	
Sn	118	115	NoGas	143.654	143.654	2.61	2111966	1.22	10000	
Sb	121	115	NoGas	133.138	133.138	1.92	2862800	1.17	10000	
Ba	137	165	NoGas	194.800	194.800	2.75	1387619	1.22	50000	
Tl	205	165	NoGas	127.887	127.887	2.31	5910501	1.12	5000	
Pb	208	165	NoGas	157.525	157.525	1.37	9530854	0.51	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	124605	3.27	155989	79.88	70	120	
Sc	45	H2	708310	2.05	788522	89.83	70	120	
Sc	45	He	49026	3.72	55083	89.00	70	120	
Sc	45	NoGas	2020139	1.89	2213509	91.26	70	120	
Ge	72	H2	202850	2.26	228382	88.82	70	120	
Ge	72	He	36956	2.42	41564	88.91	70	120	
Ge	72	NoGas	450252	1.14	493680	91.20	70	120	
In	115	H2	2679910	2.37	2933811	91.35	70	120	
In	115	He	313505	0.28	358672	87.41	70	120	
In	115	NoGas	3017505	1.40	3330807	90.59	70	120	
Tb	159	H2	3969548	2.71	4179923	94.97	70	120	
Tb	159	He	1514205	0.51	1624277	93.22	70	120	
Tb	159	NoGas	4541650	0.77	4702844	96.57	70	120	
Ho	165	H2	3861793	3.10	4040454	95.58	70	120	
Ho	165	He	1506697	3.09	1590248	94.75	70	120	
Ho	165	NoGas	4370640	1.59	4499866	97.13	70	120	

A.P.P.L. INC.

9

ICP SERIAL DILUTION

CLIENT SAMPLE NO.

B06-SB-01

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Matrix: soil

Analysis Date: 09/13/18 Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	%D	Q	M
Barium (Ba)	60.1469		56.306762		6.38		
Cobalt (Co)	1.731469		1.88142		8.66		
Chromium (Cr)	8.613201		8.644124		0.359		
Molybdenum (Mo)	22.752727		20.916764		8.07		
Lead (Pb)	27.404787		24.746142		9.70		
Vanadium (V)	21.730546		21.385041		1.59		
Zinc (Zn)	50.842837		50.309814		1.05		

Comments:

09/13/18 14:53 AZ79166S01 DF10

09/13/18 15:17 AZ79166S01-DT DF50

Sample Report

Sample Table

Sample Name	AZ79166S01-DT DF50
Data File Name	045SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T15:17:04-07:00
Sample Type	Sample
Dilution	5
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.038	0.188	25.91	210	23.81	10000	
B	11	45	NoGas	-1.025	-5.124	-26.90	128658	0.83	10000	
Na	23	72	He	10.371	51.855	4.38	41214	0.71	1000000	
Mg	24	45	He	219.656	1098.280	0.63	64066	0.34	1000000	
Al	27	45	He	1536.274	7681.370	0.17	125240	0.70	1000000	
P	31	45	He	455.371	2276.855	2.62	2625	2.12	500000	
K	39	45	He	110.715	553.577	3.73	29400	1.65	500000	
Ca	40	45	H2	458.192	2290.959	4.67	2943079	1.94	500000	
Ti	47	45	He	58.934	294.668	1.64	4870	2.36	10000	
V	51	45	He	4.277	21.385	1.82	14243	1.06	10000	
Cr	52	45	He	1.729	8.644	1.05	8786	1.79	10000	
Mn	55	45	He	18.019	90.095	0.64	34990	0.40	50000	
Fe	56	45	He	2758.510	13792.548	0.64	10123234	0.21	1000000	
Co	59	45	He	0.376	1.881	6.44	2994	7.08	10000	
Ni	60	45	He	0.979	4.895	6.98	2685	5.03	10000	
Cu	63	45	He	101.615	508.076	0.47	669983	0.53	10000	
Zn	66	115	He	10.062	50.310	2.99	16904	1.47	50000	
As	75	115	He	0.370	1.850	12.58	221	11.34	2000	
Se	78	72	H2	0.085	0.426	23.72	63	16.76	10000	
Se	78	115	He	0.202	1.008	65.56	10	40.00	10000	
Sr	88	115	NoGas	2.610	13.052	1.12	127497	0.74	50000	
Mo	95	115	NoGas	4.183	20.917	4.12	41904	3.73	10000	
Ag	107	115	NoGas	0.026	0.131	56.65	3250	12.19	5000	
Cd	111	115	He	0.073	0.364	43.30	103	41.71	10000	
Sn	118	115	He	2.380	11.898	1.97	5909	2.53	10000	
Sn	118	115	NoGas	2.253	11.266	2.46	38118	1.83	10000	
Sb	121	115	NoGas	0.510	2.549	5.86	13162	4.69	10000	
Ba	137	165	NoGas	11.261	56.307	2.44	80801	3.12	50000	
Tl	205	165	NoGas	0.125	0.624	3.10	5958	1.51	5000	
Pb	208	165	NoGas	4.949	24.746	1.23	331940	0.65	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	132950	1.43	155989	85.23	70	120	
Sc	45	H2	689862	6.38	788522	87.49	70	120	
Sc	45	He	48380	0.86	55083	87.83	70	120	
Sc	45	NoGas	2018115	0.37	2213509	91.17	70	120	
Ge	72	H2	198929	4.03	228382	87.10	70	120	
Ge	72	He	37489	0.40	41564	90.19	70	120	
Ge	72	NoGas	453583	0.91	493680	91.88	70	120	
In	115	H2	2714087	3.06	2933811	92.51	70	120	
In	115	He	323839	0.93	358672	90.29	70	120	
In	115	NoGas	3130703	0.37	3330807	93.99	70	120	
Tb	159	H2	3939233	4.36	4179923	94.24	70	120	
Tb	159	He	1531903	0.43	1624277	94.31	70	120	
Tb	159	NoGas	4499951	0.64	4702844	95.69	70	120	
Ho	165	H2	3823736	4.41	4040454	94.64	70	120	
Ho	165	He	1531772	0.55	1590248	96.32	70	120	
Ho	165	NoGas	4362217	1.52	4499866	96.94	70	120	

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/14/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 10:22	%R(1)	True CCV1	Found 12:53	%R(1)	True CCV1	Found 14:42	%R(1)	
Silver (Ag)	25	24.6012	98.4	25	23.0728	92.3	25	22.9609	91.8	P
Arsenic (As)	50	49.4022	98.8	50	45.8300	91.7	50	45.2165	90.4	P
Beryllium (Be)	50	48.4522	96.9	50	48.0164	96.0	50	48.0726	96.1	P
Cadmium (Cd)	50	49.6416	99.3	50	46.6776	93.4	50	46.2027	92.4	P
Cobalt (Co)	50	50.0374	100	50	47.7266	95.5	50	46.3110	92.6	P
Chromium (Cr)	50	49.3449	98.7	50	46.9703	93.9	50	45.5641	91.1	P
Copper (Cu)	50	54.2458	108	50	47.7085	95.4	50	46.0082	92.0	P
Molybdenum (Mo)	50	49.5793	99.2	50	46.0734	92.1	50	45.9695	91.9	P
Nickel (Ni)	50	50.4008	101	50	47.6471	95.3	50	46.1508	92.3	P
Lead (Pb)	50	50.3338	101	50	47.2827	94.6	50	46.9426	93.9	P
Antimony (Sb)	50	53.1011	106	50	48.4645	96.9	50	48.6139	97.2	P
Selenium (Se)	50	48.1119	96.2	50	44.7602	89.5	50	45.2308	90.5	P
Thallium (Tl)	50	50.5801	101	50	48.3432	96.7	50	48.4399	96.9	P
Vanadium (V)	50	49.7431	99.5	50	47.5147	95.0	50	46.1492	92.3	P
Zinc (Zn)	50	54.8719	110	50	47.5375	95.1	50	47.4497	94.9	P

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/14/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 10:22	%R(1)	True CCV1	Found 16:59	%R(1)	True CCV1	Found 18:17	%R(1)	
Silver (Ag)	25	24.6012	98.4	25	23.2141	92.9	25	22.3109	*89.2	*
Arsenic (As)	50	49.4022	98.8	50	43.5882	87.2	50	44.5501	* 89.1	*
Beryllium (Be)	50	48.4522	96.9	50	52.2041	104	50	50.0176	100	P
Cadmium (Cd)	50	49.6416	99.3	50	46.0460	92.1	50	47.0452	94.1	P
Cobalt (Co)	50	50.0374	100	50	46.4635	92.9	50	46.6552	93.3	P
Chromium (Cr)	50	49.3449	98.7	50	45.4269	90.9	50	46.2903	92.6	P
Copper (Cu)	50	54.2458	108	50	45.8485	91.7	50	46.9418	93.9	P
Molybdenum (Mo)	50	49.5793	99.2	50	46.5848	93.2	50	44.8084	89.6	P
Nickel (Ni)	50	50.4008	101	50	46.0645	92.1	50	46.6905	93.4	P
Lead (Pb)	50	50.3338	101	50	48.5853	97.2	50	46.6375	93.3	P
Antimony (Sb)	50	53.1011	106	50	49.1333	98.3	50	47.6925	95.4	P
Selenium (Se)	50	48.1119	96.2	50	42.5847	*85.2	50	48.4353	96.9	*
Thallium (Tl)	50	50.5801	101	50	49.8262	99.7	50	47.6384	95.3	P
Vanadium (V)	50	49.7431	99.5	50	45.8058	91.6	50	46.2239	92.4	P
Zinc (Zn)	50	54.8719	110	50	46.3314	92.7	50	47.1903	94.4	P

*Not bracketing samples being reported for these analytes. mm 9/20/18

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/14/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 10:26	%R(1)	True CCV1	Found 12:53	%R(1)	True CCV1	Found 14:42	%R(1)	
Barium (Ba)	50	50.6178	101	50	48.4119	96.8	50	47.7382	95.5	P

(1) Control Limits: Metals 90-110 ILM02.0

79148_62A14MIS_Mega_180914A Ba115 FORM II (PART 1) - IN

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC.   Contract: CDM Smith

ARF No: 86766   SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/14/18   Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 10:26	%R(1)	True CCV1	Found 16:59	%R(1)	True CCV1	Found 18:17	%R(1)	
Barium (Ba)	50	50.6178	101	50	48.6896	97.4	50	46.5429	93.1	P

(1) Control Limits: Metals 90-110   ILM02.0

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): water

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analysis Date: 09/14/18

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
	10:58		12:56		14:46		17:03		11:14		
Silver (Ag)	5.00	U	5.00	U	5.00	U	5.00	U	5.00	U	P
Arsenic (As)	5.00	U	5.00	U	5.00	U	5.00	U	5.00	U	P
Barium (Ba)	3.00	U	3.00	U	3.00	U	3.00	U	3.00	U	P
Beryllium (Be)	1.00	U	1.00	U	1.00	U	1.00	U	1.00	U	P
Cadmium (Cd)	1.00	U	1.00	U	1.00	U	1.00	U	1.00	U	P
Cobalt (Co)	1.00	U	1.00	U	1.00	U	1.00	U	1.00	U	P
Chromium (Cr)	10.00	U	10.00	U	10.00	U	10.00	U	10.00	U	P
Copper (Cu)	2.00	U	2.00	U	2.00	U	2.00	U	1.18	J	P
Molybdenum (Mo)	2.00	U	2.00	U	2.00	U	2.00	U	.20	J	P
Nickel (Ni)	3.00	U	3.00	U	3.00	U	3.00	U	3.00	U	P
Lead (Pb)	3.00	U	3.00	U	3.00	U	3.00	U	3.00	U	P
Antimony (Sb)	6.00	U	.45	J	.48	J	.48	J	6.00	U	P
Selenium (Se)	5.00	U	5.00	U	5.00	U	5.00	U	5.00	U	P
Thallium (Tl)	1.00	U	1.00	U	1.00	U	1.00	U	1.00	U	P
Vanadium (V)	6.00	U	6.00	U	6.00	U	6.00	U	6.00	U	P
Zinc (Zn)	20.00	U	20.00	U	20.00	U	20.00	U	20.00	U	P

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): water

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analysis Date: 09/14/18

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
	10:58		18:21						11:14		
Silver (Ag)	5.00	U	5.00	U					5.00	U	P
Arsenic (As)	5.00	U	5.00	U					5.00	U	P
Barium (Ba)	3.00	U	3.00	U					3.00	U	P
Beryllium (Be)	1.00	U	1.00	U					1.00	U	P
Cadmium (Cd)	1.00	U	1.00	U					1.00	U	P
Cobalt (Co)	1.00	U	1.00	U					1.00	U	P
Chromium (Cr)	10.00	U	10.00	U					10.00	U	P
Copper (Cu)	2.00	U	2.00	U					1.18	J	P
Molybdenum (Mo)	2.00	U	2.00	U					.20	J	P
Nickel (Ni)	3.00	U	3.00	U					3.00	U	P
Lead (Pb)	3.00	U	3.00	U					3.00	U	P
Antimony (Sb)	6.00	U	.39	J					6.00	U	P
Selenium (Se)	5.00	U	5.00	U					5.00	U	P
Thallium (Tl)	1.00	U	1.00	U					1.00	U	P
Vanadium (V)	6.00	U	6.00	U					6.00	U	P
Zinc (Zn)	20.00	U	20.00	U					20.00	U	P

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analysis Date: 09/14/18

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
	10:58		12:56		14:46		17:03		12:41		
Silver (Ag)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Arsenic (As)	2.50	U	2.50	U	2.50	U	2.50	U	.50	U	P
Barium (Ba)	1.25	U	1.25	U	1.25	U	1.25	U	.25	U	P
Beryllium (Be)	5.00	U	5.00	U	5.00	U	5.00	U	1.00	U	P
Cadmium (Cd)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Cobalt (Co)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Chromium (Cr)	2.50	U	2.50	U	2.50	U	2.50	U	.50	U	P
Copper (Cu)	12.50	U	12.50	U	12.50	U	12.50	U	2.50	U	P
Molybdenum (Mo)	1.00	U	1.00	U	1.00	U	1.00	U	.20	U	P
Nickel (Ni)	1.75	U	1.75	U	1.75	U	1.75	U	.35	U	P
Lead (Pb)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Antimony (Sb)	1.00	U	.45	J	.48	J	.48	J	.20	U	P
Selenium (Se)	2.50	U	2.50	U	2.50	U	2.50	U	.50	U	P
Thallium (Tl)	.50	U	.50	U	.50	U	.50	U	.10	U	P
Vanadium (V)	2.50	U	2.50	U	2.50	U	2.50	U	.50	U	P
Zinc (Zn)	12.50	U	12.50	U	12.50	U	12.50	U	2.50	U	P

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analysis Date: 09/14/18

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
	10:58		18:21						12:41		
Silver (Ag)	.50	U	.50	U					.10	U	P
Arsenic (As)	2.50	U	2.50	U					.50	U	P
Barium (Ba)	1.25	U	1.25	U					.25	U	P
Beryllium (Be)	5.00	U	5.00	U					1.00	U	P
Cadmium (Cd)	.50	U	.50	U					.10	U	P
Cobalt (Co)	.50	U	.50	U					.10	U	P
Chromium (Cr)	2.50	U	2.50	U					.50	U	P
Copper (Cu)	12.50	U	12.50	U					2.50	U	P
Molybdenum (Mo)	1.00	U	1.00	U					.20	U	P
Nickel (Ni)	1.75	U	1.75	U					.35	U	P
Lead (Pb)	.50	U	.50	U					.10	U	P
Antimony (Sb)	1.00	U	.39	J					.20	U	P
Selenium (Se)	2.50	U	2.50	U					.50	U	P
Thallium (Tl)	.50	U	.50	U					.10	U	P
Vanadium (V)	2.50	U	2.50	U					.50	U	P
Zinc (Zn)	12.50	U	12.50	U					2.50	U	P

ICP INTERFERENCE CHECK SAMPLE

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

ICP ID Number: Megatron ICS Source: Environmental Express

Analysis Date: 09/14/18 Concentration Units: ug/L

Analyte	True		Initial Found		
	Sol A	Sol AB	Sol A 11:02	Sol AB 11:06	%R(1)
Silver (Ag)		100	0.020951	89.1143	89.1
Arsenic (As)		50	0.046261	46.265767	92.5
Barium (Ba)		50	0.077896	48.006431	96.0
Beryllium (Be)		50	0.003061	44.190403	88.4
Cadmium (Cd)		100	0.084947	87.669877	87.7
Cobalt (Co)		50	0.00531	44.30597	88.6
Chromium (Cr)		50	0.102143	44.227585	88.5
Copper (Cu)		50	0.216073	43.739604	87.5
Molybdenum (Mo)	1000	1000	950.839893	977.896475	97.8
Nickel (Ni)		100	0.105751	86.826751	86.8
Lead (Pb)		100	0.164386	88.914094	88.9
Antimony (Sb)		50	0.121915	49.723403	99.4
Selenium (Se)		50	0.026514	44.497666	89.0
Thallium (Tl)		50	-0.00725	45.363885	90.7
Vanadium (V)		50	0.008925	45.399501	90.8
Zinc (Zn)		100	1.038504	85.432408	85.4

(1) Control Limits: Metals 80-120

Low Level ICV

Sample Name	Acq Date Time	Run Sequence	Analyte	Actual Conc (ug/L)	Spiked Conc (ug/L)	Control Limits	% Recovery	QC Flag
0.5ppb LLICV	09/14/18 10:42	180914A.b	Beryllium	0.52	0.5	80-120%	103	
4.0ppb LLICV	09/14/18 10:54	180914A.b	Sodium	96.29	100	80-120%	96	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Magnesium	23.48	25	80-120%	94	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Aluminum	10.38	10	80-120%	104	
1.0ppb LLICV	09/14/18 10:46	180914A.b	Potassium	17.55	20	80-120%	88	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Calcium	25.40	25	80-120%	102	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Vanadium	0.47	0.5	80-120%	94	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Chromium	0.48	0.5	80-120%	96	
Standard 2	09/14/18 10:04	180914A.b	Manganese	0.97	1	80-120%	97	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Iron	10.24	10	80-120%	102	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Cobalt	0.47	0.5	80-120%	94	
Standard 2	09/14/18 10:04	180914A.b	Nickel	1.19	1	80-120%	119	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Copper	0.59	0.5	80-120%	117	
4.0ppb LLICV	09/14/18 10:54	180914A.b	Zinc	4.23	4	80-120%	106	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Arsenic	0.48	0.5	80-120%	96	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Selenium	0.41	0.5	80-120%	82	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Strontium	0.52	0.5	80-120%	103	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Molybdenum	0.48	0.5	80-120%	96	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Silver	0.24	0.25	80-120%	96	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Cadmium	0.44	0.5	80-120%	88	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Tin	0.48	0.5	80-120%	96	
1.0ppb LLICV	09/14/18 10:46	180914A.b	Antimony	1.02	1	80-120%	102	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Barium	0.55	0.5	80-120%	109	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Thallium	0.45	0.5	80-120%	90	
0.5ppb LLICV	09/14/18 10:42	180914A.b	Lead	0.48	0.5	80-120%	96	

Analyte	0.5ppb LLICV	1.0ppb LLICV	2.0ppb LLICV	4.0ppb LLICV	10ppb LLICV	Standard 2
Beryllium	0.5	1	2	4	10	1
Sodium	12.5	25	50	100	250	25
Magnesium	25	50	100	200	500	50
Aluminum	10	20	40	80	200	20
Potassium	10	20	40	80	200	20
Calcium	25	50	100	200	500	50
Vanadium	0.5	1	2	4	10	1
Chromium	0.5	1	2	4	10	1
Manganese	0.5	1	2	4	10	1
Iron	10	20	40	80	200	20
Cobalt	0.5	1	2	4	10	1
Nickel	0.5	1	2	4	10	1
Copper	0.5	1	2	4	10	1
Zinc	0.5	1	2	4	10	1
Arsenic	0.5	1	2	4	10	1
Selenium	0.5	1	2	4	10	1
Strontium	0.5	1	2	4	10	1
Molybdenum	0.5	1	2	4	10	1
Silver	0.25	0.5	1	2	5	0.5
Cadmium	0.5	1	2	4	10	1
Tin	0.5	1	2	4	10	1
Antimony	0.5	1	2	4	10	1
Barium	0.5	1	2	4	10	1
Thallium	0.5	1	2	4	10	1
Lead	0.5	1	2	4	10	1

A.P.P.L. INC.
9
ICP SERIAL DILUTION

CLIENT SAMPLE NO.
B06-SB-01

Lab Name: A.P.P.L. INC.
Contract: CDM Smith
ARF No.: 86766
SDG: 86766
Matrix: soil

Analysis Date: 09/14/18
Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	%D	Q	M
Copper (Cu)	452.992809		432.226088		4.58		

Comments:
09/14/18 17:29 AZ79166S01 DF100
09/14/18 17:45 AZ79166S01 DF500 DT

Sample Report

Sample Table

Sample Name	AZ79166S01 DF500 DT
Data File Name	116SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:45:29-07:00
Sample Type	Sample
Dilution	50
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.010	0.511	113.34	110	89.54	10000	
B	11	45	NoGas	4.446	222.281	20.60	231084	0.84	10000	
Na	23	45	He	38.773	1938.669	12.70	30516	0.96	1000000	
Mg	24	45	He	23.866	1193.285	9.44	3123	4.66	1000000	
Al	27	45	He	141.618	7080.896	5.39	3668	1.95	1000000	
P	31	45	He	35.730	1786.504	60.97	93	42.11	500000	
K	39	45	He	5.233	261.668	70.64	3459	1.99	500000	
Ca	40	45	H2	43.949	2197.452	13.29	199950	3.15	500000	
Ti	47	45	He	5.961	298.030	9.36	229	12.56	10000	
V	51	45	He	0.395	19.757	17.32	929	14.66	10000	
Cr	52	45	He	0.190	9.507	8.16	1106	2.80	10000	
Mn	55	45	He	1.580	79.019	14.08	1528	8.83	50000	
Fe	56	45	He	237.371	11868.529	4.84	582044	0.36	1000000	
Co	59	45	He	0.049	2.429	14.96	380	10.64	10000	
Ni	60	45	He	0.113	5.661	18.76	336	12.96	10000	
Cu	63	45	He	8.645	432.226	4.61	55483	0.32	10000	
Zn	66	115	He	1.011	50.538	4.91	1091	4.91	50000	
As	75	115	He	0.050	2.513	26.56	24	20.83	2000	
Se	78	72	H2	0.076	3.778	33.89	61	20.63	10000	
Se	78	115	He	-0.004	-0.196	-3928.60	2	86.60	10000	
Sr	88	115	NoGas	0.246	12.322	4.41	20946	3.51	50000	
Mo	95	115	NoGas	0.397	19.866	0.91	6892	1.90	10000	
Ag	107	115	NoGas	0.009	0.460	116.40	4768	10.33	5000	
Cd	111	115	He	0.010	0.495	49.39	11	40.75	10000	
Sn	118	115	He	0.255	12.751	4.90	378	3.34	10000	
Sn	118	115	NoGas	0.249	12.445	1.12	7408	2.12	10000	
Sb	121	115	NoGas	0.574	28.725	2.10	22449	2.60	10000	
Ba	137	115	NoGas	1.015	50.767	2.64	12552	2.88	50000	
Tl	205	165	NoGas	0.028	1.415	14.80	3977	7.71	5000	
Pb	208	165	NoGas	0.457	22.846	1.15	54888	1.54	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	274029	0.21	232772	117.72	70	120	
Sc	45	H2	411170	9.29	497417	82.66	70	120	
Sc	45	He	21578	4.52	26213	82.32	70	120	
Sc	45	NoGas	3092485	1.84	3271044	94.54	70	120	
Ge	72	H2	110905	9.88	130306	85.11	70	120	
Ge	72	He	21926	1.34	25369	86.43	70	120	
Ge	72	NoGas	758913	1.36	804525	94.33	70	120	
In	115	H2	2456238	8.41	2768793	88.71	70	120	
In	115	He	164961	1.75	184583	89.37	70	120	
In	115	NoGas	5210573	1.15	5159681	100.99	70	120	
Tb	159	H2	4533951	9.19	4956789	91.47	70	120	
Tb	159	He	1102614	0.96	1146052	96.21	70	120	
Tb	159	NoGas	7662775	1.46	7155958	107.08	70	120	
Ho	165	H2	4411871	9.18	4765312	92.58	70	120	
Ho	165	He	1113133	1.08	1131090	98.41	70	120	
Ho	165	NoGas	7346452	0.63	6876887	106.83	70	120	

A.P.P.L. INC.

9

ICP SERIAL DILUTION

CLIENT SAMPLE NO.

DU01-SB-01

Lab Name: A.P.P.L. INC.

Contract: CDM Smith

ARF No.: 86766

SDG: 86766

Matrix: soil

Analysis Date: 09/14/18

Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	%D	Q	M
Barium (Ba)	18.530864		19.236775		3.81		
Cobalt (Co)	2.000871		2.214096		10.7		M
Chromium (Cr)	4.288618		4.547014		6.03		
Copper (Cu)	24.816226		24.7771		0.158		
Molybdenum (Mo)	12.375482		13.081764		5.71		
Lead (Pb)	16.499107		17.69491		7.25		
Vanadium (V)	19.670918		19.873078		1.03		
Zinc (Zn)	39.115354		39.315259		0.511		

Comments:

09/14/18 13:36 AZ79149S01 DF100

09/14/18 13:53 AZ79149S01 DF500 DT

Sample Report

Sample Table

Sample Name	AZ79149S01 DF500 DT
Data File Name	063SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:53:01-07:00
Sample Type	Sample
Dilution	5.030181087
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.049	0.245	6.90	480	6.25	10000	
B	11	45	NoGas	3.660	18.408	2.55	243178	2.42	10000	
Na	23	45	He	15.129	76.102	12.79	26051	1.01	1000000	
Mg	24	45	He	262.433	1320.086	3.56	38117	1.46	1000000	
Al	27	45	He	1267.327	6374.884	2.13	34692	0.20	1000000	
P	31	45	He	96.505	485.437	28.04	218	24.89	500000	
K	39	45	He	114.911	578.025	6.60	10863	2.48	500000	
Ca	40	45	H2	157.556	792.533	12.99	787316	3.52	500000	
Ti	47	45	He	49.915	251.079	1.27	2148	1.73	10000	
V	51	45	He	3.951	19.873	2.69	10077	1.73	10000	
Cr	52	45	He	0.904	4.547	6.18	3976	3.46	10000	
Mn	55	45	He	26.470	133.150	1.72	27871	1.09	50000	
Fe	56	45	He	2407.454	12109.932	1.92	6605198	0.20	1000000	
Co	59	45	He	0.440	2.214	3.76	3523	2.09	10000	
Ni	60	45	He	0.678	3.409	6.87	1758	7.04	10000	
Cu	63	45	He	4.926	24.777	1.01	35971	1.39	10000	
Zn	66	115	He	7.816	39.315	2.91	6458	0.87	50000	
As	75	115	He	0.463	2.329	4.60	193	7.34	2000	
Se	78	72	H2	0.126	0.632	22.49	110	13.00	10000	
Se	78	115	He	0.275	1.385	91.52	6	56.73	10000	
Sr	88	115	NoGas	1.053	5.298	1.25	91136	0.81	50000	
Mo	95	115	NoGas	2.601	13.082	2.14	46038	2.20	10000	
Ag	107	115	NoGas	0.023	0.114	22.80	5628	4.00	5000	
Cd	111	115	He	0.031	0.155	17.53	34	15.56	10000	
Sn	118	115	He	3.541	17.812	4.29	4951	1.92	10000	
Sn	118	115	NoGas	3.491	17.560	1.19	95096	1.74	10000	
Sb	121	115	NoGas	0.523	2.630	2.00	21477	2.04	10000	
Ba	137	115	NoGas	3.824	19.237	1.39	49065	1.95	50000	
Tl	205	165	NoGas	0.092	0.462	6.95	9350	4.42	5000	
Pb	208	165	NoGas	3.518	17.695	1.39	390973	1.01	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	248238	1.11	232772	106.64	70	120	
Sc	45	H2	466857	9.15	497417	93.86	70	120	
Sc	45	He	24223	2.12	26213	92.41	70	120	
Sc	45	NoGas	3315712	2.53	3271044	101.37	70	120	
Ge	72	H2	122522	8.59	130306	94.03	70	120	
Ge	72	He	23830	2.43	25369	93.93	70	120	
Ge	72	NoGas	822892	2.43	804525	102.28	70	120	
In	115	H2	2703421	8.68	2768793	97.64	70	120	
In	115	He	178446	3.14	184583	96.68	70	120	
In	115	NoGas	5458535	0.56	5159681	105.79	70	120	
Tb	159	H2	5066416	9.70	4956789	102.21	70	120	
Tb	159	He	1158192	2.32	1146052	101.06	70	120	
Tb	159	NoGas	7899095	1.01	7155958	110.38	70	120	
Ho	165	H2	4895509	8.61	4765312	102.73	70	120	
Ho	165	He	1170324	2.62	1131090	103.47	70	120	
Ho	165	NoGas	7641971	1.24	6876887	111.13	70	120	

A.P.P.L. INC.
5B
POST DIGEST SPIKE SAMPLE RECOVERY

CLIENT SAMPLE NO.
DU01-SB-01

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Analysis Date: 09/14/18 Concentration Units: mg/kg

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Silver (Ag)	80-120	45.409619		0.075562		50.302	90.1		
Arsenic (As)	80-120	114.970656		2.096948		125.755	89.8		
Beryllium (Be)	80-120	22.04913		0.202679		25.151	86.9		
Cadmium (Cd)	80-120	22.548876		0.123594		25.151	89.2		
Cobalt (Co)	80-120	112.402026		2.000871		125.755	87.8		
Nickel (Ni)	80-120	111.119756		3.429956		125.755	85.6		
Antimony (Sb)	80-120	118.548111		0.459347		125.755	93.9		
Selenium (Se)	80-120	112.091168		0.088961		125.755	89.1		
Thallium (Tl)	80-120	111.713713		0.042351		125.755	88.8		

Comments:

09/14/18 13:36 AZ79149S01 DF100

09/14/18 13:49 AZ79149S01-A DF100

Sample Report

Sample Table

Sample Name	AZ79149S01-A DF100
Data File Name	062SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:49:09-07:00
Sample Type	Sample
Dilution	1.006036217
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	21.917	22.049	1.84	205604	0.37	10000	
B	11	45	NoGas	109.727	110.389	0.54	869564	2.54	10000	
Na	23	45	He	10054.901	10115.594	1.48	3575776	1.07	1000000	
Mg	24	45	He	11730.401	11801.208	1.69	1725620	0.76	1000000	
Al	27	45	He	6726.867	6767.472	2.87	185475	1.23	1000000	
P	31	45	He	1374.077	1382.372	7.75	2635	5.25	500000	
K	39	45	He	2664.615	2680.699	2.71	175466	0.74	500000	
Ca	40	45	H2	11595.276	11665.268	11.67	57858769	3.47	500000	
Ti	47	45	He	344.880	346.961	2.14	15044	0.65	10000	
V	51	45	He	129.390	130.171	2.96	333220	0.49	10000	
Cr	52	45	He	112.097	112.774	2.75	436031	0.32	10000	
Mn	55	45	He	229.052	230.434	3.34	243975	0.92	50000	
Fe	56	45	He	11783.126	11854.252	2.98	32759119	0.51	1000000	
Co	59	45	He	111.728	112.402	2.46	895445	0.04	10000	
Ni	60	45	He	110.453	111.120	2.33	273851	0.24	10000	
Cu	63	45	He	131.539	132.333	2.60	947139	0.37	10000	
Zn	66	115	He	247.066	248.557	2.74	185458	0.10	50000	
As	75	115	He	114.281	114.971	2.59	44683	0.28	2000	
Se	78	72	H2	111.419	112.091	10.84	92507	3.07	10000	
Se	78	115	He	106.017	106.657	0.79	1258	2.37	10000	
Sr	88	115	NoGas	118.872	119.590	0.36	9914206	1.86	50000	
Mo	95	115	NoGas	126.269	127.031	1.22	2163891	3.21	10000	
Ag	107	115	NoGas	45.137	45.410	0.56	2060535	1.69	5000	
Cd	111	115	He	22.414	22.549	1.76	22543	1.61	10000	
Sn	118	115	He	129.158	129.938	3.04	172502	0.44	10000	
Sn	118	115	NoGas	131.427	132.220	0.95	3443937	2.46	10000	
Sb	121	115	NoGas	117.837	118.548	0.18	4522028	2.17	10000	
Ba	137	115	NoGas	141.950	142.807	2.26	1764701	1.75	50000	
Tl	205	165	NoGas	111.043	111.714	2.50	9055787	1.41	5000	
Pb	208	165	NoGas	129.077	129.856	1.90	13985720	0.71	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	228440	1.80	232772	98.14	70	120	
Sc	45	H2	471532	8.05	497417	94.80	70	120	
Sc	45	He	24560	2.43	26213	93.69	70	120	
Sc	45	NoGas	3314684	2.15	3271044	101.33	70	120	
Ge	72	H2	120742	7.67	130306	92.66	70	120	
Ge	72	He	24363	1.51	25369	96.04	70	120	
Ge	72	NoGas	818550	2.56	804525	101.74	70	120	
In	115	H2	2588167	9.92	2768793	93.48	70	120	
In	115	He	172317	2.63	184583	93.35	70	120	
In	115	NoGas	5308176	2.02	5159681	102.88	70	120	
Tb	159	H2	4991514	9.21	4956789	100.70	70	120	
Tb	159	He	1152128	1.79	1146052	100.53	70	120	
Tb	159	NoGas	7832590	2.61	7155958	109.46	70	120	
Ho	165	H2	4790005	8.40	4765312	100.52	70	120	
Ho	165	He	1168620	2.16	1131090	103.32	70	120	
Ho	165	NoGas	7588215	2.14	6876887	110.34	70	120	

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/18/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 8:43	%R(1)	True CCV1	Found 11:07	%R(1)	True CCV1	Found 18:51	%R(1)	
Silver (Ag)	25	23.1399	92.6	25	24.1453	96.6	25	23.4663	93.9	P
Arsenic (As)	50	49.0608	98.1	50	49.5391	99.1	50	46.0668	92.1	P
Cadmium (Cd)	50	49.3566	98.7	50	51.0664	102	50	49.6467	99.3	P
Cobalt (Co)	50	50.4980	101	50	52.7732	106	50	51.7000	103	P
Chromium (Cr)	50	49.7933	99.6	50	51.7370	103	50	50.3498	101	P
Copper (Cu)	50	50.3147	101	50	52.4637	105	50	51.8098	104	P
Molybdenum (Mo)	50	47.4745	94.9	50	49.2171	98.4	50	46.5726	93.1	P
Nickel (Ni)	50	50.0091	100	50	52.2744	105	50	51.0430	102	P
Lead (Pb)	50	47.1673	94.3	50	49.1788	98.4	50	48.9122	97.8	P
Antimony (Sb)	50	48.9222	97.8	50	49.1238	98.2	50	47.9787	96.0	P
Selenium (Se)	50	48.5506	97.1	50	50.1871	100	50	53.4304	107	P
Thallium (Tl)	50	47.9377	95.9	50	50.1283	100	50	48.9965	98.0	P
Vanadium (V)	50	49.6767	99.4	50	51.1876	102	50	50.0068	100	P
Zinc (Zn)	50	47.2042	94.4	50	50.4430	101	50	46.7476	93.5	P

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.
2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith
ARF No: 86766 SDG: 86766
Initial Calibration Source: CPI
Continuing Calibration Source: Environmental Express
Analysis Date: 09/18/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 8:43	%R(1)	True CCV1	Found 19:53	%R(1)	True	Found	%R(1)	
Silver (Ag)	25	23.1399	92.6	25	23.4711	93.9				P
Arsenic (As)	50	49.0608	98.1	50	47.0534	94.1				P
Cadmium (Cd)	50	49.3566	98.7	50	49.7313	99.5				P
Cobalt (Co)	50	50.4980	101	50	52.5014	105				P
Chromium (Cr)	50	49.7933	99.6	50	51.2279	102				P
Copper (Cu)	50	50.3147	101	50	52.1800	104				P
Molybdenum (Mo)	50	47.4745	94.9	50	47.1991	94.4				P
Nickel (Ni)	50	50.0091	100	50	52.2071	104				P
Lead (Pb)	50	47.1673	94.3	50	48.3467	96.7				P
Antimony (Sb)	50	48.9222	97.8	50	49.2101	98.4				P
Selenium (Se)	50	48.5506	97.1	50	53.6173	107				P
Thallium (Tl)	50	47.9377	95.9	50	47.5728	95.1				P
Vanadium (V)	50	49.6767	99.4	50	50.4502	101				P
Zinc (Zn)	50	47.2042	94.4	50	49.1553	98.3				P

(1) Control Limits: Metals 90-110 ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/18/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 8:47	%R(1)	True CCV1	Found 11:07	%R(1)	True CCV1	Found 18:51	%R(1)	
Barium (Ba)	50	48.8709	97.7	50	48.9725	97.9	50	47.1672	94.3	P
Beryllium (Be)	10	9.80878	98.1	50	49.3859	98.8	50	46.3563	92.7	P

(1) Control Limits: Metals 90-110

ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/18/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 8:47	%R(1)	True CCV1	Found 19:53	%R(1)	True	Found	%R(1)	
Barium (Ba)	50	48.8709	97.7	50	48.0565	96.1				P
Beryllium (Be)	10	9.80878	98.1	50	47.8165	95.6				P

(1) Control Limits: Metals 90-110

ILM02.0

BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analysis Date: 09/18/18

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
	09:07		11:11		18:55		19:57				
Silver (Ag)	.50	U	.50	U	.50	U	.50	U			P
Arsenic (As)	2.50	U	2.50	U	2.50	U	2.50	U			P
Barium (Ba)	1.25	U	1.25	U	1.25	U	1.25	U			P
Beryllium (Be)	5.00	U	5.00	U	5.00	U	5.00	U			P
Cadmium (Cd)	.50	U	.50	U	.50	U	.50	U			P
Cobalt (Co)	.50	U	.50	U	.50	U	.50	U			P
Chromium (Cr)	2.50	U	2.50	U	2.50	U	2.50	U			P
Copper (Cu)	12.50	U	12.50	U	12.50	U	12.50	U			P
Molybdenum (Mo)	1.00	U	1.00	U	.10	J	.10	J			P
Nickel (Ni)	1.75	U	1.75	U	1.75	U	1.75	U			P
Lead (Pb)	.50	U	.50	U	.50	U	.50	U			P
Antimony (Sb)	1.00	U	1.00	U	.53	J	.60	J			P
Selenium (Se)	2.50	U	2.50	U	2.50	U	2.50	U			P
Thallium (Tl)	.50	U	.50	U	.50	U	.50	U			P
Vanadium (V)	2.50	U	2.50	U	2.50	U	2.50	U			P
Zinc (Zn)	12.50	U	12.50	U	12.50	U	12.50	U			P

A.P.P.L. INC.
4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

ICP ID Number: Megatron ICS Source: Environmental Express

Analysis Date: 09/18/18 Concentration Units: ug/L

Analyte	True		Initial Found		
	Sol A	Sol AB	Sol A 9:11	Sol AB 9:15	%R(1)
Silver (Ag)		100	0.017852	95.439982	95.4
Arsenic (As)		50	0.072764	52.302337	105
Barium (Ba)		50	-0.067931	49.562409	99.1
Beryllium (Be)		50	0.001835	52.234393	104
Cadmium (Cd)		100	0.17091	101.357891	101
Cobalt (Co)		50	0.021167	51.02916	102
Chromium (Cr)		50	0.140101	51.580475	103
Copper (Cu)		50	0.030644	50.376268	101
Molybdenum (Mo)	1000	1000	1031.533329	1091.685394	109
Nickel (Ni)		100	0.119839	99.415588	99.4
Lead (Pb)		100	0.131763	95.923833	95.9
Antimony (Sb)		50	0.158722	51.794515	104
Selenium (Se)		50	0.032757	51.876507	104
Thallium (Tl)		50	0.000718	49.768724	99.5
Vanadium (V)		50	0.011127	52.657055	105
Zinc (Zn)		100	0.419421	98.612834	98.6

(1) Control Limits: Metals 80-120

Low Level ICV

Sample Name	Acq Date Time	Run Sequence	Analyte	Actual Conc (ug/L)	Spiked Conc (ug/L)	Control Limits	% Recovery	QC Flag
0.5ppb LLICV	09/18/18 8:51	180918A.b	Beryllium	0.53	0.5	80-120%	107	
2.0ppb LLICV	09/18/18 8:59	180918A.b	Sodium	49.96	50	80-120%	100	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Magnesium	26.90	25	80-120%	108	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Aluminum	10.66	10	80-120%	107	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Potassium	10.71	10	80-120%	107	
1.0ppb LLICV	09/18/18 8:55	180918A.b	Calcium	57.57	50	80-120%	115	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Vanadium	0.56	0.5	80-120%	112	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Chromium	0.55	0.5	80-120%	110	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Manganese	0.58	0.5	80-120%	115	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Iron	11.00	10	80-120%	110	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Cobalt	0.54	0.5	80-120%	108	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Nickel	0.58	0.5	80-120%	116	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Copper	0.48	0.5	80-120%	97	
2.0ppb LLICV	09/18/18 8:59	180918A.b	Zinc	1.95	2	80-120%	98	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Arsenic	0.53	0.5	80-120%	106	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Selenium	0.52	0.5	80-120%	105	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Strontium	0.52	0.5	80-120%	104	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Molybdenum	0.56	0.5	80-120%	112	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Silver	0.25	0.25	80-120%	100	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Cadmium	0.52	0.5	80-120%	104	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Tin	0.60	0.5	80-120%	120	
1.0ppb LLICV	09/18/18 8:55	180918A.b	Antimony	1.17	1	80-120%	117	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Barium	0.47	0.5	80-120%	94	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Thallium	0.51	0.5	80-120%	102	
0.5ppb LLICV	09/18/18 8:51	180918A.b	Lead	0.51	0.5	80-120%	101	

Analyte	0.5ppb LLICV	1.0ppb LLICV	2.0ppb LLICV	4.0ppb LLICV	10ppb LLICV	Standard 2
Beryllium	0.5	1	2	4	10	1
Sodium	12.5	25	50	100	250	25
Magnesium	25	50	100	200	500	50
Aluminum	10	20	40	80	200	20
Potassium	10	20	40	80	200	20
Calcium	25	50	100	200	500	50
Vanadium	0.5	1	2	4	10	1
Chromium	0.5	1	2	4	10	1
Manganese	0.5	1	2	4	10	1
Iron	10	20	40	80	200	20
Cobalt	0.5	1	2	4	10	1
Nickel	0.5	1	2	4	10	1
Copper	0.5	1	2	4	10	1
Zinc	0.5	1	2	4	10	1
Arsenic	0.5	1	2	4	10	1
Selenium	0.5	1	2	4	10	1
Strontium	0.5	1	2	4	10	1
Molybdenum	0.5	1	2	4	10	1
Silver	0.25	0.5	1	2	5	0.5
Cadmium	0.5	1	2	4	10	1
Tin	0.5	1	2	4	10	1
Antimony	0.5	1	2	4	10	1
Barium	0.5	1	2	4	10	1
Thallium	0.5	1	2	4	10	1
Lead	0.5	1	2	4	10	1

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/14/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 11:49	%R(1)	True CCV1	Found 12:17	%R(1)	True CCV1	Found 12:34	%R(1)	
Mercury (Hg)	4.17	4.205	101	5.208	5.129	98.5	5.208	5.145	98.8	P

(1) Control Limits: Metals 90-110

ILM02.0

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/14/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 11:49	%R(1)	True CCV1	Found 13:01	%R(1)	True CCV1	Found 13:17	%R(1)	
Mercury (Hg)	4.17	4.205	101	5.208	5.066	97.3	5.208	4.884	93.8	P

(1) Control Limits: Metals 90-110

ILM02.0

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analysis Date: 09/14/18

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
	11:50		12:19		12:36		13:05		11:54		
Mercury (Hg)	3.13	U	3.13	U	3.13	U	3.13	U	.50	U	P

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analysis Date: 09/14/18

Analyte	Initial Calibration Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
	11:50		13:19						11:54		
Mercury (Hg)	3.13	U	3.13	U					.50	U	P

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analysis Date: 09/14/18

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
	11:50		12:19		12:36		13:05		12:37		
Mercury (Hg)	.63	U	.63	U	.63	U	.63	U	.10	U	P

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No.: 86766 SDG: 86766

Preparation Blank Matrix (soil/water): soil

Preparation Blank Concentration Units (ug/L or mg/kg): mg/Kg

Analysis Date: 09/14/18

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
	11:50		13:19						12:37		
Mercury (Hg)	.63	U	.63	U					.10	U	P

A.P.P.L. INC.

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: A.P.P.L. INC. Contract: CDM Smith

ARF No: 86766 SDG: 86766

Initial Calibration Source: CPI

Continuing Calibration Source: Environmental Express

Analysis Date: 09/19/18 Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration						M
	True	Found 12:45	%R(1)	True CCV1	Found 14:11	%R(1)	True CCV1	Found 14:51	%R(1)	
Mercury (Hg)	4	4.137	103	5	5.184	104	5	5.183	104	P

(1) Control Limits: Metals 90-110

A.P.P.L. INC.
3
BLANKS

Lab Name: A.P.P.L. INC.   Contract: CDM Smith

ARF No.: 86766   SDG: 86766

Preparation Blank Matrix (soil/water): water

Preparation Blank Concentration Units (ug/L or mg/kg): ug/L

Analysis Date: 09/19/18

Analyte	Initial Calibration Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
	12:47		14:12		14:52				14:27		
Mercury (Hg)	.20	U	.20	U	.20	U			.20	U	P

Calibration Blank Report

Sample Table

Sample Name	Calibration Blank 9/13/18
Data File Name	004CALB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T12:20:51-07:00
Sample Type	CalBlk
Level	1
Dilution	1
Comment	Megatron EJ

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD
Be	9	6	NoGas	30	100.00
B	11	45	NoGas	144918	3.36
Na	23	72	He	37829	1.10
Mg	24	45	He	138	19.70
Al	27	45	He	989	15.09
P	31	45	He	83	34.18
K	39	45	He	12553	2.58
Ca	40	45	H2	65911	1.98
Ca (no)	44	45	He	109	11.59
Ti	47	45	He	11	96.43
V	51	45	He	199	9.23
Cr	52	45	He	1197	5.16
Mn	55	45	He	172	16.12
Fe	56	45	He	6029	2.63
Co	59	45	He	27	54.47
Ni	60	45	He	511	5.85
Cu	63	45	He	26619	1.33
Zn	66	115	He	7707	0.82
As	75	115	He	13	11.46
Se	78	72	H2	9	24.03
Se	78	115	He	4	58.08
Sr	88	115	NoGas	713	1.62
Mo	95	115	NoGas	170	35.78
Ag	107	115	NoGas	2697	3.00
Cd	111	115	He	7	34.64
Sn	118	115	He	707	4.65
Sn	118	115	NoGas	4045	1.62
Sb	121	115	NoGas	1907	7.61
Ba	137	165	NoGas	780	18.18
Tl	205	165	NoGas	213	18.94
[Pb]	206	165	NoGas	9123	1.45
[Pb]	207	165	NoGas	7529	2.54
Pb	208	165	NoGas	35190	1.94

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD
Li	6	NoGas	155989	2.00
Sc	45	H2	788522	4.05
Sc	45	He	55083	1.28
Sc	45	NoGas	2213509	2.97
Ge	72	H2	228382	1.96
Ge	72	He	41564	1.85
Ge	72	NoGas	493680	3.50
In	115	H2	2933811	4.31
In	115	He	358672	1.35
In	115	NoGas	3330807	3.46
Tb	159	H2	4179923	3.93
Tb	159	He	1624277	0.34
Tb	159	NoGas	4702844	3.10
Ho	165	H2	4040454	3.58
Ho	165	He	1590248	0.04
Ho	165	NoGas	4499866	2.78

Calibration Standard Report

Sample Table

Sample Name	Standard 1 9/13/18
Data File Name	005CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T12:24:48-07:00
Sample Type	CalStd
Level	2
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	6	NoGas	830	8.69	0.9998
B	11	45	NoGas	146705	1.18	1.0000
Na	23	72	He	42997	0.75	0.9958
Mg	24	45	He	2225	8.50	0.9989
Al	27	45	He	1349	1.74	1.0000
P	31	45	He	68	7.51	1.0000
K	39	45	He	13156	2.09	1.0000
Ca	40	45	H2	292967	1.67	0.9999
Ca (no)	44	45	He	477	11.19	
Ti	47	45	He	21	9.11	1.0000
V	51	45	He	624	3.04	1.0000
Cr	52	45	He	1959	12.61	1.0000
Mn	55	45	He	556	6.04	1.0000
Fe	56	45	He	21305	1.15	0.9999
Co	59	45	He	1191	6.17	1.0000
Ni	60	45	He	997	2.09	1.0000
Cu	63	45	He	27953	1.31	1.0000
Zn	66	115	He	9264	2.13	0.9997
As	75	115	He	88	4.95	1.0000
Se	78	72	H2	97	8.71	0.9999
Se	78	115	He	8	48.50	0.9997
Sr	88	115	NoGas	7959	2.41	0.9999
Mo	95	115	NoGas	1327	12.71	0.9999
Ag	107	115	NoGas	4387	5.06	0.9998
Cd	111	115	He	194	23.78	1.0000
Sn	118	115	He	928	1.98	1.0000
Sn	118	115	NoGas	5523	3.44	0.9998
Sb	121	115	NoGas	4257	5.11	0.9999
Ba	137	165	NoGas	2117	2.73	0.9999
Tl	205	165	NoGas	5741	6.34	0.9999
[Pb]	206	165	NoGas	10247	5.00	
[Pb]	207	165	NoGas	9266	1.97	
Pb	208	165	NoGas	41786	4.41	0.9999

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	153372	1.76	155989	98.32	70	120	
Sc	45	H2	788455	4.57	788522	99.99	70	120	
Sc	45	He	55324	1.51	55083	100.44	70	120	
Sc	45	NoGas	2213579	0.51	2213509	100.00	70	120	
Ge	72	H2	224124	3.53	228382	98.14	70	120	
Ge	72	He	41212	0.83	41564	99.15	70	120	
Ge	72	NoGas	485730	0.53	493680	98.39	70	120	
In	115	H2	2861883	4.03	2933811	97.55	70	120	
In	115	He	356458	2.01	358672	99.38	70	120	
In	115	NoGas	3282598	1.04	3330807	98.55	70	120	
Tb	159	H2	4183443	3.27	4179923	100.08	70	120	
Tb	159	He	1611794	2.07	1624277	99.23	70	120	
Tb	159	NoGas	4611446	1.66	4702844	98.06	70	120	
Ho	165	H2	3986329	4.23	4040454	98.66	70	120	
Ho	165	He	1599559	1.39	1590248	100.59	70	120	
Ho	165	NoGas	4509094	1.78	4499866	100.21	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 2 9/13/18
Data File Name	006CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T12:28:44-07:00
Sample Type	CalStd
Level	3
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	6	NoGas	5194	2.79	0.9998
B	11	45	NoGas	147807	0.65	1.0000
Na	23	72	He	55839	0.65	0.9958
Mg	24	45	He	15469	0.89	0.9989
Al	27	45	He	2911	1.78	1.0000
P	31	45	He	114	10.23	1.0000
K	39	45	He	16221	1.87	1.0000
Ca	40	45	H2	495704	0.65	0.9999
Ca (no)	44	45	He	922	10.66	
Ti	47	45	He	91	23.52	1.0000
V	51	45	He	4098	2.28	1.0000
Cr	52	45	He	6214	1.66	1.0000
Mn	55	45	He	2505	2.76	1.0000
Fe	56	45	He	92833	1.15	0.9999
Co	59	45	He	9196	0.60	1.0000
Ni	60	45	He	3573	7.80	1.0000
Cu	63	45	He	34108	0.98	1.0000
Zn	66	115	He	10442	1.99	0.9997
As	75	115	He	625	8.70	1.0000
Se	78	72	H2	733	3.31	0.9999
Se	78	115	He	37	15.75	0.9997
Sr	88	115	NoGas	50011	1.57	0.9999
Mo	95	115	NoGas	10010	6.65	0.9999
Ag	107	115	NoGas	16178	2.20	0.9998
Cd	111	115	He	1406	10.93	1.0000
Sn	118	115	He	2921	4.51	1.0000
Sn	118	115	NoGas	18611	0.36	0.9998
Sb	121	115	NoGas	23497	1.51	0.9999
Ba	137	165	NoGas	8019	2.93	0.9999
Tl	205	165	NoGas	45261	3.06	0.9999
[Pb]	206	165	NoGas	23384	3.38	
[Pb]	207	165	NoGas	20400	2.15	
Pb	208	165	NoGas	93693	0.55	0.9999

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	154632	1.81	155989	99.13	70	120	
Sc	45	H2	789669	2.20	788522	100.15	70	120	
Sc	45	He	55499	2.01	55083	100.75	70	120	
Sc	45	NoGas	2207066	1.58	2213509	99.71	70	120	
Ge	72	H2	226536	2.00	228382	99.19	70	120	
Ge	72	He	41311	1.07	41564	99.39	70	120	
Ge	72	NoGas	491790	1.26	493680	99.62	70	120	
In	115	H2	2914488	2.06	2933811	99.34	70	120	
In	115	He	356571	1.80	358672	99.41	70	120	
In	115	NoGas	3270508	2.31	3330807	98.19	70	120	
Tb	159	H2	4094729	2.47	4179923	97.96	70	120	
Tb	159	He	1639281	1.49	1624277	100.92	70	120	
Tb	159	NoGas	4650891	2.81	4702844	98.90	70	120	
Ho	165	H2	3966623	2.52	4040454	98.17	70	120	
Ho	165	He	1624339	1.03	1590248	102.14	70	120	
Ho	165	NoGas	4512896	1.91	4499866	100.29	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 3 9/13/18
Data File Name	007CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T12:32:41-07:00
Sample Type	CalStd
Level	4
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	6	NoGas	271189	1.75	0.9998
B	11	45	NoGas	323413	1.96	1.0000
Na	23	72	He	835519	0.80	0.9958
Mg	24	45	He	774392	1.23	0.9989
Al	27	45	He	94052	0.67	1.0000
P	31	45	He	1715	1.76	1.0000
K	39	45	He	205451	0.88	1.0000
Ca	40	45	H2	18259170	1.15	0.9999
Ca (no)	44	45	He	30926	0.80	
Ti	47	45	He	4808	1.69	1.0000
V	51	45	He	191087	0.80	1.0000
Cr	52	45	He	260639	0.37	1.0000
Mn	55	45	He	111926	0.54	1.0000
Fe	56	45	He	4311265	0.29	0.9999
Co	59	45	He	456448	0.43	1.0000
Ni	60	45	He	133704	0.41	1.0000
Cu	63	45	He	393497	0.60	1.0000
Zn	66	115	He	63332	0.97	0.9997
As	75	115	He	31005	1.18	1.0000
Se	78	72	H2	37702	0.72	0.9999
Se	78	115	He	1713	2.77	0.9997
Sr	88	115	NoGas	2441643	1.60	0.9999
Mo	95	115	NoGas	497134	0.96	0.9999
Ag	107	115	NoGas	679152	2.58	0.9998
Cd	111	115	He	73196	1.55	1.0000
Sn	118	115	He	121656	0.92	1.0000
Sn	118	115	NoGas	757955	1.81	0.9998
Sb	121	115	NoGas	1115922	1.75	0.9999
Ba	137	165	NoGas	368548	2.04	0.9999
Tl	205	165	NoGas	2374522	0.79	0.9999
[Pb]	206	165	NoGas	729450	1.53	
[Pb]	207	165	NoGas	671605	0.96	
Pb	208	165	NoGas	3019343	1.15	0.9999

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	152499	0.33	155989	97.76	70	120	
Sc	45	H2	777639	4.55	788522	98.62	70	120	
Sc	45	He	55737	0.50	55083	101.19	70	120	
Sc	45	NoGas	2166328	1.73	2213509	97.87	70	120	
Ge	72	H2	225646	2.60	228382	98.80	70	120	
Ge	72	He	41340	1.47	41564	99.46	70	120	
Ge	72	NoGas	485477	1.75	493680	98.34	70	120	
In	115	H2	2856831	3.86	2933811	97.38	70	120	
In	115	He	351239	0.79	358672	97.93	70	120	
In	115	NoGas	3204264	2.21	3330807	96.20	70	120	
Tb	159	H2	4164222	3.57	4179923	99.62	70	120	
Tb	159	He	1616714	0.45	1624277	99.53	70	120	
Tb	159	NoGas	4607386	0.91	4702844	97.97	70	120	
Ho	165	H2	3979747	4.75	4040454	98.50	70	120	
Ho	165	He	1605386	0.81	1590248	100.95	70	120	
Ho	165	NoGas	4408922	1.56	4499866	97.98	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 4 9/13/18
Data File Name	008CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T12:36:36-07:00
Sample Type	CalStd
Level	5
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	6	NoGas	564544	2.36	0.9998
B	11	45	NoGas	514355	3.02	1.0000
Na	23	72	He	1987188	12.44	0.9958
Mg	24	45	He	1682253	1.66	0.9989
Al	27	45	He	184701	1.32	1.0000
P	31	45	He	3253	2.18	1.0000
K	39	45	He	388182	1.03	1.0000
Ca	40	45	H2	35968902	0.51	0.9999
Ca (no)	44	45	He	60063	0.19	
Ti	47	45	He	9338	2.39	1.0000
V	51	45	He	372586	0.23	1.0000
Cr	52	45	He	507674	0.55	1.0000
Mn	55	45	He	219253	0.83	1.0000
Fe	56	45	He	8286906	1.00	0.9999
Co	59	45	He	894022	0.25	1.0000
Ni	60	45	He	258879	1.12	1.0000
Cu	63	45	He	748249	0.71	1.0000
Zn	66	115	He	114328	0.19	0.9997
As	75	115	He	61488	0.37	1.0000
Se	78	72	H2	73998	0.66	0.9999
Se	78	115	He	3265	2.64	0.9997
Sr	88	115	NoGas	4979783	1.96	0.9999
Mo	95	115	NoGas	1025354	2.03	0.9999
Ag	107	115	NoGas	1407503	3.21	0.9998
Cd	111	115	He	145196	0.60	1.0000
Sn	118	115	He	241932	1.01	1.0000
Sn	118	115	NoGas	1571014	3.48	0.9998
Sb	121	115	NoGas	2290729	1.69	0.9999
Ba	137	165	NoGas	732113	1.84	0.9999
Tl	205	165	NoGas	4752607	0.87	0.9999
[Pb]	206	165	NoGas	1580115	0.85	
[Pb]	207	165	NoGas	1408086	2.01	
Pb	208	165	NoGas	6292611	1.19	0.9999

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	152862	4.81	155989	98.00	70	120	
Sc	45	H2	790787	4.29	788522	100.29	70	120	
Sc	45	He	54884	2.08	55083	99.64	70	120	
Sc	45	NoGas	2204479	2.93	2213509	99.59	70	120	
Ge	72	H2	227927	3.24	228382	99.80	70	120	
Ge	72	He	41132	2.86	41564	98.96	70	120	
Ge	72	NoGas	486911	3.72	493680	98.63	70	120	
In	115	H2	2868703	3.69	2933811	97.78	70	120	
In	115	He	353408	1.49	358672	98.53	70	120	
In	115	NoGas	3195679	2.89	3330807	95.94	70	120	
Tb	159	H2	4210472	2.49	4179923	100.73	70	120	
Tb	159	He	1638781	1.34	1624277	100.89	70	120	
Tb	159	NoGas	4690597	2.56	4702844	99.74	70	120	
Ho	165	H2	4007960	3.01	4040454	99.20	70	120	
Ho	165	He	1612528	1.43	1590248	101.40	70	120	
Ho	165	NoGas	4517017	3.33	4499866	100.38	70	120	

Initial Calibration Verification (ICV) Report

Sample Table

Sample Name	ICV 180913
Data File Name	009_ICV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T12:40:27-07:00
Sample Type	ICV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	6	NoGas	45.532	3.777	258779	1.60	50	91.1	89.6	110.4	
B	11	45	NoGas	51.652	6.553	333300	2.65	50	103.3	89.6	110.4	
Na	23	72	He	1062.568	2.052	829264	1.12	5000	21.3	89.6	110.4	>+\- 10%
Mg	24	45	He	1148.538	1.185	383613	0.51	1250	91.9	89.6	110.4	
Al	27	45	He	1243.959	1.412	116494	0.71	1250	99.5	89.6	110.4	
P	31	45	He	234.954	8.771	1593	7.75	250	94.0	89.6	110.4	
K	39	45	He	1247.169	1.219	250054	0.47	1250	99.8	89.6	110.4	
Ca	40	45	H2	1306.992	3.557	9202522	0.96	1250	104.6	89.6	110.4	
Ti	47	45	He	50.349	4.729	4772	4.02	50	100.7	89.6	110.4	
V	51	45	He	50.129	1.381	189330	0.74	50	100.3	89.6	110.4	
Cr	52	45	He	49.891	1.494	257193	1.21	50	99.8	89.6	110.4	
Mn	55	45	He	50.313	1.915	111741	1.48	50	100.6	89.6	110.4	
Fe	56	45	He	1232.695	1.511	5191798	1.22	1250	98.6	89.6	110.4	
Co	59	45	He	49.939	1.722	451990	1.38	50	99.9	89.6	110.4	
Ni	60	45	He	50.187	1.076	132023	0.76	50	100.4	89.6	110.4	
Cu	63	45	He	50.079	0.940	392300	0.28	50	100.2	89.6	110.4	
Zn	66	115	He	49.076	1.385	60874	1.05	50	98.2	89.6	110.4	
As	75	115	He	49.228	2.271	30536	1.46	50	98.5	89.6	110.4	
Se	78	72	H2	52.243	4.244	37563	0.89	50	104.5	89.6	110.4	
Se	78	115	He	49.542	4.774	1647	3.89	50	99.1	89.6	110.4	
Sr	88	115	NoGas	47.600	3.384	2375849	0.51	50	95.2	89.6	110.4	
Mo	95	115	NoGas	47.402	3.421	485989	0.58	50	94.8	89.6	110.4	
Ag	107	115	NoGas	23.730	3.551	668104	0.77	25	94.9	89.6	110.4	
Cd	111	115	He	49.716	1.444	72811	0.63	50	99.4	89.6	110.4	
Sn	118	115	He	25.033	1.162	61544	0.37	25	100.1	89.6	110.4	
Sn	118	115	NoGas	23.780	3.376	375874	0.64	25	95.1	89.6	110.4	
Sb	121	115	NoGas	50.665	3.612	1162048	0.77	50	101.3	89.6	110.4	
Ba	137	165	NoGas	27.351	2.788	201990	0.51	50	54.7	89.6	110.4	>+\- 10%
Tl	205	165	NoGas	48.656	4.043	2322978	0.82	50	97.3	89.6	110.4	
Pb	208	165	NoGas	48.456	3.522	3053106	0.79	50	96.9	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	155017	2.14	155989	99.38	70	120	
Sc	45	H2	765277	4.56	788522	97.05	70	120	
Sc	45	He	55489	0.71	55083	100.74	70	120	
Sc	45	NoGas	2192802	4.81	2213509	99.06	70	120	
Ge	72	H2	220255	3.71	228382	96.44	70	120	
Ge	72	He	40889	1.04	41564	98.37	70	120	
Ge	72	NoGas	491864	2.40	493680	99.63	70	120	
In	115	H2	2820269	5.31	2933811	96.13	70	120	
In	115	He	355418	0.87	358672	99.09	70	120	
In	115	NoGas	3217342	2.96	3330807	96.59	70	120	
Tb	159	H2	4045758	4.41	4179923	96.79	70	120	
Tb	159	He	1636630	0.88	1624277	100.76	70	120	
Tb	159	NoGas	4667684	3.91	4702844	99.25	70	120	
Ho	165	H2	3931228	5.06	4040454	97.30	70	120	
Ho	165	He	1631865	0.99	1590248	102.62	70	120	
Ho	165	NoGas	4517769	3.31	4499866	100.40	70	120	

Initial Calibration Verification (ICV) Report

Sample Table

Sample Name	ICV 2 180913
Data File Name	010_ICV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T12:44:23-07:00
Sample Type	ICV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	6	NoGas	9.642	2.115	55036	1.15	50	19.3	89.6	110.4	>+\- 10%
B	11	45	NoGas	51.627	3.521	335302	0.34	50	103.3	89.6	110.4	
Na	23	72	He	4547.880	2.689	3484835	0.56	5000	91.0	89.6	110.4	
Mg	24	45	He	4956.463	1.682	1654159	1.66	1250	396.5	89.6	110.4	>+\- 10%
Al	27	45	He	396.385	1.431	37780	1.57	1250	31.7	89.6	110.4	>+\- 10%
P	31	45	He	400.550	2.717	2657	2.92	250	160.2	89.6	110.4	>+\- 10%
K	39	45	He	989.624	1.255	200922	0.89	1250	79.2	89.6	110.4	>+\- 10%
Ca	40	45	H2	5197.677	6.500	36041842	0.61	1250	415.8	89.6	110.4	>+\- 10%
Ti	47	45	He	49.508	1.641	4691	1.71	50	99.0	89.6	110.4	
V	51	45	He	49.767	0.371	187870	0.43	50	99.5	89.6	110.4	
Cr	52	45	He	49.518	0.164	255147	0.47	50	99.0	89.6	110.4	
Mn	55	45	He	49.642	0.620	110197	0.50	50	99.3	89.6	110.4	
Fe	56	45	He	195.271	0.517	827105	0.22	1250	15.6	89.6	110.4	>+\- 10%
Co	59	45	He	49.598	0.285	448671	0.22	50	99.2	89.6	110.4	
Ni	60	45	He	48.564	0.539	127701	0.57	50	97.1	89.6	110.4	
Cu	63	45	He	49.225	0.445	385863	0.72	50	98.4	89.6	110.4	
Zn	66	115	He	98.436	0.466	114314	1.14	50	196.9	89.6	110.4	>+\- 10%
As	75	115	He	49.199	1.358	30490	0.12	50	98.4	89.6	110.4	
Se	78	72	H2	51.995	3.179	37447	0.50	50	104.0	89.6	110.4	
Se	78	115	He	49.443	3.214	1642	3.48	50	98.9	89.6	110.4	
Sr	88	115	NoGas	48.423	4.012	2451374	0.72	50	96.8	89.6	110.4	
Mo	95	115	NoGas	47.639	4.145	495390	1.22	50	95.3	89.6	110.4	
Ag	107	115	NoGas	18.820	2.998	538126	0.69	25	75.3	89.6	110.4	>+\- 10%
Cd	111	115	He	10.169	3.185	14882	2.05	50	20.3	89.6	110.4	>+\- 10%
Sn	118	115	He	49.425	1.747	120710	0.60	25	197.7	89.6	110.4	>+\- 10%
Sn	118	115	NoGas	46.823	4.640	746697	1.38	25	187.3	89.6	110.4	>+\- 10%
Sb	121	115	NoGas	48.656	5.066	1131770	1.72	50	97.3	89.6	110.4	
Ba	137	165	NoGas	49.676	3.703	367351	2.16	50	99.4	89.6	110.4	
Tl	205	165	NoGas	49.091	2.595	2351857	1.07	50	98.2	89.6	110.4	
Pb	208	165	NoGas	47.924	2.798	3029914	1.32	50	95.8	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	155560	1.01	155989	99.72	70	120	
Sc	45	H2	758703	5.81	788522	96.22	70	120	
Sc	45	He	55458	0.31	55083	100.68	70	120	
Sc	45	NoGas	2205079	2.35	2213509	99.62	70	120	
Ge	72	H2	220550	3.40	228382	96.57	70	120	
Ge	72	He	41589	2.58	41564	100.06	70	120	
Ge	72	NoGas	490463	2.15	493680	99.35	70	120	
In	115	H2	2772270	5.50	2933811	94.49	70	120	
In	115	He	355089	1.23	358672	99.00	70	120	
In	115	NoGas	3263970	3.33	3330807	97.99	70	120	
Tb	159	H2	4014631	6.44	4179923	96.05	70	120	
Tb	159	He	1624442	0.50	1624277	100.01	70	120	
Tb	159	NoGas	4697215	1.12	4702844	99.88	70	120	
Ho	165	H2	3901500	5.91	4040454	96.56	70	120	
Ho	165	He	1613907	0.89	1590248	101.49	70	120	
Ho	165	NoGas	4530557	1.53	4499866	100.68	70	120	

Initial Calibration Blank (ICB) Report

Sample Table

Sample Name	ICB 180913
Data File Name	015_ICB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T13:11:58-07:00
Sample Type	ICB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	6	NoGas	-0.004	-87.0	10	173.2	0.1	
B	11	45	NoGas	1.441	28.6	146880	2.4	8	
Na	23	72	He	1.529	64.4	38476	0.7	50	
Mg	24	45	He	0.022	281.7	144	15.0	20	
Al	27	45	He	0.200	74.2	1001	2.3	10	
P	31	45	He	-3.928	-65.1	58	27.3	10	
K	39	45	He	-2.063	-63.8	12099	2.7	40	
Ca	40	45	H2	1.176	29.5	72373	1.7	150	
Ti	47	45	He	-0.084	-0.4	3	0.0	0.5	
V	51	45	He	-0.003	-281.0	186	17.3	0.4	
Cr	52	45	He	-0.008	-115.9	1149	3.2	0.2	
Mn	55	45	He	0.068	4.8	321	3.0	0.3	
Fe	56	45	He	-0.099	-18.3	5588	2.1	30	
Co	59	45	He	0.002	76.2	44	30.3	0.4	
Ni	60	45	He	-0.003	-394.5	500	5.7	0.4	
Cu	63	45	He	-0.157	-26.9	25341	2.1	0.4	
Zn	66	115	He	-0.132	-111.1	7546	2.1	15	
As	75	115	He	0.006	26.2	17	5.9	0.2	
Se	78	72	H2	0.003	72.2	11	14.3	0.4	
Se	78	115	He	0.061	222.8	6	71.2	0.4	
Sr	88	115	NoGas	0.003	37.4	867	4.4	0.1	
Mo	95	115	NoGas	0.001	675.5	173	29.6	0.3	
Ag	107	115	NoGas	-0.002	-497.1	2594	12.9	0.1	
Cd	111	115	He	0.003	65.0	11	27.0	0.1	
Sn	118	115	He	-0.078	-5.4	514	1.9	0.1	
Sn	118	115	NoGas	-0.047	-24.1	3211	7.3	0.1	
Sb	121	115	NoGas	0.002	233.7	1927	9.9	0.5	
Ba	137	165	NoGas	0.006	271.4	807	11.2	0.4	
Tl	205	165	NoGas	0.003	62.5	350	22.3	0.2	
Pb	208	165	NoGas	-0.146	-6.1	25722	2.1	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	157064	2.62	155989	100.69	70	120	
Sc	45	H2	767396	5.11	788522	97.32	70	120	
Sc	45	He	54778	0.96	55083	99.45	70	120	
Sc	45	NoGas	2163995	3.35	2213509	97.76	70	120	
Ge	72	H2	220010	4.28	228382	96.33	70	120	
Ge	72	He	41019	1.19	41564	98.69	70	120	
Ge	72	NoGas	486294	3.68	493680	98.50	70	120	
In	115	H2	2844817	5.36	2933811	96.97	70	120	
In	115	He	357845	0.17	358672	99.77	70	120	
In	115	NoGas	3260381	4.02	3330807	97.89	70	120	
Tb	159	H2	4057184	4.50	4179923	97.06	70	120	
Tb	159	He	1644494	0.53	1624277	101.24	70	120	
Tb	159	NoGas	4610578	4.17	4702844	98.04	70	120	
Ho	165	H2	3895422	3.97	4040454	96.41	70	120	
Ho	165	He	1611317	0.71	1590248	101.32	70	120	
Ho	165	NoGas	4429175	4.02	4499866	98.43	70	120	

Interference Check Solution A (ICS-A) Report

Sample Table

Sample Name	ICSA 180913
Data File Name	016ICSA.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T13:15:56-07:00
Sample Type	ICSA
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	NoGas	-0.002	-100.5	17	69.3	0.1	
B	11	NoGas	-1.112	-101.6	140066	3.0	8	
Na	23	He	43969.629	2.2	31566169	0.9	60000	
Mg	24	He	46308.247	1.8	15058952	1.2	60000	
Al	27	He	50994.572	1.3	4612762	1.4	60000	
P	31	He	47000.884	1.8	294273	0.8	60000	
K	39	He	50055.050	2.4	9291712	1.1	60000	
Ca	40	H2	47411.779	3.7	327388556	0.4	60000	
Ti	47	He	935.070	1.7	86133	0.8	1200	
V	51	He	0.002	715.7	201	21.4	0.2	
Cr	52	He	0.084	37.1	1596	10.8	30	
Mn	55	He	0.358	14.1	943	11.7	24	
Fe	56	He	45823.857	2.0	187749793	1.0	60000	
Co	59	He	0.019	13.6	198	9.9	5	
Ni	60	He	0.078	5.1	700	0.8	5	
Cu	63	He	-0.321	-16.4	23834	0.7	5	
Zn	66	He	-0.539	-43.2	6654	3.0	20	
As	75	He	0.069	16.2	53	13.1	0.4	
Se	78	H2	0.017	35.9	21	17.7	0.4	
Se	78	He	0.030	178.8	5	34.6	0.4	
Sr	88	NoGas	0.442	2.3	21791	5.0	5	
Mo	95	NoGas	985.937	0.6	9672393	3.1	1200	
Ag	107	NoGas	0.026	53.5	3184	11.3	5	
Cd	111	He	0.129	15.0	184	15.2	0.5	
Sn	118	He	-0.060	-46.6	522	11.7	5	
Sn	118	NoGas	-0.022	-21.4	3416	2.4	5	
Sb	121	NoGas	0.068	24.4	3254	13.4	5	
Ba	137	NoGas	-0.065	-3.2	290	3.4	1.5	
Tl	205	NoGas	0.002	24.8	313	9.8	0.2	
Pb	208	NoGas	0.095	4.2	39827	1.5	1	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	149462	4.50	155989	95.82	70	120	
Sc	45	H2	755567	3.99	788522	95.82	70	120	
Sc	45	He	54050	1.81	55083	98.12	70	120	
Sc	45	NoGas	2203057	3.63	2213509	99.53	70	120	
Ge	72	H2	209793	3.73	228382	91.86	70	120	
Ge	72	He	39339	1.62	41564	94.65	70	120	
Ge	72	NoGas	481310	3.81	493680	97.49	70	120	
In	115	H2	2648779	2.44	2933811	90.28	70	120	
In	115	He	335313	0.77	358672	93.49	70	120	
In	115	NoGas	3077378	2.78	3330807	92.39	70	120	
Tb	159	H2	3951761	4.27	4179923	94.54	70	120	
Tb	159	He	1568906	1.03	1624277	96.59	70	120	
Tb	159	NoGas	4540642	2.42	4702844	96.55	70	120	
Ho	165	H2	3839335	2.92	4040454	95.02	70	120	
Ho	165	He	1560470	1.56	1590248	98.13	70	120	
Ho	165	NoGas	4362515	1.94	4499866	96.95	70	120	

Interference Check Solution AB (ICS-AB) Report

Sample Table

Sample Name	ICSAB 180913
Data File Name	017ICSB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T13:19:47-07:00
Sample Type	ICSB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	NoGas	50.946	4.029	258004	1.50	50	101.9	80	120	
B	11	NoGas	-2.588	-33.306	131584	2.63	-8	32.3	80	120	
Na	23	He	43186.529	0.898	31197391	1.12	50000	86.4	80	120	
Mg	24	He	45366.555	1.422	14781649	0.63	50000	90.7	80	120	
Al	27	He	50072.148	0.769	4538446	1.61	50000	100.1	80	120	
P	31	He	45964.186	0.889	288370	0.94	50000	91.9	80	120	
K	39	He	49378.577	0.925	9186576	2.04	50000	98.8	80	120	
Ca	40	H2	47157.444	2.998	327123534	1.51	50000	94.3	80	120	
Ti	47	He	936.063	2.262	86387	0.83	1000	93.6	80	120	
V	51	He	48.776	2.551	179771	1.87	50	97.6	80	120	
Cr	52	He	47.790	1.641	240464	1.23	50	95.6	80	120	
Mn	55	He	46.987	1.613	101853	1.45	50	94.0	80	120	
Fe	56	He	45430.095	0.854	186525784	1.39	50000	90.9	80	120	
Co	59	He	46.705	0.854	412567	1.56	50	93.4	80	120	
Ni	60	He	90.000	0.395	230666	1.38	100	90.0	80	120	
Cu	63	He	44.454	0.374	342802	1.35	50	88.9	80	120	
Zn	66	He	89.064	2.099	98389	1.04	100	89.1	80	120	
As	75	He	48.173	2.068	28204	1.36	50	96.3	80	120	
Se	78	H2	49.031	2.763	34114	0.67	50	98.1	80	120	
Se	78	He	48.479	3.339	1521	3.39	50	97.0	80	120	
Sr	88	NoGas	0.468	5.581	23319	1.53	-5	-9.4	80	120	
Mo	95	NoGas	1033.486	4.391	10272765	1.41	1050	98.4	80	120	
Ag	107	NoGas	90.100	3.111	2454451	2.83	100	90.1	80	120	
Cd	111	He	94.655	0.179	130857	1.78	100	94.7	80	120	
Sn	118	He	-0.070	-21.884	501	6.73	-0.5	14.0	100	100	
Sn	118	NoGas	-0.022	-85.616	3447	2.79	-0.5	4.4	100	100	
Sb	121	NoGas	50.018	5.172	1112352	1.07	50	100.0	80	120	
Ba	137	NoGas	48.787	2.992	357506	1.60	50	97.6	80	120	
Tl	205	NoGas	47.273	3.155	2243959	2.10	50	94.5	80	120	
Pb	208	NoGas	93.321	2.988	5812618	1.79	100	93.3	80	120	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	138196	4.08	155989	88.59	70	120	
Sc	45	H2	758844	3.97	788522	96.24	70	120	
Sc	45	He	54155	1.68	55083	98.31	70	120	
Sc	45	NoGas	2154048	4.67	2213509	97.31	70	120	
Ge	72	H2	213041	3.30	228382	93.28	70	120	
Ge	72	He	39576	0.94	41564	95.21	70	120	
Ge	72	NoGas	486582	4.53	493680	98.56	70	120	
In	115	H2	2678895	3.90	2933811	91.31	70	120	
In	115	He	335482	1.67	358672	93.53	70	120	
In	115	NoGas	3123434	5.76	3330807	93.77	70	120	
Tb	159	H2	3948442	4.16	4179923	94.46	70	120	
Tb	159	He	1574664	1.71	1624277	96.95	70	120	
Tb	159	NoGas	4618476	4.09	4702844	98.21	70	120	
Ho	165	H2	3856729	4.51	4040454	95.45	70	120	
Ho	165	He	1578567	1.70	1590248	99.27	70	120	
Ho	165	NoGas	4491569	4.47	4499866	99.82	70	120	

Sample Report

Sample Table

Sample Name	0.5 ppb LLICV 180913
Data File Name	011SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T12:53:42-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.536	0.536	7.55	3094	7.47	10000	
B	11	45	NoGas	2.202	2.202	25.55	149489	1.46	10000	
Na	23	72	He	15.879	15.879	17.29	48882	1.24	1000000	
Mg	24	45	He	24.090	24.090	2.67	8106	0.87	1000000	
Al	27	45	He	11.349	11.349	5.79	2030	1.46	1000000	
P	31	45	He	21.647	21.647	8.80	221	6.96	500000	
K	39	45	He	9.625	9.625	12.49	14347	0.21	500000	
Ca	40	45	H2	22.371	22.371	7.72	214749	0.46	500000	
Ti	47	45	He	0.549	0.549	61.35	62	48.61	10000	
V	51	45	He	0.504	0.504	1.48	2085	1.24	10000	
Cr	52	45	He	0.511	0.511	8.69	3789	4.48	10000	
Mn	55	45	He	0.560	0.560	9.84	1403	9.27	50000	
Fe	56	45	He	10.193	10.193	4.03	48494	1.80	1000000	
Co	59	45	He	0.529	0.529	4.11	4768	2.80	10000	
Ni	60	45	He	0.589	0.589	6.31	2038	2.95	10000	
Cu	63	45	He	0.582	0.582	26.75	30771	2.07	10000	
Zn	66	115	He	1.004	1.004	51.52	8763	4.26	50000	
As	75	115	He	0.538	0.538	1.88	349	2.57	2000	
Se	78	72	H2	0.549	0.549	8.62	394	4.78	10000	
Se	78	115	He	0.523	0.523	34.85	22	27.04	10000	
Sr	88	115	NoGas	0.517	0.517	2.26	26267	1.63	50000	
Mo	95	115	NoGas	0.508	0.508	8.87	5331	10.44	10000	
Ag	107	115	NoGas	0.263	0.263	2.28	9880	1.50	5000	
Cd	111	115	He	0.539	0.539	6.46	799	6.12	10000	
Sn	118	115	He	0.442	0.442	0.70	1785	2.59	10000	
Sn	118	115	NoGas	0.485	0.485	5.94	11392	1.98	10000	
Sb	121	115	NoGas	0.597	0.597	5.02	15387	3.99	10000	
Ba	137	165	NoGas	0.437	0.437	3.70	3934	3.82	50000	
Tl	205	165	NoGas	0.512	0.512	1.72	24296	2.37	5000	
Pb	208	165	NoGas	0.428	0.428	4.62	60997	0.99	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	155862	1.77	155989	99.92	70	120	
Sc	45	H2	746476	5.65	788522	94.67	70	120	
Sc	45	He	54990	1.79	55083	99.83	70	120	
Sc	45	NoGas	2161475	1.71	2213509	97.65	70	120	
Ge	72	H2	215075	4.61	228382	94.17	70	120	
Ge	72	He	40780	3.48	41564	98.11	70	120	
Ge	72	NoGas	475454	2.06	493680	96.31	70	120	
In	115	H2	2771969	3.73	2933811	94.48	70	120	
In	115	He	357244	2.20	358672	99.60	70	120	
In	115	NoGas	3187007	1.92	3330807	95.68	70	120	
Tb	159	H2	3975359	4.95	4179923	95.11	70	120	
Tb	159	He	1626195	1.86	1624277	100.12	70	120	
Tb	159	NoGas	4601169	1.80	4702844	97.84	70	120	
Ho	165	H2	3785767	5.12	4040454	93.70	70	120	
Ho	165	He	1597637	2.76	1590248	100.46	70	120	
Ho	165	NoGas	4444280	2.32	4499866	98.76	70	120	

Sample Report

Sample Table

Sample Name	2.0 ppb LLICV 180913
Data File Name	013SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T13:01:39-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	1.841	1.841	7.29	10777	3.41	10000	
B	11	45	NoGas	3.365	3.365	36.46	156074	0.38	10000	
Na	23	72	He	44.446	44.446	3.44	69753	0.80	1000000	
Mg	24	45	He	91.401	91.401	2.38	30112	0.60	1000000	
Al	27	45	He	39.414	39.414	9.27	4569	5.45	1000000	
P	31	45	He	23.510	23.510	35.19	231	23.09	500000	
K	39	45	He	41.479	41.479	8.09	20176	0.71	500000	
Ca	40	45	H2	88.476	88.476	3.43	687818	0.24	500000	
Ti	47	45	He	2.336	2.336	23.07	228	20.56	10000	
V	51	45	He	1.995	1.995	4.04	7591	2.44	10000	
Cr	52	45	He	2.048	2.048	3.92	11506	2.33	10000	
Mn	55	45	He	2.111	2.111	1.53	4771	2.62	50000	
Fe	56	45	He	40.055	40.055	3.64	171450	1.20	1000000	
Co	59	45	He	2.084	2.084	5.18	18544	3.13	10000	
Ni	60	45	He	2.109	2.109	5.16	5933	2.84	10000	
Cu	63	45	He	1.990	1.990	9.23	40602	1.43	10000	
Zn	66	115	He	2.301	2.301	6.83	10073	1.42	50000	
As	75	115	He	1.976	1.976	5.73	1231	5.14	2000	
Se	78	72	H2	2.009	2.009	3.33	1468	0.93	10000	
Se	78	115	He	1.925	1.925	20.52	68	18.77	10000	
Sr	88	115	NoGas	1.933	1.933	3.50	98137	2.30	50000	
Mo	95	115	NoGas	1.957	1.957	5.39	20423	3.21	10000	
Ag	107	115	NoGas	0.976	0.976	5.59	30280	2.93	5000	
Cd	111	115	He	2.045	2.045	2.14	2984	2.72	10000	
Sn	118	115	He	1.974	1.974	2.11	5466	2.47	10000	
Sn	118	115	NoGas	1.880	1.880	3.55	33660	1.22	10000	
Sb	121	115	NoGas	1.897	1.897	3.21	45752	1.21	10000	
Ba	137	165	NoGas	1.911	1.911	4.86	14683	3.45	50000	
Tl	205	165	NoGas	1.936	1.936	2.77	91692	2.46	5000	
Pb	208	165	NoGas	1.850	1.850	3.51	148989	1.65	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	159485	3.99	155989	102.24	70	120	
Sc	45	H2	770832	3.24	788522	97.76	70	120	
Sc	45	He	54523	2.46	55083	98.98	70	120	
Sc	45	NoGas	2195889	3.11	2213509	99.20	70	120	
Ge	72	H2	222267	2.51	228382	97.32	70	120	
Ge	72	He	40548	2.13	41564	97.55	70	120	
Ge	72	NoGas	489251	2.76	493680	99.10	70	120	
In	115	H2	2837038	1.85	2933811	96.70	70	120	
In	115	He	353286	0.64	358672	98.50	70	120	
In	115	NoGas	3250227	2.18	3330807	97.58	70	120	
Tb	159	H2	4083284	2.88	4179923	97.69	70	120	
Tb	159	He	1639575	1.58	1624277	100.94	70	120	
Tb	159	NoGas	4659512	2.64	4702844	99.08	70	120	
Ho	165	H2	3956158	3.67	4040454	97.91	70	120	
Ho	165	He	1621738	1.33	1590248	101.98	70	120	
Ho	165	NoGas	4469587	1.88	4499866	99.33	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180913
Data File Name	030_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:18:27-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	6	NoGas	49.304	4.128	231715	2.06	50	98.6	89.6	110.4	
B	11	45	NoGas	40.273	7.044	271181	1.49	50	80.5	89.6	110.4	>+/- 10%
Na	23	72	He	1024.531	1.434	761965	0.48	1250	82.0	89.6	110.4	>+/- 10%
Mg	24	45	He	2292.450	2.546	696168	0.43	2500	91.7	89.6	110.4	
Al	27	45	He	982.729	3.444	83871	1.31	1000	98.3	89.6	110.4	
P	31	45	He	230.927	7.878	1428	9.46	250	92.4	89.6	110.4	
K	39	45	He	1020.270	1.345	188167	1.87	1000	102.0	89.6	110.4	
Ca	40	45	H2	2512.453	0.623	16560073	0.85	2500	100.5	89.6	110.4	
Ti	47	45	He	48.073	3.928	4144	2.26	50	96.1	89.6	110.4	
V	51	45	He	51.451	3.004	176711	1.77	50	102.9	89.6	110.4	
Cr	52	45	He	51.234	2.228	240165	1.02	50	102.5	89.6	110.4	
Mn	55	45	He	50.629	1.914	102265	0.87	50	101.3	89.6	110.4	
Fe	56	45	He	1039.134	2.471	3980958	1.06	1000	103.9	89.6	110.4	
Co	59	45	He	51.391	2.075	423012	0.91	50	102.8	89.6	110.4	
Ni	60	45	He	51.205	2.760	122478	0.79	50	102.4	89.6	110.4	
Cu	63	45	He	50.964	2.116	362651	0.74	50	101.9	89.6	110.4	
Zn	66	115	He	52.772	2.016	59895	0.84	50	105.5	89.6	110.4	
As	75	115	He	50.058	1.127	28669	1.42	50	100.1	89.6	110.4	
Se	78	72	H2	51.945	1.164	35127	1.56	50	103.9	89.6	110.4	
Se	78	115	He	50.860	2.953	1561	2.02	50	101.7	89.6	110.4	
Sr	88	115	NoGas	48.801	0.979	2352073	1.99	50	97.6	89.6	110.4	
Mo	95	115	NoGas	47.110	2.794	466238	0.71	50	94.2	89.6	110.4	
Ag	107	115	NoGas	23.539	2.028	639859	0.72	25	94.2	89.6	110.4	
Cd	111	115	He	50.493	0.488	68275	1.15	50	101.0	89.6	110.4	
Sn	118	115	He	50.661	0.834	114325	0.17	50	101.3	89.6	110.4	
Sn	118	115	NoGas	47.189	2.761	716298	1.00	50	94.4	89.6	110.4	
Sb	121	115	NoGas	48.060	2.312	1064342	1.28	50	96.1	89.6	110.4	
Ba	137	165	NoGas	49.060	2.128	348926	1.48	50	98.1	89.6	110.4	
Tl	205	165	NoGas	50.358	2.324	2319924	1.56	50	100.7	89.6	110.4	
Pb	208	165	NoGas	48.976	1.851	2976990	1.28	50	98.0	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	128196	2.33	155989	82.18	70	120	
Sc	45	H2	718009	0.27	788522	91.06	70	120	
Sc	45	He	50477	2.28	55083	91.64	70	120	
Sc	45	NoGas	2039763	3.64	2213509	92.15	70	120	
Ge	72	H2	206942	1.21	228382	90.61	70	120	
Ge	72	He	38902	1.85	41564	93.59	70	120	
Ge	72	NoGas	457166	2.20	493680	92.60	70	120	
In	115	H2	2755710	1.28	2933811	93.93	70	120	
In	115	He	328120	0.97	358672	91.48	70	120	
In	115	NoGas	3104973	2.30	3330807	93.22	70	120	
Tb	159	H2	4044974	1.00	4179923	96.77	70	120	
Tb	159	He	1531429	1.56	1624277	94.28	70	120	
Tb	159	NoGas	4502985	2.61	4702844	95.75	70	120	
Ho	165	H2	3887676	1.44	4040454	96.22	70	120	
Ho	165	He	1531323	1.80	1590248	96.29	70	120	
Ho	165	NoGas	4356059	1.01	4499866	96.80	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180913
Data File Name	031_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:22:21-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	6	NoGas	0.001	456.9	30	66.7	0.1	
B	11	45	NoGas	-2.082	-56.9	124783	2.9	8	
Na	23	72	He	2.655	18.9	37089	0.8	50	
Mg	24	45	He	0.147	55.8	170	13.6	20	
Al	27	45	He	-0.415	-68.5	867	4.1	10	
P	31	45	He	-5.789	-40.8	42	31.9	10	
K	39	45	He	3.905	15.6	12125	2.1	40	
Ca	40	45	H2	0.331	177.1	60790	0.7	150	
Ti	47	45	He	-0.001	-11450.5	10	120.2	0.5	
V	51	45	He	-0.013	-46.0	137	17.1	0.4	
Cr	52	45	He	0.013	140.4	1155	9.4	0.2	
Mn	55	45	He	0.012	13.5	182	2.8	0.3	
Fe	56	45	He	0.307	21.4	6667	2.1	30	
Co	59	45	He	0.009	11.9	98	7.9	0.4	
Ni	60	45	He	0.011	272.1	493	15.3	0.4	
Cu	63	45	He	0.026	244.1	24450	0.3	0.4	
Zn	66	115	He	-0.036	-358.3	7048	1.6	15	
As	75	115	He	0.009	62.6	18	19.9	0.2	
Se	78	72	H2	0.019	31.7	21	14.5	0.4	
Se	78	115	He	0.141	115.6	8	60.4	0.4	
Sr	88	115	NoGas	0.006	36.3	940	9.1	0.1	
Mo	95	115	NoGas	0.026	15.5	420	9.5	0.3	
Ag	107	115	NoGas	0.007	122.2	2697	9.8	0.1	
Cd	111	115	He	0.004	154.6	11	71.3	0.1	
Sn	118	115	He	-0.001	-741.2	647	3.2	0.1	
Sn	118	115	NoGas	0.033	19.0	4272	3.8	0.1	
Sb	121	115	NoGas	0.357	6.8	9673	4.9	0.5	
Ba	137	165	NoGas	-0.005	-278.7	710	14.7	0.4	
Tl	205	165	NoGas	0.020	9.2	1130	6.4	0.2	
Pb	208	165	NoGas	-0.087	-12.8	28534	0.2	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	131155	2.36	155989	84.08	70	120	
Sc	45	H2	702978	5.92	788522	89.15	70	120	
Sc	45	He	50244	1.81	55083	91.21	70	120	
Sc	45	NoGas	2013529	1.00	2213509	90.97	70	120	
Ge	72	H2	204689	4.33	228382	89.63	70	120	
Ge	72	He	38688	0.72	41564	93.08	70	120	
Ge	72	NoGas	452026	1.45	493680	91.56	70	120	
In	115	H2	2735657	5.74	2933811	93.25	70	120	
In	115	He	329705	0.76	358672	91.92	70	120	
In	115	NoGas	3102319	2.07	3330807	93.14	70	120	
Tb	159	H2	3925786	6.18	4179923	93.92	70	120	
Tb	159	He	1521657	1.10	1624277	93.68	70	120	
Tb	159	NoGas	4426989	3.35	4702844	94.13	70	120	
Ho	165	H2	3820353	6.07	4040454	94.55	70	120	
Ho	165	He	1501923	0.85	1590248	94.45	70	120	
Ho	165	NoGas	4310031	2.15	4499866	95.78	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180913
Data File Name	046_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:13:58-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	6	NoGas	48.617	3.233	240281	2.21	50	97.2	89.6	110.4	
B	11	45	NoGas	43.582	2.463	286307	1.67	50	87.2	89.6	110.4	>+/- 10%
Na	23	72	He	1027.370	3.292	772686	0.65	1250	82.2	89.6	110.4	>+/- 10%
Mg	24	45	He	2236.186	1.467	709688	0.53	2500	89.4	89.6	110.4	>+/- 10%
Al	27	45	He	976.568	0.755	87123	0.66	1000	97.7	89.6	110.4	
P	31	45	He	239.005	8.444	1539	7.20	250	95.6	89.6	110.4	
K	39	45	He	1010.364	0.737	194811	0.30	1000	101.0	89.6	110.4	
Ca	40	45	H2	2494.509	4.570	17335685	2.19	2500	99.8	89.6	110.4	
Ti	47	45	He	49.379	1.893	4448	0.94	50	98.8	89.6	110.4	
V	51	45	He	50.086	1.055	179782	0.18	50	100.2	89.6	110.4	
Cr	52	45	He	49.893	1.037	244437	0.11	50	99.8	89.6	110.4	
Mn	55	45	He	49.913	0.418	105359	0.64	50	99.8	89.6	110.4	
Fe	56	45	He	1009.024	1.791	4039892	1.42	1000	100.9	89.6	110.4	
Co	59	45	He	49.902	1.709	429231	0.90	50	99.8	89.6	110.4	
Ni	60	45	He	49.233	1.936	123089	1.29	50	98.5	89.6	110.4	
Cu	63	45	He	48.921	1.544	364785	0.59	50	97.8	89.6	110.4	
Zn	66	115	He	51.474	3.001	59964	1.08	50	102.9	89.6	110.4	
As	75	115	He	50.531	3.138	29610	1.26	50	101.1	89.6	110.4	
Se	78	72	H2	50.778	3.168	35423	1.38	50	101.6	89.6	110.4	
Se	78	115	He	50.145	0.942	1576	3.32	50	100.3	89.6	110.4	
Sr	88	115	NoGas	50.164	2.275	2414836	1.16	50	100.3	89.6	110.4	
Mo	95	115	NoGas	48.430	2.976	478827	0.98	50	96.9	89.6	110.4	
Ag	107	115	NoGas	24.104	2.239	654510	0.98	25	96.4	89.6	110.4	
Cd	111	115	He	50.012	2.367	69199	1.08	50	100.0	89.6	110.4	
Sn	118	115	He	50.225	1.725	116001	0.84	50	100.5	89.6	110.4	
Sn	118	115	NoGas	47.563	2.105	721293	0.21	50	95.1	89.6	110.4	
Sb	121	115	NoGas	48.187	1.648	1066135	0.45	50	96.4	89.6	110.4	
Ba	137	165	NoGas	49.299	3.005	348505	0.83	50	98.6	89.6	110.4	
Tl	205	165	NoGas	48.860	3.067	2237405	0.99	50	97.7	89.6	110.4	
Pb	208	165	NoGas	47.441	1.662	2867817	0.63	50	94.9	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	134781	2.40	155989	86.40	70	120	
Sc	45	H2	758006	4.81	788522	96.13	70	120	
Sc	45	He	52736	0.95	55083	95.74	70	120	
Sc	45	NoGas	2066136	2.95	2213509	93.34	70	120	
Ge	72	H2	213612	3.27	228382	93.53	70	120	
Ge	72	He	39360	2.55	41564	94.70	70	120	
Ge	72	NoGas	466863	2.42	493680	94.57	70	120	
In	115	H2	2732610	3.96	2933811	93.14	70	120	
In	115	He	335874	2.39	358672	93.64	70	120	
In	115	NoGas	3101824	2.05	3330807	93.13	70	120	
Tb	159	H2	3910155	3.49	4179923	93.55	70	120	
Tb	159	He	1544516	2.53	1624277	95.09	70	120	
Tb	159	NoGas	4429011	1.20	4702844	94.18	70	120	
Ho	165	H2	3775161	5.01	4040454	93.43	70	120	
Ho	165	He	1540239	3.27	1590248	96.86	70	120	
Ho	165	NoGas	4331213	2.25	4499866	96.25	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180913
Data File Name	047_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:17:53-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	6	NoGas	-0.003	-63.4	10	100.0	0.1	
B	11	45	NoGas	-2.208	-3.4	127089	2.6	8	
Na	23	72	He	0.434	137.2	36942	1.1	50	
Mg	24	45	He	0.207	26.5	198	8.6	20	
Al	27	45	He	-0.380	-98.6	913	4.2	10	
P	31	45	He	-5.792	-46.7	44	37.7	10	
K	39	45	He	2.804	26.8	12535	0.4	40	
Ca	40	45	H2	0.813	75.5	65989	1.4	150	
Ti	47	45	He	-0.082	-45.1	3	100.1	0.5	
V	51	45	He	-0.003	-156.6	180	10.3	0.4	
Cr	52	45	He	0.013	91.5	1209	5.7	0.2	
Mn	55	45	He	0.022	35.9	212	8.1	0.3	
Fe	56	45	He	0.360	24.0	7217	4.0	30	
Co	59	45	He	0.006	20.6	79	13.6	0.4	
Ni	60	45	He	-0.051	-50.1	361	16.8	0.4	
Cu	63	45	He	0.027	120.7	25692	1.8	0.4	
Zn	66	115	He	0.131	148.7	7531	3.1	15	
As	75	115	He	0.011	94.1	19	31.2	0.2	
Se	78	72	H2	0.026	27.0	27	12.2	0.4	
Se	78	115	He	0.027	121.6	5	20.0	0.4	
Sr	88	115	NoGas	0.003	69.3	810	11.8	0.1	
Mo	95	115	NoGas	0.033	28.7	493	20.5	0.3	
Ag	107	115	NoGas	0.001	903.0	2554	4.7	0.1	
Cd	111	115	He	0.002	106.1	9	32.7	0.1	
Sn	118	115	He	0.041	24.0	774	2.0	0.1	
Sn	118	115	NoGas	0.063	13.0	4756	1.4	0.1	
Sb	121	115	NoGas	0.399	1.9	10684	1.0	0.5	
Ba	137	165	NoGas	0.003	110.1	760	2.3	0.4	
Tl	205	165	NoGas	0.055	5.9	2670	4.6	0.2	
Pb	208	165	NoGas	-0.168	-4.4	23488	1.5	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	134854	2.54	155989	86.45	70	120	
Sc	45	H2	726414	6.85	788522	92.12	70	120	
Sc	45	He	52774	1.04	55083	95.81	70	120	
Sc	45	NoGas	2057648	2.77	2213509	92.96	70	120	
Ge	72	H2	211913	5.49	228382	92.79	70	120	
Ge	72	He	40234	0.14	41564	96.80	70	120	
Ge	72	NoGas	464672	1.85	493680	94.12	70	120	
In	115	H2	2729953	5.99	2933811	93.05	70	120	
In	115	He	344025	0.98	358672	95.92	70	120	
In	115	NoGas	3131511	2.52	3330807	94.02	70	120	
Tb	159	H2	3887644	6.22	4179923	93.01	70	120	
Tb	159	He	1577288	1.28	1624277	97.11	70	120	
Tb	159	NoGas	4407909	1.23	4702844	93.73	70	120	
Ho	165	H2	3749045	6.13	4040454	92.79	70	120	
Ho	165	He	1568377	0.88	1590248	98.62	70	120	
Ho	165	NoGas	4262620	1.12	4499866	94.73	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180913
Data File Name	058_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T17:01:06-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	6	NoGas	48.870	1.299	232888	0.85	50	97.7	89.6	110.4	
B	11	45	NoGas	44.204	1.831	269001	1.95	50	88.4	89.6	110.4	>+/- 10%
Na	23	72	He	982.353	2.925	670112	1.00	1250	78.6	89.6	110.4	>+/- 10%
Mg	24	45	He	2209.846	3.073	622730	1.10	2500	88.4	89.6	110.4	>+/- 10%
Al	27	45	He	945.082	2.179	74898	0.88	1000	94.5	89.6	110.4	
P	31	45	He	235.018	8.221	1346	7.66	250	94.0	89.6	110.4	
K	39	45	He	960.903	2.577	165039	0.46	1000	96.1	89.6	110.4	
Ca	40	45	H2	2644.035	6.701	15164794	0.81	2500	105.8	89.6	110.4	
Ti	47	45	He	49.332	3.060	3949	5.02	50	98.7	89.6	110.4	
V	51	45	He	49.252	2.807	156981	0.87	50	98.5	89.6	110.4	
Cr	52	45	He	49.516	3.441	215393	1.46	50	99.0	89.6	110.4	
Mn	55	45	He	49.056	3.231	91939	1.29	50	98.1	89.6	110.4	
Fe	56	45	He	1011.579	2.914	3596340	1.43	1000	101.2	89.6	110.4	
Co	59	45	He	49.853	2.995	380760	1.25	50	99.7	89.6	110.4	
Ni	60	45	He	50.289	1.411	111658	0.94	50	100.6	89.6	110.4	
Cu	63	45	He	49.764	2.788	329115	0.75	50	99.5	89.6	110.4	
Zn	66	115	He	49.922	1.429	53524	0.69	50	99.8	89.6	110.4	
As	75	115	He	48.430	1.677	26025	1.61	50	96.9	89.6	110.4	
Se	78	72	H2	53.283	4.506	32090	0.84	50	106.6	89.6	110.4	
Se	78	115	He	48.039	5.549	1383	4.18	50	96.1	89.6	110.4	
Sr	88	115	NoGas	48.184	0.158	2230488	2.28	50	96.4	89.6	110.4	
Mo	95	115	NoGas	47.376	0.627	450515	2.72	50	94.8	89.6	110.4	
Ag	107	115	NoGas	23.721	2.195	619409	3.13	25	94.9	89.6	110.4	
Cd	111	115	He	49.181	2.586	62386	1.23	50	98.4	89.6	110.4	
Sn	118	115	He	49.813	1.042	105493	1.55	50	99.6	89.6	110.4	
Sn	118	115	NoGas	47.647	1.182	694767	1.91	50	95.3	89.6	110.4	
Sb	121	115	NoGas	48.442	1.064	1030472	1.72	50	96.9	89.6	110.4	
Ba	137	165	NoGas	48.622	1.939	338659	1.73	50	97.2	89.6	110.4	
Tl	205	165	NoGas	50.565	0.667	2281867	2.70	50	101.1	89.6	110.4	
Pb	208	165	NoGas	49.381	1.022	2939308	1.47	50	98.8	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	129933	2.12	155989	83.30	70	120	
Sc	45	H2	626490	5.67	788522	79.45	70	120	
Sc	45	He	46841	1.98	55083	85.04	70	120	
Sc	45	NoGas	1926495	2.62	2213509	87.03	70	120	
Ge	72	H2	184533	4.27	228382	80.80	70	120	
Ge	72	He	35616	1.82	41564	85.69	70	120	
Ge	72	NoGas	436732	2.31	493680	88.46	70	120	
In	115	H2	2451395	6.46	2933811	83.56	70	120	
In	115	He	307888	1.37	358672	85.84	70	120	
In	115	NoGas	2981911	2.20	3330807	89.53	70	120	
Tb	159	H2	3643897	5.11	4179923	87.18	70	120	
Tb	159	He	1467688	2.67	1624277	90.36	70	120	
Tb	159	NoGas	4391195	0.54	4702844	93.37	70	120	
Ho	165	H2	3550730	5.36	4040454	87.88	70	120	
Ho	165	He	1448871	0.91	1590248	91.11	70	120	
Ho	165	NoGas	4266306	2.40	4499866	94.81	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180913
Data File Name	059_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T17:05:02-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	6	NoGas	0.009	26.2	73	15.7	0.1	
B	11	45	NoGas	-0.658	-73.2	122513	2.7	8	
Na	23	72	He	-2.083	-30.7	30786	0.5	50	
Mg	24	45	He	0.498	9.9	250	5.8	20	
Al	27	45	He	0.131	655.3	826	8.3	10	
P	31	45	He	-5.867	-41.4	38	33.4	10	
K	39	45	He	1.266	143.7	10556	2.1	40	
Ca	40	45	H2	1.019	30.2	59397	1.9	150	
Ti	47	45	He	0.009	1372.3	10	100.0	0.5	
V	51	45	He	0.005	365.5	179	30.2	0.4	
Cr	52	45	He	0.005	231.1	1009	5.1	0.2	
Mn	55	45	He	0.075	13.8	279	6.8	0.3	
Fe	56	45	He	1.438	5.7	9931	2.3	30	
Co	59	45	He	0.015	36.5	137	30.5	0.4	
Ni	60	45	He	-0.058	-49.9	297	20.6	0.4	
Cu	63	45	He	-0.003	-1241.7	21948	0.5	0.4	
Zn	66	115	He	-0.097	-207.3	6516	3.3	15	
As	75	115	He	0.002	283.3	13	27.7	0.2	
Se	78	72	H2	0.032	19.0	27	12.2	0.4	
Se	78	115	He	0.011	877.1	4	66.1	0.4	
Sr	88	115	NoGas	0.007	19.5	973	6.0	0.1	
Mo	95	115	NoGas	0.032	25.7	457	18.6	0.3	
Ag	107	115	NoGas	-0.001	-1510.1	2417	13.0	0.1	
Cd	111	115	He	0.009	78.1	17	52.0	0.1	
Sn	118	115	He	0.087	39.2	789	8.9	0.1	
Sn	118	115	NoGas	0.085	30.2	4882	5.8	0.1	
Sb	121	115	NoGas	0.317	1.3	8499	3.3	0.5	
Ba	137	165	NoGas	-0.004	-195.2	703	5.0	0.4	
Tl	205	165	NoGas	0.053	1.2	2547	2.9	0.2	
Pb	208	165	NoGas	-0.075	-12.0	28568	0.7	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	135490	1.19	155989	86.86	70	120	
Sc	45	H2	639144	3.02	788522	81.06	70	120	
Sc	45	He	45454	0.59	55083	82.52	70	120	
Sc	45	NoGas	1903320	2.38	2213509	85.99	70	120	
Ge	72	H2	184890	2.83	228382	80.96	70	120	
Ge	72	He	35296	0.85	41564	84.92	70	120	
Ge	72	NoGas	435893	2.35	493680	88.29	70	120	
In	115	H2	2504790	4.29	2933811	85.38	70	120	
In	115	He	307431	0.44	358672	85.71	70	120	
In	115	NoGas	2999863	2.22	3330807	90.06	70	120	
Tb	159	H2	3762594	3.38	4179923	90.02	70	120	
Tb	159	He	1429206	3.05	1624277	87.99	70	120	
Tb	159	NoGas	4373772	2.48	4702844	93.00	70	120	
Ho	165	H2	3589843	3.87	4040454	88.85	70	120	
Ho	165	He	1434799	0.39	1590248	90.22	70	120	
Ho	165	NoGas	4210654	2.24	4499866	93.57	70	120	

Calibration Blank Report

Sample Table

Sample Name	Calibration Blank 9/14/18
Data File Name	008CALB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T09:56:38-07:00
Sample Type	CalBlk
Level	1
Dilution	1
Comment	Megatron EJ

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD
Be	9	45	NoGas	23	107.85
B	11	45	NoGas	218619	4.45
Na	23	45	He	22467	2.66
Mg	24	45	He	56	15.09
Al	27	45	He	300	13.10
P	31	45	He	40	41.68
K	39	45	He	3846	1.55
Ca	40	45	H2	11001	2.07
Ca (no)	44	45	He	14	87.37
Ti	47	45	He	0	#DIV/0!
V	51	45	He	46	23.52
Cr	52	45	He	556	3.62
Mn	55	45	He	67	27.84
Fe	56	45	He	3464	5.09
Co	59	45	He	48	40.88
Ni	60	45	He	109	9.84
Cu	63	45	He	1101	1.37
Zn	66	115	He	408	10.98
As	75	115	He	6	113.45
Se	78	72	H2	5	31.91
Se	78	115	He	2	65.47
Sr	88	115	NoGas	770	11.69
Mo	95	115	NoGas	207	7.39
Ag	107	115	NoGas	4321	11.06
Cd	111	115	He	2	100.00
Sn	118	115	He	58	12.01
Sn	118	115	NoGas	996	4.55
Sb	121	115	NoGas	800	13.52
Ba	137	115	NoGas	157	36.85
Tl	205	165	NoGas	1630	5.45
[Pb]	206	165	NoGas	1637	4.50
[Pb]	207	165	NoGas	1423	12.38
Pb	208	165	NoGas	6521	3.91

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD
Li	6	NoGas	232772	3.43
Sc	45	H2	497417	9.05
Sc	45	He	26213	4.12
Sc	45	NoGas	3271044	3.60
Ge	72	H2	130306	8.77
Ge	72	He	25369	1.72
Ge	72	NoGas	804525	4.32
In	115	H2	2768793	9.47
In	115	He	184583	3.43
In	115	NoGas	5159681	3.83
Tb	159	H2	4956789	9.12
Tb	159	He	1146052	2.87
Tb	159	NoGas	7155958	3.84
Ho	165	H2	4765312	9.83
Ho	165	He	1131090	3.27
Ho	165	NoGas	6876887	2.82

Calibration Standard Report

Sample Table

Sample Name	Standard 1 9/14/18
Data File Name	009CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:00:36-07:00
Sample Type	CalStd
Level	2
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	45	NoGas	950	10.37	0.9999
B	11	45	NoGas	221495	3.10	0.9997
Na	23	45	He	25528	0.68	1.0000
Mg	24	45	He	840	2.78	1.0000
Al	27	45	He	348	11.91	1.0000
P	31	45	He	17	20.01	0.9998
K	39	45	He	4007	3.04	1.0000
Ca	40	45	H2	50318	2.37	0.9997
Ca (no)	44	45	He	43	58.07	
Ti	47	45	He	11	121.29	1.0000
V	51	45	He	352	3.83	1.0000
Cr	52	45	He	986	8.49	1.0000
Mn	55	45	He	198	20.80	1.0000
Fe	56	45	He	10317	3.27	1.0000
Co	59	45	He	976	9.42	1.0000
Ni	60	45	He	577	3.79	1.0000
Cu	63	45	He	2081	4.98	1.0000
Zn	66	115	He	802	14.12	0.9999
As	75	115	He	45	12.37	1.0000
Se	78	72	H2	90	5.53	0.9995
Se	78	115	He	3	114.56	0.9996
Sr	88	115	NoGas	9196	3.65	1.0000
Mo	95	115	NoGas	1904	2.65	1.0000
Ag	107	115	NoGas	6348	4.07	1.0000
Cd	111	115	He	107	20.10	1.0000
Sn	118	115	He	194	25.73	0.9999
Sn	118	115	NoGas	3745	4.16	1.0000
Sb	121	115	NoGas	4397	8.90	1.0000
Ba	137	115	NoGas	1730	5.69	0.9999
Tl	205	165	NoGas	8903	2.21	1.0000
[Pb]	206	165	NoGas	4187	5.51	
[Pb]	207	165	NoGas	3707	10.49	
Pb	208	165	NoGas	16714	3.42	1.0000

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	243595	1.93	232772	104.65	70	120	
Sc	45	H2	482506	12.57	497417	97.00	70	120	
Sc	45	He	26068	3.24	26213	99.45	70	120	
Sc	45	NoGas	3359790	2.63	3271044	102.71	70	120	
Ge	72	H2	127383	10.68	130306	97.76	70	120	
Ge	72	He	25335	1.03	25369	99.86	70	120	
Ge	72	NoGas	824241	2.07	804525	102.45	70	120	
In	115	H2	2684903	12.35	2768793	96.97	70	120	
In	115	He	186231	1.11	184583	100.89	70	120	
In	115	NoGas	5316044	2.39	5159681	103.03	70	120	
Tb	159	H2	4850867	12.29	4956789	97.86	70	120	
Tb	159	He	1149056	0.71	1146052	100.26	70	120	
Tb	159	NoGas	7319894	2.75	7155958	102.29	70	120	
Ho	165	H2	4650288	12.55	4765312	97.59	70	120	
Ho	165	He	1146924	0.83	1131090	101.40	70	120	
Ho	165	NoGas	7002947	1.81	6876887	101.83	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 2 9/14/18
Data File Name	010CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:04:35-07:00
Sample Type	CalStd
Level	3
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	45	NoGas	8899	1.99	0.9999
B	11	45	NoGas	233357	2.69	0.9997
Na	23	45	He	34618	0.35	1.0000
Mg	24	45	He	7639	1.65	1.0000
Al	27	45	He	872	12.26	1.0000
P	31	45	He	38	33.41	0.9998
K	39	45	He	5411	3.20	1.0000
Ca	40	45	H2	271037	4.44	0.9997
Ca (no)	44	45	He	283	2.35	
Ti	47	45	He	50	13.34	1.0000
V	51	45	He	2594	8.04	1.0000
Cr	52	45	He	4456	3.95	1.0000
Mn	55	45	He	1184	4.47	1.0000
Fe	56	45	He	65224	0.96	1.0000
Co	59	45	He	8535	3.79	1.0000
Ni	60	45	He	3308	3.39	1.0000
Cu	63	45	He	9638	2.90	1.0000
Zn	66	115	He	1717	10.73	0.9999
As	75	115	He	436	2.77	1.0000
Se	78	72	H2	853	1.09	0.9995
Se	78	115	He	14	32.22	0.9996
Sr	88	115	NoGas	86597	0.81	1.0000
Mo	95	115	NoGas	16929	2.16	1.0000
Ag	107	115	NoGas	27095	2.82	1.0000
Cd	111	115	He	1027	2.26	1.0000
Sn	118	115	He	1448	11.05	0.9999
Sn	118	115	NoGas	27116	1.41	1.0000
Sb	121	115	NoGas	35481	2.31	1.0000
Ba	137	115	NoGas	12849	3.12	0.9999
Tl	205	165	NoGas	72978	0.69	1.0000
[Pb]	206	165	NoGas	25868	3.81	
[Pb]	207	165	NoGas	23201	1.60	
Pb	208	165	NoGas	104181	2.09	1.0000

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	243868	1.68	232772	104.77	70	120	
Sc	45	H2	496449	8.54	497417	99.81	70	120	
Sc	45	He	26543	2.31	26213	101.26	70	120	
Sc	45	NoGas	3318908	1.47	3271044	101.46	70	120	
Ge	72	H2	130875	9.36	130306	100.44	70	120	
Ge	72	He	25062	3.62	25369	98.79	70	120	
Ge	72	NoGas	819379	2.49	804525	101.85	70	120	
In	115	H2	2726023	8.36	2768793	98.46	70	120	
In	115	He	184413	2.19	184583	99.91	70	120	
In	115	NoGas	5304203	2.06	5159681	102.80	70	120	
Tb	159	H2	4959573	8.07	4956789	100.06	70	120	
Tb	159	He	1155404	1.73	1146052	100.82	70	120	
Tb	159	NoGas	7374292	1.60	7155958	103.05	70	120	
Ho	165	H2	4793239	8.61	4765312	100.59	70	120	
Ho	165	He	1154297	1.46	1131090	102.05	70	120	
Ho	165	NoGas	7089978	1.05	6876887	103.10	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 3 9/14/18
Data File Name	011CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:14:43-07:00
Sample Type	CalStd
Level	4
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal.Coef
Be	9	45	NoGas	465103	1.08	0.9999
B	11	45	NoGas	512571	2.14	0.9997
Na	23	45	He	493385	0.39	1.0000
Mg	24	45	He	385966	0.27	1.0000
Al	27	45	He	29745	0.16	1.0000
P	31	45	He	536	7.00	0.9998
K	39	45	He	72034	0.71	1.0000
Ca	40	45	H2	12648036	3.71	0.9997
Ca (no)	44	45	He	12280	0.82	
Ti	47	45	He	2340	3.49	1.0000
V	51	45	He	135573	1.08	1.0000
Cr	52	45	He	204560	0.16	1.0000
Mn	55	45	He	56067	1.20	1.0000
Fe	56	45	He	2950393	1.16	1.0000
Co	59	45	He	420570	0.51	1.0000
Ni	60	45	He	131170	0.31	1.0000
Cu	63	45	He	380682	0.39	1.0000
Zn	66	115	He	41866	0.96	0.9999
As	75	115	He	20938	0.99	1.0000
Se	78	72	H2	42102	3.15	0.9995
Se	78	115	He	668	4.17	0.9996
Sr	88	115	NoGas	4159958	2.15	1.0000
Mo	95	115	NoGas	847255	2.16	1.0000
Ag	107	115	NoGas	1124431	1.59	1.0000
Cd	111	115	He	53664	1.00	1.0000
Sn	118	115	He	70194	1.60	0.9999
Sn	118	115	NoGas	1285125	1.24	1.0000
Sb	121	115	NoGas	1913610	1.36	1.0000
Ba	137	115	NoGas	627571	1.76	0.9999
Tl	205	165	NoGas	3892178	0.67	1.0000
[Pb]	206	165	NoGas	1208293	1.28	
[Pb]	207	165	NoGas	1099918	1.42	
Pb	208	165	NoGas	5085934	1.66	1.0000

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	244126	1.01	232772	104.88	70	120	
Sc	45	H2	497587	7.72	497417	100.03	70	120	
Sc	45	He	25962	0.09	26213	99.04	70	120	
Sc	45	NoGas	3346120	2.36	3271044	102.30	70	120	
Ge	72	H2	129037	7.40	130306	99.03	70	120	
Ge	72	He	24918	1.61	25369	98.22	70	120	
Ge	72	NoGas	814138	2.03	804525	101.19	70	120	
In	115	H2	2722716	9.04	2768793	98.34	70	120	
In	115	He	185563	0.92	184583	100.53	70	120	
In	115	NoGas	5241666	2.22	5159681	101.59	70	120	
Tb	159	H2	4991187	8.52	4956789	100.69	70	120	
Tb	159	He	1170187	0.69	1146052	102.11	70	120	
Tb	159	NoGas	7531919	1.79	7155958	105.25	70	120	
Ho	165	H2	4762742	8.63	4765312	99.95	70	120	
Ho	165	He	1167943	0.76	1131090	103.26	70	120	
Ho	165	NoGas	7215677	2.53	6876887	104.93	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 4 9/14/18
Data File Name	012CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:18:38-07:00
Sample Type	CalStd
Level	5
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	45	NoGas	935293	1.87	0.9999
B	11	45	NoGas	810351	1.97	0.9997
Na	23	45	He	932056	0.06	1.0000
Mg	24	45	He	760648	0.30	1.0000
Al	27	45	He	56965	1.77	1.0000
P	31	45	He	1018	7.30	0.9998
K	39	45	He	136882	0.46	1.0000
Ca	40	45	H2	24685236	3.19	0.9997
Ca (no)	44	45	He	23540	1.61	
Ti	47	45	He	4487	3.28	1.0000
V	51	45	He	266173	0.99	1.0000
Cr	52	45	He	402305	0.39	1.0000
Mn	55	45	He	110159	0.31	1.0000
Fe	56	45	He	5739181	1.30	1.0000
Co	59	45	He	828904	0.36	1.0000
Ni	60	45	He	255911	1.03	1.0000
Cu	63	45	He	743927	0.24	1.0000
Zn	66	115	He	77581	0.87	0.9999
As	75	115	He	40629	0.30	1.0000
Se	78	72	H2	84266	3.56	0.9995
Se	78	115	He	1218	0.85	0.9996
Sr	88	115	NoGas	8217999	1.50	1.0000
Mo	95	115	NoGas	1691896	1.67	1.0000
Ag	107	115	NoGas	2256536	2.30	1.0000
Cd	111	115	He	104572	0.81	1.0000
Sn	118	115	He	139483	1.38	0.9999
Sn	118	115	NoGas	2593192	2.25	1.0000
Sb	121	115	NoGas	3781291	1.27	1.0000
Ba	137	115	NoGas	1221529	2.71	0.9999
Tl	205	165	NoGas	7734328	2.53	1.0000
[Pb]	206	165	NoGas	2579299	2.17	
[Pb]	207	165	NoGas	2326412	2.11	
Pb	208	165	NoGas	10319958	1.87	1.0000

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	241733	1.69	232772	103.85	70	120	
Sc	45	H2	462334	9.05	497417	92.95	70	120	
Sc	45	He	25345	1.18	26213	96.69	70	120	
Sc	45	NoGas	3289813	2.15	3271044	100.57	70	120	
Ge	72	H2	121210	8.84	130306	93.02	70	120	
Ge	72	He	24444	2.15	25369	96.36	70	120	
Ge	72	NoGas	811647	2.50	804525	100.89	70	120	
In	115	H2	2555299	8.89	2768793	92.29	70	120	
In	115	He	178751	1.86	184583	96.84	70	120	
In	115	NoGas	5243768	1.34	5159681	101.63	70	120	
Tb	159	H2	4765660	8.67	4956789	96.14	70	120	
Tb	159	He	1147184	2.18	1146052	100.10	70	120	
Tb	159	NoGas	7537089	1.57	7155958	105.33	70	120	
Ho	165	H2	4564423	10.57	4765312	95.78	70	120	
Ho	165	He	1142843	1.79	1131090	101.04	70	120	
Ho	165	NoGas	7200454	2.18	6876887	104.71	70	120	

Initial Calibration Verification (ICV) Report

Sample Table

Sample Name	ICV 180914
Data File Name	013_ICV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:22:32-07:00
Sample Type	ICV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	45	NoGas	48.452	1.313	447035	1.18	50	96.9	89.6	110.4	
B	11	45	NoGas	52.331	2.126	521727	1.78	50	104.7	89.6	110.4	
Na	23	45	He	1268.522	1.441	480100	0.57	1250	101.5	89.6	110.4	
Mg	24	45	He	1255.431	1.232	188900	0.79	1250	100.4	89.6	110.4	
Al	27	45	He	1240.406	1.796	35211	1.08	1250	99.2	89.6	110.4	
P	31	45	He	267.485	9.258	556	7.03	250	107.0	89.6	110.4	
K	39	45	He	1228.421	1.719	84713	0.19	1250	98.3	89.6	110.4	
Ca	40	45	H2	1219.211	10.816	6190247	3.09	1250	97.5	89.6	110.4	
Ti	47	45	He	51.438	7.940	2294	6.85	50	102.9	89.6	110.4	
V	51	45	He	49.743	2.275	131034	0.65	50	99.5	89.6	110.4	
Cr	52	45	He	49.345	2.915	196569	1.40	50	98.7	89.6	110.4	
Mn	55	45	He	49.615	1.009	54105	0.63	50	99.2	89.6	110.4	
Fe	56	45	He	1240.963	1.215	3531711	0.85	1250	99.3	89.6	110.4	
Co	59	45	He	50.037	2.230	410111	0.75	50	100.1	89.6	110.4	
Ni	60	45	He	50.401	1.624	127848	0.90	50	100.8	89.6	110.4	
Cu	63	45	He	54.246	1.518	400074	0.15	50	108.5	89.6	110.4	
Zn	66	115	He	54.872	2.758	43021	0.71	50	109.7	89.6	110.4	
As	75	115	He	49.402	3.178	20032	1.35	50	98.8	89.6	110.4	
Se	78	72	H2	48.112	12.626	41171	4.27	50	96.2	89.6	110.4	
Se	78	115	He	50.902	9.084	627	7.37	50	101.8	89.6	110.4	
Sr	88	115	NoGas	48.718	1.508	4039579	1.73	50	97.4	89.6	110.4	
Mo	95	115	NoGas	49.579	2.015	844495	1.20	50	99.2	89.6	110.4	
Ag	107	115	NoGas	24.601	1.538	1118438	1.69	25	98.4	89.6	110.4	
Cd	111	115	He	49.642	1.640	51769	0.55	50	99.3	89.6	110.4	
Sn	118	115	He	25.003	3.237	34673	1.12	25	100.0	89.6	110.4	
Sn	118	115	NoGas	25.022	1.741	652555	1.63	25	100.1	89.6	110.4	
Sb	121	115	NoGas	53.101	1.203	2026191	2.01	50	106.2	89.6	110.4	
Ba	137	115	NoGas	27.641	2.845	341695	0.54	50	55.3	89.6	110.4	>+\- 10%
Tl	205	165	NoGas	50.580	0.561	3887987	0.74	50	101.2	89.6	110.4	
Pb	208	165	NoGas	50.334	0.323	5143358	0.98	50	100.7	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	248000	1.20	232772	106.54	70	120	
Sc	45	H2	478750	7.89	497417	96.25	70	120	
Sc	45	He	25110	1.63	26213	95.79	70	120	
Sc	45	NoGas	3260040	2.47	3271044	99.66	70	120	
Ge	72	H2	124632	8.44	130306	95.65	70	120	
Ge	72	He	24999	1.41	25369	98.54	70	120	
Ge	72	NoGas	810041	2.10	804525	100.69	70	120	
In	115	H2	2690726	8.13	2768793	97.18	70	120	
In	115	He	178676	2.19	184583	96.80	70	120	
In	115	NoGas	5278275	3.18	5159681	102.30	70	120	
Tb	159	H2	4966299	7.44	4956789	100.19	70	120	
Tb	159	He	1150157	1.46	1146052	100.36	70	120	
Tb	159	NoGas	7512170	1.60	7155958	104.98	70	120	
Ho	165	H2	4801264	8.22	4765312	100.75	70	120	
Ho	165	He	1147437	1.47	1131090	101.45	70	120	
Ho	165	NoGas	7148782	1.05	6876887	103.95	70	120	

Initial Calibration Verification (ICV) Report

Sample Table

Sample Name	ICV 2 180914
Data File Name	014_ICV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:26:28-07:00
Sample Type	ICV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	45	NoGas	10.054	0.864	93542	2.69	50	20.1	89.6	110.4	>+\- 10%
B	11	45	NoGas	51.821	1.543	522967	2.07	50	103.6	89.6	110.4	
Na	23	45	He	4709.346	0.136	1732123	1.68	1250	376.7	89.6	110.4	>+\- 10%
Mg	24	45	He	4941.893	1.361	746840	0.42	1250	395.4	89.6	110.4	>+\- 10%
Al	27	45	He	397.117	3.565	11518	1.92	1250	31.8	89.6	110.4	>+\- 10%
P	31	45	He	409.905	10.670	836	10.57	250	164.0	89.6	110.4	>+\- 10%
K	39	45	He	982.523	1.654	68810	0.14	1250	78.6	89.6	110.4	>+\- 10%
Ca	40	45	H2	4793.465	10.241	24239071	2.44	1250	383.5	89.6	110.4	>+\- 10%
Ti	47	45	He	48.427	4.990	2170	4.83	50	96.9	89.6	110.4	
V	51	45	He	49.616	1.259	131316	0.41	50	99.2	89.6	110.4	
Cr	52	45	He	48.988	2.426	196059	0.80	50	98.0	89.6	110.4	
Mn	55	45	He	49.137	1.364	53830	0.34	50	98.3	89.6	110.4	
Fe	56	45	He	200.811	1.778	576880	0.26	1250	16.1	89.6	110.4	>+\- 10%
Co	59	45	He	49.170	1.269	404900	0.37	50	98.3	89.6	110.4	
Ni	60	45	He	47.654	0.646	121454	1.00	50	95.3	89.6	110.4	
Cu	63	45	He	52.454	1.788	388671	0.45	50	104.9	89.6	110.4	
Zn	66	115	He	102.892	2.628	80247	0.51	50	205.8	89.6	110.4	>+\- 10%
As	75	115	He	48.678	2.615	19721	0.69	50	97.4	89.6	110.4	
Se	78	72	H2	47.951	12.047	41041	4.17	50	95.9	89.6	110.4	
Se	78	115	He	47.647	4.402	587	6.00	50	95.3	89.6	110.4	
Sr	88	115	NoGas	50.602	0.921	4137541	2.56	50	101.2	89.6	110.4	
Mo	95	115	NoGas	49.804	0.424	836585	1.97	50	99.6	89.6	110.4	
Ag	107	115	NoGas	19.782	0.516	887610	1.52	25	79.1	89.6	110.4	>+\- 10%
Cd	111	115	He	9.808	4.591	10216	2.53	50	19.6	89.6	110.4	>+\- 10%
Sn	118	115	He	49.110	1.322	68006	1.36	25	196.4	89.6	110.4	>+\- 10%
Sn	118	115	NoGas	49.803	0.273	1279718	1.50	25	199.2	89.6	110.4	>+\- 10%
Sb	121	115	NoGas	51.260	0.511	1928528	1.80	50	102.5	89.6	110.4	
Ba	137	115	NoGas	50.618	0.133	617018	1.61	50	101.2	89.6	110.4	
Tl	205	165	NoGas	50.017	1.478	3880231	1.72	50	100.0	89.6	110.4	
Pb	208	165	NoGas	49.202	1.278	5073886	1.01	50	98.4	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	247827	1.99	232772	106.47	70	120	
Sc	45	H2	477234	7.71	497417	95.94	70	120	
Sc	45	He	25226	1.64	26213	96.24	70	120	
Sc	45	NoGas	3286240	2.48	3271044	100.46	70	120	
Ge	72	H2	124555	7.86	130306	95.59	70	120	
Ge	72	He	24118	0.84	25369	95.07	70	120	
Ge	72	NoGas	806845	2.95	804525	100.29	70	120	
In	115	H2	2686522	7.84	2768793	97.03	70	120	
In	115	He	178503	2.14	184583	96.71	70	120	
In	115	NoGas	5202878	1.66	5159681	100.84	70	120	
Tb	159	H2	4978355	7.72	4956789	100.44	70	120	
Tb	159	He	1158268	1.24	1146052	101.07	70	120	
Tb	159	NoGas	7504181	1.48	7155958	104.87	70	120	
Ho	165	H2	4777976	7.65	4765312	100.27	70	120	
Ho	165	He	1155375	1.51	1131090	102.15	70	120	
Ho	165	NoGas	7215526	2.20	6876887	104.92	70	120	

Initial Calibration Blank (ICB) Report

Sample Table

Sample Name	ICB 180914
Data File Name	019_ICB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:58:52-07:00
Sample Type	ICB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	45	NoGas	0.004	72.2	60	44.1	0.1	
B	11	45	NoGas	1.733	50.0	228229	2.5	8	
Na	23	45	He	-0.999	-44.3	21089	0.7	50	
Mg	24	45	He	-0.043	-134.1	47	18.9	20	
Al	27	45	He	0.279	473.9	293	13.1	10	
P	31	45	He	-6.079	-125.0	27	54.5	10	
K	39	45	He	-6.508	-36.1	3244	5.1	40	
Ca	40	45	H2	0.489	21.8	13227	4.8	150	
Ti	47	45	He	0.050	173.2	2	173.2	0.5	
V	51	45	He	0.005	42.2	57	10.2	0.4	
Cr	52	45	He	-0.008	-100.2	498	6.7	0.2	
Mn	55	45	He	-0.012	-111.0	50	29.1	0.3	
Fe	56	45	He	0.107	23.5	3606	1.5	30	
Co	59	45	He	-0.002	-104.4	29	58.1	0.4	
Ni	60	45	He	-0.003	-314.7	96	26.2	0.4	
Cu	63	45	He	0.005	49.0	1084	2.0	0.4	
Zn	66	115	He	0.059	155.2	454	15.6	15	
As	75	115	He	-0.008	-44.4	2	65.5	0.2	
Se	78	72	H2	0.007	53.3	11	23.1	0.4	
Se	78	115	He	-0.155	-29.7	0	173.2	0.4	
Sr	88	115	NoGas	0.001	71.0	863	5.8	0.1	
Mo	95	115	NoGas	0.000	-1074.8	207	31.1	0.3	
Ag	107	115	NoGas	0.000	-2898.1	4411	3.9	0.1	
Cd	111	115	He	-0.001	-333.8	1	173.2	0.1	
Sn	118	115	He	0.019	147.1	84	47.1	0.1	
Sn	118	115	NoGas	0.010	20.6	1283	4.7	0.1	
Sb	121	115	NoGas	0.048	7.2	2647	5.4	0.5	
Ba	137	115	NoGas	0.011	69.1	293	31.5	0.4	
Tl	205	165	NoGas	-0.004	-52.2	1450	11.1	0.2	
Pb	208	165	NoGas	-0.013	-13.7	5561	3.5	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	252153	1.14	232772	108.33	70	120	
Sc	45	H2	483434	8.83	497417	97.19	70	120	
Sc	45	He	24997	0.54	26213	95.36	70	120	
Sc	45	NoGas	3264544	0.90	3271044	99.80	70	120	
Ge	72	H2	126008	9.46	130306	96.70	70	120	
Ge	72	He	24256	0.85	25369	95.61	70	120	
Ge	72	NoGas	810465	2.41	804525	100.74	70	120	
In	115	H2	2736051	8.86	2768793	98.82	70	120	
In	115	He	183769	0.66	184583	99.56	70	120	
In	115	NoGas	5285205	0.61	5159681	102.43	70	120	
Tb	159	H2	5001819	8.55	4956789	100.91	70	120	
Tb	159	He	1151697	0.65	1146052	100.49	70	120	
Tb	159	NoGas	7529855	1.78	7155958	105.22	70	120	
Ho	165	H2	4788170	9.50	4765312	100.48	70	120	
Ho	165	He	1149682	0.82	1131090	101.64	70	120	
Ho	165	NoGas	7277488	1.49	6876887	105.83	70	120	

Interference Check Solution A (ICS-A) Report

Sample Table

Sample Name	ICSA 180914
Data File Name	020ICSA.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T11:02:50-07:00
Sample Type	ICSA
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	NoGas	0.003	97.9	50	52.9	0.1	
B	11	NoGas	0.235	191.9	215221	1.9	8	
Na	23	He	41028.418	2.1	14870602	0.5	60000	
Mg	24	He	41577.600	2.8	6260990	0.7	60000	
Al	27	He	43579.976	3.3	1228567	1.2	60000	
P	31	He	48779.466	2.8	94501	0.7	60000	
K	39	He	43395.147	1.4	2869808	0.9	60000	
Ca	40	H2	45255.831	11.7	221771525	1.7	60000	
Ti	47	He	909.213	1.8	40611	1.7	1200	
V	51	He	0.009	108.9	67	36.1	0.2	
Cr	52	He	0.102	13.1	939	3.6	30	
Mn	55	He	0.443	20.5	546	16.5	24	
Fe	56	He	43292.168	2.2	123237813	0.6	60000	
Co	59	He	0.005	45.3	89	21.6	5	
Ni	60	He	0.106	18.1	373	14.9	5	
Cu	63	He	0.216	6.3	2648	2.7	5	
Zn	66	He	1.039	5.5	1158	3.9	20	
As	75	He	0.046	64.8	23	47.8	0.4	
Se	78	H2	0.027	16.5	26	3.9	0.4	
Se	78	He	-0.126	-75.7	1	173.2	0.4	
Sr	88	NoGas	0.455	1.8	35567	3.6	5	
Mo	95	NoGas	950.840	0.4	14938574	2.2	1200	
Ag	107	NoGas	0.021	28.0	4941	3.3	5	
Cd	111	He	0.085	16.9	87	17.8	0.5	
Sn	118	He	0.060	24.1	134	16.5	5	
Sn	118	NoGas	0.041	7.9	1921	6.6	5	
Sb	121	NoGas	0.122	5.3	5048	5.6	5	
Ba	137	NoGas	0.078	4.0	1037	1.5	1.5	
Tl	205	NoGas	-0.007	-10.6	1097	3.2	0.2	
Pb	208	NoGas	0.164	1.8	22684	2.0	1	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	222316	2.45	232772	95.51	70	120	
Sc	45	H2	463812	9.93	497417	93.24	70	120	
Sc	45	He	25144	2.06	26213	95.92	70	120	
Sc	45	NoGas	3200630	1.14	3271044	97.85	70	120	
Ge	72	H2	118215	9.99	130306	90.72	70	120	
Ge	72	He	24022	2.67	25369	94.69	70	120	
Ge	72	NoGas	794233	2.30	804525	98.72	70	120	
In	115	H2	2435891	9.51	2768793	87.98	70	120	
In	115	He	171984	2.23	184583	93.17	70	120	
In	115	NoGas	4867939	2.60	5159681	94.35	70	120	
Tb	159	H2	4515522	9.81	4956789	91.10	70	120	
Tb	159	He	1104764	2.12	1146052	96.40	70	120	
Tb	159	NoGas	7137665	1.23	7155958	99.74	70	120	
Ho	165	H2	4371595	9.41	4765312	91.74	70	120	
Ho	165	He	1110229	2.49	1131090	98.16	70	120	
Ho	165	NoGas	6885149	2.54	6876887	100.12	70	120	

Interference Check Solution AB (ICS-AB) Report

Sample Table

Sample Name	ICSAB 180914
Data File Name	021ICSB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T11:06:42-07:00
Sample Type	ICSB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	NoGas	44.190	1.884	402408	2.09	50	88.4	80	120	
B	11	NoGas	-1.394	-35.987	206960	1.21	-8	17.4	80	120	
Na	23	He	40503.645	2.705	14610996	0.95	50000	81.0	80	120	
Mg	24	He	40622.909	3.204	6088062	0.17	50000	81.2	80	120	
Al	27	He	42792.088	2.921	1200762	0.22	50000	85.6	80	120	
P	31	He	47161.250	2.593	90942	0.45	50000	94.3	80	120	
K	39	He	42597.846	2.003	2803825	1.02	50000	85.2	80	120	
Ca	40	H2	43645.471	11.746	215979174	2.44	50000	87.3	80	120	
Ti	47	He	894.569	2.285	39765	0.74	1000	89.5	80	120	
V	51	He	45.400	2.686	119180	0.47	50	90.8	80	120	
Cr	52	He	44.228	3.162	175620	0.21	50	88.5	80	120	
Mn	55	He	43.781	3.327	47573	0.76	50	87.6	80	120	
Fe	56	He	42491.857	2.734	120382844	0.52	50000	85.0	80	120	
Co	59	He	44.306	3.036	361853	0.63	50	88.6	80	120	
Ni	60	He	86.827	2.739	219388	0.91	100	86.8	80	120	
Cu	63	He	43.740	3.314	321613	0.96	50	87.5	80	120	
Zn	66	He	85.432	2.950	65273	0.40	100	85.4	80	120	
As	75	He	46.266	3.024	18344	1.09	50	92.5	80	120	
Se	78	H2	44.498	12.451	36822	2.84	50	89.0	80	120	
Se	78	He	47.708	4.807	576	6.74	50	95.4	80	120	
Sr	88	NoGas	0.447	1.406	35914	0.78	-5	-8.9	80	120	
Mo	95	NoGas	977.896	0.882	15798435	1.44	1050	93.1	80	120	
Ag	107	NoGas	89.114	0.683	3832046	0.95	100	89.1	80	120	
Cd	111	He	87.670	2.422	89383	0.26	100	87.7	80	120	
Sn	118	He	0.039	39.020	107	16.24	-0.5	-7.7	100	100	
Sn	118	NoGas	0.029	7.462	1677	3.52	-0.5	-5.7	100	100	
Sb	121	NoGas	49.723	2.634	1799608	2.56	50	99.4	80	120	
Ba	137	NoGas	48.006	1.458	562965	1.60	50	96.0	80	120	
Tl	205	NoGas	45.364	0.688	3479449	1.29	50	90.7	80	120	
Pb	208	NoGas	88.914	0.993	9060074	1.43	100	88.9	80	120	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	213125	0.69	232772	91.56	70	120	
Sc	45	H2	468186	9.36	497417	94.12	70	120	
Sc	45	He	25030	2.98	26213	95.49	70	120	
Sc	45	NoGas	3216830	0.35	3271044	98.34	70	120	
Ge	72	H2	120631	9.67	130306	92.57	70	120	
Ge	72	He	25013	3.10	25369	98.60	70	120	
Ge	72	NoGas	810569	1.66	804525	100.75	70	120	
In	115	H2	2473701	8.37	2768793	89.34	70	120	
In	115	He	174716	2.65	184583	94.65	70	120	
In	115	NoGas	5005198	0.60	5159681	97.01	70	120	
Tb	159	H2	4621565	8.66	4956789	93.24	70	120	
Tb	159	He	1127595	2.25	1146052	98.39	70	120	
Tb	159	NoGas	7339652	0.97	7155958	102.57	70	120	
Ho	165	H2	4471730	9.34	4765312	93.84	70	120	
Ho	165	He	1138560	2.53	1131090	100.66	70	120	
Ho	165	NoGas	7132839	1.35	6876887	103.72	70	120	

Sample Report

Sample Table

Sample Name	0.5 ppb LLICV 180914
Data File Name	015SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:42:52-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.516	0.516	9.32	4767	6.79	10000	
B	11	45	NoGas	3.600	3.600	21.89	238104	2.39	10000	
Na	23	45	He	15.803	15.803	10.36	28313	0.18	1000000	
Mg	24	45	He	23.483	23.483	3.68	3725	2.93	1000000	
Al	27	45	He	10.382	10.382	12.59	601	4.52	1000000	
P	31	45	He	-4.417	-4.417	-65.98	31	16.37	500000	
K	39	45	He	7.478	7.478	69.49	4341	6.99	500000	
Ca	40	45	H2	25.400	25.400	12.23	152056	2.52	500000	
Ti	47	45	He	0.604	0.604	50.31	28	48.51	10000	
V	51	45	He	0.470	0.470	2.65	1330	1.09	10000	
Cr	52	45	He	0.479	0.479	2.15	2531	1.27	10000	
Mn	55	45	He	0.618	0.618	10.03	767	10.94	50000	
Fe	56	45	He	10.241	10.241	1.71	33699	1.22	1000000	
Co	59	45	He	0.471	0.471	1.55	4063	2.86	10000	
Ni	60	45	He	0.631	0.631	0.33	1769	2.54	10000	
Cu	63	45	He	0.585	0.585	7.89	5572	6.97	10000	
Zn	66	115	He	1.399	1.399	7.04	1560	4.38	50000	
As	75	115	He	0.479	0.479	10.53	211	11.05	2000	
Se	78	72	H2	0.411	0.411	11.93	386	2.82	10000	
Se	78	115	He	0.282	0.282	46.01	6	28.87	10000	
Sr	88	115	NoGas	0.516	0.516	3.79	42966	5.54	50000	
Mo	95	115	NoGas	0.482	0.482	11.93	8302	10.67	10000	
Ag	107	115	NoGas	0.241	0.241	4.94	15097	3.97	5000	
Cd	111	115	He	0.440	0.440	13.90	485	12.85	10000	
Sn	118	115	He	0.478	0.478	1.71	756	2.59	10000	
Sn	118	115	NoGas	0.509	0.509	1.29	14097	3.08	10000	
Sb	121	115	NoGas	0.621	0.621	2.66	24191	1.93	10000	
Ba	137	115	NoGas	0.546	0.546	6.50	6808	4.45	50000	
Tl	205	165	NoGas	0.452	0.452	0.61	36776	1.52	5000	
Pb	208	165	NoGas	0.481	0.481	2.34	56464	0.78	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	251185	2.05	232772	107.91	70	120	
Sc	45	H2	522989	8.66	497417	105.14	70	120	
Sc	45	He	26091	2.34	26213	99.53	70	120	
Sc	45	NoGas	3251581	2.39	3271044	99.40	70	120	
Ge	72	H2	134888	8.86	130306	103.52	70	120	
Ge	72	He	25242	1.14	25369	99.50	70	120	
Ge	72	NoGas	792813	1.28	804525	98.54	70	120	
In	115	H2	2912177	9.37	2768793	105.18	70	120	
In	115	He	188030	1.63	184583	101.87	70	120	
In	115	NoGas	5206156	1.90	5159681	100.90	70	120	
Tb	159	H2	5273332	9.06	4956789	106.39	70	120	
Tb	159	He	1184984	1.23	1146052	103.40	70	120	
Tb	159	NoGas	7418667	0.69	7155958	103.67	70	120	
Ho	165	H2	5013884	8.41	4765312	105.22	70	120	
Ho	165	He	1182340	1.14	1131090	104.53	70	120	
Ho	165	NoGas	7221933	1.59	6876887	105.02	70	120	

Sample Report

Sample Table

Sample Name	1.0 ppb LLICV 180914
Data File Name	016SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:46:51-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	1.100	1.100	5.19	10026	2.83	10000	
B	11	45	NoGas	4.873	4.873	9.47	242771	1.31	10000	
Na	23	45	He	33.713	33.713	4.88	33914	1.40	1000000	
Mg	24	45	He	48.630	48.630	4.27	7405	1.24	1000000	
Al	27	45	He	19.443	19.443	5.58	839	4.66	1000000	
P	31	45	He	1.351	1.351	682.92	41	40.82	500000	
K	39	45	He	17.551	17.551	22.96	4867	2.50	500000	
Ca	40	45	H2	50.721	50.721	11.76	268866	2.04	500000	
Ti	47	45	He	1.185	1.185	25.28	53	27.24	10000	
V	51	45	He	0.956	0.956	2.32	2576	1.42	10000	
Cr	52	45	He	1.015	1.015	8.55	4590	6.25	10000	
Mn	55	45	He	1.806	1.806	4.64	2041	2.90	50000	
Fe	56	45	He	20.406	20.406	3.43	61656	1.75	1000000	
Co	59	45	He	0.965	0.965	5.96	7991	3.33	10000	
Ni	60	45	He	1.288	1.288	6.66	3385	3.65	10000	
Cu	63	45	He	1.099	1.099	4.93	9185	2.09	10000	
Zn	66	115	He	2.317	2.317	2.83	2249	3.77	50000	
As	75	115	He	0.940	0.940	5.16	396	3.79	2000	
Se	78	72	H2	0.935	0.935	13.94	806	4.80	10000	
Se	78	115	He	1.170	1.170	5.27	17	5.88	10000	
Sr	88	115	NoGas	0.989	0.989	0.28	82592	2.28	50000	
Mo	95	115	NoGas	0.978	0.978	1.64	16815	2.68	10000	
Ag	107	115	NoGas	0.479	0.479	0.90	26057	2.81	5000	
Cd	111	115	He	0.923	0.923	1.91	987	2.35	10000	
Sn	118	115	He	0.948	0.948	6.40	1401	5.95	10000	
Sn	118	115	NoGas	0.986	0.986	1.34	26629	1.40	10000	
Sb	121	115	NoGas	1.021	1.021	2.07	39656	3.13	10000	
Ba	137	115	NoGas	1.014	1.014	4.66	12652	3.94	50000	
Tl	205	165	NoGas	0.917	0.917	1.02	71817	1.96	5000	
Pb	208	165	NoGas	0.960	0.960	2.77	104275	1.62	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	251653	1.13	232772	108.11	70	120	
Sc	45	H2	481545	9.27	497417	96.81	70	120	
Sc	45	He	25253	3.04	26213	96.34	70	120	
Sc	45	NoGas	3215854	2.30	3271044	98.31	70	120	
Ge	72	H2	124967	9.25	130306	95.90	70	120	
Ge	72	He	24149	1.85	25369	95.19	70	120	
Ge	72	NoGas	796588	2.00	804525	99.01	70	120	
In	115	H2	2721722	9.52	2768793	98.30	70	120	
In	115	He	182915	1.61	184583	99.10	70	120	
In	115	NoGas	5262529	2.06	5159681	101.99	70	120	
Tb	159	H2	4953507	10.44	4956789	99.93	70	120	
Tb	159	He	1159860	1.60	1146052	101.20	70	120	
Tb	159	NoGas	7417827	2.19	7155958	103.66	70	120	
Ho	165	H2	4738151	9.74	4765312	99.43	70	120	
Ho	165	He	1157894	1.10	1131090	102.37	70	120	
Ho	165	NoGas	7117981	1.07	6876887	103.51	70	120	

Sample Report

Sample Table

Sample Name	4.0 ppb LLICV 180914
Data File Name	018SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T10:54:48-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	3.953	3.953	2.76	36256	3.18	10000	
B	11	45	NoGas	5.895	5.895	7.53	250374	1.34	10000	
Na	23	45	He	96.288	96.288	2.66	55723	0.56	1000000	
Mg	24	45	He	196.818	196.818	1.93	29328	1.01	1000000	
Al	27	45	He	77.068	77.068	6.97	2428	4.54	1000000	
P	31	45	He	22.404	22.404	27.21	81	15.56	500000	
K	39	45	He	74.139	74.139	6.07	8480	1.71	500000	
Ca	40	45	H2	184.223	184.223	12.46	940285	2.50	500000	
Ti	47	45	He	3.922	3.922	11.26	173	13.46	10000	
V	51	45	He	3.758	3.758	3.02	9834	4.27	10000	
Cr	52	45	He	3.873	3.873	3.27	15741	1.14	10000	
Mn	55	45	He	3.789	3.789	4.64	4143	3.12	50000	
Fe	56	45	He	77.317	77.317	2.16	220649	0.58	1000000	
Co	59	45	He	3.905	3.905	2.07	31689	0.79	10000	
Ni	60	45	He	3.868	3.868	0.61	9801	2.29	10000	
Cu	63	45	He	3.950	3.950	2.27	29777	0.85	10000	
Zn	66	115	He	4.233	4.233	8.15	3713	6.59	50000	
As	75	115	He	3.790	3.790	8.80	1553	6.83	2000	
Se	78	72	H2	3.644	3.644	13.33	3133	4.09	10000	
Se	78	115	He	3.866	3.866	23.80	50	21.07	10000	
Sr	88	115	NoGas	3.896	3.896	0.45	320125	1.29	50000	
Mo	95	115	NoGas	3.857	3.857	1.46	65154	2.18	10000	
Ag	107	115	NoGas	1.911	1.911	1.91	89914	2.19	5000	
Cd	111	115	He	3.709	3.709	4.15	3898	2.23	10000	
Sn	118	115	He	3.701	3.701	2.65	5222	2.31	10000	
Sn	118	115	NoGas	3.819	3.819	1.13	99320	0.78	10000	
Sb	121	115	NoGas	3.983	3.983	0.53	150996	0.45	10000	
Ba	137	115	NoGas	3.974	3.974	0.60	48717	1.27	50000	
Tl	205	165	NoGas	3.643	3.643	0.07	280893	0.98	5000	
Pb	208	165	NoGas	3.777	3.777	0.09	391270	1.02	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	251695	0.77	232772	108.13	70	120	
Sc	45	H2	477775	9.60	497417	96.05	70	120	
Sc	45	He	24833	2.15	26213	94.74	70	120	
Sc	45	NoGas	3237923	0.77	3271044	98.99	70	120	
Ge	72	H2	125150	9.09	130306	96.04	70	120	
Ge	72	He	24581	4.28	25369	96.89	70	120	
Ge	72	NoGas	798946	1.77	804525	99.31	70	120	
In	115	H2	2671303	9.21	2768793	96.48	70	120	
In	115	He	180066	1.89	184583	97.55	70	120	
In	115	NoGas	5216594	0.87	5159681	101.10	70	120	
Tb	159	H2	4938188	8.85	4956789	99.62	70	120	
Tb	159	He	1156862	1.84	1146052	100.94	70	120	
Tb	159	NoGas	7439543	0.88	7155958	103.96	70	120	
Ho	165	H2	4741902	9.76	4765312	99.51	70	120	
Ho	165	He	1156490	1.57	1131090	102.25	70	120	
Ho	165	NoGas	7131004	1.03	6876887	103.70	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180914
Data File Name	048_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T12:53:04-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	45	NoGas	48.016	1.796	431876	1.28	50	96.0	89.6	110.4	
B	11	45	NoGas	56.398	3.561	531600	1.77	50	112.8	89.6	110.4	>+/- 10%
Na	23	45	He	1191.463	4.851	415561	0.25	1250	95.3	89.6	110.4	
Mg	24	45	He	2339.857	4.675	323460	0.51	2500	93.6	89.6	110.4	
Al	27	45	He	920.183	3.765	24077	0.76	1000	92.0	89.6	110.4	
P	31	45	He	241.431	6.317	464	2.07	250	96.6	89.6	110.4	
K	39	45	He	905.533	5.591	58264	1.28	1000	90.6	89.6	110.4	
Ca	40	45	H2	2224.699	12.020	10830662	2.24	2500	89.0	89.6	110.4	>+/- 10%
Ti	47	45	He	45.265	9.151	1853	5.49	50	90.5	89.6	110.4	
V	51	45	He	47.515	5.431	114998	1.00	50	95.0	89.6	110.4	
Cr	52	45	He	46.970	5.203	171957	0.86	50	93.9	89.6	110.4	
Mn	55	45	He	46.270	4.422	46373	1.51	50	92.5	89.6	110.4	
Fe	56	45	He	948.028	4.950	2479650	0.91	1000	94.8	89.6	110.4	
Co	59	45	He	47.727	4.270	359515	0.33	50	95.5	89.6	110.4	
Ni	60	45	He	47.647	4.143	111082	0.49	50	95.3	89.6	110.4	
Cu	63	45	He	47.709	4.434	323462	0.12	50	95.4	89.6	110.4	
Zn	66	115	He	47.538	2.560	35437	0.53	50	95.1	89.6	110.4	
As	75	115	He	45.830	3.043	17644	0.75	50	91.7	89.6	110.4	
Se	78	72	H2	44.760	12.885	37572	3.29	50	89.5	89.6	110.4	>+/- 10%
Se	78	115	He	45.972	10.749	537	7.53	50	91.9	89.6	110.4	
Sr	88	115	NoGas	47.101	0.885	3929801	0.76	50	94.2	89.6	110.4	
Mo	95	115	NoGas	46.073	2.092	789802	2.47	50	92.1	89.6	110.4	
Ag	107	115	NoGas	23.073	2.039	1055809	2.40	25	92.3	89.6	110.4	
Cd	111	115	He	46.678	2.644	46212	1.22	50	93.4	89.6	110.4	
Sn	118	115	He	46.909	3.709	61707	0.66	50	93.8	89.6	110.4	
Sn	118	115	NoGas	46.922	1.915	1230506	2.30	50	93.8	89.6	110.4	
Sb	121	115	NoGas	48.465	1.481	1860798	1.86	50	96.9	89.6	110.4	
Ba	137	115	NoGas	48.412	0.592	602231	0.92	50	96.8	89.6	110.4	
Tl	205	165	NoGas	48.343	1.038	3972831	1.91	50	96.7	89.6	110.4	
Pb	208	165	NoGas	47.283	0.144	5165455	1.12	50	94.6	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	248342	0.92	232772	106.69	70	120	
Sc	45	H2	460324	9.50	497417	92.54	70	120	
Sc	45	He	23101	4.33	26213	88.13	70	120	
Sc	45	NoGas	3177597	0.64	3271044	97.14	70	120	
Ge	72	H2	122360	9.28	130306	93.90	70	120	
Ge	72	He	23327	3.02	25369	91.95	70	120	
Ge	72	NoGas	809285	1.09	804525	100.59	70	120	
In	115	H2	2695239	10.34	2768793	97.34	70	120	
In	115	He	169664	3.01	184583	91.92	70	120	
In	115	NoGas	5309419	0.39	5159681	102.90	70	120	
Tb	159	H2	5108144	9.64	4956789	103.05	70	120	
Tb	159	He	1141019	3.66	1146052	99.56	70	120	
Tb	159	NoGas	7859386	1.64	7155958	109.83	70	120	
Ho	165	H2	4963342	9.39	4765312	104.16	70	120	
Ho	165	He	1153283	3.38	1131090	101.96	70	120	
Ho	165	NoGas	7642047	1.08	6876887	111.13	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180914
Data File Name	049_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T12:56:58-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	45	NoGas	0.039	21.9	377	21.5	0.1	
B	11	45	NoGas	9.527	4.7	266275	1.9	8	>LOD
Na	23	45	He	16.731	7.2	25292	2.6	50	
Mg	24	45	He	1.859	4.5	306	7.0	20	
Al	27	45	He	-0.073	-991.9	261	9.0	10	
P	31	45	He	-13.623	-17.2	11	34.6	10	
K	39	45	He	-2.824	-142.3	3204	3.6	40	
Ca	40	45	H2	2.766	36.4	20998	5.3	150	
Ti	47	45	He	0.133	90.9	6	91.6	0.5	
V	51	45	He	0.042	44.4	141	28.0	0.4	
Cr	52	45	He	0.032	39.2	606	6.6	0.2	
Mn	55	45	He	0.031	52.1	89	15.6	0.3	
Fe	56	45	He	0.953	8.3	5523	4.1	30	
Co	59	45	He	0.037	15.9	317	16.2	0.4	
Ni	60	45	He	0.036	20.1	179	12.0	0.4	
Cu	63	45	He	0.066	33.5	1412	6.6	0.4	
Zn	66	115	He	0.060	133.5	422	13.5	15	
As	75	115	He	0.041	4.2	21	5.4	0.2	
Se	78	72	H2	0.065	16.7	55	9.5	0.4	
Se	78	115	He	0.046	212.4	3	43.3	0.4	
Sr	88	115	NoGas	0.036	8.9	3901	6.1	0.1	
Mo	95	115	NoGas	0.060	7.3	1267	8.1	0.3	
Ag	107	115	NoGas	0.013	61.2	5124	6.7	0.1	
Cd	111	115	He	0.031	31.9	33	28.9	0.1	
Sn	118	115	He	0.063	18.0	137	12.9	0.1	
Sn	118	115	NoGas	0.056	9.6	2540	6.9	0.1	
Sb	121	115	NoGas	0.449	5.1	18417	6.2	0.5	
Ba	137	115	NoGas	0.034	16.9	597	14.3	0.4	
Tl	205	165	NoGas	0.041	8.2	5108	6.9	0.2	
Pb	208	165	NoGas	0.015	29.7	8761	4.5	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	256099	1.15	232772	110.02	70	120	
Sc	45	H2	419519	23.23	497417	84.34	70	120	
Sc	45	He	23023	3.95	26213	87.83	70	120	
Sc	45	NoGas	3177782	1.97	3271044	97.15	70	120	
Ge	72	H2	113724	20.95	130306	87.27	70	120	
Ge	72	He	23390	2.89	25369	92.20	70	120	
Ge	72	NoGas	807282	2.17	804525	100.34	70	120	
In	115	H2	2493913	22.66	2768793	90.07	70	120	
In	115	He	170526	2.80	184583	92.38	70	120	
In	115	NoGas	5415798	2.25	5159681	104.96	70	120	
Tb	159	H2	4735390	22.09	4956789	95.53	70	120	
Tb	159	He	1120379	2.59	1146052	97.76	70	120	
Tb	159	NoGas	7796551	1.83	7155958	108.95	70	120	
Ho	165	H2	4579717	22.67	4765312	96.11	70	120	
Ho	165	He	1138722	2.32	1131090	100.67	70	120	
Ho	165	NoGas	7545937	1.47	6876887	109.73	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180914
Data File Name	074_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T14:42:54-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	45	NoGas	48.073	2.066	436230	0.57	50	96.1	89.6	110.4	
B	11	45	NoGas	50.791	1.855	504394	1.57	50	101.6	89.6	110.4	
Na	23	45	He	1164.734	0.894	415603	0.51	1250	93.2	89.6	110.4	
Mg	24	45	He	2269.797	1.109	320661	0.86	2500	90.8	89.6	110.4	
Al	27	45	He	891.080	1.880	23827	1.12	1000	89.1	89.6	110.4	>+/- 10%
P	31	45	He	214.959	4.694	427	4.13	250	86.0	89.6	110.4	>+/- 10%
K	39	45	He	881.725	0.819	58077	0.26	1000	88.2	89.6	110.4	>+/- 10%
Ca	40	45	H2	2285.749	10.841	10860617	1.95	2500	91.4	89.6	110.4	
Ti	47	45	He	44.909	4.278	1881	4.37	50	89.8	89.6	110.4	
V	51	45	He	46.149	1.070	114169	0.30	50	92.3	89.6	110.4	
Cr	52	45	He	45.564	1.086	170506	0.34	50	91.1	89.6	110.4	
Mn	55	45	He	44.184	1.977	45253	2.24	50	88.4	89.6	110.4	>+/- 10%
Fe	56	45	He	926.062	1.901	2475452	1.22	1000	92.6	89.6	110.4	
Co	59	45	He	46.311	0.837	356470	0.67	50	92.6	89.6	110.4	
Ni	60	45	He	46.151	0.154	109945	0.96	50	92.3	89.6	110.4	
Cu	63	45	He	46.008	0.481	318797	0.45	50	92.0	89.6	110.4	
Zn	66	115	He	47.450	1.834	35246	0.91	50	94.9	89.6	110.4	
As	75	115	He	45.217	1.454	17349	1.35	50	90.4	89.6	110.4	
Se	78	72	H2	45.231	12.477	37128	2.95	50	90.5	89.6	110.4	
Se	78	115	He	45.813	8.823	535	8.83	50	91.6	89.6	110.4	
Sr	88	115	NoGas	46.892	1.388	3894022	2.99	50	93.8	89.6	110.4	
Mo	95	115	NoGas	45.970	0.476	784177	1.84	50	91.9	89.6	110.4	
Ag	107	115	NoGas	22.961	0.588	1045575	1.79	25	91.8	89.6	110.4	
Cd	111	115	He	46.203	2.337	45575	1.10	50	92.4	89.6	110.4	
Sn	118	115	He	46.564	1.464	61052	0.46	50	93.1	89.6	110.4	
Sn	118	115	NoGas	46.254	0.622	1207024	1.31	50	92.5	89.6	110.4	
Sb	121	115	NoGas	48.614	1.194	1857662	2.81	50	97.2	89.6	110.4	
Ba	137	115	NoGas	47.738	0.585	590951	1.46	50	95.5	89.6	110.4	
Tl	205	165	NoGas	48.440	1.589	3880246	1.28	50	96.9	89.6	110.4	
Pb	208	165	NoGas	46.943	1.735	4999001	1.31	50	93.9	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	247925	0.73	232772	106.51	70	120	
Sc	45	H2	448809	9.18	497417	90.23	70	120	
Sc	45	He	23577	0.83	26213	89.94	70	120	
Sc	45	NoGas	3206821	2.61	3271044	98.04	70	120	
Ge	72	H2	119652	9.55	130306	91.82	70	120	
Ge	72	He	23574	2.33	25369	92.93	70	120	
Ge	72	NoGas	802937	1.25	804525	99.80	70	120	
In	115	H2	2597540	8.91	2768793	93.81	70	120	
In	115	He	168999	1.34	184583	91.56	70	120	
In	115	NoGas	5283790	1.78	5159681	102.41	70	120	
Tb	159	H2	4906589	8.86	4956789	98.99	70	120	
Tb	159	He	1126630	1.44	1146052	98.31	70	120	
Tb	159	NoGas	7754410	1.39	7155958	108.36	70	120	
Ho	165	H2	4718294	8.74	4765312	99.01	70	120	
Ho	165	He	1135120	1.51	1131090	100.36	70	120	
Ho	165	NoGas	7451337	2.60	6876887	108.35	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180914
Data File Name	075_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T14:46:48-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	45	NoGas	0.033	27.3	323	25.0	0.1	
B	11	45	NoGas	4.253	15.6	236570	0.6	8	
Na	23	45	He	10.980	19.0	23072	3.3	50	
Mg	24	45	He	1.670	7.7	276	7.3	20	
Al	27	45	He	0.948	62.0	283	5.1	10	
P	31	45	He	-11.746	-32.6	14	48.0	10	
K	39	45	He	-3.546	-34.6	3123	2.4	40	
Ca	40	45	H2	2.574	18.4	22019	1.8	150	
Ti	47	45	He	0.138	35.2	6	34.7	0.5	
V	51	45	He	0.028	43.0	106	27.6	0.4	
Cr	52	45	He	0.036	46.0	609	7.0	0.2	
Mn	55	45	He	0.022	119.0	79	31.7	0.3	
Fe	56	45	He	1.048	7.8	5694	3.9	30	
Co	59	45	He	0.040	10.3	337	6.0	0.4	
Ni	60	45	He	0.033	25.1	170	9.8	0.4	
Cu	63	45	He	0.064	10.9	1381	4.4	0.4	
Zn	66	115	He	0.178	61.2	513	14.3	15	
As	75	115	He	0.043	18.3	22	14.4	0.2	
Se	78	72	H2	0.062	16.8	56	17.6	0.4	
Se	78	115	He	-0.069	-183.9	1	114.6	0.4	
Sr	88	115	NoGas	0.038	3.9	4037	3.2	0.1	
Mo	95	115	NoGas	0.066	3.6	1363	3.4	0.3	
Ag	107	115	NoGas	0.020	17.6	5408	2.9	0.1	
Cd	111	115	He	0.036	11.3	38	9.1	0.1	
Sn	118	115	He	0.073	40.4	151	24.4	0.1	
Sn	118	115	NoGas	0.058	0.7	2581	0.7	0.1	
Sb	121	115	NoGas	0.478	1.4	19415	1.1	0.5	
Ba	137	115	NoGas	0.047	8.3	757	6.7	0.4	
Tl	205	165	NoGas	0.053	3.6	6038	1.3	0.2	
Pb	208	165	NoGas	0.024	14.5	9648	3.4	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	256575	0.70	232772	110.23	70	120	
Sc	45	H2	446239	8.43	497417	89.71	70	120	
Sc	45	He	22712	3.14	26213	86.64	70	120	
Sc	45	NoGas	3180187	1.59	3271044	97.22	70	120	
Ge	72	H2	118567	8.59	130306	90.99	70	120	
Ge	72	He	23260	2.24	25369	91.68	70	120	
Ge	72	NoGas	799633	1.57	804525	99.39	70	120	
In	115	H2	2637502	7.77	2768793	95.26	70	120	
In	115	He	172040	1.56	184583	93.20	70	120	
In	115	NoGas	5374915	0.47	5159681	104.17	70	120	
Tb	159	H2	4914110	8.17	4956789	99.14	70	120	
Tb	159	He	1114337	2.42	1146052	97.23	70	120	
Tb	159	NoGas	7751974	1.42	7155958	108.33	70	120	
Ho	165	H2	4762661	7.92	4765312	99.94	70	120	
Ho	165	He	1131082	2.45	1131090	100.00	70	120	
Ho	165	NoGas	7435369	1.69	6876887	108.12	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180914
Data File Name	106_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T16:59:47-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	45	NoGas	52.204	5.065	436435	1.09	50	104.4	89.6	110.4	
B	11	45	NoGas	58.222	5.413	503959	0.86	50	116.4	89.6	110.4	>+/- 10%
Na	23	45	He	1235.725	3.261	408006	0.22	1250	98.9	89.6	110.4	
Mg	24	45	He	2319.205	3.577	303994	0.46	2500	92.8	89.6	110.4	
Al	27	45	He	939.010	4.795	23280	1.88	1000	93.9	89.6	110.4	
P	31	45	He	248.662	22.690	451	17.86	250	99.5	89.6	110.4	
K	39	45	He	878.957	3.594	53729	0.77	1000	87.9	89.6	110.4	>+/- 10%
Ca	40	45	H2	2154.929	36.376	10057073	4.81	2500	86.2	89.6	110.4	>+/- 10%
Ti	47	45	He	46.773	7.686	1817	5.40	50	93.5	89.6	110.4	
V	51	45	He	45.806	3.340	105148	0.33	50	91.6	89.6	110.4	
Cr	52	45	He	45.427	4.419	157702	1.28	50	90.9	89.6	110.4	
Mn	55	45	He	45.751	3.052	43477	0.59	50	91.5	89.6	110.4	
Fe	56	45	He	933.870	3.396	2316414	1.01	1000	93.4	89.6	110.4	
Co	59	45	He	46.464	3.685	331824	0.70	50	92.9	89.6	110.4	
Ni	60	45	He	46.065	3.406	101822	0.94	50	92.1	89.6	110.4	
Cu	63	45	He	45.849	3.840	294747	0.71	50	91.7	89.6	110.4	
Zn	66	115	He	46.331	2.511	33394	0.31	50	92.7	89.6	110.4	
As	75	115	He	43.588	3.780	16219	1.44	50	87.2	89.6	110.4	>+/- 10%
Se	78	72	H2	42.585	33.913	35074	5.67	50	85.2	89.6	110.4	>+/- 10%
Se	78	115	He	45.766	7.337	518	7.28	50	91.5	89.6	110.4	
Sr	88	115	NoGas	47.319	6.006	3667141	2.10	50	94.6	89.6	110.4	
Mo	95	115	NoGas	46.585	5.738	741802	2.21	50	93.2	89.6	110.4	
Ag	107	115	NoGas	23.214	5.568	986789	2.00	25	92.9	89.6	110.4	
Cd	111	115	He	46.046	3.064	44059	0.31	50	92.1	89.6	110.4	
Sn	118	115	He	46.546	3.644	59188	0.88	50	93.1	89.6	110.4	
Sn	118	115	NoGas	47.140	5.302	1148489	1.79	50	94.3	89.6	110.4	
Sb	121	115	NoGas	49.133	5.204	1752601	1.53	50	98.3	89.6	110.4	
Ba	137	115	NoGas	48.690	4.758	562803	1.59	50	97.4	89.6	110.4	
Tl	205	165	NoGas	49.826	5.324	3837133	1.17	50	99.7	89.6	110.4	
Pb	208	165	NoGas	48.585	5.900	4972929	1.17	50	97.2	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	265279	3.95	232772	113.97	70	120	
Sc	45	H2	483203	39.03	497417	97.14	70	120	
Sc	45	He	21891	3.06	26213	83.51	70	120	
Sc	45	NoGas	2957402	4.04	3271044	90.41	70	120	
Ge	72	H2	128957	34.28	130306	98.96	70	120	
Ge	72	He	21888	3.41	25369	86.28	70	120	
Ge	72	NoGas	739640	3.12	804525	91.93	70	120	
In	115	H2	2847875	38.67	2768793	102.86	70	120	
In	115	He	163991	2.73	184583	88.84	70	120	
In	115	NoGas	4939539	3.97	5159681	95.73	70	120	
Tb	159	H2	5363226	38.94	4956789	108.20	70	120	
Tb	159	He	1116830	2.94	1146052	97.45	70	120	
Tb	159	NoGas	7400177	4.82	7155958	103.41	70	120	
Ho	165	H2	5231735	39.15	4765312	109.79	70	120	
Ho	165	He	1130515	2.96	1131090	99.95	70	120	
Ho	165	NoGas	7174104	4.93	6876887	104.32	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180914
Data File Name	107_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:03:41-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Fail

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	45	NoGas	0.052	21.0	477	18.9	0.1	
B	11	45	NoGas	5.484	2.9	236434	1.7	8	
Na	23	45	He	86.961	5.4	44981	1.6	50	>LOD
Mg	24	45	He	2.087	13.8	312	12.7	20	
Al	27	45	He	0.427	334.6	253	12.1	10	
P	31	45	He	-13.169	-9.4	11	17.3	10	
K	39	45	He	-5.124	-76.1	2842	6.5	40	
Ca	40	45	H2	3.235	18.2	22840	2.0	150	
Ti	47	45	He	0.323	84.3	12	83.3	0.5	
V	51	45	He	0.044	22.8	136	16.7	0.4	
Cr	52	45	He	0.037	84.4	578	17.7	0.2	
Mn	55	45	He	0.027	161.3	79	50.4	0.3	
Fe	56	45	He	1.069	6.1	5399	2.2	30	
Co	59	45	He	0.042	9.9	328	7.6	0.4	
Ni	60	45	He	0.025	34.3	142	11.8	0.4	
Cu	63	45	He	0.108	4.9	1569	1.0	0.4	
Zn	66	115	He	0.272	6.3	567	1.6	15	
As	75	115	He	0.026	90.8	15	58.1	0.2	
Se	78	72	H2	0.059	16.0	51	5.1	0.4	
Se	78	115	He	-0.007	-3079.6	2	132.3	0.4	
Sr	88	115	NoGas	0.038	10.5	3897	9.3	0.1	
Mo	95	115	NoGas	0.063	13.6	1270	10.7	0.3	
Ag	107	115	NoGas	0.018	29.4	5193	6.0	0.1	
Cd	111	115	He	0.040	23.0	41	22.7	0.1	
Sn	118	115	He	0.083	20.3	160	12.7	0.1	
Sn	118	115	NoGas	0.067	7.4	2744	2.9	0.1	
Sb	121	115	NoGas	0.480	3.0	18984	3.7	0.5	
Ba	137	115	NoGas	0.045	7.0	713	5.3	0.4	
Tl	205	165	NoGas	0.038	13.7	4841	8.8	0.2	
Pb	208	165	NoGas	0.020	2.9	9211	2.0	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	284777	0.88	232772	122.34	70	120	ISTD Failed
Sc	45	H2	405981	9.53	497417	81.62	70	120	
Sc	45	He	21325	1.66	26213	81.35	70	120	
Sc	45	NoGas	3086788	1.41	3271044	94.37	70	120	
Ge	72	H2	113420	9.62	130306	87.04	70	120	
Ge	72	He	21922	2.31	25369	86.41	70	120	
Ge	72	NoGas	768190	1.12	804525	95.48	70	120	
In	115	H2	2454214	10.24	2768793	88.64	70	120	
In	115	He	166651	0.97	184583	90.29	70	120	
In	115	NoGas	5239112	1.77	5159681	101.54	70	120	
Tb	159	H2	4523007	8.42	4956789	91.25	70	120	
Tb	159	He	1112261	2.77	1146052	97.05	70	120	
Tb	159	NoGas	7678375	2.01	7155958	107.30	70	120	
Ho	165	H2	4445648	9.83	4765312	93.29	70	120	
Ho	165	He	1132573	2.02	1131090	100.13	70	120	
Ho	165	NoGas	7482691	1.35	6876887	108.81	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180914
Data File Name	124_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T18:17:11-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	45	NoGas	50.018	1.038	427929	1.15	50	100.0	89.6	110.4	
B	11	45	NoGas	53.227	2.692	488558	0.84	50	106.5	89.6	110.4	
Na	23	45	He	1174.027	1.599	378339	0.35	1250	93.9	89.6	110.4	
Mg	24	45	He	2340.437	1.142	298741	0.75	2500	93.6	89.6	110.4	
Al	27	45	He	923.270	4.223	22293	3.00	1000	92.3	89.6	110.4	
P	31	45	He	237.755	21.136	423	20.11	250	95.1	89.6	110.4	
K	39	45	He	907.888	1.436	53937	0.44	1000	90.8	89.6	110.4	
Ca	40	45	H2	2479.222	11.821	10132685	3.37	2500	99.2	89.6	110.4	
Ti	47	45	He	46.947	7.235	1776	5.69	50	93.9	89.6	110.4	
V	51	45	He	46.224	1.742	103316	0.40	50	92.4	89.6	110.4	
Cr	52	45	He	46.290	2.282	156486	0.53	50	92.6	89.6	110.4	
Mn	55	45	He	46.184	2.467	42734	2.42	50	92.4	89.6	110.4	
Fe	56	45	He	963.851	1.412	2328010	1.58	1000	96.4	89.6	110.4	
Co	59	45	He	46.655	1.672	324449	0.28	50	93.3	89.6	110.4	
Ni	60	45	He	46.691	1.173	100494	0.70	50	93.4	89.6	110.4	
Cu	63	45	He	46.942	1.891	293838	0.34	50	93.9	89.6	110.4	
Zn	66	115	He	47.190	1.303	32718	1.21	50	94.4	89.6	110.4	
As	75	115	He	44.550	2.163	15950	0.65	50	89.1	89.6	110.4	>+/- 10%
Se	78	72	H2	48.435	13.160	35147	3.62	50	96.9	89.6	110.4	
Se	78	115	He	44.971	7.626	489	5.98	50	89.9	89.6	110.4	
Sr	88	115	NoGas	46.300	1.106	3644919	1.50	50	92.6	89.6	110.4	
Mo	95	115	NoGas	44.808	0.912	724736	1.64	50	89.6	89.6	110.4	
Ag	107	115	NoGas	22.311	1.123	963446	1.96	25	89.2	89.6	110.4	>+/- 10%
Cd	111	115	He	47.045	2.244	43309	0.94	50	94.1	89.6	110.4	
Sn	118	115	He	47.211	1.480	57770	1.18	50	94.4	89.6	110.4	
Sn	118	115	NoGas	45.474	1.434	1125186	1.76	50	90.9	89.6	110.4	
Sb	121	115	NoGas	47.693	2.348	1727461	1.45	50	95.4	89.6	110.4	
Ba	137	115	NoGas	46.543	0.723	546292	1.27	50	93.1	89.6	110.4	
Tl	205	165	NoGas	47.638	2.230	3744289	2.36	50	95.3	89.6	110.4	
Pb	208	165	NoGas	46.638	1.344	4873173	1.54	50	93.3	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	262456	1.30	232772	112.75	70	120	
Sc	45	H2	386005	8.11	497417	77.60	70	120	
Sc	45	He	21305	1.76	26213	81.27	70	120	
Sc	45	NoGas	3022810	2.11	3271044	92.41	70	120	
Ge	72	H2	105797	9.27	130306	81.19	70	120	
Ge	72	He	20983	3.14	25369	82.71	70	120	
Ge	72	NoGas	750012	2.66	804525	93.22	70	120	
In	115	H2	2327578	8.68	2768793	84.06	70	120	
In	115	He	157724	1.64	184583	85.45	70	120	
In	115	NoGas	5009762	1.30	5159681	97.09	70	120	
Tb	159	H2	4389201	7.86	4956789	88.55	70	120	
Tb	159	He	1076357	2.12	1146052	93.92	70	120	
Tb	159	NoGas	7506472	2.00	7155958	104.90	70	120	
Ho	165	H2	4264570	9.38	4765312	89.49	70	120	
Ho	165	He	1087084	2.14	1131090	96.11	70	120	
Ho	165	NoGas	7309583	1.39	6876887	106.29	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180914
Data File Name	125_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T18:21:05-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	45	NoGas	0.016	56.0	157	47.1	0.1	
B	11	45	NoGas	4.352	12.5	222576	2.6	8	
Na	23	45	He	21.213	9.7	24743	2.0	50	
Mg	24	45	He	0.754	11.6	141	5.5	20	
Al	27	45	He	2.376	64.0	299	9.3	10	
P	31	45	He	-11.715	-36.5	13	50.0	10	
K	39	45	He	-6.001	-26.1	2787	0.5	40	
Ca	40	45	H2	2.691	19.8	20080	1.7	150	
Ti	47	45	He	0.263	30.1	10	33.3	0.5	
V	51	45	He	0.025	42.3	93	29.2	0.4	
Cr	52	45	He	0.010	140.0	484	7.5	0.2	
Mn	55	45	He	0.032	29.4	83	6.9	0.3	
Fe	56	45	He	1.418	6.9	6222	0.6	30	
Co	59	45	He	0.016	27.4	151	18.5	0.4	
Ni	60	45	He	0.022	107.0	136	37.8	0.4	
Cu	63	45	He	0.022	102.3	1028	10.9	0.4	
Zn	66	115	He	0.078	75.9	416	10.1	15	
As	75	115	He	0.024	48.2	14	28.6	0.2	
Se	78	72	H2	0.043	27.4	36	18.0	0.4	
Se	78	115	He	-0.091	-101.3	1	100.0	0.4	
Sr	88	115	NoGas	0.023	10.9	2560	7.7	0.1	
Mo	95	115	NoGas	0.033	32.6	743	23.6	0.3	
Ag	107	115	NoGas	0.004	230.5	4414	10.8	0.1	
Cd	111	115	He	0.020	34.1	21	32.9	0.1	
Sn	118	115	He	0.048	20.3	111	12.1	0.1	
Sn	118	115	NoGas	0.067	4.9	2656	3.6	0.1	
Sb	121	115	NoGas	0.393	5.5	15194	2.9	0.5	
Ba	137	115	NoGas	0.030	18.6	510	12.2	0.4	
Tl	205	165	NoGas	0.018	23.3	3104	9.0	0.2	
Pb	208	165	NoGas	0.017	33.9	8571	8.3	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	264002	1.99	232772	113.42	70	120	
Sc	45	H2	397498	9.31	497417	79.91	70	120	
Sc	45	He	21278	3.73	26213	81.17	70	120	
Sc	45	NoGas	2984284	1.42	3271044	91.23	70	120	
Ge	72	H2	108659	9.61	130306	83.39	70	120	
Ge	72	He	21577	1.95	25369	85.05	70	120	
Ge	72	NoGas	743216	1.05	804525	92.38	70	120	
In	115	H2	2407338	8.62	2768793	86.95	70	120	
In	115	He	162702	2.29	184583	88.15	70	120	
In	115	NoGas	5073226	2.22	5159681	98.32	70	120	
Tb	159	H2	4502599	9.41	4956789	90.84	70	120	
Tb	159	He	1082450	1.86	1146052	94.45	70	120	
Tb	159	NoGas	7435541	1.88	7155958	103.91	70	120	
Ho	165	H2	4327729	9.66	4765312	90.82	70	120	
Ho	165	He	1090089	2.10	1131090	96.38	70	120	
Ho	165	NoGas	7226927	1.61	6876887	105.09	70	120	

Calibration Blank Report

Sample Table

Sample Name	Calibration Blank 9/18/18
Data File Name	004CALB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:24:17-07:00
Sample Type	CalBlk
Level	1
Dilution	1
Comment	Megatron EJ

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD
Be	9	6	NoGas	37	103.25
B	11	45	NoGas	22731	2.28
Na	23	45	He	24572	0.51
Mg	24	45	He	94	14.70
Al	27	45	He	111	15.10
P	31	45	He	252	14.13
K	39	45	He	11685	3.51
Ca	40	45	H2	51314	2.69
Ca (no)	44	45	He	168	16.18
Ti	47	45	He	0	#DIV/0!
V	51	45	He	194	14.38
Cr	52	45	He	891	4.51
Mn	55	45	He	84	2.28
Fe	56	45	He	2536	3.75
Co	59	45	He	48	28.20
Ni	60	45	He	66	19.25
Cu	63	45	He	1802	10.96
Zn	66	115	He	703	15.38
As	75	115	He	16	44.83
Se	78	115	H2	21	4.69
Se	78	115	He	5	65.85
Sr	88	115	NoGas	253	15.95
Mo	95	115	NoGas	100	17.33
Ag	107	115	NoGas	3300	5.01
Cd	111	115	He	1	173.21
Sn	118	115	He	166	12.14
Sn	118	115	NoGas	1155	11.35
Sb	121	115	NoGas	977	6.00
Ba	137	165	NoGas	880	12.91
Tl	205	165	NoGas	523	11.52
[Pb]	206	165	NoGas	990	16.81
[Pb]	207	165	NoGas	790	14.38
Pb	208	165	NoGas	3814	5.56

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD
Li	6	NoGas	267827	1.50
Sc	45	H2	415473	6.78
Sc	45	He	58243	1.82
Sc	45	NoGas	2418294	1.02
Ge	72	H2	121413	5.57
Ge	72	He	45798	0.92
Ge	72	NoGas	584877	1.61
In	115	H2	2292298	6.99
In	115	He	399276	0.57
In	115	NoGas	3892468	1.11
Tb	159	H2	4163457	7.14
Tb	159	He	1939211	2.03
Tb	159	NoGas	5743431	1.00
Ho	165	H2	4001522	6.74
Ho	165	He	1933801	0.63
Ho	165	NoGas	5517017	1.84

Calibration Standard Report

Sample Table

Sample Name	Standard 1 9/18/18
Data File Name	005CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:28:13-07:00
Sample Type	CalStd
Level	2
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	6	NoGas	793	5.68	1.0000
B	11	45	NoGas	22764	2.79	1.0000
Na	23	45	He	27360	1.58	0.9994
Mg	24	45	He	1490	3.13	0.9996
Al	27	45	He	310	23.29	0.9998
P	31	45	He	193	18.00	0.9998
K	39	45	He	12313	1.70	0.9998
Ca	40	45	H2	45504	3.10	0.9996
Ca (no)	44	45	He	166	16.40	
Ti	47	45	He	7	86.60	1.0000
V	51	45	He	660	4.13	0.9998
Cr	52	45	He	1393	0.24	0.9998
Mn	55	45	He	337	8.91	0.9996
Fe	56	45	He	12957	0.41	0.9999
Co	59	45	He	1081	5.01	0.9998
Ni	60	45	He	1041	11.02	0.9998
Cu	63	45	He	2200	7.01	0.9998
Zn	66	115	He	1439	6.87	0.9999
As	75	115	He	72	23.53	0.9999
Se	78	115	H2	76	7.02	0.9999
Se	78	115	He	9	43.30	1.0000
Sr	88	115	NoGas	6341	1.94	0.9997
Mo	95	115	NoGas	1213	10.07	0.9999
Ag	107	115	NoGas	4577	1.20	1.0000
Cd	111	115	He	165	10.95	0.9999
Sn	118	115	He	407	17.27	0.9998
Sn	118	115	NoGas	3047	2.52	1.0000
Sb	121	115	NoGas	3164	5.38	1.0000
Ba	137	165	NoGas	1287	11.22	1.0000
Tl	205	165	NoGas	5728	3.45	1.0000
[Pb]	206	165	NoGas	2780	10.13	
[Pb]	207	165	NoGas	2207	14.21	
Pb	208	165	NoGas	10909	7.06	0.9999

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	272695	1.17	267827	101.82	70	120	
Sc	45	H2	423106	10.21	415473	101.84	70	120	
Sc	45	He	58480	0.59	58243	100.41	70	120	
Sc	45	NoGas	2426315	2.74	2418294	100.33	70	120	
Ge	72	H2	126892	5.83	121413	104.51	70	120	
Ge	72	He	45954	0.60	45798	100.34	70	120	
Ge	72	NoGas	592916	0.96	584877	101.37	70	120	
In	115	H2	2345053	11.37	2292298	102.30	70	120	
In	115	He	400972	0.66	399276	100.42	70	120	
In	115	NoGas	3987043	0.17	3892468	102.43	70	120	
Tb	159	H2	4229150	10.58	4163457	101.58	70	120	
Tb	159	He	1955705	0.42	1939211	100.85	70	120	
Tb	159	NoGas	5835612	1.91	5743431	101.60	70	120	
Ho	165	H2	4030024	10.61	4001522	100.71	70	120	
Ho	165	He	1902991	1.56	1933801	98.41	70	120	
Ho	165	NoGas	5602752	1.55	5517017	101.55	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 2 9/18/18
Data File Name	006CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:32:10-07:00
Sample Type	CalStd
Level	3
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	6	NoGas	7438	7.12	1.0000
B	11	45	NoGas	25238	1.93	1.0000
Na	23	45	He	42865	0.41	0.9994
Mg	24	45	He	14908	1.91	0.9996
Al	27	45	He	1768	6.12	0.9998
P	31	45	He	226	9.50	0.9998
K	39	45	He	15732	0.78	0.9998
Ca	40	45	H2	235355	1.91	0.9996
Ca (no)	44	45	He	721	3.15	
Ti	47	45	He	104	1.84	1.0000
V	51	45	He	4085	3.93	0.9998
Cr	52	45	He	6053	1.38	0.9998
Mn	55	45	He	2156	5.28	0.9996
Fe	56	45	He	88309	0.25	0.9999
Co	59	45	He	9921	2.67	0.9998
Ni	60	45	He	3538	7.24	0.9998
Cu	63	45	He	9693	3.02	0.9998
Zn	66	115	He	2947	3.63	0.9999
As	75	115	He	633	7.04	0.9999
Se	78	115	H2	561	4.97	0.9999
Se	78	115	He	39	16.42	1.0000
Sr	88	115	NoGas	56792	3.22	0.9997
Mo	95	115	NoGas	11881	2.66	0.9999
Ag	107	115	NoGas	19134	2.46	1.0000
Cd	111	115	He	1487	3.46	0.9999
Sn	118	115	He	2708	0.51	0.9998
Sn	118	115	NoGas	18354	1.17	1.0000
Sb	121	115	NoGas	25209	2.23	1.0000
Ba	137	165	NoGas	8949	4.93	1.0000
Tl	205	165	NoGas	53894	3.10	1.0000
[Pb]	206	165	NoGas	18721	3.51	
[Pb]	207	165	NoGas	17063	4.67	
Pb	208	165	NoGas	77152	2.53	0.9999

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	267599	0.78	267827	99.91	70	120	
Sc	45	H2	418639	11.67	415473	100.76	70	120	
Sc	45	He	57543	5.13	58243	98.80	70	120	
Sc	45	NoGas	2392586	2.06	2418294	98.94	70	120	
Ge	72	H2	126572	7.83	121413	104.25	70	120	
Ge	72	He	45310	2.13	45798	98.93	70	120	
Ge	72	NoGas	584915	2.20	584877	100.01	70	120	
In	115	H2	2296454	12.12	2292298	100.18	70	120	
In	115	He	388099	3.94	399276	97.20	70	120	
In	115	NoGas	3958220	2.42	3892468	101.69	70	120	
Tb	159	H2	4171105	11.57	4163457	100.18	70	120	
Tb	159	He	1872157	3.29	1939211	96.54	70	120	
Tb	159	NoGas	5735593	2.40	5743431	99.86	70	120	
Ho	165	H2	3999072	11.67	4001522	99.94	70	120	
Ho	165	He	1850712	2.99	1933801	95.70	70	120	
Ho	165	NoGas	5596549	1.98	5517017	101.44	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 3 9/18/18
Data File Name	007CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:36:06-07:00
Sample Type	CalStd
Level	4
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	6	NoGas	361653	0.17	1.0000
B	11	45	NoGas	245092	1.73	1.0000
Na	23	45	He	771508	0.36	0.9994
Mg	24	45	He	716773	0.62	0.9996
Al	27	45	He	82930	0.66	0.9998
P	31	45	He	1639	6.30	0.9998
K	39	45	He	183507	0.35	0.9998
Ca	40	45	H2	8758493	2.51	0.9996
Ca (no)	44	45	He	27460	1.62	
Ti	47	45	He	4376	2.74	1.0000
V	51	45	He	188772	0.67	0.9998
Cr	52	45	He	257836	0.43	0.9998
Mn	55	45	He	103950	0.90	0.9996
Fe	56	45	He	3961663	1.15	0.9999
Co	59	45	He	467638	0.36	0.9998
Ni	60	45	He	137157	0.39	0.9998
Cu	63	45	He	389095	0.48	0.9998
Zn	66	115	He	54039	1.63	0.9999
As	75	115	He	30383	1.34	0.9999
Se	78	115	H2	27310	2.92	0.9999
Se	78	115	He	1437	0.57	1.0000
Sr	88	115	NoGas	2780282	0.93	0.9997
Mo	95	115	NoGas	575327	1.71	0.9999
Ag	107	115	NoGas	755565	1.21	1.0000
Cd	111	115	He	73268	0.68	0.9999
Sn	118	115	He	120940	0.72	0.9998
Sn	118	115	NoGas	865206	1.20	1.0000
Sb	121	115	NoGas	1255792	1.27	1.0000
Ba	137	165	NoGas	430923	1.02	1.0000
Tl	205	165	NoGas	2868239	1.04	1.0000
[Pb]	206	165	NoGas	892819	0.80	
[Pb]	207	165	NoGas	813213	0.62	
Pb	208	165	NoGas	3739817	0.67	0.9999

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	264434	1.49	267827	98.73	70	120	
Sc	45	H2	410364	10.31	415473	98.77	70	120	
Sc	45	He	57593	0.83	58243	98.88	70	120	
Sc	45	NoGas	2368410	2.27	2418294	97.94	70	120	
Ge	72	H2	123445	7.57	121413	101.67	70	120	
Ge	72	He	45486	1.11	45798	99.32	70	120	
Ge	72	NoGas	581804	1.38	584877	99.47	70	120	
In	115	H2	2280857	10.08	2292298	99.50	70	120	
In	115	He	389769	0.95	399276	97.62	70	120	
In	115	NoGas	3849884	0.88	3892468	98.91	70	120	
Tb	159	H2	4173296	10.56	4163457	100.24	70	120	
Tb	159	He	1907781	0.95	1939211	98.38	70	120	
Tb	159	NoGas	5717637	1.17	5743431	99.55	70	120	
Ho	165	H2	4012208	10.16	4001522	100.27	70	120	
Ho	165	He	1901062	0.58	1933801	98.31	70	120	
Ho	165	NoGas	5587307	1.51	5517017	101.27	70	120	

Calibration Standard Report

Sample Table

Sample Name	Standard 4 9/18/18
Data File Name	008CALS.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:40:01-07:00
Sample Type	CalStd
Level	5
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	CPS	%RSD	Cal Coef
Be	9	6	NoGas	705437	0.52	1.0000
B	11	45	NoGas	454723	0.93	1.0000
Na	23	45	He	1387410	1.41	0.9994
Mg	24	45	He	1324571	0.63	0.9996
Al	27	45	He	156391	0.04	0.9998
P	31	45	He	2973	3.65	0.9998
K	39	45	He	336400	0.66	0.9998
Ca	40	45	H2	16540828	3.11	0.9996
Ca (no)	44	45	He	52003	0.49	
Ti	47	45	He	8430	1.52	1.0000
V	51	45	He	355821	0.93	0.9998
Cr	52	45	He	485838	0.38	0.9998
Mn	55	45	He	192730	0.26	0.9996
Fe	56	45	He	7517547	0.38	0.9999
Co	59	45	He	878909	0.41	0.9998
Ni	60	45	He	258489	0.39	0.9998
Cu	63	45	He	730346	1.21	0.9998
Zn	66	115	He	102419	0.79	0.9999
As	75	115	He	57819	0.38	0.9999
Se	78	115	H2	52301	2.29	0.9999
Se	78	115	He	2811	0.54	1.0000
Sr	88	115	NoGas	5265221	2.40	0.9997
Mo	95	115	NoGas	1108944	1.90	0.9999
Ag	107	115	NoGas	1506048	1.65	1.0000
Cd	111	115	He	139313	0.45	0.9999
Sn	118	115	He	228852	0.64	0.9998
Sn	118	115	NoGas	1709387	1.23	1.0000
Sb	121	115	NoGas	2543657	1.11	1.0000
Ba	137	165	NoGas	829745	1.50	1.0000
Tl	205	165	NoGas	5506776	0.69	1.0000
[Pb]	206	165	NoGas	1871315	1.88	
[Pb]	207	165	NoGas	1682034	1.47	
Pb	208	165	NoGas	7463488	1.17	0.9999

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	256710	1.55	267827	95.85	70	120	
Sc	45	H2	410432	9.07	415473	98.79	70	120	
Sc	45	He	56506	1.56	58243	97.02	70	120	
Sc	45	NoGas	2284584	0.25	2418294	94.47	70	120	
Ge	72	H2	123539	6.52	121413	101.75	70	120	
Ge	72	He	45312	1.05	45798	98.94	70	120	
Ge	72	NoGas	560651	1.17	584877	95.86	70	120	
In	115	H2	2255837	8.88	2292298	98.41	70	120	
In	115	He	383120	0.14	399276	95.95	70	120	
In	115	NoGas	3823553	1.11	3892468	98.23	70	120	
Tb	159	H2	4197314	9.48	4163457	100.81	70	120	
Tb	159	He	1894222	1.59	1939211	97.68	70	120	
Tb	159	NoGas	5658342	2.21	5743431	98.52	70	120	
Ho	165	H2	4023287	9.84	4001522	100.54	70	120	
Ho	165	He	1903141	0.85	1933801	98.41	70	120	
Ho	165	NoGas	5455773	2.04	5517017	98.89	70	120	

Initial Calibration Verification (ICV) Report

Sample Table

Sample Name	ICV 180918
Data File Name	009_ICV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:43:51-07:00
Sample Type	ICV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	6	NoGas	44.540	2.853	325835	1.35	10	445.4	89.6	110.4	>+\- 10%
B	11	45	NoGas	50.096	2.263	249368	2.05	50	100.2	89.6	110.4	
Na	23	45	He	1289.338	0.611	740517	0.43	1250	103.1	89.6	110.4	
Mg	24	45	He	1279.263	1.276	344445	0.32	1250	102.3	89.6	110.4	
Al	27	45	He	1264.089	0.350	100061	0.70	1250	101.1	89.6	110.4	
P	31	45	He	234.546	5.757	1530	4.17	250	93.8	89.6	110.4	
K	39	45	He	1243.349	1.338	215779	0.67	1250	99.5	89.6	110.4	
Ca	40	45	H2	1202.821	9.440	4200268	1.82	1250	96.2	89.6	110.4	
Ti	47	45	He	51.178	3.351	4348	4.34	50	102.4	89.6	110.4	
V	51	45	He	49.677	0.495	178966	0.58	50	99.4	89.6	110.4	
Cr	52	45	He	49.793	0.079	245212	0.89	50	99.6	89.6	110.4	
Mn	55	45	He	50.138	1.435	98167	0.63	50	100.3	89.6	110.4	
Fe	56	45	He	1247.451	1.114	4739891	0.75	1250	99.8	89.6	110.4	
Co	59	45	He	50.498	0.340	449511	0.98	50	101.0	89.6	110.4	
Ni	60	45	He	50.009	1.318	130860	0.35	50	100.0	89.6	110.4	
Cu	63	45	He	50.315	1.330	372887	0.37	50	100.6	89.6	110.4	
Zn	66	115	He	47.204	1.362	49767	2.15	50	94.4	89.6	110.4	
As	75	115	He	49.061	2.028	28999	1.07	50	98.1	89.6	110.4	
Se	78	115	H2	48.551	12.596	26403	2.67	50	97.1	89.6	110.4	
Se	78	115	He	47.777	4.514	1367	4.30	50	95.6	89.6	110.4	
Sr	88	115	NoGas	46.825	1.566	2542574	1.80	50	93.7	89.6	110.4	
Mo	95	115	NoGas	47.475	1.206	540963	1.01	50	94.9	89.6	110.4	
Ag	107	115	NoGas	23.140	1.627	712737	0.71	25	92.6	89.6	110.4	
Cd	111	115	He	49.357	1.327	70296	0.84	50	98.7	89.6	110.4	
Sn	118	115	He	24.682	0.622	57919	0.43	25	98.7	89.6	110.4	
Sn	118	115	NoGas	23.833	1.993	417308	0.33	25	95.3	89.6	110.4	
Sb	121	115	NoGas	48.922	1.433	1266342	0.94	50	97.8	89.6	110.4	
Ba	137	165	NoGas	17.825	1.387	154519	0.50	50	35.6	89.6	110.4	>+\- 10%
Tl	205	165	NoGas	47.938	0.889	2747586	0.35	50	95.9	89.6	110.4	
Pb	208	165	NoGas	47.167	1.496	3637387	0.74	50	94.3	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	266494	2.10	267827	99.50	70	120	
Sc	45	H2	423014	7.41	415473	101.81	70	120	
Sc	45	He	56719	0.97	58243	97.38	70	120	
Sc	45	NoGas	2391855	0.77	2418294	98.91	70	120	
Ge	72	H2	123143	5.03	121413	101.42	70	120	
Ge	72	He	44702	0.78	45798	97.61	70	120	
Ge	72	NoGas	584142	1.68	584877	99.87	70	120	
In	115	H2	2332013	9.81	2292298	101.73	70	120	
In	115	He	389053	1.00	399276	97.44	70	120	
In	115	NoGas	3905571	2.19	3892468	100.34	70	120	
Tb	159	H2	4253848	8.92	4163457	102.17	70	120	
Tb	159	He	1933863	0.34	1939211	99.72	70	120	
Tb	159	NoGas	5790642	0.78	5743431	100.82	70	120	
Ho	165	H2	4091237	9.02	4001522	102.24	70	120	
Ho	165	He	1913979	0.92	1933801	98.97	70	120	
Ho	165	NoGas	5657718	0.89	5517017	102.55	70	120	

Initial Calibration Verification (ICV) Report

Sample Table

Sample Name	ICV 2 180918
Data File Name	010_ICV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:47:47-07:00
Sample Type	ICV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	6	NoGas	9.809	1.407	69257	0.59	10	98.1	89.6	110.4	
B	11	45	NoGas	49.314	1.194	241458	0.48	50	98.6	89.6	110.4	
Na	23	45	He	4839.034	1.329	2679939	2.33	1250	387.1	89.6	110.4	>+\- 10%
Mg	24	45	He	4921.954	1.945	1308449	1.04	1250	393.8	89.6	110.4	>+\- 10%
Al	27	45	He	395.986	1.394	31031	2.24	1250	31.7	89.6	110.4	>+\- 10%
P	31	45	He	381.997	6.934	2309	6.59	250	152.8	89.6	110.4	>+\- 10%
K	39	45	He	994.510	1.532	172695	0.92	1250	79.6	89.6	110.4	>+\- 10%
Ca	40	45	H2	4961.748	14.675	16250911	2.19	1250	396.9	89.6	110.4	>+\- 10%
Ti	47	45	He	48.733	2.040	4088	2.41	50	97.5	89.6	110.4	
V	51	45	He	49.939	1.217	177667	0.95	50	99.9	89.6	110.4	
Cr	52	45	He	49.739	0.420	241900	1.22	50	99.5	89.6	110.4	
Mn	55	45	He	50.356	0.748	97373	1.05	50	100.7	89.6	110.4	
Fe	56	45	He	202.071	0.465	760330	1.00	1250	16.2	89.6	110.4	>+\- 10%
Co	59	45	He	49.553	0.962	435589	0.41	50	99.1	89.6	110.4	
Ni	60	45	He	48.275	1.359	124759	1.32	50	96.6	89.6	110.4	
Cu	63	45	He	49.485	1.338	362200	0.31	50	99.0	89.6	110.4	
Zn	66	115	He	94.612	0.209	97488	0.60	50	189.2	89.6	110.4	>+\- 10%
As	75	115	He	49.276	1.707	28671	2.07	50	98.6	89.6	110.4	
Se	78	115	H2	49.543	13.081	25805	2.07	50	99.1	89.6	110.4	
Se	78	115	He	48.614	0.821	1369	0.87	50	97.2	89.6	110.4	
Sr	88	115	NoGas	49.220	1.886	2623581	1.28	50	98.4	89.6	110.4	
Mo	95	115	NoGas	48.649	0.991	544224	0.54	50	97.3	89.6	110.4	
Ag	107	115	NoGas	19.057	1.322	576881	1.12	25	76.2	89.6	110.4	>+\- 10%
Cd	111	115	He	9.929	1.273	13920	0.65	50	19.9	89.6	110.4	>+\- 10%
Sn	118	115	He	48.788	1.077	112525	1.22	25	195.2	89.6	110.4	>+\- 10%
Sn	118	115	NoGas	48.467	1.029	832069	0.48	25	193.9	89.6	110.4	>+\- 10%
Sb	121	115	NoGas	48.609	2.324	1235170	1.30	50	97.2	89.6	110.4	
Ba	137	165	NoGas	48.871	0.878	416647	0.59	50	97.7	89.6	110.4	
Tl	205	165	NoGas	48.498	1.341	2743732	0.75	50	97.0	89.6	110.4	
Pb	208	165	NoGas	47.742	1.016	3634192	0.51	50	95.5	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	257043	1.21	267827	95.97	70	120	
Sc	45	H2	403618	12.53	415473	97.15	70	120	
Sc	45	He	56015	1.35	58243	96.17	70	120	
Sc	45	NoGas	2349398	0.60	2418294	97.15	70	120	
Ge	72	H2	117363	9.78	121413	96.66	70	120	
Ge	72	He	44205	1.09	45798	96.52	70	120	
Ge	72	NoGas	572765	1.57	584877	97.93	70	120	
In	115	H2	2236908	11.18	2292298	97.58	70	120	
In	115	He	382905	0.67	399276	95.90	70	120	
In	115	NoGas	3833989	1.51	3892468	98.50	70	120	
Tb	159	H2	4107613	12.45	4163457	98.66	70	120	
Tb	159	He	1901678	1.67	1939211	98.06	70	120	
Tb	159	NoGas	5674927	1.14	5743431	98.81	70	120	
Ho	165	H2	3990172	11.50	4001522	99.72	70	120	
Ho	165	He	1862951	0.28	1933801	96.34	70	120	
Ho	165	NoGas	5584540	0.60	5517017	101.22	70	120	

Initial Calibration Blank (ICB) Report

Sample Table

Sample Name	ICB 180918
Data File Name	015_ICB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T09:07:31-07:00
Sample Type	ICB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	6	NoGas	0.001	13.3	40	0.0	0.1	
B	11	45	NoGas	-0.725	-17.0	18880	0.4	8	
Na	23	45	He	-3.116	-48.1	22263	2.6	50	
Mg	24	45	He	0.131	107.5	128	30.0	20	
Al	27	45	He	-0.153	-239.3	97	30.6	10	
P	31	45	He	-1.601	-394.8	238	13.8	10	
K	39	45	He	-0.010	-13317.7	11415	1.3	40	
Ca	40	45	H2	1.893	131.4	56122	1.8	150	
Ti	47	45	He	0.000	#DIV/0!	0	#DIV/0!	0.5	
V	51	45	He	0.007	190.4	213	21.7	0.4	
Cr	52	45	He	0.010	159.0	918	7.1	0.2	
Mn	55	45	He	-0.002	-545.5	79	25.5	0.3	
Fe	56	45	He	0.106	28.4	2882	3.2	30	
Co	59	45	He	0.003	62.5	77	23.0	0.4	
Ni	60	45	He	0.004	134.1	74	18.1	0.4	
Cu	63	45	He	-0.113	-1.2	927	0.6	0.4	
Zn	66	115	He	-0.177	-21.0	496	7.4	15	
As	75	115	He	0.006	144.7	18	25.8	0.2	
Se	78	115	H2	-0.003	-318.0	20	17.4	0.4	
Se	78	115	He	0.077	131.5	7	39.4	0.4	
Sr	88	115	NoGas	0.004	36.5	477	17.5	0.1	
Mo	95	115	NoGas	0.006	7.9	173	3.3	0.3	
Ag	107	115	NoGas	0.000	-2134.2	3284	10.3	0.1	
Cd	111	115	He	0.002	135.8	5	99.0	0.1	
Sn	118	115	He	0.017	65.2	199	12.8	0.1	
Sn	118	115	NoGas	0.008	63.0	1301	8.1	0.1	
Sb	121	115	NoGas	0.109	10.2	3774	6.9	0.5	
Ba	137	165	NoGas	0.005	416.1	927	20.0	0.4	
Tl	205	165	NoGas	0.003	6.7	713	2.1	0.2	
Pb	208	165	NoGas	-0.009	-13.8	3117	2.3	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	262609	1.38	267827	98.05	70	120	
Sc	45	H2	407837	12.91	415473	98.16	70	120	
Sc	45	He	56895	1.27	58243	97.68	70	120	
Sc	45	NoGas	2353214	2.50	2418294	97.31	70	120	
Ge	72	H2	123203	6.86	121413	101.47	70	120	
Ge	72	He	44456	2.00	45798	97.07	70	120	
Ge	72	NoGas	583754	1.63	584877	99.81	70	120	
In	115	H2	2268921	11.67	2292298	98.98	70	120	
In	115	He	384525	0.52	399276	96.31	70	120	
In	115	NoGas	3889248	1.18	3892468	99.92	70	120	
Tb	159	H2	4137309	12.10	4163457	99.37	70	120	
Tb	159	He	1890799	0.82	1939211	97.50	70	120	
Tb	159	NoGas	5714331	2.19	5743431	99.49	70	120	
Ho	165	H2	3979546	11.50	4001522	99.45	70	120	
Ho	165	He	1884858	1.31	1933801	97.47	70	120	
Ho	165	NoGas	5545141	2.52	5517017	100.51	70	120	

Interference Check Solution A (ICS-A) Report

Sample Table

Sample Name	ICSA 180918
Data File Name	016ICSA.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T09:11:28-07:00
Sample Type	ICSA
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	NoGas	0.002	247.5	43	66.6	0.1	
B	11	NoGas	-0.857	-10.9	17449	4.0	8	
Na	23	He	51823.907	1.1	27113385	0.5	60000	
Mg	24	He	51504.656	1.2	13040837	0.6	60000	
Al	27	He	51696.706	1.2	3844797	0.5	60000	
P	31	He	52726.086	0.9	271803	0.2	60000	
K	39	He	50865.875	1.5	7875901	0.8	60000	
Ca	40	H2	51333.717	10.9	166146531	1.2	60000	
Ti	47	He	1051.000	0.9	83973	0.8	1200	
V	51	He	0.011	65.6	216	11.6	0.2	
Cr	52	He	0.140	11.6	1462	4.5	30	
Mn	55	He	0.376	10.3	770	9.2	24	
Fe	56	He	51946.200	2.5	185545037	1.8	60000	
Co	59	He	0.021	5.9	221	4.6	5	
Ni	60	He	0.120	22.9	354	18.4	5	
Cu	63	He	0.031	21.6	1866	1.8	5	
Zn	66	He	0.419	25.7	1009	10.8	20	
As	75	He	0.073	12.8	52	8.6	0.4	
Se	78	H2	0.033	50.9	36	13.1	0.4	
Se	78	He	0.156	96.9	9	43.7	0.4	
Sr	88	NoGas	0.491	3.6	24771	2.3	5	
Mo	95	NoGas	1031.533	2.1	10829362	0.5	1200	
Ag	107	NoGas	0.018	51.5	3554	6.6	5	
Cd	111	He	0.171	11.5	220	11.6	0.5	
Sn	118	He	0.057	14.1	264	7.2	5	
Sn	118	NoGas	0.055	11.4	1959	6.7	5	
Sb	121	NoGas	0.159	7.2	4684	4.3	5	
Ba	137	NoGas	-0.068	-8.7	300	15.3	1.5	
Tl	205	NoGas	0.001	389.2	550	28.6	0.2	
Pb	208	NoGas	0.132	10.8	13343	7.5	1	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	232555	1.51	267827	86.83	70	120	
Sc	45	H2	397976	10.07	415473	95.79	70	120	
Sc	45	He	53349	0.70	58243	91.60	70	120	
Sc	45	NoGas	2243240	2.08	2418294	92.76	70	120	
Ge	72	H2	106002	7.21	121413	87.31	70	120	
Ge	72	He	41626	0.73	45798	90.89	70	120	
Ge	72	NoGas	558700	1.48	584877	95.52	70	120	
In	115	H2	2120186	10.73	2292298	92.49	70	120	
In	115	He	349729	0.89	399276	87.59	70	120	
In	115	NoGas	3599160	1.65	3892468	92.46	70	120	
Tb	159	H2	4010000	11.03	4163457	96.31	70	120	
Tb	159	He	1790660	1.13	1939211	92.34	70	120	
Tb	159	NoGas	5497907	1.30	5743431	95.73	70	120	
Ho	165	H2	3903536	11.32	4001522	97.55	70	120	
Ho	165	He	1776857	2.62	1933801	91.88	70	120	
Ho	165	NoGas	5369691	0.87	5517017	97.33	70	120	

Interference Check Solution AB (ICS-AB) Report

Sample Table

Sample Name	ICSAB 180918
Data File Name	017ICSB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T09:15:19-07:00
Sample Type	ICSB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High	QC Flag
Be	9	NoGas	52.234	1.489	326629	0.49	50	104.5	80	120	
B	11	NoGas	-0.930	-13.896	17085	3.47	-8	11.6	80	120	
Na	23	He	52363.313	1.119	27099259	0.66	50000	104.7	80	120	
Mg	24	He	52326.581	0.310	13106226	0.66	50000	104.7	80	120	
Al	27	He	52701.844	0.733	3877348	0.90	50000	105.4	80	120	
P	31	He	53050.605	0.956	270529	1.24	50000	106.1	80	120	
K	39	He	51405.407	1.394	7873612	1.40	50000	102.8	80	120	
Ca	40	H2	53151.023	13.200	164877425	2.05	50000	106.3	80	120	
Ti	47	He	1060.512	1.628	83812	0.98	1000	106.1	80	120	
V	51	He	52.657	1.217	176486	0.56	50	105.3	80	120	
Cr	52	He	51.580	0.928	236299	0.37	50	103.2	80	120	
Mn	55	He	51.510	1.047	93837	0.39	50	103.0	80	120	
Fe	56	He	51980.783	0.918	183674010	0.39	50000	104.0	80	120	
Co	59	He	51.029	0.610	422618	0.10	50	102.1	80	120	
Ni	60	He	99.416	1.543	241987	1.01	100	99.4	80	120	
Cu	63	He	50.376	0.837	347388	1.02	50	100.8	80	120	
Zn	66	He	98.613	0.615	92736	0.71	100	98.6	80	120	
As	75	He	52.302	0.147	27780	0.81	50	104.6	80	120	
Se	78	H2	51.877	13.530	24947	2.12	50	103.8	80	120	
Se	78	He	51.184	4.043	1316	3.22	50	102.4	80	120	
Sr	88	NoGas	0.502	1.536	25292	1.62	-5	-10.0	80	120	
Mo	95	NoGas	1091.685	0.834	11428627	0.80	1050	104.0	80	120	
Ag	107	NoGas	95.440	0.854	2691910	0.94	100	95.4	80	120	
Cd	111	He	101.358	1.197	129706	0.70	100	101.4	80	120	
Sn	118	He	0.035	18.446	219	5.35	-0.5	-7.0	100	100	
Sn	118	NoGas	0.038	12.513	1673	4.37	-0.5	-7.6	100	100	
Sb	121	NoGas	51.795	1.168	1231978	1.55	50	103.6	80	120	
Ba	137	NoGas	49.562	1.684	406252	1.25	50	99.1	80	120	
Tl	205	NoGas	49.769	1.487	2707173	0.79	50	99.5	80	120	
Pb	208	NoGas	95.924	2.054	7016650	1.37	100	95.9	80	120	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	227735	1.02	267827	85.03	70	120	
Sc	45	H2	382415	11.19	415473	92.04	70	120	
Sc	45	He	52772	0.69	58243	90.61	70	120	
Sc	45	NoGas	2236921	1.12	2418294	92.50	70	120	
Ge	72	H2	101103	10.77	121413	83.27	70	120	
Ge	72	He	41866	0.89	45798	91.42	70	120	
Ge	72	NoGas	558017	0.47	584877	95.41	70	120	
In	115	H2	2066475	11.36	2292298	90.15	70	120	
In	115	He	349565	0.89	399276	87.55	70	120	
In	115	NoGas	3588228	0.52	3892468	92.18	70	120	
Tb	159	H2	3918994	10.20	4163457	94.13	70	120	
Tb	159	He	1767817	0.25	1939211	91.16	70	120	
Tb	159	NoGas	5524777	1.24	5743431	96.19	70	120	
Ho	165	H2	3797515	11.32	4001522	94.90	70	120	
Ho	165	He	1779885	0.61	1933801	92.04	70	120	
Ho	165	NoGas	5369570	0.71	5517017	97.33	70	120	

Sample Report

Sample Table

Sample Name	0.5 ppb LLICV 180918
Data File Name	011SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:51:41-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.533	0.533	2.94	3947	3.67	10000	
B	11	45	NoGas	1.336	1.336	7.87	28045	1.26	10000	
Na	23	45	He	17.367	17.367	12.12	33411	2.40	1000000	
Mg	24	45	He	26.901	26.901	2.60	7296	1.18	1000000	
Al	27	45	He	10.660	10.660	12.81	946	10.00	1000000	
P	31	45	He	-5.647	-5.647	-181.11	214	27.38	500000	
K	39	45	He	10.712	10.712	17.74	13078	2.41	500000	
Ca	40	45	H2	19.160	19.160	19.29	114486	0.89	500000	
Ti	47	45	He	0.683	0.683	29.54	58	29.61	10000	
V	51	45	He	0.560	0.560	4.12	2196	4.62	10000	
Cr	52	45	He	0.550	0.550	1.55	3549	0.36	10000	
Mn	55	45	He	0.575	0.575	5.09	1202	5.33	50000	
Fe	56	45	He	11.003	11.003	1.00	44038	1.27	1000000	
Co	59	45	He	0.540	0.540	4.11	4827	4.09	10000	
Ni	60	45	He	0.580	0.580	5.72	1575	6.12	10000	
Cu	63	45	He	0.483	0.483	2.75	5295	1.67	10000	
Zn	66	115	He	8.989	8.989	1.35	9974	0.46	50000	
As	75	115	He	0.531	0.531	7.51	327	6.47	2000	
Se	78	115	H2	0.524	0.524	8.84	299	0.63	10000	
Se	78	115	He	0.592	0.592	42.06	22	32.78	10000	
Sr	88	115	NoGas	0.519	0.519	3.71	28390	3.46	50000	
Mo	95	115	NoGas	0.560	0.560	4.94	6461	3.54	10000	
Ag	107	115	NoGas	0.251	0.251	3.21	10971	0.80	5000	
Cd	111	115	He	0.521	0.521	8.63	739	8.58	10000	
Sn	118	115	He	0.598	0.598	12.30	1552	10.39	10000	
Sn	118	115	NoGas	0.556	0.556	2.60	10852	2.54	10000	
Sb	121	115	NoGas	0.884	0.884	1.60	23780	1.11	10000	
Ba	137	165	NoGas	0.472	0.472	4.86	4834	2.76	50000	
Tl	205	165	NoGas	0.508	0.508	3.42	28847	2.05	5000	
Pb	208	165	NoGas	0.505	0.505	3.30	41683	1.73	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	267137	0.93	267827	99.74	70	120	
Sc	45	H2	410670	9.96	415473	98.84	70	120	
Sc	45	He	56440	1.51	58243	96.90	70	120	
Sc	45	NoGas	2351279	0.93	2418294	97.23	70	120	
Ge	72	H2	122888	5.79	121413	101.21	70	120	
Ge	72	He	44750	3.10	45798	97.71	70	120	
Ge	72	NoGas	575188	0.76	584877	98.34	70	120	
In	115	H2	2265900	8.72	2292298	98.85	70	120	
In	115	He	386853	0.92	399276	96.89	70	120	
In	115	NoGas	3896902	1.46	3892468	100.11	70	120	
Tb	159	H2	4174516	10.01	4163457	100.27	70	120	
Tb	159	He	1894616	1.16	1939211	97.70	70	120	
Tb	159	NoGas	5727260	1.89	5743431	99.72	70	120	
Ho	165	H2	3980155	9.47	4001522	99.47	70	120	
Ho	165	He	1897737	1.33	1933801	98.14	70	120	
Ho	165	NoGas	5505979	1.33	5517017	99.80	70	120	

Sample Report

Sample Table

Sample Name	1.0 ppb LLICV 180918
Data File Name	012SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:55:38-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.991	0.991	0.76	7242	0.50	10000	
B	11	45	NoGas	0.946	0.946	19.13	26416	4.86	10000	
Na	23	45	He	38.598	38.598	1.78	45577	0.95	1000000	
Mg	24	45	He	53.984	53.984	2.10	14686	1.72	1000000	
Al	27	45	He	20.501	20.501	8.92	1737	8.36	1000000	
P	31	45	He	-3.915	-3.915	-100.20	226	9.84	500000	
K	39	45	He	25.419	25.419	10.75	15628	3.14	500000	
Ca	40	45	H2	57.565	57.565	18.69	241764	2.15	500000	
Ti	47	45	He	1.068	1.068	19.77	91	20.15	10000	
V	51	45	He	1.034	1.034	1.10	3926	1.08	10000	
Cr	52	45	He	1.063	1.063	4.33	6111	3.32	10000	
Mn	55	45	He	1.119	1.119	3.29	2281	2.96	50000	
Fe	56	45	He	22.025	22.025	2.17	86478	1.70	1000000	
Co	59	45	He	1.046	1.046	0.14	9394	0.54	10000	
Ni	60	45	He	1.290	1.290	0.86	3451	0.66	10000	
Cu	63	45	He	1.044	1.044	3.70	9501	2.91	10000	
Zn	66	115	He	2.576	2.576	1.30	3359	1.47	50000	
As	75	115	He	1.077	1.077	10.16	651	10.48	2000	
Se	78	115	H2	1.018	1.018	9.12	568	3.35	10000	
Se	78	115	He	1.187	1.187	36.96	39	32.13	10000	
Sr	88	115	NoGas	1.052	1.052	3.58	57033	1.17	50000	
Mo	95	115	NoGas	1.061	1.061	5.94	12108	4.36	10000	
Ag	107	115	NoGas	0.509	0.509	1.77	18814	2.83	5000	
Cd	111	115	He	1.012	1.012	4.49	1440	3.78	10000	
Sn	118	115	He	1.028	1.028	4.32	2565	4.52	10000	
Sn	118	115	NoGas	1.063	1.063	0.23	19618	2.39	10000	
Sb	121	115	NoGas	1.172	1.172	2.36	31122	3.64	10000	
Ba	137	165	NoGas	0.967	0.967	3.47	9033	3.88	50000	
Tl	205	165	NoGas	0.985	0.985	1.63	55744	1.24	5000	
Pb	208	165	NoGas	1.029	1.029	2.16	81345	1.47	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	264920	1.25	267827	98.91	70	120	
Sc	45	H2	411029	12.15	415473	98.93	70	120	
Sc	45	He	56958	0.43	58243	97.79	70	120	
Sc	45	NoGas	2359915	1.83	2418294	97.59	70	120	
Ge	72	H2	124473	7.86	121413	102.52	70	120	
Ge	72	He	44954	1.76	45798	98.16	70	120	
Ge	72	NoGas	580487	1.23	584877	99.25	70	120	
In	115	H2	2301956	11.25	2292298	100.42	70	120	
In	115	He	388512	0.83	399276	97.30	70	120	
In	115	NoGas	3883253	2.49	3892468	99.76	70	120	
Tb	159	H2	4131372	11.56	4163457	99.23	70	120	
Tb	159	He	1902543	1.40	1939211	98.11	70	120	
Tb	159	NoGas	5729321	1.79	5743431	99.75	70	120	
Ho	165	H2	4036755	12.81	4001522	100.88	70	120	
Ho	165	He	1890159	0.54	1933801	97.74	70	120	
Ho	165	NoGas	5533348	0.90	5517017	100.30	70	120	

Sample Report

Sample Table

Sample Name	2.0 ppb LLICV 180918
Data File Name	013SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T08:59:35-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	1.976	1.976	6.66	14406	6.02	10000	
B	11	45	NoGas	1.642	1.642	12.03	29597	1.70	10000	
Na	23	45	He	49.960	49.960	2.79	51722	2.33	1000000	
Mg	24	45	He	103.641	103.641	1.43	28004	2.33	1000000	
Al	27	45	He	40.805	40.805	2.47	3336	2.14	1000000	
P	31	45	He	4.178	4.178	87.49	269	6.83	500000	
K	39	45	He	40.253	40.253	1.78	18009	2.39	500000	
Ca	40	45	H2	86.926	86.926	15.71	339489	2.13	500000	
Ti	47	45	He	1.922	1.922	14.96	163	14.72	10000	
V	51	45	He	2.003	2.003	3.18	7399	1.52	10000	
Cr	52	45	He	2.029	2.029	1.42	10829	1.14	10000	
Mn	55	45	He	1.953	1.953	3.17	3905	2.49	50000	
Fe	56	45	He	41.106	41.106	2.30	158616	1.12	1000000	
Co	59	45	He	2.070	2.070	1.08	18475	0.74	10000	
Ni	60	45	He	2.019	2.019	1.29	5348	2.69	10000	
Cu	63	45	He	1.967	1.967	5.51	16263	3.18	10000	
Zn	66	115	He	1.954	1.954	4.90	2721	3.18	50000	
As	75	115	He	2.026	2.026	2.44	1214	3.30	2000	
Se	78	115	H2	1.967	1.967	16.87	1066	5.19	10000	
Se	78	115	He	2.104	2.104	5.08	65	5.38	10000	
Sr	88	115	NoGas	2.012	2.012	2.54	107695	0.91	50000	
Mo	95	115	NoGas	2.034	2.034	2.03	22902	0.67	10000	
Ag	107	115	NoGas	1.014	1.014	1.77	33837	0.35	5000	
Cd	111	115	He	1.894	1.894	2.33	2704	2.92	10000	
Sn	118	115	He	1.943	1.943	1.44	4717	2.06	10000	
Sn	118	115	NoGas	1.996	1.996	3.60	35429	2.10	10000	
Sb	121	115	NoGas	2.052	2.052	1.32	53196	0.77	10000	
Ba	137	165	NoGas	1.927	1.927	4.92	17123	3.93	50000	
Tl	205	165	NoGas	1.913	1.913	1.70	107774	1.56	5000	
Pb	208	165	NoGas	1.907	1.907	3.30	147458	0.80	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	264970	0.68	267827	98.93	70	120	
Sc	45	H2	410205	10.98	415473	98.73	70	120	
Sc	45	He	56742	1.78	58243	97.42	70	120	
Sc	45	NoGas	2367026	1.46	2418294	97.88	70	120	
Ge	72	H2	124080	5.98	121413	102.20	70	120	
Ge	72	He	45270	1.37	45798	98.85	70	120	
Ge	72	NoGas	569817	0.62	584877	97.43	70	120	
In	115	H2	2288300	10.71	2292298	99.83	70	120	
In	115	He	389704	0.88	399276	97.60	70	120	
In	115	NoGas	3842827	1.87	3892468	98.72	70	120	
Tb	159	H2	4197544	11.11	4163457	100.82	70	120	
Tb	159	He	1905613	1.85	1939211	98.27	70	120	
Tb	159	NoGas	5682600	1.90	5743431	98.94	70	120	
Ho	165	H2	4027825	10.75	4001522	100.66	70	120	
Ho	165	He	1902328	1.44	1933801	98.37	70	120	
Ho	165	NoGas	5535300	2.82	5517017	100.33	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180918
Data File Name	045_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T11:07:36-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	6	NoGas	49.386	2.094	326346	0.74	50	98.8	89.6	110.4	
B	11	45	NoGas	44.770	3.074	207042	1.27	50	89.5	89.6	110.4	>+/- 10%
Na	23	45	He	1340.880	1.785	674716	0.87	1250	107.3	89.6	110.4	
Mg	24	45	He	2603.343	0.942	614867	0.69	2500	104.1	89.6	110.4	
Al	27	45	He	1008.828	0.969	70080	1.97	1000	100.9	89.6	110.4	
P	31	45	He	225.215	6.788	1298	5.87	250	90.1	89.6	110.4	
K	39	45	He	1023.643	0.408	157624	1.18	1000	102.4	89.6	110.4	
Ca	40	45	H2	2563.183	12.657	7337349	2.11	2500	102.5	89.6	110.4	
Ti	47	45	He	49.720	8.410	3704	7.77	50	99.4	89.6	110.4	
V	51	45	He	51.188	1.239	161763	0.30	50	102.4	89.6	110.4	
Cr	52	45	He	51.737	1.873	223458	0.87	50	103.5	89.6	110.4	
Mn	55	45	He	51.440	1.016	88360	1.16	50	102.9	89.6	110.4	
Fe	56	45	He	1044.286	1.527	3481203	0.92	1000	104.4	89.6	110.4	
Co	59	45	He	52.773	0.565	412096	0.61	50	105.5	89.6	110.4	
Ni	60	45	He	52.274	1.552	119995	0.54	50	104.5	89.6	110.4	
Cu	63	45	He	52.464	1.610	341025	0.81	50	104.9	89.6	110.4	
Zn	66	115	He	50.443	3.143	47971	2.04	50	100.9	89.6	110.4	
As	75	115	He	49.539	2.232	26443	1.04	50	99.1	89.6	110.4	
Se	78	115	H2	50.187	13.514	24006	3.16	50	100.4	89.6	110.4	
Se	78	115	He	48.436	3.605	1252	3.00	50	96.9	89.6	110.4	
Sr	88	115	NoGas	49.969	1.512	2591604	0.79	50	99.9	89.6	110.4	
Mo	95	115	NoGas	49.217	0.423	535754	1.28	50	98.4	89.6	110.4	
Ag	107	115	NoGas	24.145	0.186	710379	1.37	25	96.6	89.6	110.4	
Cd	111	115	He	51.066	1.971	65681	1.67	50	102.1	89.6	110.4	
Sn	118	115	He	50.801	1.994	107490	0.74	50	101.6	89.6	110.4	
Sn	118	115	NoGas	49.699	1.256	830157	0.97	50	99.4	89.6	110.4	
Sb	121	115	NoGas	49.124	0.790	1214698	0.68	50	98.2	89.6	110.4	
Ba	137	165	NoGas	48.973	0.658	412842	1.37	50	97.9	89.6	110.4	
Tl	205	165	NoGas	50.128	0.410	2804228	0.96	50	100.3	89.6	110.4	
Pb	208	165	NoGas	49.179	1.261	3701491	1.39	50	98.4	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	240684	1.46	267827	89.87	70	120	
Sc	45	H2	350448	10.14	415473	84.35	70	120	
Sc	45	He	49758	1.03	58243	85.43	70	120	
Sc	45	NoGas	2199085	1.51	2418294	90.94	70	120	
Ge	72	H2	99069	8.90	121413	81.60	70	120	
Ge	72	He	40104	0.76	45798	87.57	70	120	
Ge	72	NoGas	550823	1.83	584877	94.18	70	120	
In	115	H2	2052809	9.98	2292298	89.55	70	120	
In	115	He	351348	1.24	399276	88.00	70	120	
In	115	NoGas	3730421	1.32	3892468	95.84	70	120	
Tb	159	H2	3938201	11.87	4163457	94.59	70	120	
Tb	159	He	1778626	0.51	1939211	91.72	70	120	
Tb	159	NoGas	5662448	0.15	5743431	98.59	70	120	
Ho	165	H2	3803538	10.43	4001522	95.05	70	120	
Ho	165	He	1765860	0.37	1933801	91.32	70	120	
Ho	165	NoGas	5521762	0.75	5517017	100.09	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180918
Data File Name	046_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T11:11:40-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	6	NoGas	0.012	93.9	113	66.2	0.1	
B	11	45	NoGas	-2.253	-3.9	11197	1.3	8	
Na	23	45	He	-0.174	-68.0	21097	0.8	50	
Mg	24	45	He	0.670	12.9	241	8.4	20	
Al	27	45	He	0.136	403.6	106	36.6	10	
P	31	45	He	-22.025	-30.1	111	29.4	10	
K	39	45	He	-0.364	-577.2	10021	2.5	40	
Ca	40	45	H2	1.009	264.1	46030	2.6	150	
Ti	47	45	He	0.029	173.2	2	173.2	0.5	
V	51	45	He	0.021	59.7	233	16.5	0.4	
Cr	52	45	He	0.018	83.7	847	8.2	0.2	
Mn	55	45	He	-0.002	-361.1	70	14.3	0.3	
Fe	56	45	He	0.340	7.8	3331	3.0	30	
Co	59	45	He	0.012	14.7	139	10.0	0.4	
Ni	60	45	He	0.003	212.0	62	20.3	0.4	
Cu	63	45	He	-0.042	-14.7	1283	3.5	0.4	
Zn	66	115	He	-0.171	-28.6	463	10.1	15	
As	75	115	He	0.008	91.4	18	22.0	0.2	
Se	78	115	H2	0.012	77.2	25	12.4	0.4	
Se	78	115	He	-0.016	-359.9	4	35.3	0.4	
Sr	88	115	NoGas	0.017	6.9	1100	4.7	0.1	
Mo	95	115	NoGas	0.042	14.7	543	12.0	0.3	
Ag	107	115	NoGas	0.003	345.8	3220	8.7	0.1	
Cd	111	115	He	0.011	71.5	16	66.1	0.1	
Sn	118	115	He	0.033	19.2	219	6.2	0.1	
Sn	118	115	NoGas	0.039	16.4	1737	7.3	0.1	
Sb	121	115	NoGas	0.359	4.2	9696	2.7	0.5	
Ba	137	165	NoGas	0.034	32.1	1160	8.3	0.4	
Tl	205	165	NoGas	0.027	6.1	2017	4.3	0.2	
Pb	208	165	NoGas	-0.006	-22.5	3337	3.6	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	239671	1.08	267827	89.49	70	120	
Sc	45	H2	353511	13.26	415473	85.09	70	120	
Sc	45	He	50202	0.62	58243	86.19	70	120	
Sc	45	NoGas	2182461	2.74	2418294	90.25	70	120	
Ge	72	H2	97722	12.84	121413	80.49	70	120	
Ge	72	He	40152	1.78	45798	87.67	70	120	
Ge	72	NoGas	542127	0.92	584877	92.69	70	120	
In	115	H2	2066602	11.55	2292298	90.15	70	120	
In	115	He	355211	0.12	399276	88.96	70	120	
In	115	NoGas	3692000	1.41	3892468	94.85	70	120	
Tb	159	H2	3901418	12.13	4163457	93.71	70	120	
Tb	159	He	1769772	0.56	1939211	91.26	70	120	
Tb	159	NoGas	5643462	0.52	5743431	98.26	70	120	
Ho	165	H2	3831712	11.33	4001522	95.76	70	120	
Ho	165	He	1754200	1.25	1933801	90.71	70	120	
Ho	165	NoGas	5494216	0.57	5517017	99.59	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180918
Data File Name	159_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T18:51:18-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	6	NoGas	46.356	0.235	292833	1.61	50	92.7	89.6	110.4	
B	11	45	NoGas	42.553	2.038	187185	1.63	50	85.1	89.6	110.4	>+/- 10%
Na	23	45	He	1260.320	2.139	590961	1.01	1250	100.8	89.6	110.4	
Mg	24	45	He	2515.473	2.235	552497	1.35	2500	100.6	89.6	110.4	
Al	27	45	He	982.918	3.626	63475	1.18	1000	98.3	89.6	110.4	
P	31	45	He	194.437	7.454	1069	4.83	250	77.8	89.6	110.4	>+/- 10%
K	39	45	He	960.123	2.004	138057	0.95	1000	96.0	89.6	110.4	
Ca	40	45	H2	2732.792	14.440	6882577	3.93	2500	109.3	89.6	110.4	
Ti	47	45	He	48.152	8.235	3334	6.03	50	96.3	89.6	110.4	
V	51	45	He	50.007	1.993	146968	0.70	50	100.0	89.6	110.4	
Cr	52	45	He	50.350	2.740	202239	0.10	50	100.7	89.6	110.4	
Mn	55	45	He	51.027	3.690	81483	1.04	50	102.1	89.6	110.4	
Fe	56	45	He	1016.032	3.932	3148835	1.35	1000	101.6	89.6	110.4	
Co	59	45	He	51.700	3.389	375336	0.85	50	103.4	89.6	110.4	
Ni	60	45	He	51.043	3.426	108939	0.77	50	102.1	89.6	110.4	
Cu	63	45	He	51.810	2.199	313205	0.71	50	103.6	89.6	110.4	
Zn	66	115	He	46.748	3.389	43886	1.13	50	93.5	89.6	110.4	
As	75	115	He	46.067	3.417	24248	0.57	50	92.1	89.6	110.4	
Se	78	115	H2	53.430	13.907	23292	2.97	50	106.9	89.6	110.4	
Se	78	115	He	44.856	3.967	1143	1.97	50	89.7	89.6	110.4	
Sr	88	115	NoGas	46.235	1.301	2415269	1.22	50	92.5	89.6	110.4	
Mo	95	115	NoGas	46.573	2.989	510488	1.92	50	93.1	89.6	110.4	
Ag	107	115	NoGas	23.466	2.721	695297	1.80	25	93.9	89.6	110.4	
Cd	111	115	He	49.647	3.244	62962	0.44	50	99.3	89.6	110.4	
Sn	118	115	He	49.288	2.610	102856	0.91	50	98.6	89.6	110.4	
Sn	118	115	NoGas	48.530	2.370	816359	0.97	50	97.1	89.6	110.4	
Sb	121	115	NoGas	47.979	3.033	1194591	1.10	50	96.0	89.6	110.4	
Ba	137	165	NoGas	47.167	1.245	403919	0.98	50	94.3	89.6	110.4	
Tl	205	165	NoGas	48.997	0.903	2784263	1.14	50	98.0	89.6	110.4	
Pb	208	165	NoGas	48.912	0.198	3739725	0.85	50	97.8	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	230033	1.51	267827	85.89	70	120	
Sc	45	H2	308777	10.02	415473	74.32	70	120	
Sc	45	He	46286	2.64	58243	79.47	70	120	
Sc	45	NoGas	2080592	1.68	2418294	86.04	70	120	
Ge	72	H2	88427	10.29	121413	72.83	70	120	
Ge	72	He	39710	3.89	45798	86.71	70	120	
Ge	72	NoGas	538060	1.00	584877	92.00	70	120	
In	115	H2	1871898	10.29	2292298	81.66	70	120	
In	115	He	346614	2.83	399276	86.81	70	120	
In	115	NoGas	3757598	2.34	3892468	96.54	70	120	
Tb	159	H2	3611765	11.54	4163457	86.75	70	120	
Tb	159	He	1756698	2.94	1939211	90.59	70	120	
Tb	159	NoGas	5669511	1.31	5743431	98.71	70	120	
Ho	165	H2	3530272	10.19	4001522	88.22	70	120	
Ho	165	He	1771946	2.82	1933801	91.63	70	120	
Ho	165	NoGas	5609117	0.75	5517017	101.67	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180918
Data File Name	160_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T18:55:13-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	6	NoGas	0.072	28.2	493	27.2	0.1	
B	11	45	NoGas	-2.350	-3.6	10423	3.6	8	
Na	23	45	He	8.450	9.6	23021	1.7	50	
Mg	24	45	He	4.144	4.5	971	4.6	20	
Al	27	45	He	2.068	38.1	218	20.0	10	
P	31	45	He	-38.559	-13.1	28	79.9	10	
K	39	45	He	-0.251	-1525.5	9112	2.7	40	
Ca	40	45	H2	5.163	47.0	50958	1.1	150	
Ti	47	45	He	0.164	48.4	11	45.8	0.5	
V	51	45	He	0.074	21.0	367	12.0	0.4	
Cr	52	45	He	0.066	29.3	959	10.6	0.2	
Mn	55	45	He	0.094	24.5	213	14.3	0.3	
Fe	56	45	He	2.065	6.7	8289	2.8	30	
Co	59	45	He	0.086	7.2	650	5.1	0.4	
Ni	60	45	He	0.070	33.6	197	22.2	0.4	
Cu	63	45	He	0.003	586.8	1429	4.2	0.4	
Zn	66	115	He	-0.042	-28.7	572	2.7	15	
As	75	115	He	0.066	8.3	48	4.3	0.2	
Se	78	115	H2	0.079	7.2	53	7.1	0.4	
Se	78	115	He	0.187	153.5	9	76.0	0.4	
Sr	88	115	NoGas	0.081	9.5	4444	8.4	0.1	
Mo	95	115	NoGas	0.101	2.4	1203	1.3	0.3	
Ag	107	115	NoGas	0.045	20.1	4484	7.1	0.1	
Cd	111	115	He	0.080	9.2	103	9.1	0.1	
Sn	118	115	He	0.149	20.1	456	14.3	0.1	>LOD
Sn	118	115	NoGas	0.120	5.8	3124	3.0	0.1	>LOD
Sb	121	115	NoGas	0.533	3.0	14143	3.9	0.5	>LOD
Ba	137	165	NoGas	0.095	8.0	1720	4.7	0.4	
Tl	205	165	NoGas	0.090	6.1	5698	6.5	0.2	
Pb	208	165	NoGas	0.068	1.5	9121	0.1	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	233131	1.27	267827	87.05	70	120	
Sc	45	H2	309416	11.12	415473	74.47	70	120	
Sc	45	He	45619	2.83	58243	78.33	70	120	
Sc	45	NoGas	2106076	1.44	2418294	87.09	70	120	
Ge	72	H2	89490	10.19	121413	73.71	70	120	
Ge	72	He	39186	2.71	45798	85.56	70	120	
Ge	72	NoGas	543596	1.20	584877	92.94	70	120	
In	115	H2	1884459	10.68	2292298	82.21	70	120	
In	115	He	346937	1.90	399276	86.89	70	120	
In	115	NoGas	3741037	1.25	3892468	96.11	70	120	
Tb	159	H2	3656305	10.88	4163457	87.82	70	120	
Tb	159	He	1771941	2.33	1939211	91.37	70	120	
Tb	159	NoGas	5815911	1.41	5743431	101.26	70	120	
Ho	165	H2	3579270	11.04	4001522	89.45	70	120	
Ho	165	He	1773967	2.19	1933801	91.73	70	120	
Ho	165	NoGas	5653612	0.94	5517017	102.48	70	120	

Continuing Calibration Verification (CCV) Report

Sample Table

Sample Name	CCV 180918
Data File Name	173_CCV.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:53:52-07:00
Sample Type	CCV
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Exp Value	%Rec	%Low	%High2	QC Flag
Be	9	6	NoGas	47.817	1.102	311149	1.23	50	95.6	89.6	110.4	
B	11	45	NoGas	40.950	2.079	196598	0.90	50	81.9	89.6	110.4	>+/- 10%
Na	23	45	He	1270.550	2.390	631539	0.91	1250	101.6	89.6	110.4	
Mg	24	45	He	2520.688	2.550	587025	0.88	2500	100.8	89.6	110.4	
Al	27	45	He	975.075	2.762	66780	0.13	1000	97.5	89.6	110.4	
P	31	45	He	203.964	7.531	1180	7.87	250	81.6	89.6	110.4	>+/- 10%
K	39	45	He	977.059	2.308	148795	0.65	1000	97.7	89.6	110.4	
Ca	40	45	H2	2706.287	13.441	7307516	2.65	2500	108.3	89.6	110.4	
Ti	47	45	He	50.201	5.373	3689	5.46	50	100.4	89.6	110.4	
V	51	45	He	50.450	3.870	157173	1.29	50	100.9	89.6	110.4	
Cr	52	45	He	51.228	3.119	218168	0.92	50	102.5	89.6	110.4	
Mn	55	45	He	51.904	3.812	87885	1.02	50	103.8	89.6	110.4	
Fe	56	45	He	1019.905	2.462	3352663	1.10	1000	102.0	89.6	110.4	
Co	59	45	He	52.501	2.842	404207	0.34	50	105.0	89.6	110.4	
Ni	60	45	He	52.207	2.758	118167	0.79	50	104.4	89.6	110.4	
Cu	63	45	He	52.180	2.781	334443	0.16	50	104.4	89.6	110.4	
Zn	66	115	He	49.155	3.224	47984	1.10	50	98.3	89.6	110.4	
As	75	115	He	47.053	2.049	25776	0.51	50	94.1	89.6	110.4	
Se	78	115	H2	53.617	13.773	24693	2.76	50	107.2	89.6	110.4	
Se	78	115	He	46.063	6.901	1221	4.77	50	92.1	89.6	110.4	
Sr	88	115	NoGas	47.653	1.729	2585663	0.75	50	95.3	89.6	110.4	
Mo	95	115	NoGas	47.199	1.785	537462	0.71	50	94.4	89.6	110.4	
Ag	107	115	NoGas	23.471	1.401	722486	1.01	25	93.9	89.6	110.4	
Cd	111	115	He	49.731	2.194	65636	0.52	50	99.5	89.6	110.4	
Sn	118	115	He	49.848	2.506	108236	0.54	50	99.7	89.6	110.4	
Sn	118	115	NoGas	49.356	1.954	862485	0.99	50	98.7	89.6	110.4	
Sb	121	115	NoGas	49.210	1.437	1273065	1.36	50	98.4	89.6	110.4	
Ba	137	165	NoGas	48.057	2.548	430278	2.06	50	96.1	89.6	110.4	
Tl	205	165	NoGas	47.573	0.399	2826927	1.50	50	95.1	89.6	110.4	
Pb	208	165	NoGas	48.347	1.362	3864987	0.60	50	96.7	89.6	110.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	236960	0.50	267827	88.47	70	120	
Sc	45	H2	331144	11.14	415473	79.70	70	120	
Sc	45	He	49082	2.77	58243	84.27	70	120	
Sc	45	NoGas	2261894	2.35	2418294	93.53	70	120	
Ge	72	H2	93585	10.93	121413	77.08	70	120	
Ge	72	He	41060	3.02	45798	89.65	70	120	
Ge	72	NoGas	584623	1.71	584877	99.96	70	120	
In	115	H2	1978637	11.03	2292298	86.32	70	120	
In	115	He	360621	2.33	399276	90.32	70	120	
In	115	NoGas	3903330	2.37	3892468	100.28	70	120	
Tb	159	H2	3824122	10.03	4163457	91.85	70	120	
Tb	159	He	1814192	2.99	1939211	93.55	70	120	
Tb	159	NoGas	6012327	0.71	5743431	104.68	70	120	
Ho	165	H2	3728146	10.18	4001522	93.17	70	120	
Ho	165	He	1848897	2.96	1933801	95.61	70	120	
Ho	165	NoGas	5865377	1.32	5517017	106.31	70	120	

Continuing Calibration Blank (CCB) Report

Sample Table

Sample Name	CCB 180918
Data File Name	174_CCB.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:57:46-07:00
Sample Type	CCB
Dilution	1
Comment	Megatron EJ
ISTD Ref File Name	004CALB.d
Sample QC Pass/Fail	Fail
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	Conc %RSD	CPS	CPS %RSD	Upper Limit	QC Flag
Be	9	6	NoGas	0.065	30.0	463	27.8	0.1	
B	11	45	NoGas	-2.769	-4.1	9306	4.4	8	
Na	23	45	He	3.230	65.5	21847	0.5	50	
Mg	24	45	He	4.087	4.1	1013	4.3	20	
Al	27	45	He	1.797	28.2	212	13.2	10	
P	31	45	He	-38.705	-3.0	29	17.6	10	
K	39	45	He	-1.001	-343.8	9525	1.0	40	
Ca	40	45	H2	2.990	229.3	52860	3.9	150	
Ti	47	45	He	0.075	91.5	6	91.6	0.5	
V	51	45	He	0.072	26.6	379	14.3	0.4	
Cr	52	45	He	0.069	18.6	1024	1.6	0.2	
Mn	55	45	He	0.089	18.2	217	9.4	0.3	
Fe	56	45	He	2.298	8.0	9504	1.8	30	
Co	59	45	He	0.090	10.3	717	8.4	0.4	
Ni	60	45	He	0.080	12.0	233	13.6	0.4	
Cu	63	45	He	0.018	98.4	1607	5.9	0.4	
Zn	66	115	He	-0.003	-1574.2	629	3.1	15	
As	75	115	He	0.087	14.8	61	10.0	0.2	
Se	78	115	H2	0.068	64.6	55	15.1	0.4	
Se	78	115	He	0.224	69.0	11	37.9	0.4	
Sr	88	115	NoGas	0.074	3.5	4371	4.1	0.1	
Mo	95	115	NoGas	0.103	10.9	1300	10.6	0.3	
Ag	107	115	NoGas	0.040	29.2	4627	8.2	0.1	
Cd	111	115	He	0.061	17.7	82	20.0	0.1	
Sn	118	115	He	0.110	3.5	387	5.2	0.1	>LOD
Sn	118	115	NoGas	0.118	1.9	3289	0.5	0.1	>LOD
Sb	121	115	NoGas	0.596	5.0	16752	3.9	0.5	>LOD
Ba	137	165	NoGas	0.071	17.5	1557	6.6	0.4	
Tl	205	165	NoGas	0.091	6.8	5938	6.8	0.2	
Pb	208	165	NoGas	0.064	13.0	9091	7.3	0.4	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	242749	0.30	267827	90.64	70	120	
Sc	45	H2	393961	38.60	415473	94.82	70	120	
Sc	45	He	48234	4.75	58243	82.81	70	120	
Sc	45	NoGas	2240201	1.37	2418294	92.64	70	120	
Ge	72	H2	108881	33.02	121413	89.68	70	120	
Ge	72	He	41213	4.42	45798	89.99	70	120	
Ge	72	NoGas	578064	0.51	584877	98.84	70	120	
In	115	H2	2365667	36.95	2292298	103.20	70	120	
In	115	He	359150	4.95	399276	89.95	70	120	
In	115	NoGas	3988444	0.97	3892468	102.47	70	120	
Tb	159	H2	4552860	37.14	4163457	109.35	70	120	
Tb	159	He	1793134	5.84	1939211	92.47	70	120	
Tb	159	NoGas	5941693	0.62	5743431	103.45	70	120	
Ho	165	H2	4439235	37.33	4001522	110.94	70	120	
Ho	165	He	1817212	5.01	1933801	93.97	70	120	
Ho	165	NoGas	5830763	0.74	5517017	105.69	70	120	

Method Loaded
Method Name: ANA 7471 Method Last Saved: 09/18/18 3:48:41 PM
Method Description: EPA 7471

Sequence No.: 1 Autosampler Location: 1
Sample ID: Calib. Blank Date Collected: 09/14/18 11:37:32 AM
Analyst: Data Type: Reprocessed on 09/19/18 4:10:24 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: Calib. Blank Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.00]	0.0001	0.0006	0.0001	11:38:10 AM	No
2		[0.00]	0.0001	0.0007	0.0001	11:38:33 AM	No
3		[0.00]	0.0001	0.0004	0.0001	11:38:56 AM	No
Mean:		[0.00]	0.0001				
SD:		0.0000	0.0000				
%RSD:		0.00%	4.21				

Auto-zero performed.

Sequence No.: 2 Autosampler Location: 2
Sample ID: ICAL 0.208ppb 9/14/18 TH Date Collected: 09/14/18 11:39:10 AM
Analyst: Data Type: Reprocessed on 09/19/18 4:10:24 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICAL 0.208ppb 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.208]	0.0021	0.0092	0.0022	11:39:49 AM	No
2		[0.208]	0.0021	0.0094	0.0022	11:40:12 AM	No
3		[0.208]	0.0021	0.0096	0.0023	11:40:35 AM	No
Mean:		[0.208]	0.0021				
SD:		0.00000	0.0000				
%RSD:		0.00%	1.07				

Standard number 1 applied. [0.208]
Correlation Coef.: 1.000000 Slope: 0.01006 Intercept: 0.00000

Sequence No.: 3 Autosampler Location: 3
Sample ID: ICAL 0.520ppb 9/14/18 TH Date Collected: 09/14/18 11:40:49 AM
Analyst: Data Type: Reprocessed on 09/19/18 4:10:24 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICAL 0.520ppb 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.520]	0.0056	0.0254	0.0057	11:41:28 AM	No
2		[0.520]	0.0056	0.0249	0.0057	11:41:51 AM	No
3		[0.520]	0.0056	0.0255	0.0058	11:42:14 AM	No
Mean:		[0.520]	0.0056				
SD:		0.00000	0.0000				
%RSD:		0.00%	0.29				

Standard number 2 applied. [0.520]
Correlation Coef.: 0.998302 Slope: 0.01068 Intercept: 0.00000

Sequence No.: 4 Autosampler Location: 4
Sample ID: ICAL 1.041ppb 9/14/18 TH Date Collected: 09/14/18 11:42:29 AM
Analyst: Data Type: Reprocessed on 09/19/18 4:10:24 PM

Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICAL 1.041ppb 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[1.041]	0.0115	0.0513	0.0117	11:43:08 AM	No
2		[1.041]	0.0115	0.0504	0.0117	11:43:31 AM	No
3		[1.041]	0.0115	0.0503	0.0117	11:43:54 AM	No
Mean:		[1.041]	0.0115				
SD:		0.00000	0.0000				
%RSD:		0.00%	0.07				

Standard number 3 applied. [1.041]
Correlation Coef.: 0.999307 Slope: 0.01099 Intercept: 0.00000

===

Sequence No.: 5 Autosampler Location: 5
Sample ID: ICAL 2.083ppb 9/14/18 TH Date Collected: 09/14/18 11:44:09 AM
Analyst: Data Type: Reprocessed on 09/19/18 4:10:25 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICAL 2.083ppb 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[2.083]	0.0229	0.1011	0.0231	11:44:49 AM	No
2		[2.083]	0.0228	0.0995	0.0229	11:45:12 AM	No
3		[2.083]	0.0227	0.0991	0.0229	11:45:35 AM	No
Mean:		[2.083]	0.0228				
SD:		0.00000	0.0001				
%RSD:		0.00%	0.47				

Standard number 4 applied. [2.083]
Correlation Coef.: 0.999877 Slope: 0.01097 Intercept: 0.00000

===

Sequence No.: 6 Autosampler Location: 6
Sample ID: ICAL 5.208ppb 9/14/18 TH Date Collected: 09/14/18 11:45:50 AM
Analyst: Data Type: Reprocessed on 09/19/18 4:10:25 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICAL 5.208ppb 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[5.208]	0.0548	0.2413	0.0549	11:46:28 AM	No
2		[5.208]	0.0552	0.2403	0.0554	11:46:51 AM	No
3		[5.208]	0.0551	0.2403	0.0552	11:47:14 AM	No
Mean:		[5.208]	0.0550				
SD:		0.00000	0.0002				
%RSD:		0.00%	0.42				

Standard number 5 applied. [5.208]
Correlation Coef.: 0.999779 Slope: 0.01064 Intercept: 0.00000

===

Sequence No.: 7 Autosampler Location: 7
Sample ID: ICAL 10.417ppb 9/14/18 TH Date Collected: 09/14/18 11:47:28 AM
Analyst: Data Type: Reprocessed on 09/19/18 4:10:25 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICAL 10.417ppb 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[10.417]	0.1120	0.4963	0.1121	11:48:06 AM	No

2	[10.417]	0.1118	0.4886	0.1119	11:48:30 AM	No
3	[10.417]	0.1109	0.4891	0.1111	11:48:53 AM	No
Mean:	[10.417]	0.1116				
SD:	0.00000	0.0005				
%RSD:	0.00%	0.49				

Standard number 6 applied. [10.417]
Correlation Coef.: 0.999946 Slope: 0.01069 Intercept: 0.00000

Calibration data for Hg 253.7 **Equation: Linear Through Zero**

ID	Mean Signal (Abs)	Entered Conc. ug/L	Calculated Conc. ug/L	Standard Deviation	%RSD
Calib. Blank	0.0000	0	0.0000	0.00	4.21
ICAL 0.208ppb 9/14/18 TH	0.0021	0.208	0.1957	0.00	1.07
ICAL 0.520ppb 9/14/18 TH	0.0056	0.520	0.5238	0.00	0.29
ICAL 1.041ppb 9/14/18 TH	0.0115	1.041	1.0788	0.00	0.07
ICAL 2.083ppb 9/14/18 TH	0.0228	2.083	2.1352	0.00	0.47
ICAL 5.208ppb 9/14/18 TH	0.0550	5.208	5.1463	0.00	0.42
ICAL 10.417ppb 9/14/18 TH	0.1116	10.417	10.4329	0.00	0.49

Correlation Coef.: 0.999946 Slope: 0.01069 Intercept: 0.00000

Sequence No.: 8 **Autosampler Location: 9**
Sample ID: ICV 9/14/18 TH **Date Collected: 09/14/18 11:49:07 AM**
Analyst: **Data Type: Reprocessed on 09/19/18 4:10:25 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICV 9/14/18 TH **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	4.219	4.219	0.0451	0.1986	0.0453	11:49:46 AM	No
2	4.194	4.194	0.0448	0.1957	0.0450	11:50:09 AM	No
3	4.203	4.203	0.0449	0.1970	0.0451	11:50:33 AM	No
Mean:	4.205	4.205	0.0450				
SD:	0.0127	0.0127	0.0001				
%RSD:	0.30%	0.30%	0.30				

QC value within limits for Hg 253.7 Recovery = 100.85%
All analyte(s) passed QC.

Sequence No.: 9 **Autosampler Location: 1**
Sample ID: ICB 9/14/18 TH **Date Collected: 09/14/18 11:50:47 AM**
Analyst: **Data Type: Reprocessed on 09/19/18 4:10:25 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: ICB 9/14/18 TH **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0033	-0.0033	-0.0000	-0.0001	0.0001	11:51:25 AM	No
2	0.0011	0.0011	0.0000	0.0003	0.0002	11:51:48 AM	No
3	0.0016	0.0016	0.0000	0.0003	0.0002	11:52:11 AM	No
Mean:	-0.0002	-0.0002	-0.0000				
SD:	0.00268	0.00268	0.0000				
%RSD:	>999.9%	>999.9%	>999.9%				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 10 **Autosampler Location: 2**
Sample ID: LLQC 9/14/18 TH **Date Collected: 09/14/18 11:52:25 AM**
Analyst: **Data Type: Reprocessed on 09/19/18 4:10:25 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Reprocessing Begun
Logged In Analyst: chemist_metals Technique: AA FIMS-MHS

Results Data Set (original): 180919W
Results Library (original): C:\Users\Public\PerkinElmer\AA\Data\Results\Results.mdb
Results Data Set (reprocessed):
Results Library (reprocessed):

Sequence No.: 1 Autosampler Location: 1
Sample ID: Calib. Blank Date Collected: 09/19/18 12:33:53 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:09 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: Calib. Blank Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.00]	0.0001	0.0026	0.0003	12:34:32 PM	No
2		[0.00]	-0.0000	0.0010	0.0002	12:34:55 PM	No
3		[0.00]	-0.0001	-0.0001	0.0001	12:35:18 PM	No
Mean:		[0.00]	0.0000				
SD:		0.0000	0.0001				
%RSD:		0.00%	0.00				

Auto-zero performed.

Sequence No.: 2 Autosampler Location: 2
Sample ID: ICAL 0.2ppb 9/19/18 TH Date Collected: 09/19/18 12:35:31 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:09 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICAL 0.2ppb 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1581	0.1581	0.0011	0.0055	0.0013	12:36:10 PM	No
2	0.1526	0.1526	0.0010	0.0052	0.0012	12:36:33 PM	No
3	0.1521	0.1521	0.0010	0.0049	0.0012	12:36:56 PM	No
Mean:	0.1543	0.1543	0.0010				
SD:	0.00331	0.00331	0.0000				
%RSD:	2.15%	2.15%	2.15				

QC value less than the lower limit for Hg 253.7 Recovery = 77.15%
QC Failed. Continue with analysis.

Sequence No.: 3 Autosampler Location: 3
Sample ID: ICAL 0.5ppb 9/19/18 TH Date Collected: 09/19/18 12:37:10 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:09 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICAL 0.5ppb 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[0.5]	0.0031	0.0152	0.0033	12:37:49 PM	No
2		[0.5]	0.0031	0.0150	0.0033	12:38:12 PM	No
3		[0.5]	0.0032	0.0156	0.0034	12:38:36 PM	No
Mean:		[0.5]	0.0031				
SD:		0.000	0.0000				
%RSD:		0.00%	1.47				

Standard number 2 applied. [0.5]
Correlation Coef.: 0.999910 Slope: 0.00677 Intercept: 0.00000

Sequence No.: 4
Sample ID: ICAL 1ppb 9/19/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 4
Date Collected: 09/19/18 12:38:50 PM
Data Type: Reprocessed on 09/19/18 4:08:09 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: ICAL 1ppb 9/19/18 TH   Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[1]	0.0064	0.0320	0.0066	12:39:29 PM	No
2		[1]	0.0064	0.0313	0.0066	12:39:52 PM	No
3		[1]	0.0064	0.0319	0.0066	12:40:16 PM	No
Mean:		[1]	0.0064				
SD:		0.00	0.0000				
%RSD:		0.00%	0.69				

Standard number 3 applied. [1]
Correlation Coef.: 0.999910 Slope: 0.00677 Intercept: 0.00000

Sequence No.: 5
Sample ID: ICAL 2ppb 9/19/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 5
Date Collected: 09/19/18 12:40:30 PM
Data Type: Reprocessed on 09/19/18 4:08:10 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: ICAL 2ppb 9/19/18 TH   Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[2]	0.0139	0.0689	0.0141	12:41:10 PM	No
2		[2]	0.0137	0.0670	0.0139	12:41:34 PM	No
3		[2]	0.0137	0.0676	0.0139	12:41:57 PM	No
Mean:		[2]	0.0137				
SD:		0.00	0.0001				
%RSD:		0.00%	0.70				

Standard number 4 applied. [2]
Correlation Coef.: 0.999910 Slope: 0.00677 Intercept: 0.00000

Sequence No.: 6
Sample ID: ICAL 5ppb 9/19/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 6
Date Collected: 09/19/18 12:42:12 PM
Data Type: Reprocessed on 09/19/18 4:08:10 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: ICAL 5ppb 9/19/18 TH   Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[5]	0.0346	0.1739	0.0348	12:42:50 PM	No
2		[5]	0.0341	0.1688	0.0343	12:43:14 PM	No
3		[5]	0.0342	0.1698	0.0344	12:43:37 PM	No
Mean:		[5]	0.0343				
SD:		0.00	0.0003				
%RSD:		0.00%	0.83				

Standard number 5 applied. [5]
Correlation Coef.: 0.999910 Slope: 0.00677 Intercept: 0.00000

Sequence No.: 7
Sample ID: ICAL 10ppb 9/19/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 7
Date Collected: 09/19/18 12:43:50 PM
Data Type: Reprocessed on 09/19/18 4:08:10 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: ICAL 10ppb 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1		[10]	0.0676	0.3416	0.0678	12:44:29 PM	No
2		[10]	0.0673	0.3367	0.0675	12:44:52 PM	No
3		[10]	0.0676	0.3377	0.0677	12:45:15 PM	No
Mean:		[10]	0.0675				
SD:		0.00	0.0002				
%RSD:		0.00%	0.25				

Standard number 6 applied. [10]
Correlation Coef.: 0.999910 Slope: 0.00677 Intercept: 0.00000

Calibration data for Hg 253.7 Equation: Linear Through Zero

ID	Mean Signal (Abs)	Entered Conc. ug/L	Calculated Conc. ug/L	Standard Deviation	%RSD
Calib. Blank	0.0000	0	0.0000	0.00	0.00
ICAL 0.5ppb 9/19/18 TH	0.0031	0.5	0.4607	0.00	1.47
ICAL 1ppb 9/19/18 TH	0.0064	1.0	0.9454	0.00	0.69
ICAL 2ppb 9/19/18 TH	0.0137	2.0	2.0300	0.00	0.70
ICAL 5ppb 9/19/18 TH	0.0343	5.0	5.0678	0.00	0.83
ICAL 10ppb 9/19/18 TH	0.0675	10.0	9.9664	0.00	0.25

Correlation Coef.: 0.999910 Slope: 0.00677 Intercept: 0.00000

Sequence No.: 8 Autosampler Location: 9
Sample ID: ICV 9/19/18 TH Date Collected: 09/19/18 12:45:29 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:11 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICV 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	4.154	4.154	0.0281	0.1454	0.0283	12:46:08 PM	No
2	4.133	4.133	0.0280	0.1424	0.0282	12:46:31 PM	No
3	4.124	4.124	0.0279	0.1433	0.0281	12:46:55 PM	No
Mean:	4.137	4.137	0.0280				
SD:	0.0152	0.0152	0.0001				
%RSD:	0.37%	0.37%	0.37				

QC value within limits for Hg 253.7 Recovery = 103.43%
All analyte(s) passed QC.

Sequence No.: 9 Autosampler Location: 1
Sample ID: ICB 9/19/18 TH Date Collected: 09/19/18 12:47:09 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:11 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: ICB 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1009	0.1009	0.0007	0.0083	0.0009	12:47:47 PM	No
2	0.0291	0.0291	0.0002	0.0037	0.0004	12:48:11 PM	No
3	0.0125	0.0125	0.0001	0.0021	0.0003	12:48:34 PM	No
Mean:	0.0475	0.0475	0.0003				
SD:	0.04701	0.04701	0.0003				
%RSD:	98.97%	98.97%	98.97				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 10 Autosampler Location: 2
Sample ID: LLQC 9/19/18 TH Date Collected: 09/19/18 2:09:09 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:11 PM
Logged In Analyst (Original) : chemist_metals

METALS

Raw Data

APPL, INC.

Sample Report

Sample Table

Sample Name	AZ79146S01 DF100
Data File Name	056SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:24:48-07:00
Sample Type	Sample
Dilution	0.998003992
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.198	0.198	17.73	1880	17.05	10000	
B	11	45	NoGas	3.916	3.908	16.90	244389	2.10	10000	
Na	23	45	He	50.141	50.041	11.56	37171	0.40	1000000	
Mg	24	45	He	1165.884	1163.556	5.04	164399	0.51	1000000	
Al	27	45	He	5318.088	5307.473	4.93	140597	0.64	1000000	
P	31	45	He	365.756	365.026	8.86	702	13.04	500000	
K	39	45	He	562.862	561.739	4.66	38265	2.49	500000	
Ca	40	45	H2	730.850	729.391	11.00	3572577	2.94	500000	
Ti	47	45	He	199.087	198.689	5.43	8324	3.35	10000	
V	51	45	He	15.821	15.789	4.40	39097	1.19	10000	
Cr	52	45	He	2.525	2.520	5.90	9899	0.30	10000	
Mn	55	45	He	154.455	154.147	5.08	157714	0.69	50000	
Fe	56	45	He	8017.294	8001.292	4.66	21367754	0.80	1000000	
Co	59	45	He	1.798	1.794	6.24	13843	0.80	10000	
Ni	60	45	He	9.985	9.965	7.13	23799	2.33	10000	
Cu	63	45	He	14.526	14.497	6.07	101089	0.87	10000	
Zn	66	115	He	31.433	31.370	3.10	24062	1.74	50000	
As	75	115	He	1.282	1.279	5.00	509	4.89	2000	
Se	78	72	H2	0.080	0.079	18.74	70	10.33	10000	
Se	78	115	He	0.829	0.827	37.55	12	30.05	10000	
Sr	88	115	NoGas	5.525	5.514	0.31	471091	1.28	50000	
Mo	95	115	NoGas	9.250	9.232	0.20	161977	1.19	10000	
Ag	107	115	NoGas	0.053	0.053	12.75	6982	3.24	5000	
Cd	111	115	He	0.102	0.101	13.26	105	13.56	10000	
Sn	118	115	He	3.583	3.576	2.82	4867	3.95	10000	
Sn	118	115	NoGas	3.651	3.644	0.97	98671	1.96	10000	
Sb	121	115	NoGas	0.499	0.498	1.50	20366	0.20	10000	
Ba	137	115	NoGas	20.285	20.244	0.96	257582	1.15	50000	
Tl	205	165	NoGas	0.040	0.040	5.48	5118	2.47	5000	
Pb	208	165	NoGas	8.711	8.694	1.69	960322	1.33	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	245988	0.78	232772	105.68	70	120	
Sc	45	H2	460467	7.88	497417	92.57	70	120	
Sc	45	He	23571	5.32	26213	89.92	70	120	
Sc	45	NoGas	3311360	0.59	3271044	101.23	70	120	
Ge	72	H2	120294	9.29	130306	92.32	70	120	
Ge	72	He	23560	4.67	25369	92.87	70	120	
Ge	72	NoGas	813914	1.25	804525	101.17	70	120	
In	115	H2	2673920	8.04	2768793	96.57	70	120	
In	115	He	173331	4.10	184583	93.90	70	120	
In	115	NoGas	5417977	1.24	5159681	105.01	70	120	
Tb	159	H2	4986244	8.20	4956789	100.59	70	120	
Tb	159	He	1139837	4.06	1146052	99.46	70	120	
Tb	159	NoGas	7958236	0.54	7155958	111.21	70	120	
Ho	165	H2	4846366	8.74	4765312	101.70	70	120	
Ho	165	He	1154861	3.97	1131090	102.10	70	120	
Ho	165	NoGas	7664854	1.17	6876887	111.46	70	120	

Sample Report

Sample Table

Sample Name	AZ79147S01 DF100
Data File Name	057SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:28:46-07:00
Sample Type	Sample
Dilution	1.005025126
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.207	0.208	13.67	1954	14.06	10000	
B	11	45	NoGas	3.556	3.574	18.30	240789	1.77	10000	
Na	23	45	He	60.137	60.439	5.51	41600	1.07	1000000	
Mg	24	45	He	1260.054	1266.386	3.82	182177	0.13	1000000	
Al	27	45	He	5858.801	5888.243	3.09	158814	0.72	1000000	
P	31	45	He	400.329	402.341	4.23	781	0.65	500000	
K	39	45	He	611.796	614.870	2.61	42335	1.34	500000	
Ca	40	45	H2	793.078	797.063	9.87	4026232	2.20	500000	
Ti	47	45	He	303.289	304.814	3.10	13004	1.84	10000	
V	51	45	He	17.687	17.776	3.43	44805	0.32	10000	
Cr	52	45	He	3.068	3.083	7.21	12214	3.22	10000	
Mn	55	45	He	145.454	146.185	3.60	152307	1.00	50000	
Fe	56	45	He	8387.496	8429.644	2.98	22922949	0.89	1000000	
Co	59	45	He	1.733	1.742	4.52	13690	1.14	10000	
Ni	60	45	He	23.228	23.345	3.40	56679	0.89	10000	
Cu	63	45	He	17.356	17.443	3.19	123717	1.15	10000	
Zn	66	115	He	31.644	31.803	2.21	24665	0.68	50000	
As	75	115	He	1.426	1.433	1.23	576	1.18	2000	
Se	78	72	H2	0.078	0.078	13.23	71	4.60	10000	
Se	78	115	He	1.385	1.392	6.76	19	5.26	10000	
Sr	88	115	NoGas	6.399	6.431	1.11	545103	1.28	50000	
Mo	95	115	NoGas	10.768	10.822	1.95	188357	0.83	10000	
Ag	107	115	NoGas	0.093	0.093	8.92	8836	3.35	5000	
Cd	111	115	He	0.088	0.088	22.71	92	20.74	10000	
Sn	118	115	He	2.068	2.078	1.11	2884	3.06	10000	
Sn	118	115	NoGas	2.104	2.114	0.90	57261	2.47	10000	
Sb	121	115	NoGas	0.570	0.572	4.60	23146	6.21	10000	
Ba	137	115	NoGas	20.695	20.799	0.72	262630	2.13	50000	
Tl	205	165	NoGas	0.047	0.047	7.89	5685	5.30	5000	
Pb	208	165	NoGas	11.473	11.531	1.43	1256690	0.49	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	241571	1.11	232772	103.78	70	120	
Sc	45	H2	478052	7.91	497417	96.11	70	120	
Sc	45	He	24148	3.74	26213	92.12	70	120	
Sc	45	NoGas	3291612	1.73	3271044	100.63	70	120	
Ge	72	H2	123866	7.93	130306	95.06	70	120	
Ge	72	He	23987	3.38	25369	94.55	70	120	
Ge	72	NoGas	819758	1.02	804525	101.89	70	120	
In	115	H2	2744682	6.99	2768793	99.13	70	120	
In	115	He	176418	1.99	184583	95.58	70	120	
In	115	NoGas	5414610	2.15	5159681	104.94	70	120	
Tb	159	H2	5150269	8.98	4956789	103.90	70	120	
Tb	159	He	1160864	3.04	1146052	101.29	70	120	
Tb	159	NoGas	7777884	2.92	7155958	108.69	70	120	
Ho	165	H2	4986864	8.87	4765312	104.65	70	120	
Ho	165	He	1169920	2.85	1131090	103.43	70	120	
Ho	165	NoGas	7630301	1.89	6876887	110.96	70	120	

Sample Report

Sample Table

Sample Name	AZ79148S01 DF100
Data File Name	058SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:32:42-07:00
Sample Type	Sample
Dilution	0.997008973
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.212	0.211	15.93	2020	15.96	10000	
B	11	45	NoGas	3.332	3.322	11.05	242224	1.50	10000	
Na	23	45	He	74.136	73.914	13.01	45173	2.06	1000000	
Mg	24	45	He	1202.802	1199.205	7.99	169031	0.24	1000000	
Al	27	45	He	6027.137	6009.110	8.05	158759	0.37	1000000	
P	31	45	He	426.560	425.284	15.32	804	7.93	500000	
K	39	45	He	590.370	588.604	10.71	39777	1.58	500000	
Ca	40	45	H2	833.204	830.712	11.39	4268028	2.04	500000	
Ti	47	45	He	223.362	222.694	6.28	9318	4.04	10000	
V	51	45	He	17.872	17.819	7.48	44016	1.60	10000	
Cr	52	45	He	3.690	3.679	7.95	14193	0.85	10000	
Mn	55	45	He	155.931	155.464	8.04	158683	0.54	50000	
Fe	56	45	He	8761.096	8734.891	8.50	23261781	0.38	1000000	
Co	59	45	He	1.837	1.831	7.27	14109	1.40	10000	
Ni	60	45	He	11.217	11.183	7.92	26652	0.42	10000	
Cu	63	45	He	33.418	33.318	7.80	230604	0.38	10000	
Zn	66	115	He	50.358	50.208	6.15	37791	1.41	50000	
As	75	115	He	1.436	1.432	11.21	561	4.39	2000	
Se	78	72	H2	0.079	0.079	18.34	73	12.01	10000	
Se	78	115	He	0.757	0.755	34.63	11	27.27	10000	
Sr	88	115	NoGas	6.506	6.487	0.30	559426	1.06	50000	
Mo	95	115	NoGas	10.501	10.470	0.81	185441	1.10	10000	
Ag	107	115	NoGas	0.110	0.110	5.40	9730	1.88	5000	
Cd	111	115	He	0.179	0.179	14.78	180	8.01	10000	
Sn	118	115	He	1.625	1.620	8.34	2204	1.71	10000	
Sn	118	115	NoGas	1.547	1.543	1.03	42791	2.04	10000	
Sb	121	115	NoGas	1.655	1.650	0.61	66214	1.19	10000	
Ba	137	115	NoGas	24.382	24.310	1.45	312257	1.47	50000	
Tl	205	165	NoGas	0.043	0.043	4.46	5418	3.88	5000	
Pb	208	165	NoGas	19.164	19.106	2.30	2110089	1.17	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	243692	1.01	232772	104.69	70	120	
Sc	45	H2	483244	9.10	497417	97.15	70	120	
Sc	45	He	23547	7.82	26213	89.83	70	120	
Sc	45	NoGas	3328989	0.61	3271044	101.77	70	120	
Ge	72	H2	124818	8.65	130306	95.79	70	120	
Ge	72	He	23731	8.12	25369	93.54	70	120	
Ge	72	NoGas	822992	1.61	804525	102.30	70	120	
In	115	H2	2784110	7.14	2768793	100.55	70	120	
In	115	He	171307	7.08	184583	92.81	70	120	
In	115	NoGas	5464857	1.15	5159681	105.91	70	120	
Tb	159	H2	5211544	9.58	4956789	105.14	70	120	
Tb	159	He	1121465	6.06	1146052	97.85	70	120	
Tb	159	NoGas	7917268	0.25	7155958	110.64	70	120	
Ho	165	H2	4999639	9.03	4765312	104.92	70	120	
Ho	165	He	1134531	5.87	1131090	100.30	70	120	
Ho	165	NoGas	7687849	1.11	6876887	111.79	70	120	

Sample Report

Sample Table

Sample Name	AZ79149S01 DF100
Data File Name	059SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:36:40-07:00
Sample Type	Sample
Dilution	1.006036217
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.201	0.203	2.27	1960	4.36	10000	
B	11	45	NoGas	2.562	2.578	29.35	242356	3.44	10000	
Na	23	45	He	47.384	47.670	13.17	36312	1.58	1000000	
Mg	24	45	He	1301.850	1309.708	6.78	183841	0.59	1000000	
Al	27	45	He	6359.352	6397.739	7.43	168268	0.39	1000000	
P	31	45	He	466.490	469.306	9.23	882	1.43	500000	
K	39	45	He	588.206	591.757	7.17	39879	0.81	500000	
Ca	40	45	H2	753.041	757.586	12.11	3775681	3.26	500000	
Ti	47	45	He	252.749	254.275	5.07	10591	2.65	10000	
V	51	45	He	19.553	19.671	9.05	48319	1.60	10000	
Cr	52	45	He	4.263	4.289	7.28	16395	0.89	10000	
Mn	55	45	He	132.565	133.365	8.03	135494	0.66	50000	
Fe	56	45	He	12116.313	12189.450	7.89	32318228	0.64	1000000	
Co	59	45	He	1.989	2.001	7.41	15338	1.19	10000	
Ni	60	45	He	3.409	3.430	8.43	8203	2.18	10000	
Cu	63	45	He	24.667	24.816	7.87	171211	1.05	10000	
Zn	66	115	He	38.881	39.115	6.48	29425	1.69	50000	
As	75	115	He	2.084	2.097	5.55	818	2.39	2000	
Se	78	72	H2	0.088	0.089	18.80	78	8.54	10000	
Se	78	115	He	1.052	1.058	32.88	15	31.49	10000	
Sr	88	115	NoGas	4.979	5.009	5.56	433265	0.44	50000	
Mo	95	115	NoGas	12.301	12.375	6.12	219660	0.87	10000	
Ag	107	115	NoGas	0.075	0.076	11.73	8186	0.55	5000	
Cd	111	115	He	0.123	0.124	5.84	125	7.54	10000	
Sn	118	115	He	17.467	17.572	8.35	23290	1.64	10000	
Sn	118	115	NoGas	16.832	16.933	7.45	460079	3.70	10000	
Sb	121	115	NoGas	0.457	0.459	3.25	19125	3.24	10000	
Ba	137	115	NoGas	18.420	18.531	5.13	238732	1.66	50000	
Tl	205	165	NoGas	0.042	0.042	2.47	5391	4.28	5000	
Pb	208	165	NoGas	16.400	16.499	5.00	1834706	0.66	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	246380	4.80	232772	105.85	70	120	
Sc	45	H2	472963	8.78	497417	95.08	70	120	
Sc	45	He	23640	7.09	26213	90.18	70	120	
Sc	45	NoGas	3396750	4.98	3271044	103.84	70	120	
Ge	72	H2	121170	9.77	130306	92.99	70	120	
Ge	72	He	23873	5.15	25369	94.10	70	120	
Ge	72	NoGas	833136	4.66	804525	103.56	70	120	
In	115	H2	2696676	8.59	2768793	97.40	70	120	
In	115	He	172244	6.82	184583	93.32	70	120	
In	115	NoGas	5539802	5.75	5159681	107.37	70	120	
Tb	159	H2	5067423	8.17	4956789	102.23	70	120	
Tb	159	He	1129086	6.50	1146052	98.52	70	120	
Tb	159	NoGas	8030691	5.98	7155958	112.22	70	120	
Ho	165	H2	4911487	8.62	4765312	103.07	70	120	
Ho	165	He	1144504	6.44	1131090	101.19	70	120	
Ho	165	NoGas	7818927	5.37	6876887	113.70	70	120	

Sample Report

Sample Table

Sample Name	AZ79150S01 DF100
Data File Name	064SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:56:59-07:00
Sample Type	Sample
Dilution	1.005025126
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.223	0.224	9.83	2184	11.00	10000	
B	11	45	NoGas	3.400	3.417	3.80	249526	1.50	10000	
Na	23	45	He	45.611	45.840	2.79	38485	0.35	1000000	
Mg	24	45	He	1228.055	1234.227	0.98	186990	0.57	1000000	
Al	27	45	He	7003.430	7038.623	1.72	199823	0.34	1000000	
P	31	45	He	459.726	462.036	1.57	939	0.41	500000	
K	39	45	He	533.522	536.203	2.46	39339	0.78	500000	
Ca	40	45	H2	733.741	737.429	10.92	3767387	3.55	500000	
Ti	47	45	He	259.212	260.514	3.23	11700	2.79	10000	
V	51	45	He	20.764	20.868	1.05	55384	1.25	10000	
Cr	52	45	He	4.303	4.324	1.10	17841	1.53	10000	
Mn	55	45	He	116.550	117.136	2.13	128514	0.68	50000	
Fe	56	45	He	9884.931	9934.604	1.48	28443107	0.13	1000000	
Co	59	45	He	2.005	2.015	1.46	16677	2.81	10000	
Ni	60	45	He	3.019	3.034	3.85	7847	2.63	10000	
Cu	63	45	He	22.882	22.997	1.42	171397	0.28	10000	
Zn	66	115	He	41.347	41.555	3.68	32888	1.07	50000	
As	75	115	He	1.790	1.799	7.78	739	6.23	2000	
Se	78	72	H2	0.121	0.122	6.85	108	5.94	10000	
Se	78	115	He	0.972	0.977	45.49	14	38.42	10000	
Sr	88	115	NoGas	4.945	4.969	1.23	432995	2.14	50000	
Mo	95	115	NoGas	13.280	13.347	0.60	238678	2.11	10000	
Ag	107	115	NoGas	0.110	0.110	5.20	9893	1.23	5000	
Cd	111	115	He	0.147	0.148	9.02	157	7.00	10000	
Sn	118	115	He	1.147	1.152	3.04	1663	3.67	10000	
Sn	118	115	NoGas	1.120	1.126	0.57	31831	2.04	10000	
Sb	121	115	NoGas	1.035	1.041	1.41	42496	1.89	10000	
Ba	137	115	NoGas	17.245	17.331	1.22	224848	1.35	50000	
Tl	205	165	NoGas	0.069	0.069	4.06	7599	4.36	5000	
Pb	208	165	NoGas	17.591	17.679	0.69	1956416	1.37	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	243339	0.53	232772	104.54	70	120	
Sc	45	H2	483555	7.62	497417	97.21	70	120	
Sc	45	He	25410	1.45	26213	96.94	70	120	
Sc	45	NoGas	3423837	1.53	3271044	104.67	70	120	
Ge	72	H2	123111	7.76	130306	94.48	70	120	
Ge	72	He	25244	3.04	25369	99.51	70	120	
Ge	72	NoGas	847061	1.98	804525	105.29	70	120	
In	115	H2	2716066	8.21	2768793	98.10	70	120	
In	115	He	180776	2.86	184583	97.94	70	120	
In	115	NoGas	5563600	2.56	5159681	107.83	70	120	
Tb	159	H2	5086845	8.47	4956789	102.62	70	120	
Tb	159	He	1174081	2.38	1146052	102.45	70	120	
Tb	159	NoGas	8042400	1.18	7155958	112.39	70	120	
Ho	165	H2	4906930	8.93	4765312	102.97	70	120	
Ho	165	He	1194899	2.09	1131090	105.64	70	120	
Ho	165	NoGas	7762206	1.95	6876887	112.87	70	120	

Sample Report

Sample Table

Sample Name	AZ79151S01 DF100
Data File Name	065SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T14:00:59-07:00
Sample Type	Sample
Dilution	1.003009027
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.202	0.203	6.01	2074	5.89	10000	
B	11	45	NoGas	1.483	1.487	42.32	248450	0.60	10000	
Na	23	45	He	55.816	55.984	3.99	41931	0.15	1000000	
Mg	24	45	He	1236.009	1239.729	1.91	186917	0.15	1000000	
Al	27	45	He	6371.139	6390.310	2.73	180562	0.78	1000000	
P	31	45	He	371.142	372.259	5.99	760	4.02	500000	
K	39	45	He	558.860	560.542	2.53	40754	0.34	500000	
Ca	40	45	H2	1027.279	1030.370	14.97	4746193	2.65	500000	
Ti	47	45	He	333.710	334.714	1.86	14962	0.67	10000	
V	51	45	He	19.951	20.011	2.00	52857	1.59	10000	
Cr	52	45	He	4.731	4.745	1.60	19428	0.52	10000	
Mn	55	45	He	131.618	132.015	1.23	144162	1.02	50000	
Fe	56	45	He	12274.914	12311.850	2.19	35078870	0.37	1000000	
Co	59	45	He	2.025	2.031	0.92	16729	1.77	10000	
Ni	60	45	He	4.125	4.137	3.18	10613	2.71	10000	
Cu	63	45	He	56.658	56.829	2.47	419915	0.67	10000	
Zn	66	115	He	56.045	56.213	2.84	44485	0.74	50000	
As	75	115	He	1.867	1.873	8.61	772	7.71	2000	
Se	78	72	H2	0.109	0.109	17.22	89	2.88	10000	
Se	78	115	He	1.111	1.114	61.10	16	51.16	10000	
Sr	88	115	NoGas	5.476	5.492	2.01	499328	1.95	50000	
Mo	95	115	NoGas	13.829	13.871	1.97	258847	1.87	10000	
Ag	107	115	NoGas	0.104	0.105	7.87	10033	4.66	5000	
Cd	111	115	He	0.165	0.166	11.23	177	13.27	10000	
Sn	118	115	He	11.990	12.026	1.48	16872	1.09	10000	
Sn	118	115	NoGas	11.662	11.697	0.98	334557	0.93	10000	
Sb	121	115	NoGas	1.809	1.815	1.94	76660	1.62	10000	
Ba	137	115	NoGas	21.059	21.123	1.10	285989	1.59	50000	
Tl	205	165	NoGas	0.057	0.057	10.60	6858	7.28	5000	
Pb	208	165	NoGas	29.305	29.393	1.66	3399923	1.56	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	248490	0.43	232772	106.75	70	120	
Sc	45	H2	438720	13.08	497417	88.20	70	120	
Sc	45	He	25241	2.03	26213	96.29	70	120	
Sc	45	NoGas	3577047	1.04	3271044	109.35	70	120	
Ge	72	H2	114265	14.69	130306	87.69	70	120	
Ge	72	He	24912	1.74	25369	98.20	70	120	
Ge	72	NoGas	870487	0.34	804525	108.20	70	120	
In	115	H2	2462628	14.00	2768793	88.94	70	120	
In	115	He	180933	2.32	184583	98.02	70	120	
In	115	NoGas	5794033	0.65	5159681	112.29	70	120	
Tb	159	H2	4602808	14.20	4956789	92.86	70	120	
Tb	159	He	1181850	1.91	1146052	103.12	70	120	
Tb	159	NoGas	8293767	0.79	7155958	115.90	70	120	
Ho	165	H2	4466285	14.54	4765312	93.72	70	120	
Ho	165	He	1198706	1.76	1131090	105.98	70	120	
Ho	165	NoGas	8109032	0.62	6876887	117.92	70	120	

Sample Report

Sample Table

Sample Name	AZ79152S01 DF100
Data File Name	161SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:01:56-07:00
Sample Type	Sample
Dilution	1.01010101
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.238	0.240	13.89	1467	13.10	10000	
B	11	45	NoGas	-2.387	-2.411	-1.97	10100	2.89	10000	
Na	23	45	He	55.143	55.700	2.19	44570	1.92	1000000	
Mg	24	45	He	1340.362	1353.901	0.91	294700	0.75	1000000	
Al	27	45	He	6333.448	6397.422	0.74	409031	1.47	1000000	
P	31	45	He	336.199	339.595	7.90	1705	7.49	500000	
K	39	45	He	622.586	628.875	1.43	92879	2.08	500000	
Ca	40	45	H2	812.538	820.746	13.84	2201379	2.92	500000	
Ti	47	45	He	248.242	250.749	2.87	17219	3.15	10000	
V	51	45	He	18.787	18.977	0.31	55367	1.69	10000	
Cr	52	45	He	3.485	3.521	1.77	14674	1.76	10000	
Mn	55	45	He	144.518	145.978	0.87	230937	0.89	50000	
Fe	56	45	He	9184.171	9276.941	0.48	28486944	2.11	1000000	
Co	59	45	He	1.948	1.968	1.04	14198	2.29	10000	
Ni	60	45	He	14.046	14.188	1.89	30048	0.50	10000	
Cu	63	45	He	31.833	32.155	1.00	193174	0.69	10000	
Zn	66	115	He	57.739	58.322	1.10	55243	0.21	50000	
As	75	115	He	1.252	1.265	3.39	687	2.34	2000	
Se	78	115	H2	0.061	0.061	37.36	46	12.76	10000	
Se	78	115	He	0.793	0.801	21.30	25	18.23	10000	
Sr	88	115	NoGas	5.974	6.034	0.35	306864	1.93	50000	
Mo	95	115	NoGas	15.774	15.933	1.41	169978	1.18	10000	
Ag	107	115	NoGas	0.122	0.123	8.26	6655	2.56	5000	
Cd	111	115	He	0.147	0.149	18.00	192	17.77	10000	
Sn	118	115	He	2.850	2.879	2.05	6216	2.50	10000	
Sn	118	115	NoGas	2.935	2.964	1.25	49539	0.81	10000	
Sb	121	115	NoGas	1.016	1.026	2.87	25780	4.29	10000	
Ba	137	165	NoGas	25.799	26.060	1.65	220633	1.76	50000	
Tl	205	165	NoGas	0.065	0.065	11.18	4177	6.62	5000	
Pb	208	165	NoGas	22.797	23.027	3.18	1738845	0.41	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	220238	0.55	267827	82.23	70	120	
Sc	45	H2	327990	11.13	415473	78.94	70	120	
Sc	45	He	46317	1.64	58243	79.52	70	120	
Sc	45	NoGas	2069524	1.41	2418294	85.58	70	120	
Ge	72	H2	92069	11.00	121413	75.83	70	120	
Ge	72	He	38184	0.34	45798	83.37	70	120	
Ge	72	NoGas	527115	1.15	584877	90.12	70	120	
In	115	H2	1987722	10.69	2292298	86.71	70	120	
In	115	He	354009	1.05	399276	88.66	70	120	
In	115	NoGas	3691899	1.90	3892468	94.85	70	120	
Tb	159	H2	3855107	10.67	4163457	92.59	70	120	
Tb	159	He	1817853	0.77	1939211	93.74	70	120	
Tb	159	NoGas	5671912	1.45	5743431	98.75	70	120	
Ho	165	H2	3784928	11.68	4001522	94.59	70	120	
Ho	165	He	1824643	1.47	1933801	94.36	70	120	
Ho	165	NoGas	5592982	3.33	5517017	101.38	70	120	

Sample Report

Sample Table

Sample Name	AZ79153S01 DF100
Data File Name	162SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:05:51-07:00
Sample Type	Sample
Dilution	1.008064516
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.124	0.125	22.74	793	19.58	10000	
B	11	45	NoGas	-2.755	-2.777	-2.07	9019	2.90	10000	
Na	23	45	He	47.039	47.418	6.97	40889	1.83	1000000	
Mg	24	45	He	1189.861	1199.456	2.25	261662	0.10	1000000	
Al	27	45	He	4141.163	4174.560	2.18	267508	0.26	1000000	
P	31	45	He	328.401	331.050	6.09	1669	3.60	500000	
K	39	45	He	661.524	666.859	2.60	98112	0.37	500000	
Ca	40	45	H2	845.424	852.242	15.41	2110499	2.07	500000	
Ti	47	45	He	198.235	199.834	3.45	13752	2.58	10000	
V	51	45	He	13.258	13.365	2.69	39117	0.60	10000	
Cr	52	45	He	2.253	2.272	2.31	9739	0.24	10000	
Mn	55	45	He	172.926	174.321	1.52	276391	0.64	50000	
Fe	56	45	He	6854.602	6909.881	2.04	21263579	1.15	1000000	
Co	59	45	He	1.788	1.803	3.08	13036	0.90	10000	
Ni	60	45	He	7.230	7.288	2.44	15497	1.46	10000	
Cu	63	45	He	10.706	10.792	1.96	65932	0.34	10000	
Zn	66	115	He	28.954	29.188	2.07	27481	2.33	50000	
As	75	115	He	0.989	0.997	4.98	535	2.53	2000	
Se	78	115	H2	0.035	0.035	76.26	31	20.67	10000	
Se	78	115	He	0.316	0.318	18.58	13	9.12	10000	
Sr	88	115	NoGas	5.861	5.908	0.65	312164	1.20	50000	
Mo	95	115	NoGas	4.638	4.676	4.29	51914	5.34	10000	
Ag	107	115	NoGas	0.074	0.075	6.01	5468	1.12	5000	
Cd	111	115	He	0.119	0.120	9.14	153	6.46	10000	
Sn	118	115	He	2.501	2.521	3.17	5370	4.79	10000	
Sn	118	115	NoGas	2.489	2.509	0.65	43744	1.68	10000	
Sb	121	115	NoGas	0.286	0.289	3.62	8222	3.96	10000	
Ba	137	165	NoGas	17.989	18.134	1.54	158604	1.21	50000	
Tl	205	165	NoGas	0.059	0.060	7.65	3996	6.86	5000	
Pb	208	165	NoGas	17.812	17.956	1.42	1399560	0.75	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	224593	3.07	267827	83.86	70	120	
Sc	45	H2	303364	12.79	415473	73.02	70	120	
Sc	45	He	46335	2.14	58243	79.55	70	120	
Sc	45	NoGas	2156678	0.80	2418294	89.18	70	120	
Ge	72	H2	85845	12.25	121413	70.71	70	120	
Ge	72	He	38848	1.66	45798	84.83	70	120	
Ge	72	NoGas	545840	1.02	584877	93.33	70	120	
In	115	H2	1843596	13.60	2292298	80.43	70	120	
In	115	He	347307	2.51	399276	86.98	70	120	
In	115	NoGas	3827851	1.48	3892468	98.34	70	120	
Tb	159	H2	3612225	12.52	4163457	86.76	70	120	
Tb	159	He	1755938	2.93	1939211	90.55	70	120	
Tb	159	NoGas	5833117	1.36	5743431	101.56	70	120	
Ho	165	H2	3558210	13.11	4001522	88.92	70	120	
Ho	165	He	1757307	1.31	1933801	90.87	70	120	
Ho	165	NoGas	5754441	1.17	5517017	104.30	70	120	

Sample Report

Sample Table

Sample Name	AZ79154S01 DF100
Data File Name	163SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:09:45-07:00
Sample Type	Sample
Dilution	0.993048659
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.259	0.257	10.04	1630	9.08	10000	
B	11	45	NoGas	-2.617	-2.599	-2.58	9519	0.64	10000	
Na	23	45	He	66.712	66.248	2.56	50326	0.97	1000000	
Mg	24	45	He	1726.973	1714.968	2.31	383513	0.30	1000000	
Al	27	45	He	6883.827	6835.976	2.54	449010	0.39	1000000	
P	31	45	He	324.871	322.613	12.35	1668	8.28	500000	
K	39	45	He	811.950	806.306	2.23	119488	0.42	500000	
Ca	40	45	H2	683.030	678.282	12.21	1761912	1.37	500000	
Ti	47	45	He	294.483	292.436	3.61	20628	1.68	10000	
V	51	45	He	18.877	18.746	2.99	56181	0.66	10000	
Cr	52	45	He	2.921	2.901	4.25	12536	2.45	10000	
Mn	55	45	He	217.618	216.105	2.57	351211	0.73	50000	
Fe	56	45	He	9039.734	8976.896	2.60	28316940	0.89	1000000	
Co	59	45	He	2.498	2.481	3.47	18377	1.79	10000	
Ni	60	45	He	9.526	9.460	1.84	20605	0.64	10000	
Cu	63	45	He	8.782	8.720	2.94	54872	0.46	10000	
Zn	66	115	He	24.163	23.995	2.65	23407	0.93	50000	
As	75	115	He	1.264	1.255	4.07	691	1.67	2000	
Se	78	115	H2	0.074	0.074	46.74	50	18.81	10000	
Se	78	115	He	0.483	0.480	62.05	17	46.63	10000	
Sr	88	115	NoGas	5.554	5.516	2.54	296454	2.13	50000	
Mo	95	115	NoGas	8.359	8.301	1.57	93641	0.34	10000	
Ag	107	115	NoGas	0.042	0.041	10.31	4507	2.90	5000	
Cd	111	115	He	0.074	0.073	16.50	97	15.80	10000	
Sn	118	115	He	0.409	0.407	11.68	1014	8.14	10000	
Sn	118	115	NoGas	0.440	0.437	5.77	8678	3.62	10000	
Sb	121	115	NoGas	0.191	0.190	7.21	5818	5.88	10000	
Ba	137	165	NoGas	24.279	24.110	3.30	212586	1.17	50000	
Tl	205	165	NoGas	0.083	0.082	4.65	5338	3.21	5000	
Pb	208	165	NoGas	5.284	5.247	1.64	415827	0.77	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	224909	1.04	267827	83.98	70	120	
Sc	45	H2	310883	11.20	415473	74.83	70	120	
Sc	45	He	46797	2.44	58243	80.35	70	120	
Sc	45	NoGas	2143521	2.39	2418294	88.64	70	120	
Ge	72	H2	86361	10.72	121413	71.13	70	120	
Ge	72	He	39802	2.32	45798	86.91	70	120	
Ge	72	NoGas	547409	1.22	584877	93.59	70	120	
In	115	H2	1903463	11.15	2292298	83.04	70	120	
In	115	He	353015	2.62	399276	88.41	70	120	
In	115	NoGas	3836271	1.68	3892468	98.56	70	120	
Tb	159	H2	3711959	11.25	4163457	89.16	70	120	
Tb	159	He	1795272	0.84	1939211	92.58	70	120	
Tb	159	NoGas	5861541	1.96	5743431	102.06	70	120	
Ho	165	H2	3607686	10.96	4001522	90.16	70	120	
Ho	165	He	1794848	0.37	1933801	92.81	70	120	
Ho	165	NoGas	5725733	2.16	5517017	103.78	70	120	

Sample Report

Sample Table

Sample Name	AZ79155S01 DF100
Data File Name	164SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:13:40-07:00
Sample Type	Sample
Dilution	1.006036217
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.263	0.265	13.49	1677	13.79	10000	
B	11	45	NoGas	-2.722	-2.739	-1.94	9223	2.36	10000	
Na	23	45	He	55.613	55.949	4.84	45759	0.61	1000000	
Mg	24	45	He	1283.104	1290.849	3.07	288263	0.69	1000000	
Al	27	45	He	6606.933	6646.814	1.88	436079	1.66	1000000	
P	31	45	He	252.450	253.974	2.58	1359	1.58	500000	
K	39	45	He	589.257	592.814	4.00	90312	0.67	500000	
Ca	40	45	H2	779.388	784.093	12.51	2115245	2.02	500000	
Ti	47	45	He	264.523	266.120	2.42	18755	3.12	10000	
V	51	45	He	20.784	20.909	3.27	62561	0.79	10000	
Cr	52	45	He	2.613	2.628	2.12	11426	3.08	10000	
Mn	55	45	He	134.205	135.016	2.95	219139	0.61	50000	
Fe	56	45	He	9282.432	9338.463	2.51	29419392	1.45	1000000	
Co	59	45	He	1.739	1.750	2.58	12957	1.03	10000	
Ni	60	45	He	9.071	9.125	1.86	19853	1.70	10000	
Cu	63	45	He	17.942	18.051	3.61	111887	1.29	10000	
Zn	66	115	He	27.529	27.695	2.99	26561	0.51	50000	
As	75	115	He	1.326	1.334	12.00	723	8.43	2000	
Se	78	115	H2	0.072	0.072	33.16	51	12.23	10000	
Se	78	115	He	0.529	0.532	29.45	18	19.16	10000	
Sr	88	115	NoGas	5.630	5.664	0.95	297961	0.64	50000	
Mo	95	115	NoGas	25.287	25.440	2.06	280681	1.38	10000	
Ag	107	115	NoGas	0.069	0.070	21.15	5288	7.78	5000	
Cd	111	115	He	0.064	0.064	9.49	83	7.71	10000	
Sn	118	115	He	0.282	0.283	4.59	744	5.34	10000	
Sn	118	115	NoGas	0.303	0.305	1.10	6278	1.57	10000	
Sb	121	115	NoGas	0.336	0.338	8.45	9420	8.13	10000	
Ba	137	165	NoGas	17.617	17.723	0.93	155618	0.54	50000	
Tl	205	165	NoGas	0.059	0.059	4.97	3967	5.04	5000	
Pb	208	165	NoGas	5.412	5.444	1.22	428747	0.93	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	227620	0.58	267827	84.99	70	120	
Sc	45	H2	327801	10.20	415473	78.90	70	120	
Sc	45	He	47352	3.21	58243	81.30	70	120	
Sc	45	NoGas	2172904	0.59	2418294	89.85	70	120	
Ge	72	H2	90461	10.95	121413	74.51	70	120	
Ge	72	He	39875	3.01	45798	87.07	70	120	
Ge	72	NoGas	548860	0.74	584877	93.84	70	120	
In	115	H2	1976795	8.71	2292298	86.24	70	120	
In	115	He	352820	3.38	399276	88.36	70	120	
In	115	NoGas	3803614	1.09	3892468	97.72	70	120	
Tb	159	H2	3870903	11.79	4163457	92.97	70	120	
Tb	159	He	1797117	3.50	1939211	92.67	70	120	
Tb	159	NoGas	5806787	1.25	5743431	101.10	70	120	
Ho	165	H2	3744055	9.62	4001522	93.57	70	120	
Ho	165	He	1817438	3.46	1933801	93.98	70	120	
Ho	165	NoGas	5764528	0.91	5517017	104.49	70	120	

Sample Report

Sample Table

Sample Name	AZ79156S01 DF100
Data File Name	165SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:17:35-07:00
Sample Type	Sample
Dilution	0.998003992
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.262	0.261	5.41	1660	5.52	10000	
B	11	45	NoGas	-2.902	-2.897	-2.90	8569	3.99	10000	
Na	23	45	He	204.150	203.742	1.03	115613	1.19	1000000	
Mg	24	45	He	1396.658	1393.870	0.33	316449	1.02	1000000	
Al	27	45	He	6943.869	6930.009	0.58	462127	1.65	1000000	
P	31	45	He	277.822	277.267	4.34	1487	2.47	500000	
K	39	45	He	636.359	635.089	1.40	97606	1.17	500000	
Ca	40	45	H2	803.628	802.024	13.03	2142465	2.21	500000	
Ti	47	45	He	245.836	245.345	2.90	17568	1.88	10000	
V	51	45	He	18.840	18.802	0.42	57213	1.27	10000	
Cr	52	45	He	2.727	2.722	0.64	11993	1.82	10000	
Mn	55	45	He	103.479	103.273	1.54	170409	0.91	50000	
Fe	56	45	He	8622.331	8605.121	0.89	27555347	0.56	1000000	
Co	59	45	He	1.674	1.671	3.22	12581	4.50	10000	
Ni	60	45	He	10.560	10.539	2.57	23292	1.32	10000	
Cu	63	45	He	14.146	14.118	1.11	89279	0.33	10000	
Zn	66	115	He	24.052	24.004	4.00	23375	2.20	50000	
As	75	115	He	1.216	1.214	6.06	667	4.01	2000	
Se	78	115	H2	0.097	0.097	32.00	61	11.19	10000	
Se	78	115	He	0.613	0.612	33.53	21	26.65	10000	
Sr	88	115	NoGas	6.204	6.191	3.37	332988	0.93	50000	
Mo	95	115	NoGas	20.985	20.943	3.03	236299	0.44	10000	
Ag	107	115	NoGas	0.077	0.077	19.57	5614	8.66	5000	
Cd	111	115	He	0.056	0.056	24.07	73	22.87	10000	
Sn	118	115	He	0.250	0.249	1.44	679	2.88	10000	
Sn	118	115	NoGas	0.263	0.262	6.44	5689	7.34	10000	
Sb	121	115	NoGas	0.200	0.200	5.57	6088	3.83	10000	
Ba	137	165	NoGas	18.934	18.896	2.50	167626	0.13	50000	
Tl	205	165	NoGas	0.067	0.067	6.32	4471	7.54	5000	
Pb	208	165	NoGas	4.949	4.939	2.28	393454	0.53	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	226857	2.02	267827	84.70	70	120	
Sc	45	H2	322370	10.45	415473	77.59	70	120	
Sc	45	He	47727	1.29	58243	81.94	70	120	
Sc	45	NoGas	2195656	1.60	2418294	90.79	70	120	
Ge	72	H2	88155	11.19	121413	72.61	70	120	
Ge	72	He	39339	1.51	45798	85.90	70	120	
Ge	72	NoGas	557087	1.56	584877	95.25	70	120	
In	115	H2	1941394	11.67	2292298	84.69	70	120	
In	115	He	354128	1.88	399276	88.69	70	120	
In	115	NoGas	3860138	2.97	3892468	99.17	70	120	
Tb	159	H2	3749587	10.09	4163457	90.06	70	120	
Tb	159	He	1795235	3.32	1939211	92.58	70	120	
Tb	159	NoGas	5899674	2.95	5743431	102.72	70	120	
Ho	165	H2	3636806	10.20	4001522	90.89	70	120	
Ho	165	He	1790798	1.52	1933801	92.61	70	120	
Ho	165	NoGas	5781860	2.44	5517017	104.80	70	120	

Sample Report

Sample Table

Sample Name	AZ79157S01 DF100
Data File Name	166SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:21:32-07:00
Sample Type	Sample
Dilution	1.005025126
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.266	0.267	7.01	1703	6.88	10000	
B	11	45	NoGas	-2.627	-2.641	-4.16	9733	4.47	10000	
Na	23	45	He	59.967	60.268	8.53	48866	1.01	1000000	
Mg	24	45	He	1419.672	1426.806	4.13	326294	0.22	1000000	
Al	27	45	He	6640.730	6674.101	4.96	448208	1.09	1000000	
P	31	45	He	263.834	265.160	6.37	1443	4.18	500000	
K	39	45	He	629.619	632.783	3.46	98096	0.97	500000	
Ca	40	45	H2	792.068	796.048	20.16	1990178	2.67	500000	
Ti	47	45	He	259.997	261.304	3.40	18856	1.44	10000	
V	51	45	He	17.299	17.386	3.39	53312	0.56	10000	
Cr	52	45	He	2.693	2.707	2.31	12027	1.92	10000	
Mn	55	45	He	100.882	101.389	3.88	168553	0.60	50000	
Fe	56	45	He	7838.515	7877.904	3.23	25418503	0.74	1000000	
Co	59	45	He	1.678	1.686	6.26	12780	2.45	10000	
Ni	60	45	He	7.893	7.933	3.42	17680	0.83	10000	
Cu	63	45	He	11.466	11.524	3.56	73711	0.58	10000	
Zn	66	115	He	20.211	20.312	3.92	20044	1.70	50000	
As	75	115	He	1.153	1.159	11.44	644	11.67	2000	
Se	78	115	H2	0.104	0.104	7.14	62	16.92	10000	
Se	78	115	He	0.712	0.715	33.14	24	28.13	10000	
Sr	88	115	NoGas	5.350	5.377	2.07	288005	1.57	50000	
Mo	95	115	NoGas	15.725	15.804	2.38	177579	1.65	10000	
Ag	107	115	NoGas	0.053	0.053	11.53	4898	4.71	5000	
Cd	111	115	He	0.041	0.041	20.89	55	18.41	10000	
Sn	118	115	He	0.232	0.233	9.21	651	7.41	10000	
Sn	118	115	NoGas	0.231	0.232	1.04	5139	2.01	10000	
Sb	121	115	NoGas	0.182	0.183	9.24	5644	7.02	10000	
Ba	137	165	NoGas	17.943	18.033	0.81	159748	0.26	50000	
Tl	205	165	NoGas	0.064	0.064	5.93	4327	4.21	5000	
Pb	208	165	NoGas	4.683	4.707	1.64	374543	0.96	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	229093	0.63	267827	85.54	70	120	
Sc	45	H2	307699	16.41	415473	74.06	70	120	
Sc	45	He	48464	3.84	58243	83.21	70	120	
Sc	45	NoGas	2200190	0.22	2418294	90.98	70	120	
Ge	72	H2	85856	15.88	121413	70.71	70	120	
Ge	72	He	40788	1.51	45798	89.06	70	120	
Ge	72	NoGas	563916	1.13	584877	96.42	70	120	
In	115	H2	1827267	18.31	2292298	79.71	70	120	
In	115	He	359585	2.21	399276	90.06	70	120	
In	115	NoGas	3868949	1.21	3892468	99.40	70	120	
Tb	159	H2	3548568	17.54	4163457	85.23	70	120	
Tb	159	He	1803865	0.58	1939211	93.02	70	120	
Tb	159	NoGas	5851558	0.71	5743431	101.88	70	120	
Ho	165	H2	3452929	16.10	4001522	86.29	70	120	
Ho	165	He	1820455	2.32	1933801	94.14	70	120	
Ho	165	NoGas	5810794	1.05	5517017	105.32	70	120	

Sample Report

Sample Table

Sample Name	AZ79158S01 DF100
Data File Name	167SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:25:27-07:00
Sample Type	Sample
Dilution	1.007049345
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.147	0.148	14.93	973	14.54	10000	
B	11	45	NoGas	-2.972	-2.992	-4.13	8412	7.51	10000	
Na	23	45	He	92.410	93.061	5.30	65403	0.26	1000000	
Mg	24	45	He	1441.015	1451.173	2.54	337129	0.94	1000000	
Al	27	45	He	6381.856	6426.844	2.37	438558	1.05	1000000	
P	31	45	He	339.732	342.127	7.32	1833	9.56	500000	
K	39	45	He	655.899	660.523	2.52	103585	1.10	500000	
Ca	40	45	H2	720.339	725.416	8.89	1989952	2.75	500000	
Ti	47	45	He	336.529	338.901	2.99	24836	0.88	10000	
V	51	45	He	16.686	16.803	1.86	52346	1.52	10000	
Cr	52	45	He	2.749	2.769	2.57	12478	1.74	10000	
Mn	55	45	He	103.264	103.992	3.59	175578	1.41	50000	
Fe	56	45	He	7751.889	7806.535	3.74	25574813	0.45	1000000	
Co	59	45	He	1.751	1.763	4.46	13574	1.61	10000	
Ni	60	45	He	7.906	7.962	1.76	18027	1.91	10000	
Cu	63	45	He	7.533	7.586	2.12	49822	2.72	10000	
Zn	66	115	He	19.590	19.728	3.70	19596	3.27	50000	
As	75	115	He	1.554	1.565	2.36	869	3.76	2000	
Se	78	115	H2	0.068	0.068	20.18	50	11.18	10000	
Se	78	115	He	0.610	0.615	34.48	21	25.20	10000	
Sr	88	115	NoGas	4.636	4.668	0.88	250157	0.79	50000	
Mo	95	115	NoGas	1.000	1.008	5.48	11414	4.56	10000	
Ag	107	115	NoGas	0.032	0.033	8.41	4274	1.11	5000	
Cd	111	115	He	0.037	0.037	20.16	51	21.74	10000	
Sn	118	115	He	0.202	0.204	3.54	591	5.09	10000	
Sn	118	115	NoGas	0.206	0.207	3.58	4720	2.41	10000	
Sb	121	115	NoGas	0.086	0.086	11.80	3170	8.77	10000	
Ba	137	165	NoGas	15.705	15.816	1.65	140849	0.78	50000	
Tl	205	165	NoGas	0.072	0.072	2.98	4808	3.34	5000	
Pb	208	165	NoGas	4.621	4.654	1.79	372038	0.95	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	233850	0.57	267827	87.31	70	120	
Sc	45	H2	331469	5.77	415473	79.78	70	120	
Sc	45	He	49308	3.37	58243	84.66	70	120	
Sc	45	NoGas	2228920	1.87	2418294	92.17	70	120	
Ge	72	H2	90119	6.74	121413	74.22	70	120	
Ge	72	He	41914	2.21	45798	91.52	70	120	
Ge	72	NoGas	569219	1.65	584877	97.32	70	120	
In	115	H2	1983464	6.66	2292298	86.53	70	120	
In	115	He	362229	2.57	399276	90.72	70	120	
In	115	NoGas	3877440	0.92	3892468	99.61	70	120	
Tb	159	H2	3805531	5.45	4163457	91.40	70	120	
Tb	159	He	1820843	1.60	1939211	93.90	70	120	
Tb	159	NoGas	5964326	1.46	5743431	103.85	70	120	
Ho	165	H2	3723432	4.61	4001522	93.05	70	120	
Ho	165	He	1821600	2.20	1933801	94.20	70	120	
Ho	165	NoGas	5849378	2.21	5517017	106.02	70	120	

Sample Report

Sample Table

Sample Name	AZ79159S01 DF100
Data File Name	168SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:29:23-07:00
Sample Type	Sample
Dilution	1.009081736
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.177	0.179	20.15	1163	19.11	10000	
B	11	45	NoGas	-2.757	-2.782	-2.37	9433	4.23	10000	
Na	23	45	He	74.616	75.293	0.56	57057	1.91	1000000	
Mg	24	45	He	1528.456	1542.337	1.52	358968	0.56	1000000	
Al	27	45	He	6834.488	6896.557	2.49	471403	0.69	1000000	
P	31	45	He	375.243	378.651	3.69	2008	4.90	500000	
K	39	45	He	731.575	738.219	1.15	114845	1.48	500000	
Ca	40	45	H2	751.899	758.728	13.17	2078030	2.40	500000	
Ti	47	45	He	375.572	378.983	3.13	27821	1.17	10000	
V	51	45	He	18.841	19.012	1.80	59305	0.52	10000	
Cr	52	45	He	3.398	3.429	1.21	15305	2.33	10000	
Mn	55	45	He	98.995	99.894	1.70	169000	0.53	50000	
Fe	56	45	He	8665.251	8743.947	1.17	28707973	0.90	1000000	
Co	59	45	He	1.730	1.746	2.44	13473	3.06	10000	
Ni	60	45	He	12.212	12.323	0.80	27919	1.36	10000	
Cu	63	45	He	8.554	8.632	2.44	56570	1.14	10000	
Zn	66	115	He	21.130	21.322	0.56	21253	2.34	50000	
As	75	115	He	1.586	1.600	3.70	893	4.23	2000	
Se	78	115	H2	0.073	0.074	8.72	53	6.91	10000	
Se	78	115	He	0.829	0.836	23.00	27	16.97	10000	
Sr	88	115	NoGas	5.119	5.166	1.77	279040	0.68	50000	
Mo	95	115	NoGas	1.348	1.360	4.69	15504	4.57	10000	
Ag	107	115	NoGas	0.039	0.039	13.04	4517	4.21	5000	
Cd	111	115	He	0.038	0.038	2.47	52	3.85	10000	
Sn	118	115	He	0.209	0.211	13.97	609	8.76	10000	
Sn	118	115	NoGas	0.244	0.246	3.32	5432	1.12	10000	
Sb	121	115	NoGas	0.097	0.098	8.06	3497	6.15	10000	
Ba	137	165	NoGas	17.841	18.003	2.15	160454	2.63	50000	
Tl	205	165	NoGas	0.082	0.083	2.82	5458	2.01	5000	
Pb	208	165	NoGas	5.290	5.338	0.72	426819	1.23	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	233119	0.52	267827	87.04	70	120	
Sc	45	H2	333797	10.46	415473	80.34	70	120	
Sc	45	He	49481	2.03	58243	84.96	70	120	
Sc	45	NoGas	2256779	1.34	2418294	93.32	70	120	
Ge	72	H2	91718	10.73	121413	75.54	70	120	
Ge	72	He	41425	2.45	45798	90.45	70	120	
Ge	72	NoGas	567358	2.29	584877	97.00	70	120	
In	115	H2	1978130	9.29	2292298	86.29	70	120	
In	115	He	364950	1.83	399276	91.40	70	120	
In	115	NoGas	3917797	1.87	3892468	100.65	70	120	
Tb	159	H2	3797133	9.75	4163457	91.20	70	120	
Tb	159	He	1851971	1.35	1939211	95.50	70	120	
Tb	159	NoGas	5973809	1.22	5743431	104.01	70	120	
Ho	165	H2	3662837	10.36	4001522	91.54	70	120	
Ho	165	He	1855341	1.42	1933801	95.94	70	120	
Ho	165	NoGas	5868803	0.52	5517017	106.38	70	120	

Sample Report

Sample Table

Sample Name	AZ79160S01 DF100
Data File Name	169SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T19:33:19-07:00
Sample Type	Sample
Dilution	1.008064516
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.140	0.141	8.91	943	6.12	10000	
B	11	45	NoGas	-3.347	-3.374	-6.15	7068	6.93	10000	
Na	23	45	He	45.765	46.134	5.83	43314	1.43	1000000	
Mg	24	45	He	1334.335	1345.096	3.23	315229	1.71	1000000	
Al	27	45	He	5962.651	6010.737	4.32	413603	0.70	1000000	
P	31	45	He	323.332	325.940	6.53	1769	4.65	500000	
K	39	45	He	623.495	628.523	3.42	99914	0.87	500000	
Ca	40	45	H2	496.062	500.063	13.53	1392373	2.34	500000	
Ti	47	45	He	239.997	241.932	4.32	17882	1.96	10000	
V	51	45	He	15.752	15.879	3.89	49897	1.95	10000	
Cr	52	45	He	2.442	2.462	4.59	11271	1.91	10000	
Mn	55	45	He	89.071	89.789	3.90	152927	0.85	50000	
Fe	56	45	He	7505.308	7565.835	3.42	25008537	1.45	1000000	
Co	59	45	He	1.557	1.570	2.62	12201	1.30	10000	
Ni	60	45	He	9.421	9.496	3.90	21670	0.89	10000	
Cu	63	45	He	7.390	7.449	5.78	49333	1.69	10000	
Zn	66	115	He	17.645	17.787	1.50	17920	3.87	50000	
As	75	115	He	1.342	1.352	5.63	760	3.76	2000	
Se	78	115	H2	0.075	0.076	28.38	53	8.13	10000	
Se	78	115	He	0.514	0.518	57.67	19	42.97	10000	
Sr	88	115	NoGas	3.383	3.410	8.36	191505	1.05	50000	
Mo	95	115	NoGas	1.157	1.167	11.78	13813	5.12	10000	
Ag	107	115	NoGas	0.033	0.033	31.44	4507	0.78	5000	
Cd	111	115	He	0.033	0.033	42.28	46	42.82	10000	
Sn	118	115	He	0.174	0.175	15.66	536	13.78	10000	
Sn	118	115	NoGas	0.175	0.176	11.07	4384	0.66	10000	
Sb	121	115	NoGas	0.063	0.063	14.29	2707	4.99	10000	
Ba	137	165	NoGas	14.205	14.319	8.46	131464	1.41	50000	
Tl	205	165	NoGas	0.063	0.064	9.56	4427	0.65	5000	
Pb	208	165	NoGas	4.235	4.269	7.37	352202	1.76	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	237273	5.50	267827	88.59	70	120	
Sc	45	H2	335675	10.56	415473	80.79	70	120	
Sc	45	He	49799	3.87	58243	85.50	70	120	
Sc	45	NoGas	2322702	7.19	2418294	96.05	70	120	
Ge	72	H2	91849	11.45	121413	75.65	70	120	
Ge	72	He	41352	3.50	45798	90.29	70	120	
Ge	72	NoGas	583924	6.88	584877	99.84	70	120	
In	115	H2	1987684	10.23	2292298	86.71	70	120	
In	115	He	366343	3.61	399276	91.75	70	120	
In	115	NoGas	4083309	7.72	3892468	104.90	70	120	
Tb	159	H2	3818615	11.12	4163457	91.72	70	120	
Tb	159	He	1825609	4.11	1939211	94.14	70	120	
Tb	159	NoGas	6214796	8.33	5743431	108.21	70	120	
Ho	165	H2	3744452	10.47	4001522	93.58	70	120	
Ho	165	He	1853078	2.36	1933801	95.83	70	120	
Ho	165	NoGas	6058879	8.39	5517017	109.82	70	120	

Sample Report

Sample Table

Sample Name	AZ79161S01 DF10
Data File Name	034SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:34:10-07:00
Sample Type	Sample
Dilution	1.030927835
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.202	0.208	5.40	877	7.42	10000	
B	11	45	NoGas	-0.341	-0.351	-148.56	122794	2.19	10000	
Na	23	72	He	34.104	35.159	0.78	57555	1.46	1000000	
Mg	24	45	He	687.646	708.914	1.47	197968	1.09	1000000	
Al	27	45	He	5876.337	6058.080	1.43	471026	0.91	1000000	
P	31	45	He	733.329	756.009	4.33	4133	3.30	500000	
K	39	45	He	421.774	434.819	1.83	80082	0.42	500000	
Ca	40	45	H2	842.313	868.364	2.95	5378371	1.51	500000	
Ti	47	45	He	292.806	301.862	2.04	23870	1.50	10000	
V	51	45	He	17.781	18.331	1.67	57981	1.17	10000	
Cr	52	45	He	47.028	48.482	1.53	208959	0.25	10000	
Mn	55	45	He	576.872	594.713	1.93	1102413	0.79	50000	
Fe	56	45	He	153274.450	158014.897	1.56	555621827	0.32	1000000	
Co	59	45	He	17.690	18.237	2.39	137967	1.08	10000	
Ni	60	45	He	47.999	49.483	1.51	108821	0.17	10000	
Cu	63	45	He	127.578	131.524	1.41	825419	0.04	10000	
Zn	66	115	He	165.545	170.665	3.40	156941	1.83	50000	
As	75	115	He	17.912	18.466	2.03	9323	0.43	2000	
Se	78	72	H2	0.226	0.233	5.76	152	3.84	10000	
Se	78	115	He	0.996	1.026	21.86	31	20.52	10000	
Sr	88	115	NoGas	6.999	7.215	4.17	313380	0.39	50000	
Mo	95	115	NoGas	13.614	14.035	3.83	125126	0.33	10000	
Ag	107	115	NoGas	0.098	0.101	18.32	4781	5.63	5000	
Cd	111	115	He	0.386	0.398	2.11	480	2.08	10000	
Sn	118	115	He	1069.399	1102.474	2.57	2179662	0.86	10000	
Sn	118	115	NoGas	1008.936	1040.141	2.17	14145174	1.92	10000	
Sb	121	115	NoGas	2.493	2.570	2.95	52812	1.39	10000	
Ba	137	165	NoGas	20.506	21.140	1.76	143018	2.46	50000	
Tl	205	165	NoGas	0.122	0.126	1.75	5698	4.25	5000	
Pb	208	165	NoGas	366.335	377.665	3.24	21544842	0.85	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	115285	2.41	155989	73.91	70	120	
Sc	45	H2	691061	3.62	788522	87.64	70	120	
Sc	45	He	47819	1.32	55083	86.81	70	120	
Sc	45	NoGas	1892492	3.20	2213509	85.50	70	120	
Ge	72	H2	194920	2.40	228382	85.35	70	120	
Ge	72	He	37567	1.51	41564	90.38	70	120	
Ge	72	NoGas	459434	3.22	493680	93.06	70	120	
In	115	H2	2603759	3.61	2933811	88.75	70	120	
In	115	He	298034	1.70	358672	83.09	70	120	
In	115	NoGas	2882840	4.07	3330807	86.55	70	120	
Tb	159	H2	3939607	2.84	4179923	94.25	70	120	
Tb	159	He	1458342	1.26	1624277	89.78	70	120	
Tb	159	NoGas	4422364	3.22	4702844	94.04	70	120	
Ho	165	H2	3829431	3.16	4040454	94.78	70	120	
Ho	165	He	1455969	0.98	1590248	91.56	70	120	
Ho	165	NoGas	4259924	3.74	4499866	94.67	70	120	

Sample Report

Sample Table

Sample Name	AZ79161S01 DF50
Data File Name	108SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:13:56-07:00
Sample Type	Sample
Dilution	5.154639175
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.028	0.142	6.40	257	8.11	10000	
B	11	45	NoGas	4.631	23.872	7.21	226830	1.50	10000	
Na	23	45	He	39.651	204.386	13.00	30794	1.87	1000000	
Mg	24	45	He	148.849	767.261	2.61	19277	1.69	1000000	
Al	27	45	He	1216.509	6270.665	4.41	29651	0.87	1000000	
P	31	45	He	172.789	890.666	27.45	319	22.35	500000	
K	39	45	He	78.542	404.856	4.49	7616	1.24	500000	
Ca	40	45	H2	159.630	822.833	11.86	724586	3.09	500000	
Ti	47	45	He	58.185	299.922	5.43	2229	4.73	10000	
V	51	45	He	3.346	17.246	2.46	7608	3.56	10000	
Cr	52	45	He	8.986	46.322	3.54	31126	2.85	10000	
Mn	55	45	He	111.910	576.853	2.87	104738	1.17	50000	
Fe	56	45	He	30312.948	156252.309	3.25	74012379	0.25	1000000	
Co	59	45	He	3.385	17.449	3.34	23865	1.60	10000	
Ni	60	45	He	9.129	47.057	3.99	19960	2.74	10000	
Cu	63	45	He	25.091	129.335	3.80	159380	0.53	10000	
Zn	66	115	He	29.437	151.739	2.23	21438	1.80	50000	
As	75	115	He	3.100	15.982	4.53	1163	3.95	2000	
Se	78	72	H2	0.050	0.258	11.47	43	2.45	10000	
Se	78	115	He	0.346	1.785	63.92	6	44.10	10000	
Sr	88	115	NoGas	1.312	6.761	0.83	106417	2.12	50000	
Mo	95	115	NoGas	2.507	12.922	1.94	41680	1.91	10000	
Ag	107	115	NoGas	0.018	0.093	30.21	5074	3.13	5000	
Cd	111	115	He	0.066	0.342	25.70	65	22.15	10000	
Sn	118	115	He	187.890	968.507	1.56	239810	1.25	10000	
Sn	118	115	NoGas	191.306	986.113	1.93	4840694	2.41	10000	
Sb	121	115	NoGas	0.572	2.950	2.30	22012	3.83	10000	
Ba	137	115	NoGas	4.104	21.155	1.59	49436	1.95	50000	
Tl	205	165	NoGas	0.002	0.009	202.58	1907	14.76	5000	
Pb	208	165	NoGas	73.474	378.731	1.66	7843292	1.58	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	267418	1.12	232772	114.88	70	120	
Sc	45	H2	423606	8.40	497417	85.16	70	120	
Sc	45	He	21576	3.47	26213	82.31	70	120	
Sc	45	NoGas	3021758	2.19	3271044	92.38	70	120	
Ge	72	H2	112723	8.45	130306	86.51	70	120	
Ge	72	He	21651	1.64	25369	85.34	70	120	
Ge	72	NoGas	755510	1.65	804525	93.91	70	120	
In	115	H2	2502875	7.84	2768793	90.40	70	120	
In	115	He	164647	2.76	184583	89.20	70	120	
In	115	NoGas	5126462	1.63	5159681	99.36	70	120	
Tb	159	H2	4626206	9.47	4956789	93.33	70	120	
Tb	159	He	1114601	2.56	1146052	97.26	70	120	
Tb	159	NoGas	7624470	1.79	7155958	106.55	70	120	
Ho	165	H2	4499987	8.35	4765312	94.43	70	120	
Ho	165	He	1128618	2.54	1131090	99.78	70	120	
Ho	165	NoGas	7471726	1.41	6876887	108.65	70	120	

Sample Report

Sample Table

Sample Name	AZ79162S01 DF10
Data File Name	035SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:38:02-07:00
Sample Type	Sample
Dilution	1.030927835
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.245	0.252	15.66	1007	18.46	10000	
B	11	45	NoGas	-4.228	-4.358	-25.99	109730	0.34	10000	
Na	23	72	He	32.828	33.843	4.08	55513	1.97	1000000	
Mg	24	45	He	857.094	883.602	1.99	241042	0.94	1000000	
Al	27	45	He	5897.116	6079.501	2.13	461808	1.10	1000000	
P	31	45	He	753.686	776.996	1.63	4149	2.32	500000	
K	39	45	He	392.803	404.952	1.22	73605	0.71	500000	
Ca	40	45	H2	423.555	436.655	2.32	2693368	0.38	500000	
Ti	47	45	He	259.347	267.369	3.30	20661	3.50	10000	
V	51	45	He	17.934	18.488	1.56	57135	0.55	10000	
Cr	52	45	He	61.582	63.487	1.89	267031	0.91	10000	
Mn	55	45	He	474.976	489.666	1.39	886921	0.34	50000	
Fe	56	45	He	175426.534	180852.097	1.48	621350695	0.97	1000000	
Co	59	45	He	10.060	10.372	2.27	76677	1.41	10000	
Ni	60	45	He	52.161	53.774	1.16	115512	0.69	10000	
Cu	63	45	He	126.110	130.010	0.60	797530	1.18	10000	
Zn	66	115	He	66.530	68.587	1.71	64750	0.22	50000	
As	75	115	He	21.124	21.777	1.61	10638	0.15	2000	
Se	78	72	H2	0.154	0.159	6.12	105	4.57	10000	
Se	78	115	He	0.575	0.593	43.45	19	36.84	10000	
Sr	88	115	NoGas	3.216	3.316	4.16	144320	1.00	50000	
Mo	95	115	NoGas	20.997	21.646	2.49	192910	1.05	10000	
Ag	107	115	NoGas	0.244	0.251	5.65	8459	3.63	5000	
Cd	111	115	He	0.226	0.233	16.05	274	15.45	10000	
Sn	118	115	He	2341.313	2413.725	1.18	4618031	1.11	10000	
Sn	118	115	NoGas	2199.353	2267.375	1.70	30823067	1.49	10000	
Sb	121	115	NoGas	2.686	2.769	3.62	56741	0.91	10000	
Ba	137	165	NoGas	15.615	16.098	0.98	108664	1.17	50000	
Tl	205	165	NoGas	0.102	0.105	17.93	4791	17.23	5000	
Pb	208	165	NoGas	791.005	815.469	2.49	46313006	0.41	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	109515	3.56	155989	70.21	70	120	
Sc	45	H2	680787	2.41	788522	86.34	70	120	
Sc	45	He	46720	1.06	55083	84.82	70	120	
Sc	45	NoGas	1881088	3.52	2213509	84.98	70	120	
Ge	72	H2	192492	1.23	228382	84.29	70	120	
Ge	72	He	36792	0.89	41564	88.52	70	120	
Ge	72	NoGas	463001	3.09	493680	93.79	70	120	
In	115	H2	2552465	2.55	2933811	87.00	70	120	
In	115	He	288403	1.77	358672	80.41	70	120	
In	115	NoGas	2881486	3.21	3330807	86.51	70	120	
Tb	159	H2	3916685	2.69	4179923	93.70	70	120	
Tb	159	He	1450142	1.44	1624277	89.28	70	120	
Tb	159	NoGas	4421617	2.29	4702844	94.02	70	120	
Ho	165	H2	3802567	3.81	4040454	94.11	70	120	
Ho	165	He	1447144	1.76	1590248	91.00	70	120	
Ho	165	NoGas	4242587	2.15	4499866	94.28	70	120	

Sample Report

Sample Table

Sample Name	AZ79162S01 DF100
Data File Name	109SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:17:53-07:00
Sample Type	Sample
Dilution	10.30927835
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.014	0.142	45.82	143	39.67	10000	
B	11	45	NoGas	2.933	30.240	11.82	223796	1.77	10000	
Na	23	45	He	34.736	358.105	11.72	29572	2.72	1000000	
Mg	24	45	He	85.442	880.842	4.29	11191	2.09	1000000	
Al	27	45	He	575.490	5932.883	1.89	14305	0.32	1000000	
P	31	45	He	63.253	652.092	28.37	140	23.45	500000	
K	39	45	He	27.109	279.476	7.02	4750	1.79	500000	
Ca	40	45	H2	42.154	434.573	12.77	189270	2.41	500000	
Ti	47	45	He	24.246	249.960	9.46	939	10.55	10000	
V	51	45	He	1.627	16.773	1.65	3755	1.42	10000	
Cr	52	45	He	5.527	56.976	2.73	19509	1.02	10000	
Mn	55	45	He	42.827	441.512	1.89	40519	0.30	50000	
Fe	56	45	He	16181.533	166819.929	2.11	39911116	0.13	1000000	
Co	59	45	He	0.890	9.171	7.16	6359	4.92	10000	
Ni	60	45	He	4.582	47.235	2.14	10164	0.84	10000	
Cu	63	45	He	11.396	117.488	2.53	73629	0.33	10000	
Zn	66	115	He	5.709	58.851	4.74	4371	2.00	50000	
As	75	115	He	1.661	17.125	2.45	615	4.49	2000	
Se	78	72	H2	0.018	0.190	22.25	18	17.83	10000	
Se	78	115	He	0.090	0.931	205.80	3	66.67	10000	
Sr	88	115	NoGas	0.285	2.936	5.24	23920	4.61	50000	
Mo	95	115	NoGas	1.799	18.547	3.55	30247	3.20	10000	
Ag	107	115	NoGas	0.027	0.279	8.65	5524	1.38	5000	
Cd	111	115	He	0.021	0.214	33.53	21	28.64	10000	
Sn	118	115	He	195.803	2018.583	2.56	245432	0.35	10000	
Sn	118	115	NoGas	194.731	2007.540	0.65	4972866	0.64	10000	
Sb	121	115	NoGas	0.304	3.138	3.91	12188	3.61	10000	
Ba	137	115	NoGas	1.404	14.473	2.44	17169	1.77	50000	
Tl	205	165	NoGas	-0.005	-0.048	-52.62	1407	15.25	5000	
Pb	208	165	NoGas	73.031	752.897	1.30	7849368	0.92	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	272458	0.87	232772	117.05	70	120	
Sc	45	H2	405112	10.01	497417	81.44	70	120	
Sc	45	He	21785	2.15	26213	83.11	70	120	
Sc	45	NoGas	3106107	1.27	3271044	94.96	70	120	
Ge	72	H2	108657	9.88	130306	83.39	70	120	
Ge	72	He	21640	2.58	25369	85.30	70	120	
Ge	72	NoGas	754534	1.68	804525	93.79	70	120	
In	115	H2	2391696	10.49	2768793	86.38	70	120	
In	115	He	161718	2.38	184583	87.61	70	120	
In	115	NoGas	5173814	0.71	5159681	100.27	70	120	
Tb	159	H2	4504572	10.54	4956789	90.88	70	120	
Tb	159	He	1108267	1.88	1146052	96.70	70	120	
Tb	159	NoGas	7719962	2.13	7155958	107.88	70	120	
Ho	165	H2	4390706	10.21	4765312	92.14	70	120	
Ho	165	He	1115682	2.12	1131090	98.64	70	120	
Ho	165	NoGas	7522973	1.42	6876887	109.40	70	120	

Sample Report

Sample Table

Sample Name	AZ79163S01 DF10
Data File Name	036SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:41:55-07:00
Sample Type	Sample
Dilution	1.041666667
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.275	0.286	6.20	1230	9.38	10000	
B	11	45	NoGas	-3.047	-3.174	-10.35	116151	2.42	10000	
Na	23	72	He	39.091	40.720	3.67	58856	1.34	1000000	
Mg	24	45	He	1520.741	1584.106	1.20	431167	0.25	1000000	
Al	27	45	He	6940.405	7229.589	1.29	547907	0.37	1000000	
P	31	45	He	281.596	293.329	2.38	1608	3.04	500000	
K	39	45	He	758.772	790.387	0.47	133363	0.57	500000	
Ca	40	45	H2	429.321	447.209	5.35	2792816	0.44	500000	
Ti	47	45	He	405.817	422.726	0.28	32592	1.24	10000	
V	51	45	He	21.670	22.573	1.50	69576	0.53	10000	
Cr	52	45	He	5.550	5.781	1.08	25196	0.59	10000	
Mn	55	45	He	132.782	138.315	0.62	250126	0.77	50000	
Fe	56	45	He	9987.030	10403.157	0.67	35673356	0.45	1000000	
Co	59	45	He	2.169	2.260	2.50	16689	1.52	10000	
Ni	60	45	He	3.631	3.782	1.96	8515	2.67	10000	
Cu	63	45	He	9.438	9.832	1.99	81239	0.69	10000	
Zn	66	115	He	27.177	28.309	1.46	32494	0.07	50000	
As	75	115	He	1.438	1.498	4.23	792	3.04	2000	
Se	78	72	H2	0.118	0.123	7.50	84	4.56	10000	
Se	78	115	He	0.800	0.833	14.29	27	13.35	10000	
Sr	88	115	NoGas	3.528	3.675	2.88	165742	0.31	50000	
Mo	95	115	NoGas	9.320	9.708	1.16	89778	1.93	10000	
Ag	107	115	NoGas	0.053	0.055	10.82	3834	6.80	5000	
Cd	111	115	He	0.037	0.038	20.89	53	17.95	10000	
Sn	118	115	He	1.603	1.670	5.29	4024	3.39	10000	
Sn	118	115	NoGas	1.379	1.436	5.39	23887	1.89	10000	
Sb	121	115	NoGas	0.132	0.137	12.38	4554	4.94	10000	
Ba	137	165	NoGas	17.048	17.759	6.30	123484	2.98	50000	
Tl	205	165	NoGas	0.092	0.096	7.01	4511	2.61	5000	
Pb	208	165	NoGas	3.921	4.084	4.87	273640	0.19	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	119684	4.68	155989	76.73	70	120	
Sc	45	H2	697558	4.81	788522	88.46	70	120	
Sc	45	He	47108	0.97	55083	85.52	70	120	
Sc	45	NoGas	1924742	3.31	2213509	86.95	70	120	
Ge	72	H2	196206	3.02	228382	85.91	70	120	
Ge	72	He	36270	2.07	41564	87.26	70	120	
Ge	72	NoGas	434569	4.37	493680	88.03	70	120	
In	115	H2	2722240	3.88	2933811	92.79	70	120	
In	115	He	311153	1.12	358672	86.75	70	120	
In	115	NoGas	3017414	3.11	3330807	90.59	70	120	
Tb	159	H2	4111182	3.43	4179923	98.36	70	120	
Tb	159	He	1502224	2.45	1624277	92.49	70	120	
Tb	159	NoGas	4478453	3.16	4702844	95.23	70	120	
Ho	165	H2	3967412	4.05	4040454	98.19	70	120	
Ho	165	He	1470725	0.71	1590248	92.48	70	120	
Ho	165	NoGas	4425288	4.41	4499866	98.34	70	120	

Sample Report

Sample Table

Sample Name	AZ79164S01 DF10
Data File Name	037SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:45:53-07:00
Sample Type	Sample
Dilution	1.01010101
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.389	0.393	6.99	1767	8.35	10000	
B	11	45	NoGas	-2.438	-2.462	-32.57	120044	1.09	10000	
Na	23	72	He	46.287	46.754	4.83	62494	2.14	1000000	
Mg	24	45	He	1683.525	1700.531	0.92	477431	0.70	1000000	
Al	27	45	He	8815.710	8904.757	0.70	695916	0.71	1000000	
P	31	45	He	470.490	475.243	4.82	2640	6.13	500000	
K	39	45	He	798.454	806.519	1.11	139803	0.60	500000	
Ca	40	45	H2	905.695	914.843	0.58	5753737	3.48	500000	
Ti	47	45	He	559.242	564.891	0.60	44919	0.94	10000	
V	51	45	He	28.510	28.798	0.71	91518	1.45	10000	
Cr	52	45	He	6.967	7.038	1.03	31380	1.24	10000	
Mn	55	45	He	178.535	180.338	1.90	336296	0.52	50000	
Fe	56	45	He	12880.854	13010.964	2.12	46014900	1.30	1000000	
Co	59	45	He	2.633	2.660	1.02	20260	1.11	10000	
Ni	60	45	He	4.704	4.752	1.94	10903	0.66	10000	
Cu	63	45	He	13.413	13.549	1.25	105898	1.05	10000	
Zn	66	115	He	33.700	34.041	2.84	38007	2.19	50000	
As	75	115	He	2.048	2.069	3.71	1104	4.03	2000	
Se	78	72	H2	0.152	0.153	7.98	104	9.25	10000	
Se	78	115	He	0.677	0.684	0.65	23	0.00	10000	
Sr	88	115	NoGas	6.529	6.595	1.70	305575	1.79	50000	
Mo	95	115	NoGas	12.801	12.930	2.67	122913	0.32	10000	
Ag	107	115	NoGas	0.061	0.061	28.34	4034	10.59	5000	
Cd	111	115	He	0.066	0.067	9.40	89	9.32	10000	
Sn	118	115	He	0.864	0.872	0.62	2408	0.62	10000	
Sn	118	115	NoGas	0.786	0.794	1.39	15165	2.27	10000	
Sb	121	115	NoGas	0.260	0.262	2.62	7292	0.60	10000	
Ba	137	165	NoGas	22.140	22.364	1.58	157507	1.18	50000	
Tl	205	165	NoGas	0.088	0.089	10.27	4254	8.99	5000	
Pb	208	165	NoGas	5.529	5.585	1.57	365439	0.35	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	121979	2.98	155989	78.20	70	120	
Sc	45	H2	687604	3.29	788522	87.20	70	120	
Sc	45	He	47120	1.41	55083	85.54	70	120	
Sc	45	NoGas	1956191	1.87	2213509	88.38	70	120	
Ge	72	H2	192945	2.41	228382	84.48	70	120	
Ge	72	He	35629	1.47	41564	85.72	70	120	
Ge	72	NoGas	433503	0.92	493680	87.81	70	120	
In	115	H2	2669143	1.55	2933811	90.98	70	120	
In	115	He	305654	0.54	358672	85.22	70	120	
In	115	NoGas	3009792	2.49	3330807	90.36	70	120	
Tb	159	H2	3990225	4.04	4179923	95.46	70	120	
Tb	159	He	1457783	1.67	1624277	89.75	70	120	
Tb	159	NoGas	4511778	1.92	4702844	95.94	70	120	
Ho	165	H2	3852020	2.06	4040454	95.34	70	120	
Ho	165	He	1466151	1.94	1590248	92.20	70	120	
Ho	165	NoGas	4345757	1.44	4499866	96.58	70	120	

Sample Report

Sample Table

Sample Name	AZ79165S01 DF10
Data File Name	038SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:49:50-07:00
Sample Type	Sample
Dilution	1.030927835
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.263	0.272	9.21	1127	8.94	10000	
B	11	45	NoGas	-3.833	-3.951	-24.75	112212	6.78	10000	
Na	23	72	He	40.011	41.248	3.63	59505	2.55	1000000	
Mg	24	45	He	1186.862	1223.570	0.38	336702	0.60	1000000	
Al	27	45	He	7148.444	7369.530	0.51	564599	0.81	1000000	
P	31	45	He	381.464	393.262	1.26	2153	0.94	500000	
K	39	45	He	506.961	522.640	1.46	92710	1.33	500000	
Ca	40	45	H2	640.969	660.793	5.36	4054297	1.75	500000	
Ti	47	45	He	380.172	391.929	0.91	30545	0.75	10000	
V	51	45	He	21.509	22.174	1.08	69098	1.14	10000	
Cr	52	45	He	4.099	4.225	1.64	18885	1.84	10000	
Mn	55	45	He	174.830	180.237	1.15	329442	1.41	50000	
Fe	56	45	He	68917.825	71049.304	0.44	246257412	0.56	1000000	
Co	59	45	He	5.077	5.234	1.12	39047	1.17	10000	
Ni	60	45	He	9.257	9.543	1.85	21039	1.87	10000	
Cu	63	45	He	1101.189	1135.246	1.23	6848756	1.24	10000	
Zn	66	115	He	159.356	164.284	1.56	154694	1.37	50000	
As	75	115	He	1.872	1.930	5.44	1006	4.97	2000	
Se	78	72	H2	0.150	0.155	12.44	102	8.54	10000	
Se	78	115	He	1.242	1.281	16.96	39	16.01	10000	
Sr	88	115	NoGas	4.132	4.260	3.29	187813	1.52	50000	
Mo	95	115	NoGas	17.594	18.138	3.31	163861	1.64	10000	
Ag	107	115	NoGas	0.113	0.116	15.86	5241	10.54	5000	
Cd	111	115	He	0.332	0.343	6.91	423	6.63	10000	
Sn	118	115	He	51.095	52.675	1.12	107034	0.55	10000	
Sn	118	115	NoGas	50.401	51.960	3.46	719344	2.36	10000	
Sb	121	115	NoGas	3.574	3.684	0.48	76015	2.53	10000	
Ba	137	165	NoGas	21.598	22.266	2.93	150354	2.53	50000	
Tl	205	165	NoGas	0.069	0.071	9.40	3287	8.98	5000	
Pb	208	165	NoGas	69.820	71.979	1.54	4128330	0.75	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	114326	0.33	155989	73.29	70	120	
Sc	45	H2	682667	3.51	788522	86.58	70	120	
Sc	45	He	47128	0.30	55083	85.56	70	120	
Sc	45	NoGas	1899732	4.97	2213509	85.82	70	120	
Ge	72	H2	191257	3.21	228382	83.74	70	120	
Ge	72	He	36290	2.16	41564	87.31	70	120	
Ge	72	NoGas	437434	3.84	493680	88.61	70	120	
In	115	H2	2625645	1.04	2933811	89.50	70	120	
In	115	He	304600	0.73	358672	84.92	70	120	
In	115	NoGas	2920574	2.64	3330807	87.68	70	120	
Tb	159	H2	4004862	1.91	4179923	95.81	70	120	
Tb	159	He	1492997	0.42	1624277	91.92	70	120	
Tb	159	NoGas	4375984	1.97	4702844	93.05	70	120	
Ho	165	H2	3866792	2.29	4040454	95.70	70	120	
Ho	165	He	1466179	0.48	1590248	92.20	70	120	
Ho	165	NoGas	4251972	1.11	4499866	94.49	70	120	

Sample Report

Sample Table

Sample Name	AZ79165S01 DF50
Data File Name	110SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:21:47-07:00
Sample Type	Sample
Dilution	5.154639175
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.055	0.285	13.84	500	13.86	10000	
B	11	45	NoGas	3.624	18.679	20.69	223716	1.62	10000	
Na	23	45	He	37.834	195.019	6.21	30582	3.39	1000000	
Mg	24	45	He	239.621	1235.159	1.55	31336	0.79	1000000	
Al	27	45	He	1386.883	7148.882	0.72	34149	0.32	1000000	
P	31	45	He	50.253	259.034	19.19	118	12.77	500000	
K	39	45	He	84.220	434.126	4.54	8023	2.22	500000	
Ca	40	45	H2	121.795	627.809	11.96	552070	2.36	500000	
Ti	47	45	He	73.118	376.897	1.69	2831	0.69	10000	
V	51	45	He	3.849	19.840	7.30	8834	6.45	10000	
Cr	52	45	He	0.728	3.754	9.58	2976	8.91	10000	
Mn	55	45	He	32.680	168.453	1.26	30956	1.04	50000	
Fe	56	45	He	12879.552	66389.446	0.58	31793810	0.50	1000000	
Co	59	45	He	0.925	4.768	4.34	6619	3.38	10000	
Ni	60	45	He	1.716	8.843	1.92	3866	2.80	10000	
Cu	63	45	He	194.179	1000.922	1.46	1240895	0.84	10000	
Zn	66	115	He	28.023	144.451	2.39	20279	0.88	50000	
As	75	115	He	0.320	1.651	6.40	124	6.98	2000	
Se	78	72	H2	0.034	0.177	15.44	31	8.41	10000	
Se	78	115	He	0.346	1.784	89.32	6	60.09	10000	
Sr	88	115	NoGas	0.750	3.868	3.11	60988	3.03	50000	
Mo	95	115	NoGas	3.146	16.217	2.18	52071	2.12	10000	
Ag	107	115	NoGas	0.012	0.064	50.70	4811	5.63	5000	
Cd	111	115	He	0.073	0.376	31.28	71	30.88	10000	
Sn	118	115	He	9.170	47.269	0.32	11674	3.06	10000	
Sn	118	115	NoGas	9.193	47.387	1.16	232715	1.08	10000	
Sb	121	115	NoGas	0.701	3.611	3.23	26662	3.07	10000	
Ba	137	115	NoGas	4.142	21.350	3.06	49710	2.98	50000	
Tl	205	165	NoGas	-0.001	-0.004	-227.97	1680	7.78	5000	
Pb	208	165	NoGas	12.372	63.774	0.66	1306497	0.71	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	269179	0.40	232772	115.64	70	120	
Sc	45	H2	421537	9.00	497417	84.75	70	120	
Sc	45	He	21797	1.00	26213	83.15	70	120	
Sc	45	NoGas	3053265	1.53	3271044	93.34	70	120	
Ge	72	H2	112255	8.68	130306	86.15	70	120	
Ge	72	He	21513	4.20	25369	84.80	70	120	
Ge	72	NoGas	751133	0.66	804525	93.36	70	120	
In	115	H2	2505092	9.15	2768793	90.48	70	120	
In	115	He	163491	3.12	184583	88.57	70	120	
In	115	NoGas	5107907	0.08	5159681	99.00	70	120	
Tb	159	H2	4665955	9.79	4956789	94.13	70	120	
Tb	159	He	1106713	2.28	1146052	96.57	70	120	
Tb	159	NoGas	7521297	0.73	7155958	105.11	70	120	
Ho	165	H2	4538392	7.91	4765312	95.24	70	120	
Ho	165	He	1119437	2.11	1131090	98.97	70	120	
Ho	165	NoGas	7358167	1.11	6876887	107.00	70	120	

Sample Report

Sample Table

Sample Name	AZ79165S01 DF200
Data File Name	111SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:25:47-07:00
Sample Type	Sample
Dilution	20.6185567
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.013	0.278	22.72	137	18.42	10000	
B	11	45	NoGas	4.087	84.259	10.38	224567	0.97	10000	
Na	23	45	He	30.724	633.481	9.70	28213	2.87	1000000	
Mg	24	45	He	61.966	1277.648	2.86	8100	1.19	1000000	
Al	27	45	He	346.381	7141.867	2.36	8679	3.83	1000000	
P	31	45	He	3.294	67.922	404.48	39	57.07	500000	
K	39	45	He	15.712	323.961	8.37	4082	1.18	500000	
Ca	40	45	H2	31.402	647.459	12.38	145668	2.18	500000	
Ti	47	45	He	19.430	400.619	9.79	749	9.51	10000	
V	51	45	He	1.008	20.780	6.53	2331	6.35	10000	
Cr	52	45	He	0.179	3.680	11.08	1072	4.17	10000	
Mn	55	45	He	8.237	169.826	3.56	7805	1.21	50000	
Fe	56	45	He	3291.405	67864.014	2.57	8088557	0.55	1000000	
Co	59	45	He	0.226	4.656	8.86	1637	6.53	10000	
Ni	60	45	He	0.422	8.701	2.20	1014	2.47	10000	
Cu	63	45	He	49.275	1015.981	2.76	314082	0.55	10000	
Zn	66	115	He	7.156	147.549	6.63	5489	6.53	50000	
As	75	115	He	0.098	2.018	24.24	42	20.13	2000	
Se	78	72	H2	0.015	0.308	38.46	16	29.47	10000	
Se	78	115	He	0.142	2.920	235.26	4	103.25	10000	
Sr	88	115	NoGas	0.195	4.019	1.64	16308	2.59	50000	
Mo	95	115	NoGas	0.823	16.974	1.96	13693	1.61	10000	
Ag	107	115	NoGas	0.002	0.043	247.66	4334	4.21	5000	
Cd	111	115	He	0.015	0.320	35.65	17	30.20	10000	
Sn	118	115	He	2.457	50.669	2.56	3187	1.09	10000	
Sn	118	115	NoGas	2.347	48.393	1.54	59783	1.68	10000	
Sb	121	115	NoGas	0.195	4.027	6.44	7959	6.62	10000	
Ba	137	115	NoGas	1.010	20.832	2.68	12168	1.73	50000	
Tl	205	165	NoGas	-0.013	-0.259	-12.92	757	18.75	5000	
Pb	208	165	NoGas	3.064	63.172	1.76	330661	1.82	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	271333	0.73	232772	116.57	70	120	
Sc	45	H2	411480	9.22	497417	82.72	70	120	
Sc	45	He	21702	2.35	26213	82.79	70	120	
Sc	45	NoGas	3030678	1.43	3271044	92.65	70	120	
Ge	72	H2	111580	8.14	130306	85.63	70	120	
Ge	72	He	21723	1.63	25369	85.63	70	120	
Ge	72	NoGas	748738	1.27	804525	93.07	70	120	
In	115	H2	2461729	8.41	2768793	88.91	70	120	
In	115	He	164616	1.54	184583	89.18	70	120	
In	115	NoGas	5076791	1.04	5159681	98.39	70	120	
Tb	159	H2	4597104	8.54	4956789	92.74	70	120	
Tb	159	He	1109618	0.98	1146052	96.82	70	120	
Tb	159	NoGas	7553218	1.27	7155958	105.55	70	120	
Ho	165	H2	4448938	9.83	4765312	93.36	70	120	
Ho	165	He	1123154	1.42	1131090	99.30	70	120	
Ho	165	NoGas	7400258	1.65	6876887	107.61	70	120	

Sample Report

Sample Table

Sample Name	AZ79166S01 DF10
Data File Name	039SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:53:44-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.236	0.236	16.84	1057	17.46	10000	
B	11	45	NoGas	-2.966	-2.966	-16.53	113014	1.60	10000	
Na	23	72	He	53.583	53.583	4.56	68493	1.76	1000000	
Mg	24	45	He	1084.494	1084.494	1.61	306465	0.90	1000000	
Al	27	45	He	7585.625	7585.625	1.29	596734	0.52	1000000	
P	31	45	He	2251.825	2251.825	3.20	12314	2.57	500000	
K	39	45	He	554.562	554.562	2.64	100016	2.14	500000	
Ca	40	45	H2	2376.049	2376.049	1.51	14397771	1.25	500000	
Ti	47	45	He	300.177	300.177	1.75	24026	1.04	10000	
V	51	45	He	21.731	21.731	1.81	69534	1.06	10000	
Cr	52	45	He	8.613	8.613	1.55	38409	0.82	10000	
Mn	55	45	He	90.613	90.613	0.97	170153	0.63	50000	
Fe	56	45	He	13972.008	13972.008	0.43	49736515	0.48	1000000	
Co	59	45	He	1.731	1.731	1.85	13282	2.07	10000	
Ni	60	45	He	5.183	5.183	1.84	11926	1.88	10000	
Cu	63	45	He	522.528	522.528	2.63	3248846	1.85	10000	
Zn	66	115	He	50.843	50.843	1.68	54956	1.34	50000	
As	75	115	He	1.522	1.522	4.18	837	3.95	2000	
Se	78	72	H2	0.172	0.172	2.92	114	2.88	10000	
Se	78	115	He	0.698	0.698	42.11	24	35.60	10000	
Sr	88	115	NoGas	14.263	14.263	2.01	640923	1.91	50000	
Mo	95	115	NoGas	22.753	22.753	2.08	209931	1.17	10000	
Ag	107	115	NoGas	0.086	0.086	14.03	4501	5.29	5000	
Cd	111	115	He	0.375	0.375	5.35	487	5.14	10000	
Sn	118	115	He	12.535	12.535	1.93	27279	1.76	10000	
Sn	118	115	NoGas	12.635	12.635	3.37	181281	2.21	10000	
Sb	121	115	NoGas	1.104	1.104	3.55	24398	2.55	10000	
Ba	137	165	NoGas	60.147	60.147	3.40	415317	1.87	50000	
Tl	205	165	NoGas	0.058	0.058	5.86	2814	5.34	5000	
Pb	208	165	NoGas	27.405	27.405	1.82	1632773	1.16	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	119191	1.88	155989	76.41	70	120	
Sc	45	H2	660009	1.19	788522	83.70	70	120	
Sc	45	He	46948	0.77	55083	85.23	70	120	
Sc	45	NoGas	1868546	2.57	2213509	84.42	70	120	
Ge	72	H2	188758	1.32	228382	82.65	70	120	
Ge	72	He	36298	1.33	41564	87.33	70	120	
Ge	72	NoGas	423598	1.13	493680	85.80	70	120	
In	115	H2	2560650	1.44	2933811	87.28	70	120	
In	115	He	311068	0.17	358672	86.73	70	120	
In	115	NoGas	2892960	1.63	3330807	86.85	70	120	
Tb	159	H2	3872718	2.25	4179923	92.65	70	120	
Tb	159	He	1489577	1.33	1624277	91.71	70	120	
Tb	159	NoGas	4356862	1.13	4702844	92.64	70	120	
Ho	165	H2	3719967	1.16	4040454	92.07	70	120	
Ho	165	He	1484152	2.03	1590248	93.33	70	120	
Ho	165	NoGas	4232275	2.38	4499866	94.05	70	120	

Sample Report

Sample Table

Sample Name	AZ79166S01 DF100
Data File Name	112SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:29:43-07:00
Sample Type	Sample
Dilution	10
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.030	0.295	18.15	280	16.37	10000	
B	11	45	NoGas	3.806	38.056	3.04	227742	1.71	10000	
Na	23	45	He	38.540	385.404	9.81	31317	2.25	1000000	
Mg	24	45	He	109.060	1090.601	6.41	14516	1.31	1000000	
Al	27	45	He	715.973	7159.726	6.66	18033	2.33	1000000	
P	31	45	He	212.041	2120.412	1.03	397	5.51	500000	
K	39	45	He	44.286	442.856	23.55	5820	4.98	500000	
Ca	40	45	H2	198.899	1988.995	10.50	908628	2.71	500000	
Ti	47	45	He	26.198	261.982	4.32	1032	5.13	10000	
V	51	45	He	1.832	18.316	6.59	4293	1.84	10000	
Cr	52	45	He	0.763	7.625	5.53	3144	0.64	10000	
Mn	55	45	He	8.178	81.785	8.03	7908	2.99	50000	
Fe	56	45	He	1273.565	12735.647	6.24	3196626	0.87	1000000	
Co	59	45	He	0.147	1.470	5.59	1107	10.09	10000	
Ni	60	45	He	0.425	4.253	4.60	1043	2.21	10000	
Cu	63	45	He	45.299	452.993	5.16	294943	0.80	10000	
Zn	66	115	He	4.755	47.546	3.74	3820	1.82	50000	
As	75	115	He	0.148	1.485	28.85	61	24.96	2000	
Se	78	72	H2	0.021	0.209	31.28	21	16.65	10000	
Se	78	115	He	0.082	0.819	191.69	3	57.74	10000	
Sr	88	115	NoGas	1.262	12.622	1.30	103983	1.58	50000	
Mo	95	115	NoGas	1.945	19.448	0.98	32885	2.94	10000	
Ag	107	115	NoGas	0.005	0.054	115.70	4591	6.55	5000	
Cd	111	115	He	0.023	0.228	48.57	24	44.10	10000	
Sn	118	115	He	1.113	11.133	9.27	1493	9.49	10000	
Sn	118	115	NoGas	1.123	11.232	1.26	29860	2.85	10000	
Sb	121	115	NoGas	0.122	1.222	4.53	5404	1.62	10000	
Ba	137	115	NoGas	5.536	55.362	2.01	67636	0.62	50000	
Tl	205	165	NoGas	-0.010	-0.100	-12.41	967	10.47	5000	
Pb	208	165	NoGas	2.365	23.651	1.43	258012	0.89	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	270130	1.16	232772	116.05	70	120	
Sc	45	H2	426924	7.84	497417	85.83	70	120	
Sc	45	He	22192	5.23	26213	84.66	70	120	
Sc	45	NoGas	3094143	1.49	3271044	94.59	70	120	
Ge	72	H2	114452	8.39	130306	87.83	70	120	
Ge	72	He	22024	2.24	25369	86.81	70	120	
Ge	72	NoGas	753229	1.54	804525	93.62	70	120	
In	115	H2	2555818	8.36	2768793	92.31	70	120	
In	115	He	166930	1.82	184583	90.44	70	120	
In	115	NoGas	5205191	2.38	5159681	100.88	70	120	
Tb	159	H2	4756926	7.59	4956789	95.97	70	120	
Tb	159	He	1121584	1.82	1146052	97.86	70	120	
Tb	159	NoGas	7621828	1.74	7155958	106.51	70	120	
Ho	165	H2	4624926	8.32	4765312	97.05	70	120	
Ho	165	He	1133590	2.19	1131090	100.22	70	120	
Ho	165	NoGas	7433853	1.03	6876887	108.10	70	120	

Sample Report

Sample Table

Sample Name	AZ79167S01 DF10
Data File Name	048SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:21:51-07:00
Sample Type	Sample
Dilution	1.01010101
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.191	0.192	8.34	947	10.42	10000	
B	11	45	NoGas	-0.276	-0.279	-103.51	138706	2.24	10000	
Na	23	72	He	49.520	50.020	3.02	74448	1.64	1000000	
Mg	24	45	He	1182.126	1194.066	2.03	383666	0.92	1000000	
Al	27	45	He	7317.008	7390.917	2.12	661131	1.07	1000000	
P	31	45	He	1776.125	1794.066	4.04	11171	2.59	500000	
K	39	45	He	623.477	629.774	1.25	127628	0.71	500000	
Ca	40	45	H2	1318.955	1332.278	3.53	9151181	1.45	500000	
Ti	47	45	He	260.680	263.313	1.83	23969	2.23	10000	
V	51	45	He	15.020	15.171	0.92	55266	1.12	10000	
Cr	52	45	He	9.249	9.343	0.62	47293	1.19	10000	
Mn	55	45	He	123.350	124.596	2.63	265953	1.62	50000	
Fe	56	45	He	10293.121	10397.092	1.90	42083032	0.82	1000000	
Co	59	45	He	2.101	2.122	1.47	18506	1.31	10000	
Ni	60	45	He	4.609	4.655	2.52	12234	1.01	10000	
Cu	63	45	He	169.377	171.088	2.46	1227185	1.20	10000	
Zn	66	115	He	96.415	97.389	1.84	109669	2.22	50000	
As	75	115	He	1.086	1.097	0.87	671	2.07	2000	
Se	78	72	H2	0.143	0.144	4.70	107	7.22	10000	
Se	78	115	He	0.746	0.753	11.06	28	8.15	10000	
Sr	88	115	NoGas	15.788	15.948	1.89	782692	0.53	50000	
Mo	95	115	NoGas	7.088	7.160	2.74	72272	1.59	10000	
Ag	107	115	NoGas	0.633	0.639	5.77	20202	4.88	5000	
Cd	111	115	He	0.493	0.498	4.21	712	4.08	10000	
Sn	118	115	He	30.207	30.513	1.39	72428	0.95	10000	
Sn	118	115	NoGas	30.245	30.551	2.18	473474	0.82	10000	
Sb	121	115	NoGas	27.178	27.452	2.80	619710	2.76	10000	
Ba	137	165	NoGas	102.088	103.119	1.86	729013	0.36	50000	
Tl	205	165	NoGas	0.082	0.083	9.41	4017	10.97	5000	
Pb	208	165	NoGas	172.605	174.348	2.28	10458649	0.36	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	131644	2.48	155989	84.39	70	120	
Sc	45	H2	754051	4.23	788522	95.63	70	120	
Sc	45	He	53927	1.40	55083	97.90	70	120	
Sc	45	NoGas	2133780	2.46	2213509	96.40	70	120	
Ge	72	H2	210376	3.54	228382	92.12	70	120	
Ge	72	He	41060	0.52	41564	98.79	70	120	
Ge	72	NoGas	475482	2.45	493680	96.31	70	120	
In	115	H2	2758265	4.16	2933811	94.02	70	120	
In	115	He	347304	1.22	358672	96.83	70	120	
In	115	NoGas	3192380	2.06	3330807	95.84	70	120	
Tb	159	H2	3999966	3.75	4179923	95.69	70	120	
Tb	159	He	1564618	1.34	1624277	96.33	70	120	
Tb	159	NoGas	4555456	3.02	4702844	96.87	70	120	
Ho	165	H2	3811705	4.29	4040454	94.34	70	120	
Ho	165	He	1584033	0.41	1590248	99.61	70	120	
Ho	165	NoGas	4379293	2.18	4499866	97.32	70	120	

Sample Report

Sample Table

Sample Name	AZ79167S01 DF20
Data File Name	117SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:49:30-07:00
Sample Type	Sample
Dilution	2.02020202
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.107	0.216	8.30	967	7.90	10000	
B	11	45	NoGas	4.916	9.932	8.42	235998	1.47	10000	
Na	23	45	He	52.856	106.780	11.27	34813	2.16	1000000	
Mg	24	45	He	620.788	1254.117	6.34	79979	1.14	1000000	
Al	27	45	He	3501.562	7073.863	6.68	84629	1.47	1000000	
P	31	45	He	929.699	1878.180	4.77	1573	1.18	500000	
K	39	45	He	272.352	550.206	4.91	18549	1.69	500000	
Ca	40	45	H2	637.097	1287.064	11.11	2709586	2.66	500000	
Ti	47	45	He	124.482	251.478	8.58	4752	4.84	10000	
V	51	45	He	6.911	13.962	7.98	15609	2.81	10000	
Cr	52	45	He	4.338	8.764	5.10	15233	5.31	10000	
Mn	55	45	He	57.748	116.663	6.27	53897	1.03	50000	
Fe	56	45	He	4884.707	9868.095	5.35	11895265	0.41	1000000	
Co	59	45	He	0.953	1.925	9.06	6717	3.73	10000	
Ni	60	45	He	2.273	4.593	4.47	5027	3.80	10000	
Cu	63	45	He	80.344	162.311	6.00	506860	0.74	10000	
Zn	66	115	He	44.848	90.603	8.70	31314	1.08	50000	
As	75	115	He	0.526	1.062	12.98	194	4.97	2000	
Se	78	72	H2	0.076	0.153	1.73	61	7.55	10000	
Se	78	115	He	0.413	0.834	84.66	6	50.76	10000	
Sr	88	115	NoGas	6.983	14.108	0.45	570870	1.65	50000	
Mo	95	115	NoGas	3.155	6.374	0.75	53121	1.86	10000	
Ag	107	115	NoGas	0.282	0.570	5.15	16922	4.97	5000	
Cd	111	115	He	0.249	0.504	11.83	233	6.22	10000	
Sn	118	115	He	14.490	29.274	7.48	17893	1.50	10000	
Sn	118	115	NoGas	13.631	27.538	0.77	350512	0.85	10000	
Sb	121	115	NoGas	12.236	24.720	3.91	460367	4.21	10000	
Ba	137	115	NoGas	45.394	91.704	1.00	552568	0.63	50000	
Tl	205	165	NoGas	0.030	0.061	19.02	4184	12.80	5000	
Pb	208	165	NoGas	81.664	164.977	1.53	8693139	0.31	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	268159	0.93	232772	115.20	70	120	
Sc	45	H2	400622	8.40	497417	80.54	70	120	
Sc	45	He	21540	5.31	26213	82.17	70	120	
Sc	45	NoGas	3122391	0.84	3271044	95.46	70	120	
Ge	72	H2	108149	8.94	130306	83.00	70	120	
Ge	72	He	21111	6.51	25369	83.22	70	120	
Ge	72	NoGas	764809	1.83	804525	95.06	70	120	
In	115	H2	2373958	8.22	2768793	85.74	70	120	
In	115	He	159406	7.38	184583	86.36	70	120	
In	115	NoGas	5196022	1.62	5159681	100.70	70	120	
Tb	159	H2	4440061	8.63	4956789	89.58	70	120	
Tb	159	He	1097850	10.03	1146052	95.79	70	120	
Tb	159	NoGas	7644284	1.65	7155958	106.82	70	120	
Ho	165	H2	4336226	8.00	4765312	91.00	70	120	
Ho	165	He	1109950	10.47	1131090	98.13	70	120	
Ho	165	NoGas	7452295	1.84	6876887	108.37	70	120	

Sample Report

Sample Table

Sample Name	AZ79168S01 DF10
Data File Name	049SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:25:48-07:00
Sample Type	Sample
Dilution	0.952380952
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.203	0.193	9.28	1000	12.29	10000	
B	11	45	NoGas	-0.522	-0.497	-187.12	136684	3.53	10000	
Na	23	72	He	293.461	279.487	1.93	253790	1.05	1000000	
Mg	24	45	He	1565.734	1491.175	1.37	511664	0.40	1000000	
Al	27	45	He	8841.705	8420.671	2.08	804239	1.34	1000000	
P	31	45	He	1946.929	1854.218	5.80	12323	5.07	500000	
K	39	45	He	1256.714	1196.870	2.45	246442	1.43	500000	
Ca	40	45	H2	2566.139	2443.942	2.53	17666759	0.94	500000	
Ti	47	45	He	421.434	401.366	1.57	39007	0.63	10000	
V	51	45	He	22.104	21.052	0.99	81806	1.13	10000	
Cr	52	45	He	33.886	32.272	2.00	171298	1.24	10000	
Mn	55	45	He	284.424	270.880	0.59	617345	0.44	50000	
Fe	56	45	He	11597.138	11044.893	1.59	47743805	1.01	1000000	
Co	59	45	He	4.529	4.313	1.40	40131	1.20	10000	
Ni	60	45	He	72.750	69.286	2.30	187024	1.50	10000	
Cu	63	45	He	501.488	477.608	1.87	3607330	1.03	10000	
Zn	66	115	He	302.323	287.927	1.83	322559	0.88	50000	
As	75	115	He	1.754	1.670	7.03	1058	5.99	2000	
Se	78	72	H2	0.162	0.155	7.06	120	3.71	10000	
Se	78	115	He	0.834	0.794	40.68	31	34.87	10000	
Sr	88	115	NoGas	24.106	22.958	5.65	1186566	0.73	50000	
Mo	95	115	NoGas	12.032	11.459	4.95	121769	0.89	10000	
Ag	107	115	NoGas	7.323	6.974	5.68	205073	1.73	5000	
Cd	111	115	He	0.841	0.801	4.79	1190	3.84	10000	
Sn	118	115	He	20.718	19.731	0.06	49081	0.98	10000	
Sn	118	115	NoGas	21.906	20.862	3.28	342701	8.48	10000	
Sb	121	115	NoGas	95.356	90.815	5.29	2155091	0.84	10000	
Ba	137	165	NoGas	155.551	148.144	3.91	1115040	0.09	50000	
Tl	205	165	NoGas	0.115	0.109	0.24	5551	3.88	5000	
Pb	208	165	NoGas	366.542	349.088	4.49	22262032	0.61	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	130588	3.63	155989	83.72	70	120	
Sc	45	H2	750279	2.12	788522	95.15	70	120	
Sc	45	He	54298	1.03	55083	98.57	70	120	
Sc	45	NoGas	2117829	5.72	2213509	95.68	70	120	
Ge	72	H2	209955	3.02	228382	91.93	70	120	
Ge	72	He	40539	0.60	41564	97.53	70	120	
Ge	72	NoGas	472616	4.77	493680	95.73	70	120	
In	115	H2	2721274	2.96	2933811	92.76	70	120	
In	115	He	341645	1.00	358672	95.25	70	120	
In	115	NoGas	3176927	5.90	3330807	95.38	70	120	
Tb	159	H2	3972652	2.83	4179923	95.04	70	120	
Tb	159	He	1590796	1.31	1624277	97.94	70	120	
Tb	159	NoGas	4560455	4.13	4702844	96.97	70	120	
Ho	165	H2	3821610	3.18	4040454	94.58	70	120	
Ho	165	He	1574911	0.73	1590248	99.04	70	120	
Ho	165	NoGas	4401027	4.02	4499866	97.80	70	120	

Sample Report

Sample Table

Sample Name	AZ79168S01 DF100
Data File Name	118SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:53:27-07:00
Sample Type	Sample
Dilution	9.523809524
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.019	0.183	23.35	190	21.05	10000	
B	11	45	NoGas	3.884	36.991	5.03	227763	0.81	10000	
Na	23	45	He	58.219	554.469	5.40	37561	1.52	1000000	
Mg	24	45	He	166.779	1588.375	3.32	22170	1.54	1000000	
Al	27	45	He	892.298	8498.073	2.98	22408	0.79	1000000	
P	31	45	He	166.025	1581.195	21.67	318	20.59	500000	
K	39	45	He	111.848	1065.220	3.19	9760	2.51	500000	
Ca	40	45	H2	238.996	2276.157	12.29	1049631	2.74	500000	
Ti	47	45	He	41.318	393.507	5.88	1627	7.29	10000	
V	51	45	He	2.084	19.844	1.23	4880	2.56	10000	
Cr	52	45	He	3.085	29.379	2.69	11282	2.96	10000	
Mn	55	45	He	27.185	258.906	2.35	26170	0.25	50000	
Fe	56	45	He	1138.256	10840.534	3.38	2856680	1.18	1000000	
Co	59	45	He	0.421	4.006	4.43	3084	6.44	10000	
Ni	60	45	He	6.944	66.134	0.77	15619	2.18	10000	
Cu	63	45	He	47.937	456.547	2.06	311933	0.14	10000	
Zn	66	115	He	27.816	264.916	2.21	20392	0.85	50000	
As	75	115	He	0.176	1.676	1.03	71	2.92	2000	
Se	78	72	H2	0.024	0.230	22.24	23	10.34	10000	
Se	78	115	He	0.088	0.833	448.59	3	145.30	10000	
Sr	88	115	NoGas	2.179	20.753	0.47	178577	1.05	50000	
Mo	95	115	NoGas	1.088	10.361	4.63	18450	5.55	10000	
Ag	107	115	NoGas	0.677	6.443	1.99	34492	1.45	5000	
Cd	111	115	He	0.071	0.680	32.36	71	30.00	10000	
Sn	118	115	He	1.910	18.195	4.69	2505	5.61	10000	
Sn	118	115	NoGas	1.923	18.318	1.32	50298	1.43	10000	
Sb	121	115	NoGas	8.579	81.705	0.46	322845	0.93	10000	
Ba	137	115	NoGas	14.099	134.274	1.07	171652	0.52	50000	
Tl	205	165	NoGas	0.002	0.017	201.82	1897	15.37	5000	
Pb	208	165	NoGas	34.333	326.984	1.93	3625857	1.68	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	272109	0.56	232772	116.90	70	120	
Sc	45	H2	412013	9.26	497417	82.83	70	120	
Sc	45	He	22150	2.16	26213	84.50	70	120	
Sc	45	NoGas	3088607	0.44	3271044	94.42	70	120	
Ge	72	H2	110880	9.56	130306	85.09	70	120	
Ge	72	He	22012	3.23	25369	86.77	70	120	
Ge	72	NoGas	760373	1.22	804525	94.51	70	120	
In	115	H2	2445481	8.40	2768793	88.32	70	120	
In	115	He	165564	2.01	184583	89.70	70	120	
In	115	NoGas	5193433	1.05	5159681	100.65	70	120	
Tb	159	H2	4591572	9.68	4956789	92.63	70	120	
Tb	159	He	1112855	2.19	1146052	97.10	70	120	
Tb	159	NoGas	7578187	0.26	7155958	105.90	70	120	
Ho	165	H2	4449491	9.21	4765312	93.37	70	120	
Ho	165	He	1124058	2.39	1131090	99.38	70	120	
Ho	165	NoGas	7384092	0.96	6876887	107.38	70	120	

Sample Report

Sample Table

Sample Name	AZ79169S01 DF10
Data File Name	050SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:29:42-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.181	0.181	20.08	877	18.82	10000	
B	11	45	NoGas	-2.219	-2.219	-22.58	124422	3.63	10000	
Na	23	72	He	51.070	51.070	5.99	70674	1.50	1000000	
Mg	24	45	He	1023.508	1023.508	1.37	312277	0.57	1000000	
Al	27	45	He	5594.857	5594.857	0.99	475445	1.06	1000000	
P	31	45	He	516.230	516.230	2.26	3107	1.37	500000	
K	39	45	He	525.238	525.238	1.39	102889	1.55	500000	
Ca	40	45	H2	625.030	625.030	3.23	4162300	2.06	500000	
Ti	47	45	He	319.663	319.663	1.23	27625	1.59	10000	
V	51	45	He	22.286	22.286	1.03	76989	0.54	10000	
Cr	52	45	He	9.782	9.782	1.73	46946	0.93	10000	
Mn	55	45	He	397.686	397.686	1.54	805667	0.03	50000	
Fe	56	45	He	50727.388	50727.388	0.79	194943743	0.88	1000000	
Co	59	45	He	5.173	5.173	1.89	42789	0.38	10000	
Ni	60	45	He	13.123	13.123	0.96	31881	0.76	10000	
Cu	63	45	He	33.086	33.086	2.62	245030	0.82	10000	
Zn	66	115	He	133.207	133.207	0.61	137902	0.76	50000	
As	75	115	He	7.705	7.705	3.24	4342	1.92	2000	
Se	78	72	H2	0.111	0.111	12.69	81	8.74	10000	
Se	78	115	He	0.537	0.537	47.05	20	37.75	10000	
Sr	88	115	NoGas	3.826	3.826	3.85	181106	0.04	50000	
Mo	95	115	NoGas	18.211	18.211	4.49	176567	1.52	10000	
Ag	107	115	NoGas	0.171	0.171	1.38	6998	4.54	5000	
Cd	111	115	He	0.228	0.228	6.98	309	8.10	10000	
Sn	118	115	He	365.770	365.770	1.00	806470	0.59	10000	
Sn	118	115	NoGas	357.069	357.069	1.95	5285609	1.99	10000	
Sb	121	115	NoGas	1.691	1.691	1.00	38381	4.05	10000	
Ba	137	165	NoGas	19.933	19.933	4.65	142830	2.12	50000	
Tl	205	165	NoGas	0.073	0.073	5.68	3594	5.80	5000	
Pb	208	165	NoGas	285.524	285.524	4.70	17261969	0.60	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	128372	4.87	155989	82.30	70	120	
Sc	45	H2	717946	3.09	788522	91.05	70	120	
Sc	45	He	50690	1.55	55083	92.02	70	120	
Sc	45	NoGas	2015825	4.86	2213509	91.07	70	120	
Ge	72	H2	200316	3.30	228382	87.71	70	120	
Ge	72	He	38392	1.55	41564	92.37	70	120	
Ge	72	NoGas	459214	3.58	493680	93.02	70	120	
In	115	H2	2647302	3.08	2933811	90.23	70	120	
In	115	He	322167	1.33	358672	89.82	70	120	
In	115	NoGas	3042108	3.79	3330807	91.33	70	120	
Tb	159	H2	3907238	3.73	4179923	93.48	70	120	
Tb	159	He	1507906	1.85	1624277	92.84	70	120	
Tb	159	NoGas	4543321	5.20	4702844	96.61	70	120	
Ho	165	H2	3718925	2.82	4040454	92.04	70	120	
Ho	165	He	1523162	0.69	1590248	95.78	70	120	
Ho	165	NoGas	4379961	4.59	4499866	97.34	70	120	

Sample Report

Sample Table

Sample Name	AZ79169S01 DF50
Data File Name	119SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:57:23-07:00
Sample Type	Sample
Dilution	5
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.032	0.158	19.81	300	16.67	10000	
B	11	45	NoGas	3.247	16.236	12.18	226730	1.92	10000	
Na	23	45	He	28.462	142.308	13.96	27784	0.53	1000000	
Mg	24	45	He	211.079	1055.394	4.75	27759	1.46	1000000	
Al	27	45	He	1087.316	5436.582	3.80	26977	0.41	1000000	
P	31	45	He	87.158	435.791	6.71	181	7.66	500000	
K	39	45	He	90.963	454.816	7.96	8454	0.99	500000	
Ca	40	45	H2	121.540	607.699	13.50	514763	2.06	500000	
Ti	47	45	He	60.569	302.845	1.63	2360	2.55	10000	
V	51	45	He	4.062	20.312	5.09	9378	3.37	10000	
Cr	52	45	He	1.730	8.652	8.40	6463	5.48	10000	
Mn	55	45	He	74.750	373.748	4.65	71118	0.92	50000	
Fe	56	45	He	9630.406	48152.028	3.99	23905875	0.37	1000000	
Co	59	45	He	0.957	4.786	4.04	6888	1.33	10000	
Ni	60	45	He	2.422	12.110	5.12	5449	1.23	10000	
Cu	63	45	He	6.213	31.064	4.09	40821	1.77	10000	
Zn	66	115	He	24.004	120.020	2.20	17572	1.34	50000	
As	75	115	He	1.321	6.606	5.46	499	4.50	2000	
Se	78	72	H2	0.028	0.139	4.29	25	8.23	10000	
Se	78	115	He	0.196	0.981	175.50	4	93.26	10000	
Sr	88	115	NoGas	0.705	3.527	2.94	58326	2.43	50000	
Mo	95	115	NoGas	3.263	16.315	0.77	54900	1.06	10000	
Ag	107	115	NoGas	0.025	0.124	34.05	5444	7.20	5000	
Cd	111	115	He	0.045	0.225	45.55	45	45.28	10000	
Sn	118	115	He	66.462	332.309	3.07	84953	0.33	10000	
Sn	118	115	NoGas	68.319	341.597	0.53	1751918	1.27	10000	
Sb	121	115	NoGas	0.381	1.907	3.49	15131	4.97	10000	
Ba	137	115	NoGas	3.683	18.417	0.46	44970	2.25	50000	
Tl	205	165	NoGas	0.004	0.018	48.75	2054	8.36	5000	
Pb	208	165	NoGas	54.550	272.750	1.14	5816497	1.59	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	270772	1.00	232772	116.33	70	120	
Sc	45	H2	395071	11.56	497417	79.42	70	120	
Sc	45	He	21941	4.01	26213	83.70	70	120	
Sc	45	NoGas	3123162	2.72	3271044	95.48	70	120	
Ge	72	H2	107647	10.14	130306	82.61	70	120	
Ge	72	He	22109	3.80	25369	87.15	70	120	
Ge	72	NoGas	765841	0.56	804525	95.19	70	120	
In	115	H2	2342256	9.84	2768793	84.59	70	120	
In	115	He	164892	3.32	184583	89.33	70	120	
In	115	NoGas	5193598	1.80	5159681	100.66	70	120	
Tb	159	H2	4393949	9.78	4956789	88.65	70	120	
Tb	159	He	1112163	2.71	1146052	97.04	70	120	
Tb	159	NoGas	7631942	1.50	7155958	106.65	70	120	
Ho	165	H2	4263931	11.32	4765312	89.48	70	120	
Ho	165	He	1119750	2.83	1131090	99.00	70	120	
Ho	165	NoGas	7460731	1.78	6876887	108.49	70	120	

Sample Report

Sample Table

Sample Name	AZ79170S01 DF10
Data File Name	051SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:33:38-07:00
Sample Type	Sample
Dilution	0.99009901
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.213	0.211	2.10	1027	6.49	10000	
B	11	45	NoGas	-0.885	-0.876	-121.32	125999	2.86	10000	
Na	23	72	He	52.289	51.772	1.20	67660	1.45	1000000	
Mg	24	45	He	1151.216	1139.818	0.46	335622	0.66	1000000	
Al	27	45	He	6659.871	6593.932	1.35	540595	1.09	1000000	
P	31	45	He	648.718	642.295	4.40	3713	4.65	500000	
K	39	45	He	647.316	640.906	0.62	118592	0.18	500000	
Ca	40	45	H2	1239.150	1226.881	4.65	7855422	1.31	500000	
Ti	47	45	He	313.777	310.670	1.64	25910	1.54	10000	
V	51	45	He	25.705	25.450	1.11	84824	0.78	10000	
Cr	52	45	He	4.946	4.897	1.90	23203	1.53	10000	
Mn	55	45	He	155.280	153.743	0.29	300705	0.54	50000	
Fe	56	45	He	11966.222	11847.745	1.02	43943165	0.66	1000000	
Co	59	45	He	2.057	2.037	1.78	16276	1.90	10000	
Ni	60	45	He	3.055	3.025	4.42	7437	4.19	10000	
Cu	63	45	He	83.480	82.653	0.89	555172	0.46	10000	
Zn	66	115	He	59.805	59.213	1.44	64054	0.98	50000	
As	75	115	He	1.862	1.843	0.77	1031	0.15	2000	
Se	78	72	H2	0.144	0.142	10.49	99	5.58	10000	
Se	78	115	He	0.735	0.727	34.05	25	29.63	10000	
Sr	88	115	NoGas	5.868	5.810	2.05	271930	1.59	50000	
Mo	95	115	NoGas	12.887	12.759	4.13	122486	2.12	10000	
Ag	107	115	NoGas	0.180	0.178	2.02	7092	2.08	5000	
Cd	111	115	He	0.130	0.129	19.32	175	19.38	10000	
Sn	118	115	He	4.594	4.548	2.90	10481	2.25	10000	
Sn	118	115	NoGas	4.469	4.425	4.52	68355	1.61	10000	
Sb	121	115	NoGas	0.922	0.913	5.29	21264	2.38	10000	
Ba	137	165	NoGas	20.136	19.937	3.31	142074	0.68	50000	
Tl	205	165	NoGas	0.068	0.067	1.18	3297	3.54	5000	
Pb	208	165	NoGas	27.530	27.258	3.39	1669691	0.49	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	128232	4.52	155989	82.21	70	120	
Sc	45	H2	689191	5.65	788522	87.40	70	120	
Sc	45	He	48431	0.41	55083	87.92	70	120	
Sc	45	NoGas	1970316	4.22	2213509	89.01	70	120	
Ge	72	H2	195131	4.47	228382	85.44	70	120	
Ge	72	He	36305	1.40	41564	87.35	70	120	
Ge	72	NoGas	438561	1.89	493680	88.84	70	120	
In	115	H2	2640248	4.41	2933811	89.99	70	120	
In	115	He	313957	0.69	358672	87.53	70	120	
In	115	NoGas	2980014	2.81	3330807	89.47	70	120	
Tb	159	H2	3903378	4.04	4179923	93.38	70	120	
Tb	159	He	1467608	3.04	1624277	90.35	70	120	
Tb	159	NoGas	4409902	2.73	4702844	93.77	70	120	
Ho	165	H2	3824175	5.14	4040454	94.65	70	120	
Ho	165	He	1451748	2.69	1590248	91.29	70	120	
Ho	165	NoGas	4311017	3.64	4499866	95.80	70	120	

Sample Report

Sample Table

Sample Name	AZ79171S01 DF10
Data File Name	052SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:37:37-07:00
Sample Type	Sample
Dilution	1.020408163
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.230	0.235	11.14	1140	9.77	10000	
B	11	45	NoGas	-0.448	-0.457	-212.47	124223	1.64	10000	
Na	23	72	He	36.331	37.072	2.86	56365	0.73	1000000	
Mg	24	45	He	1107.590	1130.194	2.22	319663	0.75	1000000	
Al	27	45	He	6752.215	6890.016	2.62	542543	0.42	1000000	
P	31	45	He	780.175	796.097	0.96	4406	2.05	500000	
K	39	45	He	613.616	626.139	2.64	111855	0.55	500000	
Ca	40	45	H2	1104.891	1127.440	3.17	6923110	2.35	500000	
Ti	47	45	He	281.676	287.425	2.20	23027	0.88	10000	
V	51	45	He	23.877	24.364	2.64	78023	2.40	10000	
Cr	52	45	He	6.338	6.467	2.26	29162	4.89	10000	
Mn	55	45	He	147.464	150.474	2.65	282684	0.46	50000	
Fe	56	45	He	11651.785	11889.576	2.05	42362018	1.18	1000000	
Co	59	45	He	2.034	2.076	3.83	15925	1.10	10000	
Ni	60	45	He	2.824	2.882	1.94	6840	1.27	10000	
Cu	63	45	He	99.701	101.736	3.28	651781	0.53	10000	
Zn	66	115	He	83.710	85.419	2.40	85430	1.24	50000	
As	75	115	He	1.752	1.788	10.34	954	9.18	2000	
Se	78	72	H2	0.162	0.165	8.51	109	7.75	10000	
Se	78	115	He	0.693	0.707	36.62	24	31.15	10000	
Sr	88	115	NoGas	5.930	6.051	2.93	274357	0.44	50000	
Mo	95	115	NoGas	12.035	12.280	0.72	114312	3.17	10000	
Ag	107	115	NoGas	0.361	0.369	3.29	11784	2.98	5000	
Cd	111	115	He	0.213	0.217	6.04	276	6.91	10000	
Sn	118	115	He	5.157	5.262	1.95	11486	1.99	10000	
Sn	118	115	NoGas	5.086	5.190	2.68	77211	0.64	10000	
Sb	121	115	NoGas	0.892	0.910	4.29	20590	1.65	10000	
Ba	137	165	NoGas	23.037	23.507	1.40	158354	1.15	50000	
Tl	205	165	NoGas	0.064	0.065	10.16	3030	9.77	5000	
Pb	208	165	NoGas	37.872	38.645	1.46	2226841	1.16	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	131978	1.46	155989	84.61	70	120	
Sc	45	H2	680207	5.40	788522	86.26	70	120	
Sc	45	He	47966	2.95	55083	87.08	70	120	
Sc	45	NoGas	1920332	3.39	2213509	86.76	70	120	
Ge	72	H2	191191	3.45	228382	83.72	70	120	
Ge	72	He	35844	1.66	41564	86.24	70	120	
Ge	72	NoGas	430899	4.11	493680	87.28	70	120	
In	115	H2	2583177	4.31	2933811	88.05	70	120	
In	115	He	308473	1.19	358672	86.00	70	120	
In	115	NoGas	2975864	3.20	3330807	89.34	70	120	
Tb	159	H2	3867224	4.89	4179923	92.52	70	120	
Tb	159	He	1474088	2.20	1624277	90.75	70	120	
Tb	159	NoGas	4367317	2.31	4702844	92.87	70	120	
Ho	165	H2	3715916	4.94	4040454	91.97	70	120	
Ho	165	He	1475883	0.80	1590248	92.81	70	120	
Ho	165	NoGas	4200338	2.54	4499866	93.34	70	120	

Sample Report

Sample Table

Sample Name	AZ79171S01 DF50
Data File Name	028SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180918A.b
Acq Date Time	2018-09-18T10:00:46-07:00
Sample Type	Sample
Dilution	5.102040816
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.057	0.291	3.51	410	2.44	10000	
B	11	45	NoGas	-1.520	-7.757	-4.02	15016	2.10	10000	
Na	23	45	He	14.443	73.689	8.46	30138	0.99	1000000	
Mg	24	45	He	253.551	1293.626	3.19	64440	0.53	1000000	
Al	27	45	He	1374.195	7011.200	2.25	102567	0.75	1000000	
P	31	45	He	157.959	805.913	14.13	1048	10.86	500000	
K	39	45	He	121.120	617.961	6.16	29501	1.07	500000	
Ca	40	45	H2	202.042	1030.825	13.97	704534	1.77	500000	
Ti	47	45	He	59.445	303.291	5.96	4763	6.24	10000	
V	51	45	He	4.767	24.320	2.13	16357	2.02	10000	
Cr	52	45	He	1.260	6.427	0.77	6649	2.32	10000	
Mn	55	45	He	29.567	150.851	1.81	54632	1.52	50000	
Fe	56	45	He	2323.700	11855.614	2.36	8324119	0.81	1000000	
Co	59	45	He	0.414	2.112	3.37	3518	1.86	10000	
Ni	60	45	He	0.612	3.123	2.17	1570	1.70	10000	
Cu	63	45	He	20.704	105.630	3.00	145653	0.12	10000	
Zn	66	115	He	16.884	86.145	2.08	17374	3.07	50000	
As	75	115	He	0.365	1.862	12.79	220	10.93	2000	
Se	78	115	H2	0.028	0.142	14.45	37	16.41	10000	
Se	78	115	He	0.075	0.383	148.36	7	42.86	10000	
Sr	88	115	NoGas	1.202	6.132	1.81	66002	0.55	50000	
Mo	95	115	NoGas	2.402	12.254	4.41	27666	3.34	10000	
Ag	107	115	NoGas	0.060	0.307	8.66	5194	3.67	5000	
Cd	111	115	He	0.041	0.209	25.15	57	24.02	10000	
Sn	118	115	He	1.061	5.412	6.89	2519	7.74	10000	
Sn	118	115	NoGas	1.014	5.175	0.92	19016	1.59	10000	
Sb	121	115	NoGas	0.179	0.911	2.09	5645	3.01	10000	
Ba	137	165	NoGas	4.456	22.735	1.29	39894	0.58	50000	
Tl	205	165	NoGas	0.108	0.550	5.94	6815	3.72	5000	
Pb	208	165	NoGas	7.081	36.127	0.59	557655	1.28	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	241162	0.84	267827	90.04	70	120	
Sc	45	H2	399952	11.08	415473	96.26	70	120	
Sc	45	He	53508	2.99	58243	91.87	70	120	
Sc	45	NoGas	2303168	1.16	2418294	95.24	70	120	
Ge	72	H2	106251	10.31	121413	87.51	70	120	
Ge	72	He	42896	0.79	45798	93.66	70	120	
Ge	72	NoGas	566647	2.31	584877	96.88	70	120	
In	115	H2	2300842	10.78	2292298	100.37	70	120	
In	115	He	370529	1.37	399276	92.80	70	120	
In	115	NoGas	3935117	1.35	3892468	101.10	70	120	
Tb	159	H2	4302000	9.91	4163457	103.33	70	120	
Tb	159	He	1838852	0.62	1939211	94.82	70	120	
Tb	159	NoGas	5866913	1.31	5743431	102.15	70	120	
Ho	165	H2	4133262	10.39	4001522	103.29	70	120	
Ho	165	He	1837297	0.44	1933801	95.01	70	120	
Ho	165	NoGas	5742769	1.70	5517017	104.09	70	120	

Sample Report

Sample Table

Sample Name	AZ79172S01 DF10
Data File Name	053SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:41:36-07:00
Sample Type	Sample
Dilution	1.020408163
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.151	0.154	8.87	690	9.05	10000	
B	11	45	NoGas	-1.042	-1.064	-30.34	121752	1.39	10000	
Na	23	72	He	36.593	37.340	5.45	56976	0.53	1000000	
Mg	24	45	He	749.054	764.341	0.53	212790	1.19	1000000	
Al	27	45	He	4574.632	4667.991	0.52	362021	0.23	1000000	
P	31	45	He	1176.328	1200.335	5.36	6500	5.44	500000	
K	39	45	He	377.939	385.652	2.24	71928	1.66	500000	
Ca	40	45	H2	2585.395	2638.158	4.14	15380300	0.17	500000	
Ti	47	45	He	262.289	267.642	2.08	21102	2.48	10000	
V	51	45	He	22.803	23.268	1.22	73324	0.49	10000	
Cr	52	45	He	20.841	21.266	2.21	91942	1.45	10000	
Mn	55	45	He	481.475	491.301	0.78	908017	0.75	50000	
Fe	56	45	He	81276.175	82934.873	1.71	290728664	1.20	1000000	
Co	59	45	He	9.535	9.730	1.54	73397	0.82	10000	
Ni	60	45	He	23.558	24.039	0.76	52927	0.15	10000	
Cu	63	45	He	1841.767	1879.354	0.84	11452393	0.92	10000	
Zn	66	115	He	276.740	282.388	0.49	258989	0.65	50000	
As	75	115	He	27.745	28.311	1.02	14485	0.16	2000	
Se	78	72	H2	0.134	0.137	1.02	88	1.14	10000	
Se	78	115	He	0.779	0.795	14.35	25	12.06	10000	
Sr	88	115	NoGas	8.637	8.813	1.35	398045	1.63	50000	
Mo	95	115	NoGas	15.126	15.435	2.33	143083	0.58	10000	
Ag	107	115	NoGas	0.455	0.464	3.98	14180	6.21	5000	
Cd	111	115	He	0.443	0.452	4.31	551	3.43	10000	
Sn	118	115	He	541.425	552.474	0.61	1107752	0.52	10000	
Sn	118	115	NoGas	544.297	555.405	2.18	7853124	1.00	10000	
Sb	121	115	NoGas	304.226	310.435	2.10	6425193	0.79	10000	
Ba	137	165	NoGas	175.096	178.669	1.59	1222407	0.81	50000	
Tl	205	165	NoGas	0.058	0.060	8.84	2854	10.55	5000	
Pb	208	165	NoGas	543.013	554.095	1.07	32113317	1.21	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	120282	1.77	155989	77.11	70	120	
Sc	45	H2	648821	3.96	788522	82.28	70	120	
Sc	45	He	47182	0.73	55083	85.66	70	120	
Sc	45	NoGas	1910914	2.23	2213509	86.33	70	120	
Ge	72	H2	183938	1.92	228382	80.54	70	120	
Ge	72	He	36133	2.61	41564	86.93	70	120	
Ge	72	NoGas	443632	3.66	493680	89.86	70	120	
In	115	H2	2446492	4.33	2933811	83.39	70	120	
In	115	He	299016	0.90	358672	83.37	70	120	
In	115	NoGas	2965584	2.89	3330807	89.03	70	120	
Tb	159	H2	3755532	4.28	4179923	89.85	70	120	
Tb	159	He	1462875	0.67	1624277	90.06	70	120	
Tb	159	NoGas	4438882	2.07	4702844	94.39	70	120	
Ho	165	H2	3607289	4.38	4040454	89.28	70	120	
Ho	165	He	1456481	1.64	1590248	91.59	70	120	
Ho	165	NoGas	4283060	2.25	4499866	95.18	70	120	

Sample Report

Sample Table

Sample Name	AZ79172S01 DF100
Data File Name	120SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T18:01:20-07:00
Sample Type	Sample
Dilution	10.20408163
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.012	0.126	60.17	130	50.44	10000	
B	11	45	NoGas	4.151	42.355	6.34	229099	0.37	10000	
Na	23	45	He	22.438	228.962	18.72	26142	0.77	1000000	
Mg	24	45	He	71.294	727.491	5.41	9500	1.15	1000000	
Al	27	45	He	409.095	4174.435	4.60	10410	1.79	1000000	
P	31	45	He	97.473	994.625	10.72	200	4.41	500000	
K	39	45	He	24.556	250.567	18.83	4677	1.61	500000	
Ca	40	45	H2	224.618	2292.025	12.58	961291	2.92	500000	
Ti	47	45	He	21.568	220.082	5.93	849	6.24	10000	
V	51	45	He	1.959	19.989	6.78	4586	4.41	10000	
Cr	52	45	He	1.783	18.194	8.65	6709	3.56	10000	
Mn	55	45	He	41.080	419.185	4.36	39509	0.29	50000	
Fe	56	45	He	7113.884	72590.657	5.00	17833995	0.59	1000000	
Co	59	45	He	0.851	8.679	2.10	6191	2.60	10000	
Ni	60	45	He	2.059	21.005	9.94	4685	5.27	10000	
Cu	63	45	He	153.801	1569.402	5.46	998190	1.19	10000	
Zn	66	115	He	23.215	236.892	4.59	16876	3.19	50000	
As	75	115	He	2.238	22.832	5.03	836	3.37	2000	
Se	78	72	H2	0.022	0.221	10.09	20	3.40	10000	
Se	78	115	He	-0.090	-0.919	-175.42	1	173.21	10000	
Sr	88	115	NoGas	0.727	7.420	2.86	59985	2.15	50000	
Mo	95	115	NoGas	1.206	12.302	4.20	20376	3.69	10000	
Ag	107	115	NoGas	0.038	0.392	19.86	6038	4.89	5000	
Cd	111	115	He	0.042	0.431	19.76	42	16.50	10000	
Sn	118	115	He	45.274	461.982	2.36	57463	0.38	10000	
Sn	118	115	NoGas	43.965	448.621	2.14	1125502	1.42	10000	
Sb	121	115	NoGas	25.236	257.510	5.62	946082	5.02	10000	
Ba	137	115	NoGas	15.009	153.155	1.80	182372	1.06	50000	
Tl	205	165	NoGas	-0.008	-0.078	-25.00	1160	12.93	5000	
Pb	208	165	NoGas	45.842	467.777	1.49	4896271	1.17	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	272475	1.68	232772	117.06	70	120	
Sc	45	H2	401339	9.24	497417	80.68	70	120	
Sc	45	He	22166	4.31	26213	84.56	70	120	
Sc	45	NoGas	3086901	0.41	3271044	94.37	70	120	
Ge	72	H2	108170	9.85	130306	83.01	70	120	
Ge	72	He	21910	2.60	25369	86.37	70	120	
Ge	72	NoGas	762124	0.25	804525	94.73	70	120	
In	115	H2	2429849	9.86	2768793	87.76	70	120	
In	115	He	163630	2.27	184583	88.65	70	120	
In	115	NoGas	5183460	0.75	5159681	100.46	70	120	
Tb	159	H2	4513543	9.15	4956789	91.06	70	120	
Tb	159	He	1107866	1.86	1146052	96.67	70	120	
Tb	159	NoGas	7712159	0.31	7155958	107.77	70	120	
Ho	165	H2	4367250	10.24	4765312	91.65	70	120	
Ho	165	He	1122593	1.93	1131090	99.25	70	120	
Ho	165	NoGas	7471387	0.36	6876887	108.64	70	120	

Sample Report

Sample Table

Sample Name	AZ79172S01 DF500
Data File Name	121SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T18:05:19-07:00
Sample Type	Sample
Dilution	51.02040816
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	-0.001	-0.028	-433.41	17	124.90	10000	
B	11	45	NoGas	4.017	204.949	9.13	224701	1.51	10000	
Na	23	45	He	40.923	2087.904	8.22	31679	1.39	1000000	
Mg	24	45	He	14.207	724.833	2.08	1910	1.72	1000000	
Al	27	45	He	81.665	4166.566	5.36	2257	6.56	1000000	
P	31	45	He	11.711	597.517	37.61	53	12.50	500000	
K	39	45	He	0.008	0.410	6134.12	3216	1.41	500000	
Ca	40	45	H2	44.032	2246.512	8.71	203157	2.18	500000	
Ti	47	45	He	4.420	225.485	12.92	172	14.78	10000	
V	51	45	He	0.397	20.263	8.41	951	9.99	10000	
Cr	52	45	He	0.353	17.995	4.35	1687	3.86	10000	
Mn	55	45	He	8.087	412.623	2.26	7738	2.88	50000	
Fe	56	45	He	1450.588	74009.582	2.16	3599157	0.28	1000000	
Co	59	45	He	0.161	8.195	15.23	1186	12.75	10000	
Ni	60	45	He	0.410	20.932	14.26	997	11.93	10000	
Cu	63	45	He	31.323	1598.103	2.81	201811	0.82	10000	
Zn	66	115	He	4.966	253.364	7.95	3896	8.40	50000	
As	75	115	He	0.469	23.942	3.69	179	4.47	2000	
Se	78	72	H2	0.005	0.246	94.09	8	37.75	10000	
Se	78	115	He	-0.063	-3.211	-79.65	1	43.30	10000	
Sr	88	115	NoGas	0.144	7.338	1.82	12415	2.75	50000	
Mo	95	115	NoGas	0.246	12.551	3.99	4297	2.62	10000	
Ag	107	115	NoGas	0.005	0.277	123.11	4547	6.72	5000	
Cd	111	115	He	0.011	0.546	52.60	12	44.10	10000	
Sn	118	115	He	8.941	456.185	4.52	11381	3.24	10000	
Sn	118	115	NoGas	8.825	450.262	0.46	225415	0.79	10000	
Sb	121	115	NoGas	4.900	249.975	1.58	183287	1.69	10000	
Ba	137	115	NoGas	3.024	154.300	1.91	36660	2.06	50000	
Tl	205	165	NoGas	-0.013	-0.654	-16.18	730	21.75	5000	
Pb	208	165	NoGas	8.814	449.688	0.79	930234	0.78	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	271152	0.69	232772	116.49	70	120	
Sc	45	H2	415363	7.17	497417	83.50	70	120	
Sc	45	He	21899	1.96	26213	83.54	70	120	
Sc	45	NoGas	3037411	1.44	3271044	92.86	70	120	
Ge	72	H2	111011	7.35	130306	85.19	70	120	
Ge	72	He	21526	1.24	25369	84.85	70	120	
Ge	72	NoGas	747555	0.92	804525	92.92	70	120	
In	115	H2	2483970	7.01	2768793	89.71	70	120	
In	115	He	163503	1.24	184583	88.58	70	120	
In	115	NoGas	5153142	1.18	5159681	99.87	70	120	
Tb	159	H2	4628975	7.55	4956789	93.39	70	120	
Tb	159	He	1097057	1.76	1146052	95.72	70	120	
Tb	159	NoGas	7516590	0.91	7155958	105.04	70	120	
Ho	165	H2	4454459	7.32	4765312	93.48	70	120	
Ho	165	He	1110748	1.79	1131090	98.20	70	120	
Ho	165	NoGas	7338605	1.54	6876887	106.71	70	120	

Sample Report

Sample Table

Sample Name	AZ79173S01 DF10
Data File Name	054SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:45:28-07:00
Sample Type	Sample
Dilution	1.052631579
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.136	0.143	22.60	610	19.94	10000	
B	11	45	NoGas	-1.418	-1.493	-92.30	120747	3.71	10000	
Na	23	72	He	88.703	93.371	3.92	89537	1.01	1000000	
Mg	24	45	He	947.478	997.346	0.68	263448	0.53	1000000	
Al	27	45	He	7091.087	7464.302	1.12	548889	0.96	1000000	
P	31	45	He	3543.482	3729.981	0.29	19028	1.26	500000	
K	39	45	He	368.373	387.761	0.63	68904	1.49	500000	
Ca	40	45	H2	6261.832	6591.402	4.63	37315380	0.58	500000	
Ti	47	45	He	209.287	220.302	2.77	16485	2.98	10000	
V	51	45	He	13.458	14.167	0.02	42437	1.18	10000	
Cr	52	45	He	46.367	48.807	1.46	199031	1.16	10000	
Mn	55	45	He	865.003	910.530	1.72	1596784	1.32	50000	
Fe	56	45	He	120614.949	126963.104	1.30	422362330	0.75	1000000	
Co	59	45	He	22.922	24.128	1.14	172700	0.48	10000	
Ni	60	45	He	59.900	63.052	0.43	131084	0.81	10000	
Cu	63	45	He	189.074	199.025	0.42	1171019	1.34	10000	
Zn	66	115	He	275.299	289.788	1.80	258009	1.04	50000	
As	75	115	He	5.888	6.198	2.04	3087	0.96	2000	
Se	78	72	H2	0.239	0.252	8.78	152	7.90	10000	
Se	78	115	He	0.682	0.718	7.86	23	6.74	10000	
Sr	88	115	NoGas	19.138	20.145	5.02	872099	1.33	50000	
Mo	95	115	NoGas	17.069	17.967	5.79	159769	2.02	10000	
Ag	107	115	NoGas	1.065	1.121	5.63	29636	1.37	5000	
Cd	111	115	He	0.981	1.032	6.86	1216	7.88	10000	
Sn	118	115	He	370.731	390.243	0.05	759781	1.20	10000	
Sn	118	115	NoGas	371.292	390.834	4.84	5303537	0.75	10000	
Sb	121	115	NoGas	21.747	22.891	2.56	456463	1.75	10000	
Ba	137	165	NoGas	83.179	87.557	3.57	582725	1.36	50000	
Tl	205	165	NoGas	0.061	0.065	10.55	2997	9.81	5000	
Pb	208	165	NoGas	373.064	392.699	2.95	22135238	0.41	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	118330	1.66	155989	75.86	70	120	
Sc	45	H2	651542	4.82	788522	82.63	70	120	
Sc	45	He	46190	1.19	55083	83.86	70	120	
Sc	45	NoGas	1914709	3.80	2213509	86.50	70	120	
Ge	72	H2	185247	3.78	228382	81.11	70	120	
Ge	72	He	35434	1.57	41564	85.25	70	120	
Ge	72	NoGas	451974	2.91	493680	91.55	70	120	
In	115	H2	2504101	5.02	2933811	85.35	70	120	
In	115	He	299432	1.15	358672	83.48	70	120	
In	115	NoGas	2938087	4.14	3330807	88.21	70	120	
Tb	159	H2	3830547	4.16	4179923	91.64	70	120	
Tb	159	He	1462899	2.68	1624277	90.06	70	120	
Tb	159	NoGas	4406332	3.19	4702844	93.70	70	120	
Ho	165	H2	3646650	4.80	4040454	90.25	70	120	
Ho	165	He	1432648	1.39	1590248	90.09	70	120	
Ho	165	NoGas	4297188	3.28	4499866	95.50	70	120	

Sample Report

Sample Table

Sample Name	AZ79173S01 DF50
Data File Name	122SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T18:09:17-07:00
Sample Type	Sample
Dilution	5.102040816
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.023	0.119	21.23	227	17.83	10000	
B	11	45	NoGas	3.596	18.346	4.72	227612	2.15	10000	
Na	23	45	He	37.897	193.354	7.72	30856	0.82	1000000	
Mg	24	45	He	210.071	1071.793	3.71	27709	1.09	1000000	
Al	27	45	He	1498.382	7644.807	2.29	37195	1.14	1000000	
P	31	45	He	716.803	3657.160	16.36	1245	13.00	500000	
K	39	45	He	65.626	334.829	6.49	7018	1.94	500000	
Ca	40	45	H2	1288.815	6575.589	12.33	5572093	2.87	500000	
Ti	47	45	He	42.977	219.271	7.12	1681	9.49	10000	
V	51	45	He	2.733	13.943	1.46	6342	2.40	10000	
Cr	52	45	He	9.041	46.129	3.86	31914	0.81	10000	
Mn	55	45	He	162.826	830.747	3.14	155327	0.44	50000	
Fe	56	45	He	24580.012	125408.225	3.15	61189578	0.74	1000000	
Co	59	45	He	4.515	23.034	3.58	32432	0.82	10000	
Ni	60	45	He	11.821	60.311	4.83	26315	2.09	10000	
Cu	63	45	He	38.081	194.291	3.57	246156	1.01	10000	
Zn	66	115	He	53.998	275.502	3.10	38546	2.11	50000	
As	75	115	He	1.170	5.971	3.11	437	1.60	2000	
Se	78	72	H2	0.054	0.274	10.70	45	6.68	10000	
Se	78	115	He	0.092	0.468	348.91	3	115.47	10000	
Sr	88	115	NoGas	3.649	18.616	1.02	297974	2.65	50000	
Mo	95	115	NoGas	3.271	16.689	1.89	54946	3.14	10000	
Ag	107	115	NoGas	0.207	1.057	5.00	13552	5.42	5000	
Cd	111	115	He	0.206	1.052	9.94	198	12.25	10000	
Sn	118	115	He	72.792	371.388	3.99	91782	1.73	10000	
Sn	118	115	NoGas	73.309	374.024	0.83	1876379	1.70	10000	
Sb	121	115	NoGas	4.064	20.735	1.35	153098	2.53	10000	
Ba	137	115	NoGas	16.419	83.772	1.18	199513	1.35	50000	
Tl	205	165	NoGas	0.002	0.012	154.01	1980	17.03	5000	
Pb	208	165	NoGas	74.556	380.390	0.07	7988477	1.81	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	270489	2.80	232772	116.20	70	120	
Sc	45	H2	408430	9.02	497417	82.11	70	120	
Sc	45	He	21995	3.07	26213	83.91	70	120	
Sc	45	NoGas	3108119	1.87	3271044	95.02	70	120	
Ge	72	H2	110368	9.80	130306	84.70	70	120	
Ge	72	He	21563	3.24	25369	85.00	70	120	
Ge	72	NoGas	769782	1.65	804525	95.68	70	120	
In	115	H2	2438869	8.52	2768793	88.08	70	120	
In	115	He	162654	2.49	184583	88.12	70	120	
In	115	NoGas	5184451	2.38	5159681	100.48	70	120	
Tb	159	H2	4526848	8.46	4956789	91.33	70	120	
Tb	159	He	1099881	1.66	1146052	95.97	70	120	
Tb	159	NoGas	7622210	1.46	7155958	106.52	70	120	
Ho	165	H2	4439038	9.46	4765312	93.15	70	120	
Ho	165	He	1114866	1.51	1131090	98.57	70	120	
Ho	165	NoGas	7499116	1.86	6876887	109.05	70	120	

Sample Report

Sample Table

Sample Name	AZ79174S01 DF10
Data File Name	055SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:49:20-07:00
Sample Type	Sample
Dilution	0.980392157
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.246	0.241	8.57	1150	11.76	10000	
B	11	45	NoGas	-2.424	-2.376	-24.93	118891	3.13	10000	
Na	23	72	He	52.794	51.758	4.13	66490	1.01	1000000	
Mg	24	45	He	1258.891	1234.206	1.23	350294	1.15	1000000	
Al	27	45	He	5445.320	5338.549	1.54	422024	0.71	1000000	
P	31	45	He	503.049	493.185	5.67	2764	5.71	500000	
K	39	45	He	867.176	850.172	2.38	148050	1.46	500000	
Ca	40	45	H2	1231.425	1207.280	3.20	7590858	1.46	500000	
Ti	47	45	He	458.314	449.328	2.17	36115	1.60	10000	
V	51	45	He	22.741	22.295	2.32	71641	1.49	10000	
Cr	52	45	He	13.275	13.015	1.30	57749	0.72	10000	
Mn	55	45	He	250.523	245.611	1.27	462952	0.44	50000	
Fe	56	45	He	10333.701	10131.080	1.89	36219627	1.12	1000000	
Co	59	45	He	2.436	2.388	0.93	18386	0.94	10000	
Ni	60	45	He	7.088	6.949	4.46	15899	3.76	10000	
Cu	63	45	He	14.153	13.875	1.33	108389	0.66	10000	
Zn	66	115	He	52.515	51.485	1.94	55740	1.36	50000	
As	75	115	He	1.692	1.658	2.04	916	1.74	2000	
Se	78	72	H2	0.109	0.106	9.81	76	6.73	10000	
Se	78	115	He	0.605	0.593	26.11	21	21.82	10000	
Sr	88	115	NoGas	9.185	9.005	3.20	424495	1.21	50000	
Mo	95	115	NoGas	7.563	7.414	1.39	71867	2.48	10000	
Ag	107	115	NoGas	0.069	0.068	19.36	4197	4.82	5000	
Cd	111	115	He	0.223	0.219	9.62	287	9.08	10000	
Sn	118	115	He	1.067	1.046	2.15	2842	2.05	10000	
Sn	118	115	NoGas	1.003	0.983	3.59	18123	1.05	10000	
Sb	121	115	NoGas	2.243	2.199	1.77	49241	2.83	10000	
Ba	137	165	NoGas	26.240	25.725	2.95	184442	0.82	50000	
Tl	205	165	NoGas	0.073	0.071	3.11	3504	1.41	5000	
Pb	208	165	NoGas	10.288	10.086	2.60	643467	0.60	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	124728	5.65	155989	79.96	70	120	
Sc	45	H2	669562	4.25	788522	84.91	70	120	
Sc	45	He	46228	0.83	55083	83.92	70	120	
Sc	45	NoGas	1936053	2.20	2213509	87.47	70	120	
Ge	72	H2	191313	2.85	228382	83.77	70	120	
Ge	72	He	35508	1.25	41564	85.43	70	120	
Ge	72	NoGas	436151	1.97	493680	88.35	70	120	
In	115	H2	2584702	3.66	2933811	88.10	70	120	
In	115	He	306653	0.39	358672	85.50	70	120	
In	115	NoGas	2975837	3.75	3330807	89.34	70	120	
Tb	159	H2	3887168	4.60	4179923	93.00	70	120	
Tb	159	He	1460626	1.39	1624277	89.92	70	120	
Tb	159	NoGas	4466219	3.58	4702844	94.97	70	120	
Ho	165	H2	3794994	5.32	4040454	93.92	70	120	
Ho	165	He	1473173	0.54	1590248	92.64	70	120	
Ho	165	NoGas	4299066	3.03	4499866	95.54	70	120	

Sample Report

Sample Table

Sample Name	AZ79175S01 DF10
Data File Name	056SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:53:17-07:00
Sample Type	Sample
Dilution	1.041666667
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.133	0.139	15.87	600	16.92	10000	
B	11	45	NoGas	-2.490	-2.593	-11.15	114596	2.73	10000	
Na	23	72	He	43.796	45.621	5.33	61277	1.05	1000000	
Mg	24	45	He	1026.079	1068.833	1.07	282693	0.76	1000000	
Al	27	45	He	6501.859	6772.770	1.68	498735	0.79	1000000	
P	31	45	He	1378.745	1436.192	4.52	7375	2.65	500000	
K	39	45	He	519.473	541.117	1.41	91996	1.10	500000	
Ca	40	45	H2	1534.627	1598.570	5.46	8978216	0.51	500000	
Ti	47	45	He	325.338	338.894	1.86	25392	3.06	10000	
V	51	45	He	17.121	17.834	2.44	53439	1.41	10000	
Cr	52	45	He	20.759	21.624	2.46	88837	1.43	10000	
Mn	55	45	He	378.106	393.860	1.36	691699	0.62	50000	
Fe	56	45	He	81626.807	85027.924	1.75	283217518	0.14	1000000	
Co	59	45	He	10.347	10.778	1.45	77266	1.62	10000	
Ni	60	45	He	21.660	22.563	1.38	47239	1.19	10000	
Cu	63	45	He	101.465	105.693	1.58	632870	0.46	10000	
Zn	66	115	He	268.462	279.648	0.64	250458	0.25	50000	
As	75	115	He	3.982	4.148	1.06	2080	0.51	2000	
Se	78	72	H2	0.148	0.155	20.35	95	14.10	10000	
Se	78	115	He	0.915	0.953	19.87	29	17.24	10000	
Sr	88	115	NoGas	9.416	9.808	2.15	430586	0.44	50000	
Mo	95	115	NoGas	8.673	9.034	3.47	81482	1.54	10000	
Ag	107	115	NoGas	0.591	0.616	0.40	17569	1.78	5000	
Cd	111	115	He	0.616	0.641	3.32	761	3.90	10000	
Sn	118	115	He	160.309	166.989	0.42	327148	1.01	10000	
Sn	118	115	NoGas	161.810	168.552	2.45	2319699	1.08	10000	
Sb	121	115	NoGas	1.525	1.589	2.58	33660	2.42	10000	
Ba	137	165	NoGas	36.647	38.174	1.40	255204	0.52	50000	
Tl	205	165	NoGas	0.051	0.054	3.58	2520	4.20	5000	
Pb	208	165	NoGas	214.521	223.460	2.13	12644295	0.74	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	117669	1.81	155989	75.43	70	120	
Sc	45	H2	637144	5.63	788522	80.80	70	120	
Sc	45	He	45772	1.79	55083	83.10	70	120	
Sc	45	NoGas	1869891	3.30	2213509	84.48	70	120	
Ge	72	H2	180517	4.47	228382	79.04	70	120	
Ge	72	He	35869	1.61	41564	86.30	70	120	
Ge	72	NoGas	439141	1.85	493680	88.95	70	120	
In	115	H2	2434262	3.15	2933811	82.97	70	120	
In	115	He	297857	0.66	358672	83.04	70	120	
In	115	NoGas	2943190	2.09	3330807	88.36	70	120	
Tb	159	H2	3740461	4.37	4179923	89.49	70	120	
Tb	159	He	1377592	1.63	1624277	84.81	70	120	
Tb	159	NoGas	4386131	2.07	4702844	93.27	70	120	
Ho	165	H2	3599486	4.09	4040454	89.09	70	120	
Ho	165	He	1409725	1.34	1590248	88.65	70	120	
Ho	165	NoGas	4262190	1.53	4499866	94.72	70	120	

Sample Report

Sample Table

Sample Name	AZ79175S01 DF50
Data File Name	123SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T18:13:14-07:00
Sample Type	Sample
Dilution	5.208333333
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.018	0.092	24.55	167	21.07	10000	
B	11	45	NoGas	3.044	15.856	66.90	211845	7.19	10000	
Na	23	45	He	24.339	126.765	10.71	26120	2.10	1000000	
Mg	24	45	He	216.438	1127.283	0.87	28078	0.74	1000000	
Al	27	45	He	1281.781	6675.945	1.37	31322	1.70	1000000	
P	31	45	He	272.229	1417.857	2.73	487	3.14	500000	
K	39	45	He	90.211	469.848	5.06	8296	2.08	500000	
Ca	40	45	H2	285.959	1489.371	15.89	1239255	5.39	500000	
Ti	47	45	He	64.909	338.066	10.19	2495	11.20	10000	
V	51	45	He	3.118	16.242	3.10	7109	3.45	10000	
Cr	52	45	He	3.730	19.427	3.96	13223	4.72	10000	
Mn	55	45	He	70.738	368.428	0.78	66399	1.74	50000	
Fe	56	45	He	15384.324	80126.685	0.61	37664290	0.56	1000000	
Co	59	45	He	1.947	10.140	1.25	13779	1.31	10000	
Ni	60	45	He	4.064	21.165	5.94	8957	5.59	10000	
Cu	63	45	He	18.850	98.177	1.16	120291	0.20	10000	
Zn	66	115	He	48.787	254.101	1.71	34381	1.35	50000	
As	75	115	He	0.748	3.898	8.56	278	9.77	2000	
Se	78	72	H2	0.030	0.155	40.39	26	23.31	10000	
Se	78	115	He	0.331	1.726	54.82	6	36.74	10000	
Sr	88	115	NoGas	1.807	9.414	13.30	138337	2.12	50000	
Mo	95	115	NoGas	1.670	8.699	11.57	26354	1.93	10000	
Ag	107	115	NoGas	0.112	0.584	24.71	8716	2.69	5000	
Cd	111	115	He	0.114	0.592	18.12	108	15.82	10000	
Sn	118	115	He	29.600	154.166	2.13	36843	0.17	10000	
Sn	118	115	NoGas	30.327	157.952	14.82	725360	3.42	10000	
Sb	121	115	NoGas	0.330	1.718	9.81	12342	2.48	10000	
Ba	137	115	NoGas	7.167	37.326	15.00	81407	4.21	50000	
Tl	205	165	NoGas	-0.003	-0.015	-96.13	1440	3.67	5000	
Pb	208	165	NoGas	41.455	215.913	14.18	4137665	3.12	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	251466	8.26	232772	108.03	70	120	
Sc	45	H2	408447	10.26	497417	82.11	70	120	
Sc	45	He	21618	1.05	26213	82.47	70	120	
Sc	45	NoGas	2943948	11.93	3271044	90.00	70	120	
Ge	72	H2	109289	10.47	130306	83.87	70	120	
Ge	72	He	21412	1.86	25369	84.40	70	120	
Ge	72	NoGas	711859	8.19	804525	88.48	70	120	
In	115	H2	2432645	10.48	2768793	87.86	70	120	
In	115	He	160382	1.95	184583	86.89	70	120	
In	115	NoGas	4893489	11.17	5159681	94.84	70	120	
Tb	159	H2	4557435	9.42	4956789	91.94	70	120	
Tb	159	He	1090208	1.94	1146052	95.13	70	120	
Tb	159	NoGas	7244216	10.68	7155958	101.23	70	120	
Ho	165	H2	4409995	10.44	4765312	92.54	70	120	
Ho	165	He	1100107	2.38	1131090	97.26	70	120	
Ho	165	NoGas	7051445	10.78	6876887	102.54	70	120	

Sample Report

Sample Table

Sample Name	AZ79176S01 DF10
Data File Name	057SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T16:57:11-07:00
Sample Type	Sample
Dilution	0.943396226
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.409	0.386	8.23	1854	11.97	10000	
B	11	45	NoGas	-2.271	-2.143	-18.96	119378	3.74	10000	
Na	23	72	He	46.285	43.665	9.94	62940	1.65	1000000	
Mg	24	45	He	1958.197	1847.355	2.61	554359	0.80	1000000	
Al	27	45	He	9236.863	8714.021	2.35	727902	0.81	1000000	
P	31	45	He	376.047	354.762	2.24	2120	1.77	500000	
K	39	45	He	901.225	850.212	2.35	156162	0.96	500000	
Ca	40	45	H2	864.991	816.029	2.57	5349370	1.26	500000	
Ti	47	45	He	629.877	594.224	3.20	50500	1.36	10000	
V	51	45	He	32.567	30.724	1.80	104341	0.51	10000	
Cr	52	45	He	9.850	9.292	1.44	43871	1.16	10000	
Mn	55	45	He	170.970	161.293	2.30	321548	0.34	50000	
Fe	56	45	He	13796.245	13015.325	3.27	49200396	1.36	1000000	
Co	59	45	He	2.787	2.629	1.27	21407	0.84	10000	
Ni	60	45	He	5.855	5.524	0.17	13447	2.05	10000	
Cu	63	45	He	16.075	15.165	2.85	122185	0.94	10000	
Zn	66	115	He	36.792	34.709	2.07	40890	0.89	50000	
As	75	115	He	2.317	2.186	5.49	1247	5.12	2000	
Se	78	72	H2	0.130	0.122	2.85	88	5.00	10000	
Se	78	115	He	0.877	0.827	16.41	29	13.21	10000	
Sr	88	115	NoGas	5.488	5.178	2.95	255028	2.14	50000	
Mo	95	115	NoGas	14.109	13.311	1.57	134500	1.52	10000	
Ag	107	115	NoGas	0.059	0.056	18.48	3954	4.30	5000	
Cd	111	115	He	0.035	0.033	35.29	49	30.43	10000	
Sn	118	115	He	0.489	0.462	16.41	1625	9.35	10000	
Sn	118	115	NoGas	0.485	0.457	4.99	10676	3.22	10000	
Sb	121	115	NoGas	0.183	0.173	7.37	5608	2.47	10000	
Ba	137	165	NoGas	16.798	15.847	2.73	117778	0.60	50000	
Tl	205	165	NoGas	0.088	0.083	2.93	4167	2.04	5000	
Pb	208	165	NoGas	5.187	4.893	3.47	339445	2.02	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	121770	5.10	155989	78.06	70	120	
Sc	45	H2	669370	2.93	788522	84.89	70	120	
Sc	45	He	47052	2.03	55083	85.42	70	120	
Sc	45	NoGas	1936824	4.93	2213509	87.50	70	120	
Ge	72	H2	188919	3.03	228382	82.72	70	120	
Ge	72	He	35921	3.76	41564	86.42	70	120	
Ge	72	NoGas	433862	3.29	493680	87.88	70	120	
In	115	H2	2566671	2.59	2933811	87.49	70	120	
In	115	He	305678	1.18	358672	85.22	70	120	
In	115	NoGas	2987974	3.01	3330807	89.71	70	120	
Tb	159	H2	3865240	2.99	4179923	92.47	70	120	
Tb	159	He	1463651	0.20	1624277	90.11	70	120	
Tb	159	NoGas	4459718	3.11	4702844	94.83	70	120	
Ho	165	H2	3730577	2.66	4040454	92.33	70	120	
Ho	165	He	1457423	1.71	1590248	91.65	70	120	
Ho	165	NoGas	4278747	3.37	4499866	95.09	70	120	

Sample Report

Sample Table

Sample Name	AZ79177S01 DF10
Data File Name	040SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:57:39-07:00
Sample Type	Sample
Dilution	1.041666667
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.208	0.217	13.19	973	10.34	10000	
B	11	45	NoGas	-2.341	-2.439	-6.70	120057	1.98	10000	
Na	23	72	He	51.988	54.154	4.31	66446	1.20	1000000	
Mg	24	45	He	1152.321	1200.335	2.29	324647	1.40	1000000	
Al	27	45	He	4872.357	5075.372	1.37	382455	0.44	1000000	
P	31	45	He	302.607	315.216	3.04	1711	2.40	500000	
K	39	45	He	695.023	723.982	3.13	122260	1.85	500000	
Ca	40	45	H2	848.647	884.007	5.28	5170025	1.63	500000	
Ti	47	45	He	430.602	448.543	2.03	34358	1.08	10000	
V	51	45	He	21.533	22.431	1.83	68700	1.08	10000	
Cr	52	45	He	4.455	4.640	3.05	20296	2.03	10000	
Mn	55	45	He	264.858	275.894	1.98	495559	0.97	50000	
Fe	56	45	He	9494.206	9889.798	1.42	33696563	0.57	1000000	
Co	59	45	He	2.225	2.318	1.07	17011	2.14	10000	
Ni	60	45	He	2.912	3.034	2.36	6872	2.62	10000	
Cu	63	45	He	6.052	6.304	5.34	59867	2.27	10000	
Zn	66	115	He	26.820	27.938	4.68	31471	2.86	50000	
As	75	115	He	1.387	1.445	7.62	748	6.89	2000	
Se	78	72	H2	0.073	0.077	12.01	53	6.15	10000	
Se	78	115	He	0.424	0.442	47.13	16	35.15	10000	
Sr	88	115	NoGas	6.428	6.696	0.92	299948	0.81	50000	
Mo	95	115	NoGas	10.538	10.977	1.96	100929	0.25	10000	
Ag	107	115	NoGas	0.048	0.050	9.81	3694	5.01	5000	
Cd	111	115	He	0.104	0.109	5.10	137	3.68	10000	
Sn	118	115	He	0.404	0.421	26.84	1440	14.45	10000	
Sn	118	115	NoGas	0.446	0.464	2.59	10148	0.73	10000	
Sb	121	115	NoGas	0.475	0.494	2.77	11861	0.93	10000	
Ba	137	165	NoGas	21.885	22.797	0.94	153170	1.67	50000	
Tl	205	165	NoGas	0.069	0.072	1.39	3310	1.68	5000	
Pb	208	165	NoGas	5.070	5.281	0.66	332396	1.04	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	124681	4.39	155989	79.93	70	120	
Sc	45	H2	660462	6.57	788522	83.76	70	120	
Sc	45	He	46810	1.07	55083	84.98	70	120	
Sc	45	NoGas	1950826	2.00	2213509	88.13	70	120	
Ge	72	H2	188590	5.46	228382	82.58	70	120	
Ge	72	He	35764	0.99	41564	86.05	70	120	
Ge	72	NoGas	430823	1.89	493680	87.27	70	120	
In	115	H2	2573042	6.38	2933811	87.70	70	120	
In	115	He	304583	1.51	358672	84.92	70	120	
In	115	NoGas	3000598	1.71	3330807	90.09	70	120	
Tb	159	H2	3855243	5.28	4179923	92.23	70	120	
Tb	159	He	1471101	3.45	1624277	90.57	70	120	
Tb	159	NoGas	4434663	2.47	4702844	94.30	70	120	
Ho	165	H2	3715837	4.66	4040454	91.97	70	120	
Ho	165	He	1448118	0.96	1590248	91.06	70	120	
Ho	165	NoGas	4274501	0.89	4499866	94.99	70	120	

Sample Report

Sample Table

Sample Name	AZ79178S01 DF10
Data File Name	041SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T15:01:36-07:00
Sample Type	Sample
Dilution	0.980392157
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	0.223	0.219	24.48	1050	19.89	10000	
B	11	45	NoGas	-2.419	-2.371	-46.41	117502	2.74	10000	
Na	23	72	He	40.448	39.655	0.61	59512	0.26	1000000	
Mg	24	45	He	1091.417	1070.017	1.43	313296	0.99	1000000	
Al	27	45	He	6186.595	6065.289	1.53	494516	0.99	1000000	
P	31	45	He	355.333	348.366	4.52	2035	4.03	500000	
K	39	45	He	529.658	519.273	1.34	97524	1.37	500000	
Ca	40	45	H2	650.797	638.037	2.27	4014863	0.66	500000	
Ti	47	45	He	335.229	328.656	1.94	27255	1.70	10000	
V	51	45	He	22.833	22.385	2.44	74202	1.75	10000	
Cr	52	45	He	3.229	3.165	2.72	15272	2.05	10000	
Mn	55	45	He	167.764	164.474	1.19	319868	0.72	50000	
Fe	56	45	He	10248.705	10047.750	1.69	37057111	0.92	1000000	
Co	59	45	He	1.681	1.648	3.81	13096	3.20	10000	
Ni	60	45	He	2.253	2.209	1.44	5515	0.72	10000	
Cu	63	45	He	12.873	12.621	1.90	103784	0.81	10000	
Zn	66	115	He	29.356	28.780	2.20	34190	1.62	50000	
As	75	115	He	1.644	1.611	2.41	894	2.26	2000	
Se	78	72	H2	0.106	0.104	7.18	73	7.39	10000	
Se	78	115	He	0.916	0.898	26.65	30	23.33	10000	
Sr	88	115	NoGas	4.554	4.464	4.62	212412	0.58	50000	
Mo	95	115	NoGas	21.327	20.909	3.57	203946	1.84	10000	
Ag	107	115	NoGas	0.096	0.094	7.71	4928	1.75	5000	
Cd	111	115	He	0.098	0.096	18.36	129	17.24	10000	
Sn	118	115	He	1.013	0.994	7.32	2739	5.09	10000	
Sn	118	115	NoGas	1.029	1.009	4.59	18649	2.65	10000	
Sb	121	115	NoGas	1.304	1.278	4.62	29553	0.93	10000	
Ba	137	165	NoGas	22.076	21.643	5.40	155879	2.61	50000	
Tl	205	165	NoGas	0.063	0.061	7.18	3054	3.23	5000	
Pb	208	165	NoGas	12.373	12.131	4.19	770090	0.56	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	125910	3.68	155989	80.72	70	120	
Sc	45	H2	665359	2.33	788522	84.38	70	120	
Sc	45	He	47688	0.78	55083	86.58	70	120	
Sc	45	NoGas	1915564	5.77	2213509	86.54	70	120	
Ge	72	H2	188243	1.41	228382	82.42	70	120	
Ge	72	He	36117	0.26	41564	86.89	70	120	
Ge	72	NoGas	431733	4.81	493680	87.45	70	120	
In	115	H2	2572735	3.31	2933811	87.69	70	120	
In	115	He	307781	0.61	358672	85.81	70	120	
In	115	NoGas	3001206	5.02	3330807	90.10	70	120	
Tb	159	H2	3866967	2.24	4179923	92.51	70	120	
Tb	159	He	1463383	1.35	1624277	90.09	70	120	
Tb	159	NoGas	4455106	5.33	4702844	94.73	70	120	
Ho	165	H2	3762673	1.87	4040454	93.13	70	120	
Ho	165	He	1473365	0.59	1590248	92.65	70	120	
Ho	165	NoGas	4318468	4.17	4499866	95.97	70	120	

Sample Report

Sample Table

Sample Name	AZ79179W09 DF10
Data File Name	052SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:08:55-07:00
Sample Type	Sample
Dilution	10
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	-0.001	-0.006	-103.50	17	34.64	10000	
B	11	45	NoGas	6.408	64.079	5.68	247896	0.76	10000	
Na	23	45	He	21.266	212.657	9.56	26838	0.55	1000000	
Mg	24	45	He	1.022	10.221	15.90	190	10.53	1000000	
Al	27	45	He	2.024	20.242	72.42	316	11.78	1000000	
P	31	45	He	2.580	25.803	387.48	40	44.09	500000	
K	39	45	He	-2.109	-21.092	-28.38	3258	1.34	500000	
Ca	40	45	H2	4.090	40.901	11.52	29648	1.63	500000	
Ti	47	45	He	0.192	1.917	88.99	8	89.21	10000	
V	51	45	He	0.014	0.137	76.48	73	36.08	10000	
Cr	52	45	He	0.042	0.423	52.73	644	14.71	10000	
Mn	55	45	He	0.088	0.884	25.01	147	14.19	50000	
Fe	56	45	He	3.716	37.161	2.57	12749	1.90	1000000	
Co	59	45	He	-0.001	-0.005	-171.07	38	18.36	10000	
Ni	60	45	He	0.025	0.248	63.65	153	23.51	10000	
Cu	63	45	He	3.060	30.596	3.43	21632	1.35	10000	
Zn	66	115	He	7.306	73.063	2.65	5787	1.89	50000	
As	75	115	He	-0.008	-0.078	-52.66	2	65.47	2000	
Se	78	72	H2	0.004	0.042	37.15	8	7.51	10000	
Se	78	115	He	-0.096	-0.956	-88.78	1	100.00	10000	
Sr	88	115	NoGas	0.023	0.234	6.76	2784	3.84	50000	
Mo	95	115	NoGas	0.004	0.044	75.16	293	19.98	10000	
Ag	107	115	NoGas	-0.003	-0.028	-13.86	4374	1.06	5000	
Cd	111	115	He	0.003	0.035	70.01	5	43.30	10000	
Sn	118	115	He	0.218	2.177	21.71	340	16.32	10000	
Sn	118	115	NoGas	0.188	1.885	2.19	6056	1.31	10000	
Sb	121	115	NoGas	0.057	0.567	7.19	3050	6.28	10000	
Ba	137	115	NoGas	0.045	0.450	10.08	733	6.73	50000	
Tl	205	165	NoGas	-0.009	-0.088	-11.88	1077	9.12	5000	
Pb	208	165	NoGas	0.274	2.735	5.02	36681	3.85	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	244118	0.42	232772	104.87	70	120	
Sc	45	H2	452784	8.58	497417	91.03	70	120	
Sc	45	He	23060	1.99	26213	87.97	70	120	
Sc	45	NoGas	3168544	0.91	3271044	96.87	70	120	
Ge	72	H2	119657	7.70	130306	91.83	70	120	
Ge	72	He	23246	2.76	25369	91.63	70	120	
Ge	72	NoGas	794432	0.66	804525	98.75	70	120	
In	115	H2	2698839	9.12	2768793	97.47	70	120	
In	115	He	170260	1.86	184583	92.24	70	120	
In	115	NoGas	5390163	1.15	5159681	104.47	70	120	
Tb	159	H2	5071093	8.57	4956789	102.31	70	120	
Tb	159	He	1116497	1.25	1146052	97.42	70	120	
Tb	159	NoGas	7825713	1.08	7155958	109.36	70	120	
Ho	165	H2	4920075	8.55	4765312	103.25	70	120	
Ho	165	He	1134269	1.50	1131090	100.28	70	120	
Ho	165	NoGas	7558939	1.60	6876887	109.92	70	120	

Sample Report

Sample Table

Sample Name	180911A BLK 3010
Data File Name	023SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T11:14:26-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.000	0.000	4540.50	20	50.00	10000	
B	11	45	NoGas	-2.114	-2.114	-30.84	179757	2.02	10000	
Na	23	45	He	25.656	25.656	15.88	26948	2.36	1000000	
Mg	24	45	He	3.036	3.036	7.97	447	9.05	1000000	
Al	27	45	He	6.012	6.012	52.23	400	21.28	1000000	
P	31	45	He	5.642	5.642	55.34	43	13.32	500000	
K	39	45	He	3.540	3.540	60.61	3430	3.90	500000	
Ca	40	45	H2	11.269	11.269	10.25	61715	1.28	500000	
Ti	47	45	He	0.206	0.206	173.21	8	173.21	10000	
V	51	45	He	0.041	0.041	42.39	133	32.50	10000	
Cr	52	45	He	0.396	0.396	3.88	1843	5.61	10000	
Mn	55	45	He	0.069	0.069	30.99	121	13.58	50000	
Fe	56	45	He	5.342	5.342	7.83	16175	3.49	1000000	
Co	59	45	He	0.001	0.001	80.08	48	10.66	10000	
Ni	60	45	He	0.142	0.142	16.16	406	12.37	10000	
Cu	63	45	He	1.181	1.181	3.38	8522	1.03	10000	
Zn	66	115	He	2.937	2.937	3.93	2389	1.65	50000	
As	75	115	He	0.033	0.033	32.36	17	21.21	2000	
Se	78	72	H2	0.025	0.025	36.53	24	22.56	10000	
Se	78	115	He	0.002	0.002	3982.82	2	50.00	10000	
Sr	88	115	NoGas	0.033	0.033	5.00	3250	6.62	50000	
Mo	95	115	NoGas	0.196	0.196	5.90	3290	5.78	10000	
Ag	107	115	NoGas	0.015	0.015	6.20	4727	3.29	5000	
Cd	111	115	He	-0.001	-0.001	-102.35	1	173.21	10000	
Sn	118	115	He	0.397	0.397	6.70	540	4.82	10000	
Sn	118	115	NoGas	0.356	0.356	4.34	9547	6.53	10000	
Sb	121	115	NoGas	0.249	0.249	1.51	9580	4.14	10000	
Ba	137	115	NoGas	0.049	0.049	28.41	710	19.87	50000	
Tl	205	165	NoGas	0.006	0.006	34.66	2107	5.66	5000	
Pb	208	165	NoGas	0.093	0.093	10.75	15877	4.24	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	177892	2.97	232772	76.42	70	120	
Sc	45	H2	435841	7.38	497417	87.62	70	120	
Sc	45	He	21974	3.01	26213	83.83	70	120	
Sc	45	NoGas	2851879	3.50	3271044	87.19	70	120	
Ge	72	H2	114963	8.33	130306	88.23	70	120	
Ge	72	He	22584	1.12	25369	89.02	70	120	
Ge	72	NoGas	773071	2.73	804525	96.09	70	120	
In	115	H2	2571721	6.74	2768793	92.88	70	120	
In	115	He	159433	2.30	184583	86.37	70	120	
In	115	NoGas	4890589	2.75	5159681	94.78	70	120	
Tb	159	H2	4888905	8.46	4956789	98.63	70	120	
Tb	159	He	1062610	1.44	1146052	92.72	70	120	
Tb	159	NoGas	7229159	2.13	7155958	101.02	70	120	
Ho	165	H2	4712728	7.94	4765312	98.90	70	120	
Ho	165	He	1074074	1.99	1131090	94.96	70	120	
Ho	165	NoGas	6976125	2.13	6876887	101.44	70	120	

Sample Report

Sample Table

Sample Name	180911A BLK 3050
Data File Name	032SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T14:26:18-07:00
Sample Type	Sample
Dilution	0.1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	-0.003	0.000	-76.69	10	100.00	10000	
B	11	45	NoGas	-2.751	-0.275	-26.10	115526	2.16	10000	
Na	23	72	He	23.638	2.364	3.38	49410	0.78	1000000	
Mg	24	45	He	8.328	0.833	5.80	2516	7.32	1000000	
Al	27	45	He	4.834	0.483	16.19	1243	4.31	1000000	
P	31	45	He	8.194	0.819	40.00	118	17.06	500000	
K	39	45	He	1.840	0.184	26.03	11192	1.22	500000	
Ca	40	45	H2	31.427	3.143	6.87	253908	1.24	500000	
Ti	47	45	He	0.251	0.025	101.40	30	67.58	10000	
V	51	45	He	0.063	0.006	13.54	379	8.32	10000	
Cr	52	45	He	0.262	0.026	7.86	2195	5.25	10000	
Mn	55	45	He	0.112	0.011	25.60	364	15.09	50000	
Fe	56	45	He	10.278	1.028	2.08	42459	0.61	1000000	
Co	59	45	He	0.013	0.001	22.94	124	17.01	10000	
Ni	60	45	He	0.057	0.006	23.91	572	3.56	10000	
Cu	63	45	He	-3.148	-0.315	-0.58	3309	5.45	10000	
Zn	66	115	He	6.440	0.644	7.14	12884	4.01	50000	
As	75	115	He	0.043	0.004	48.96	35	32.95	2000	
Se	78	72	H2	0.155	0.016	17.54	108	13.67	10000	
Se	78	115	He	0.168	0.017	132.16	9	74.18	10000	
Sr	88	115	NoGas	0.044	0.004	6.16	2717	6.12	50000	
Mo	95	115	NoGas	0.062	0.006	42.01	757	34.32	10000	
Ag	107	115	NoGas	0.002	0.000	269.47	2520	8.14	5000	
Cd	111	115	He	-0.001	0.000	-292.58	4	132.29	10000	
Sn	118	115	He	1.108	0.111	5.00	2990	3.68	10000	
Sn	118	115	NoGas	1.147	0.115	1.59	20585	1.42	10000	
Sb	121	115	NoGas	0.644	0.064	6.04	15651	6.53	10000	
Ba	137	165	NoGas	0.003	0.000	592.34	787	18.08	50000	
Tl	205	165	NoGas	0.023	0.002	8.26	1267	7.59	5000	
Pb	208	165	NoGas	-0.239	-0.024	-6.91	19962	1.50	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	117224	3.39	155989	75.15	70	120	
Sc	45	H2	685175	4.05	788522	86.89	70	120	
Sc	45	He	47786	1.93	55083	86.75	70	120	
Sc	45	NoGas	1899136	3.54	2213509	85.80	70	120	
Ge	72	H2	198368	2.52	228382	86.86	70	120	
Ge	72	He	36840	0.73	41564	88.63	70	120	
Ge	72	NoGas	442131	1.75	493680	89.56	70	120	
In	115	H2	2672046	3.18	2933811	91.08	70	120	
In	115	He	313089	0.75	358672	87.29	70	120	
In	115	NoGas	3030405	2.14	3330807	90.98	70	120	
Tb	159	H2	4005670	4.75	4179923	95.83	70	120	
Tb	159	He	1517502	0.61	1624277	93.43	70	120	
Tb	159	NoGas	4535941	3.10	4702844	96.45	70	120	
Ho	165	H2	3875188	5.05	4040454	95.91	70	120	
Ho	165	He	1499341	1.35	1590248	94.28	70	120	
Ho	165	NoGas	4412748	3.55	4499866	98.06	70	120	

Sample Report

Sample Table

Sample Name	180913A BLK DF10
Data File Name	045SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T12:41:11-07:00
Sample Type	Sample
Dilution	0.1
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.000	0.000	16389.85	23	173.21	10000	
B	11	45	NoGas	10.653	1.065	3.91	280906	1.31	10000	
Na	23	45	He	25.366	2.537	8.19	30169	1.27	1000000	
Mg	24	45	He	0.831	0.083	9.10	176	9.37	1000000	
Al	27	45	He	-0.405	-0.041	-260.26	271	13.98	1000000	
P	31	45	He	-2.950	-0.295	-102.16	32	15.80	500000	
K	39	45	He	-4.419	-0.442	-20.17	3337	3.85	500000	
Ca	40	45	H2	3.822	0.382	14.64	30823	0.59	500000	
Ti	47	45	He	0.306	0.031	28.31	13	25.01	10000	
V	51	45	He	0.012	0.001	36.13	73	12.02	10000	
Cr	52	45	He	0.012	0.001	234.05	568	17.18	10000	
Mn	55	45	He	-0.002	0.000	-1429.59	61	38.70	50000	
Fe	56	45	He	1.048	0.105	16.42	6179	4.75	1000000	
Co	59	45	He	0.001	0.000	528.06	49	47.88	10000	
Ni	60	45	He	0.014	0.001	29.87	137	4.88	10000	
Cu	63	45	He	0.045	0.004	44.14	1357	7.03	10000	
Zn	66	115	He	3.078	0.308	3.86	2794	4.16	50000	
As	75	115	He	0.000	0.000	12400.05	6	90.56	2000	
Se	78	72	H2	0.010	0.001	14.39	14	4.41	10000	
Se	78	115	He	-0.100	-0.010	-80.74	1	100.00	10000	
Sr	88	115	NoGas	0.013	0.001	8.42	1904	5.18	50000	
Mo	95	115	NoGas	0.008	0.001	55.64	360	22.05	10000	
Ag	107	115	NoGas	0.004	0.000	78.52	4758	2.63	5000	
Cd	111	115	He	-0.002	0.000	0.00	0	#DIV/0!	10000	
Sn	118	115	He	0.065	0.006	38.81	146	23.17	10000	
Sn	118	115	NoGas	0.058	0.006	2.38	2624	0.13	10000	
Sb	121	115	NoGas	0.177	0.018	4.04	7805	4.62	10000	
Ba	137	115	NoGas	0.033	0.003	14.40	583	11.02	50000	
Tl	205	165	NoGas	-0.003	0.000	-41.64	1590	6.00	5000	
Pb	208	165	NoGas	-0.013	-0.001	-17.30	5884	4.38	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	238980	1.47	232772	102.67	70	120	
Sc	45	H2	492662	8.70	497417	99.04	70	120	
Sc	45	He	24676	3.39	26213	94.13	70	120	
Sc	45	NoGas	3273827	0.59	3271044	100.09	70	120	
Ge	72	H2	128423	8.68	130306	98.55	70	120	
Ge	72	He	24490	3.30	25369	96.54	70	120	
Ge	72	NoGas	838578	0.94	804525	104.23	70	120	
In	115	H2	2866457	8.13	2768793	103.53	70	120	
In	115	He	179030	1.26	184583	96.99	70	120	
In	115	NoGas	5447661	1.33	5159681	105.58	70	120	
Tb	159	H2	5349971	8.02	4956789	107.93	70	120	
Tb	159	He	1161743	2.14	1146052	101.37	70	120	
Tb	159	NoGas	7926380	1.56	7155958	110.77	70	120	
Ho	165	H2	5179500	8.91	4765312	108.69	70	120	
Ho	165	He	1178839	1.71	1131090	104.22	70	120	
Ho	165	NoGas	7662360	0.54	6876887	111.42	70	120	

Sample Report

Sample Table

Sample Name	180911A LCS 3010 DF5
Data File Name	024SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T11:18:26-07:00
Sample Type	Sample
Dilution	5
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	8.192	40.960	7.65	76253	4.96	10000	
B	11	45	NoGas	34.643	173.216	10.05	422788	1.60	10000	
Na	23	45	He	4365.818	21829.089	5.40	1544262	1.36	1000000	
Mg	24	45	He	4566.881	22834.403	4.69	663287	0.68	1000000	
Al	27	45	He	359.103	1795.515	3.60	10043	1.93	1000000	
P	31	45	He	424.170	2120.852	2.02	830	2.13	500000	
K	39	45	He	905.638	4528.191	4.18	61247	0.56	500000	
Ca	40	45	H2	4136.307	20681.534	9.12	21076563	1.43	500000	
Ti	47	45	He	44.923	224.617	5.19	1935	1.60	10000	
V	51	45	He	48.043	240.214	4.26	122213	0.34	10000	
Cr	52	45	He	47.509	237.543	4.01	182802	0.41	10000	
Mn	55	45	He	46.000	229.999	6.16	48416	2.17	50000	
Fe	56	45	He	187.136	935.681	3.92	517006	0.28	1000000	
Co	59	45	He	47.763	238.814	4.19	378047	0.81	10000	
Ni	60	45	He	46.434	232.168	3.41	113766	0.74	10000	
Cu	63	45	He	50.438	252.190	4.05	359288	0.25	10000	
Zn	66	115	He	96.280	481.401	3.93	71867	1.53	50000	
As	75	115	He	47.720	238.601	2.66	18500	0.48	2000	
Se	78	72	H2	42.812	214.059	10.84	36293	2.21	10000	
Se	78	115	He	47.805	239.025	3.63	564	4.10	10000	
Sr	88	115	NoGas	46.610	233.050	5.35	3973728	2.87	50000	
Mo	95	115	NoGas	46.553	232.765	5.55	815346	2.93	10000	
Ag	107	115	NoGas	18.373	91.864	6.24	859819	3.64	5000	
Cd	111	115	He	9.505	47.526	2.75	9477	0.11	10000	
Sn	118	115	He	47.523	237.616	2.84	62960	0.10	10000	
Sn	118	115	NoGas	46.615	233.074	5.94	1248933	3.36	10000	
Sb	121	115	NoGas	49.150	245.751	5.25	1928217	2.64	10000	
Ba	137	115	NoGas	47.472	237.362	5.28	603422	2.66	50000	
Tl	205	165	NoGas	45.441	227.204	5.18	3744502	2.41	5000	
Pb	208	165	NoGas	45.253	226.264	5.80	4956857	2.84	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	199978	3.76	232772	85.91	70	120	
Sc	45	H2	480660	8.02	497417	96.63	70	120	
Sc	45	He	24270	4.02	26213	92.59	70	120	
Sc	45	NoGas	3292407	3.23	3271044	100.65	70	120	
Ge	72	H2	123351	8.60	130306	94.66	70	120	
Ge	72	He	23956	3.64	25369	94.43	70	120	
Ge	72	NoGas	832203	1.99	804525	103.44	70	120	
In	115	H2	2779185	10.29	2768793	100.38	70	120	
In	115	He	170833	2.73	184583	92.55	70	120	
In	115	NoGas	5430331	2.66	5159681	105.25	70	120	
Tb	159	H2	5280043	8.80	4956789	106.52	70	120	
Tb	159	He	1104027	2.58	1146052	96.33	70	120	
Tb	159	NoGas	8000295	3.26	7155958	111.80	70	120	
Ho	165	H2	5153818	8.56	4765312	108.15	70	120	
Ho	165	He	1115609	2.53	1131090	98.63	70	120	
Ho	165	NoGas	7670810	3.01	6876887	111.54	70	120	

Sample Report

Sample Table

Sample Name	180911A LCS 3050 DF5
Data File Name	033SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date.Time	2018-09-13T14:30:15-07:00
Sample Type	Sample
Dilution	0.5
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc.	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	9.862	4.931	3.83	45206	2.13	10000	
B	11	45	NoGas	41.196	20.598	5.79	266174	1.55	10000	
Na	23	72	He	4276.383	2138.192	1.03	3025790	0.12	1000000	
Mg	24	45	He	4680.371	2340.186	2.86	1403472	1.48	1000000	
Al	27	45	He	358.335	179.168	2.73	30773	1.41	1000000	
P	31	45	He	369.231	184.616	6.90	2206	5.55	500000	
K	39	45	He	925.283	462.641	1.49	169555	0.07	500000	
Ca	40	45	H2	4593.441	2296.720	4.07	30089028	0.26	500000	
Ti	47	45	He	47.239	23.620	3.46	4022	2.02	10000	
V	51	45	He	47.621	23.811	1.54	161551	0.62	10000	
Cr	52	45	He	47.404	23.702	0.87	219549	0.72	10000	
Mn	55	45	He	47.057	23.528	1.79	93874	0.53	50000	
Fe	56	45	He	190.007	95.004	1.27	723380	0.34	1000000	
Co	59	45	He	47.603	23.801	1.23	386975	0.64	10000	
Ni	60	45	He	45.674	22.837	1.63	107951	0.23	10000	
Cu	63	45	He	46.410	23.205	0.54	328336	1.52	10000	
Zn	66	115	He	89.727	44.864	0.64	95822	0.33	50000	
As	75	115	He	46.439	23.219	0.35	26299	0.92	2000	
Se	78	72	H2	45.850	22.925	2.68	30377	0.55	10000	
Se	78	115	He	43.366	21.683	3.77	1316	2.84	10000	
Sr	88	115	NoGas	47.575	23.787	3.09	2268748	1.31	50000	
Mo	95	115	NoGas	46.706	23.353	2.55	457581	1.70	10000	
Ag	107	115	NoGas	18.255	9.127	1.39	491744	0.88	5000	
Cd	111	115	He	9.333	4.666	0.94	12482	0.36	10000	
Sn	118	115	He	47.335	23.667	0.76	105669	1.27	10000	
Sn	118	115	NoGas	47.607	23.803	2.68	715242	1.21	10000	
Sb	121	115	NoGas	48.832	24.416	2.41	1070311	0.93	10000	
Ba	137	165	NoGas	48.450	24.225	2.08	343685	1.66	50000	
Tl	205	165	NoGas	47.296	23.648	2.52	2172916	1.13	5000	
Pb	208	165	NoGas	47.583	23.791	1.31	2885582	0.91	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	124970	2.02	155989	80.11	70	120	
Sc	45	H2	715487	3.81	788522	90.74	70	120	
Sc	45	He	49842	1.45	55083	90.48	70	120	
Sc	45	NoGas	1978153	1.98	2213509	89.37	70	120	
Ge	72	H2	202846	2.96	228382	88.82	70	120	
Ge	72	He	38362	0.93	41564	92.30	70	120	
Ge	72	NoGas	449198	1.32	493680	90.99	70	120	
In	115	H2	2644908	3.27	2933811	90.15	70	120	
In	115	He	324442	0.93	358672	90.46	70	120	
In	115	NoGas	3073050	1.83	3330807	92.26	70	120	
Tb	159	H2	3990776	4.04	4179923	95.47	70	120	
Tb	159	He	1525506	1.52	1624277	93.92	70	120	
Tb	159	NoGas	4507372	1.06	4702844	95.84	70	120	
Ho	165	H2	3867540	4.05	4040454	95.72	70	120	
Ho	165	He	1498762	2.20	1590248	94.25	70	120	
Ho	165	NoGas	4344846	2.05	4499866	96.56	70	120	

Sample Report

Sample Table

Sample Name	180913A LCS DF10
Data File Name	046SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T12:45:10-07:00
Sample Type	Sample
Dilution	0.1
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	4.235	0.424	2.95	38865	3.51	10000	
B	11	45	NoGas	31.331	3.133	3.78	397314	0.78	10000	
Na	23	45	He	2152.039	215.204	5.71	768107	0.48	1000000	
Mg	24	45	He	2162.086	216.209	4.88	312591	1.08	1000000	
Al	27	45	He	171.772	17.177	4.77	4925	3.10	1000000	
P	31	45	He	173.617	17.362	15.96	360	14.55	500000	
K	39	45	He	415.814	41.581	6.69	29890	0.43	500000	
Ca	40	45	H2	2022.345	202.234	10.79	10023162	1.96	500000	
Ti	47	45	He	20.966	2.097	5.15	899	3.02	10000	
V	51	45	He	21.893	2.189	6.44	55419	0.76	10000	
Cr	52	45	He	21.807	2.181	6.39	83737	1.00	10000	
Mn	55	45	He	21.397	2.140	6.22	22449	2.11	50000	
Fe	56	45	He	88.193	8.819	5.15	244143	1.01	1000000	
Co	59	45	He	21.781	2.178	4.65	171615	1.54	10000	
Ni	60	45	He	21.347	2.135	6.84	52058	1.42	10000	
Cu	63	45	He	22.103	2.210	6.28	157181	0.60	10000	
Zn	66	115	He	42.301	4.230	3.04	32569	2.18	50000	
As	75	115	He	21.041	2.104	0.86	8361	1.70	2000	
Se	78	72	H2	19.819	1.982	11.28	17023	1.44	10000	
Se	78	115	He	19.912	1.991	8.29	242	9.92	10000	
Sr	88	115	NoGas	22.265	2.226	2.54	1881550	2.23	50000	
Mo	95	115	NoGas	21.632	2.163	1.61	375611	1.20	10000	
Ag	107	115	NoGas	8.781	0.878	3.19	409648	2.84	5000	
Cd	111	115	He	4.269	0.427	3.07	4362	2.68	10000	
Sn	118	115	He	21.884	2.188	2.65	29733	2.17	10000	
Sn	118	115	NoGas	22.040	2.204	2.29	585849	2.05	10000	
Sb	121	115	NoGas	22.656	2.266	2.71	881288	2.31	10000	
Ba	137	115	NoGas	22.815	2.282	2.96	287486	2.65	50000	
Tl	205	165	NoGas	22.670	2.267	1.78	1854065	1.57	5000	
Pb	208	165	NoGas	21.537	2.154	1.57	2344451	1.40	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	234871	1.06	232772	100.90	70	120	
Sc	45	H2	468118	9.33	497417	94.11	70	120	
Sc	45	He	24170	5.47	26213	92.21	70	120	
Sc	45	NoGas	3240119	1.70	3271044	99.05	70	120	
Ge	72	H2	125110	9.86	130306	96.01	70	120	
Ge	72	He	24421	2.79	25369	96.26	70	120	
Ge	72	NoGas	832822	1.28	804525	103.52	70	120	
In	115	H2	2736296	10.01	2768793	98.83	70	120	
In	115	He	174980	2.48	184583	94.80	70	120	
In	115	NoGas	5376912	0.46	5159681	104.21	70	120	
Tb	159	H2	5214514	9.41	4956789	105.20	70	120	
Tb	159	He	1133531	3.54	1146052	98.91	70	120	
Tb	159	NoGas	7888851	1.07	7155958	110.24	70	120	
Ho	165	H2	5023601	9.54	4765312	105.42	70	120	
Ho	165	He	1154523	2.54	1131090	102.07	70	120	
Ho	165	NoGas	7602810	1.66	6876887	110.56	70	120	

Sample Report

Sample Table

Sample Name	AZ79149S01 MS DF100
Data File Name	060SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:41:17-07:00
Sample Type	Sample
Dilution	1.006036217
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	57.428	57.774	0.79	548925	1.39	10000	
B	11	45	NoGas	59.316	59.674	0.51	582524	1.58	10000	
Na	23	45	He	1633.263	1643.122	0.91	597702	1.69	1000000	
Mg	24	45	He	2840.389	2857.534	1.12	417360	1.89	1000000	
Al	27	45	He	8206.975	8256.514	1.66	225972	2.14	1000000	
P	31	45	He	707.878	712.151	6.51	1375	5.46	500000	
K	39	45	He	2114.160	2126.922	1.56	139808	2.09	500000	
Ca	40	45	H2	2477.578	2492.533	13.31	12742113	2.46	500000	
Ti	47	45	He	421.472	424.017	1.84	18361	1.65	10000	
V	51	45	He	81.264	81.755	0.36	209076	1.45	10000	
Cr	52	45	He	66.143	66.542	1.19	257214	1.83	10000	
Mn	55	45	He	188.357	189.494	1.54	200440	2.06	50000	
Fe	56	45	He	12569.723	12645.597	1.02	34910480	2.03	1000000	
Co	59	45	He	65.169	65.562	0.88	521708	1.28	10000	
Ni	60	45	He	65.945	66.343	0.99	163349	1.55	10000	
Cu	63	45	He	86.968	87.493	0.98	625871	1.86	10000	
Zn	66	115	He	96.171	96.751	5.02	72277	3.21	50000	
As	75	115	He	64.417	64.806	4.63	25139	2.89	2000	
Se	78	72	H2	57.131	57.476	13.12	48509	3.09	10000	
Se	78	115	He	60.822	61.189	4.18	722	5.32	10000	
Sr	88	115	NoGas	68.762	69.177	0.75	5872704	1.10	50000	
Mo	95	115	NoGas	73.295	73.738	0.15	1286047	0.90	10000	
Ag	107	115	NoGas	31.149	31.337	1.27	1457609	2.10	5000	
Cd	111	115	He	63.978	64.365	4.14	64206	2.36	10000	
Sn	118	115	He	38.376	38.607	4.74	51190	2.70	10000	
Sn	118	115	NoGas	38.217	38.448	0.44	1026155	1.20	10000	
Sb	121	115	NoGas	37.773	38.001	1.93	1484970	2.71	10000	
Ba	137	115	NoGas	29.711	29.890	0.43	378426	1.25	50000	
Tl	205	165	NoGas	62.131	62.506	1.60	5150846	2.19	5000	
Pb	208	165	NoGas	80.975	81.464	0.62	8919694	0.92	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	235798	0.79	232772	101.30	70	120	
Sc	45	H2	487218	10.60	497417	97.95	70	120	
Sc	45	He	24522	1.30	26213	93.55	70	120	
Sc	45	NoGas	3376764	1.27	3271044	103.23	70	120	
Ge	72	H2	123860	9.89	130306	95.05	70	120	
Ge	72	He	23988	2.98	25369	94.56	70	120	
Ge	72	NoGas	819286	0.96	804525	101.83	70	120	
In	115	H2	2739978	10.98	2768793	98.96	70	120	
In	115	He	172003	2.40	184583	93.18	70	120	
In	115	NoGas	5435322	0.84	5159681	105.34	70	120	
Tb	159	H2	5147556	10.07	4956789	103.85	70	120	
Tb	159	He	1135627	1.39	1146052	99.09	70	120	
Tb	159	NoGas	7890708	0.82	7155958	110.27	70	120	
Ho	165	H2	5007440	10.86	4765312	105.08	70	120	
Ho	165	He	1148210	2.12	1131090	101.51	70	120	
Ho	165	NoGas	7710103	0.88	6876887	112.12	70	120	

Sample Report

Sample Table

Sample Name	AZ79149S01 MSD DF100
Data File Name	061SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T13:45:14-07:00
Sample Type	Sample
Dilution	1.006036217
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	56.739	57.081	0.79	541636	1.83	10000	
B	11	45	NoGas	59.050	59.407	2.07	580084	0.95	10000	
Na	23	45	He	1629.046	1638.879	4.84	600429	0.49	1000000	
Mg	24	45	He	2806.271	2823.210	5.01	415213	0.18	1000000	
Al	27	45	He	8006.497	8054.826	4.92	222002	0.31	1000000	
P	31	45	He	717.090	721.418	11.99	1401	9.64	500000	
K	39	45	He	2135.473	2148.363	4.85	142177	0.48	500000	
Ca	40	45	H2	2606.022	2621.752	11.37	13387477	3.09	500000	
Ti	47	45	He	419.083	421.613	5.90	18384	2.47	10000	
V	51	45	He	81.503	81.994	5.00	211150	0.15	10000	
Cr	52	45	He	66.003	66.401	4.94	258463	0.14	10000	
Mn	55	45	He	187.329	188.459	4.88	200743	0.17	50000	
Fe	56	45	He	12743.406	12820.328	5.09	35636805	0.06	1000000	
Co	59	45	He	64.693	65.084	5.13	521503	0.08	10000	
Ni	60	45	He	65.821	66.218	4.18	164225	0.88	10000	
Cu	63	45	He	87.214	87.741	5.41	631917	0.35	10000	
Zn	66	115	He	95.152	95.726	3.69	73981	1.17	50000	
As	75	115	He	62.202	62.577	2.22	25117	0.55	2000	
Se	78	72	H2	59.562	59.921	11.89	51041	3.19	10000	
Se	78	115	He	58.841	59.196	5.25	722	5.31	10000	
Sr	88	115	NoGas	67.323	67.729	1.40	5815435	1.86	50000	
Mo	95	115	NoGas	72.908	73.348	1.11	1293848	1.75	10000	
Ag	107	115	NoGas	31.692	31.883	1.04	1499825	2.04	5000	
Cd	111	115	He	61.814	62.187	3.43	64170	0.87	10000	
Sn	118	115	He	41.757	42.009	2.98	57624	0.29	10000	
Sn	118	115	NoGas	41.817	42.069	1.60	1135415	1.28	10000	
Sb	121	115	NoGas	38.261	38.492	0.42	1521344	2.39	10000	
Ba	137	115	NoGas	29.669	29.848	1.15	382199	1.88	50000	
Tl	205	165	NoGas	62.697	63.076	1.25	5153971	1.03	5000	
Pb	208	165	NoGas	82.088	82.584	0.95	8966963	1.43	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	237887	1.14	232772	102.20	70	120	
Sc	45	H2	485144	8.27	497417	97.53	70	120	
Sc	45	He	24733	4.91	26213	94.35	70	120	
Sc	45	NoGas	3372420	1.86	3271044	103.10	70	120	
Ge	72	H2	124778	8.69	130306	95.76	70	120	
Ge	72	He	24590	1.98	25369	96.93	70	120	
Ge	72	NoGas	829338	1.58	804525	103.08	70	120	
In	115	H2	2710852	8.49	2768793	97.91	70	120	
In	115	He	177930	2.73	184583	96.40	70	120	
In	115	NoGas	5498492	2.81	5159681	106.57	70	120	
Tb	159	H2	5098841	8.75	4956789	102.87	70	120	
Tb	159	He	1172133	2.71	1146052	102.28	70	120	
Tb	159	NoGas	7991768	1.63	7155958	111.68	70	120	
Ho	165	H2	4963849	8.94	4765312	104.17	70	120	
Ho	165	He	1176918	3.14	1131090	104.05	70	120	
Ho	165	NoGas	7646934	2.26	6876887	111.20	70	120	

Sample Report

Sample Table

Sample Name	AZ79166S01 MS DF10
Data File Name	042SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T15:05:33-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	10.142	10.142	2.79	45912	3.07	10000	
B	11	45	NoGas	39.840	39.840	4.68	261033	3.13	10000	
Na	23	72	He	4343.316	4343.316	2.12	2914272	3.05	1000000	
Mg	24	45	He	6096.338	6096.338	2.34	1767801	1.18	1000000	
Al	27	45	He	8827.644	8827.644	3.00	712656	2.03	1000000	
P	31	45	He	1490.882	1490.882	3.26	8394	2.73	500000	
K	39	45	He	1520.260	1520.260	1.45	262331	0.87	500000	
Ca	40	45	H2	6422.898	6422.898	5.91	39146714	2.38	500000	
Ti	47	45	He	627.911	627.911	0.93	51586	1.25	10000	
V	51	45	He	70.890	70.890	0.41	232495	1.41	10000	
Cr	52	45	He	56.411	56.411	0.44	252455	1.45	10000	
Mn	55	45	He	148.923	148.923	0.78	286984	0.86	50000	
Fe	56	45	He	13120.508	13120.508	0.44	47947277	1.07	1000000	
Co	59	45	He	48.332	48.332	0.76	379939	0.44	10000	
Ni	60	45	He	50.930	50.930	0.84	116358	0.65	10000	
Cu	63	45	He	956.923	956.923	1.43	6088737	0.73	10000	
Zn	66	115	He	124.601	124.601	2.48	124654	1.43	50000	
As	75	115	He	47.828	47.828	2.11	25900	1.11	2000	
Se	78	72	H2	48.789	48.789	2.75	30260	1.81	10000	
Se	78	115	He	47.865	47.865	1.41	1389	0.87	10000	
Sr	88	115	NoGas	59.004	59.004	1.45	2746433	1.28	50000	
Mo	95	115	NoGas	70.047	70.047	1.22	669683	0.66	10000	
Ag	107	115	NoGas	18.177	18.177	1.16	477855	0.62	5000	
Cd	111	115	He	9.616	9.616	1.08	12300	0.44	10000	
Sn	118	115	He	52.528	52.528	0.99	112072	0.04	10000	
Sn	118	115	NoGas	52.217	52.217	2.07	765371	2.09	10000	
Sb	121	115	NoGas	40.180	40.180	1.72	859869	1.53	10000	
Ba	137	165	NoGas	92.684	92.684	3.94	648712	0.53	50000	
Tl	205	165	NoGas	46.849	46.849	2.78	2126800	1.10	5000	
Pb	208	165	NoGas	77.057	77.057	3.75	4594997	0.57	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	123356	0.82	155989	79.08	70	120	
Sc	45	H2	666660	5.16	788522	84.55	70	120	
Sc	45	He	48195	1.18	55083	87.50	70	120	
Sc	45	NoGas	1972460	1.32	2213509	89.11	70	120	
Ge	72	H2	189888	3.25	228382	83.14	70	120	
Ge	72	He	36379	1.22	41564	87.52	70	120	
Ge	72	NoGas	442962	1.37	493680	89.73	70	120	
In	115	H2	2522282	4.30	2933811	85.97	70	120	
In	115	He	310288	1.01	358672	86.51	70	120	
In	115	NoGas	2998730	1.19	3330807	90.03	70	120	
Tb	159	H2	3851290	3.96	4179923	92.14	70	120	
Tb	159	He	1485342	2.22	1624277	91.45	70	120	
Tb	159	NoGas	4434257	2.86	4702844	94.29	70	120	
Ho	165	H2	3691818	4.17	4040454	91.37	70	120	
Ho	165	He	1490550	1.19	1590248	93.73	70	120	
Ho	165	NoGas	4295010	3.89	4499866	95.45	70	120	

Sample Report

Sample Table

Sample Name	AZ79166S01 MS DF100
Data File Name	113SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:33:42-07:00
Sample Type	Sample
Dilution	10
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	1.005	10.049	5.48	8549	9.10	10000	
B	11	45	NoGas	8.566	85.663	7.30	245690	2.68	10000	
Na	23	45	He	444.752	4447.523	3.99	160815	0.57	1000000	
Mg	24	45	He	552.436	5524.361	4.11	73338	1.44	1000000	
Al	27	45	He	841.033	8410.335	3.97	21139	1.17	1000000	
P	31	45	He	128.502	1285.019	3.56	253	2.28	500000	
K	39	45	He	132.884	1328.842	4.40	10986	1.96	500000	
Ca	40	45	H2	606.865	6068.648	12.48	2622312	2.65	500000	
Ti	47	45	He	56.929	569.291	9.07	2238	6.59	10000	
V	51	45	He	6.387	63.872	2.25	14884	3.09	10000	
Cr	52	45	He	5.080	50.795	3.29	18274	0.39	10000	
Mn	55	45	He	13.912	139.115	2.30	13425	1.20	50000	
Fe	56	45	He	1243.828	12438.284	3.92	3122062	0.96	1000000	
Co	59	45	He	4.388	43.881	5.06	31754	2.13	10000	
Ni	60	45	He	4.745	47.450	2.16	10704	2.07	10000	
Cu	63	45	He	86.640	866.397	3.88	563050	1.03	10000	
Zn	66	115	He	11.209	112.092	2.48	8449	1.10	50000	
As	75	115	He	4.154	41.542	1.36	1569	2.59	2000	
Se	78	72	H2	4.379	43.792	13.61	3331	3.65	10000	
Se	78	115	He	3.821	38.214	6.49	46	7.69	10000	
Sr	88	115	NoGas	5.332	53.324	2.42	421058	1.36	50000	
Mo	95	115	NoGas	6.391	63.912	2.86	103682	1.19	10000	
Ag	107	115	NoGas	1.720	17.203	2.12	78272	1.99	5000	
Cd	111	115	He	0.874	8.735	9.67	847	8.55	10000	
Sn	118	115	He	4.563	45.631	1.14	5917	0.79	10000	
Sn	118	115	NoGas	4.832	48.324	2.21	120615	1.47	10000	
Sb	121	115	NoGas	3.615	36.155	3.20	131862	0.61	10000	
Ba	137	115	NoGas	8.702	87.015	2.92	102393	0.76	50000	
Tl	205	165	NoGas	4.099	40.989	3.01	318186	1.51	5000	
Pb	208	165	NoGas	6.940	69.396	2.68	718515	1.55	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	267131	2.94	232772	114.76	70	120	
Sc	45	H2	407721	9.66	497417	81.97	70	120	
Sc	45	He	22161	2.94	26213	84.54	70	120	
Sc	45	NoGas	2994217	4.01	3271044	91.54	70	120	
Ge	72	H2	110896	10.37	130306	85.10	70	120	
Ge	72	He	22087	1.36	25369	87.06	70	120	
Ge	72	NoGas	742232	3.69	804525	92.26	70	120	
In	115	H2	2422485	10.17	2768793	87.49	70	120	
In	115	He	165802	1.62	184583	89.83	70	120	
In	115	NoGas	5019805	3.62	5159681	97.29	70	120	
Tb	159	H2	4584594	10.19	4956789	92.49	70	120	
Tb	159	He	1114193	1.57	1146052	97.22	70	120	
Tb	159	NoGas	7349771	3.96	7155958	102.71	70	120	
Ho	165	H2	4411541	10.57	4765312	92.58	70	120	
Ho	165	He	1128375	1.43	1131090	99.76	70	120	
Ho	165	NoGas	7189418	4.10	6876887	104.54	70	120	

Sample Report

Sample Table

Sample Name	AZ79166S01 MSD DF10
Data File Name	043SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180913B.b
Acq Date Time	2018-09-13T15:09:25-07:00
Sample Type	Sample
Dilution	1
Comment	Megatron EJ
ISTD Ref FileName	004CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	6	NoGas	9.919	9.919	2.38	45247	2.13	10000	
B	11	45	NoGas	38.725	38.725	6.91	261621	2.23	10000	
Na	23	72	He	4230.612	4230.612	2.10	2855320	1.32	1000000	
Mg	24	45	He	5896.257	5896.257	1.74	1723208	2.06	1000000	
Al	27	45	He	8042.590	8042.590	1.45	654496	2.14	1000000	
P	31	45	He	1444.078	1444.078	2.75	8199	4.01	500000	
K	39	45	He	1487.405	1487.405	1.22	258910	2.21	500000	
Ca	40	45	H2	6033.279	6033.279	1.85	38886884	0.55	500000	
Ti	47	45	He	566.745	566.745	3.46	46910	2.65	10000	
V	51	45	He	68.747	68.747	2.54	227154	1.45	10000	
Cr	52	45	He	54.564	54.564	3.78	246012	2.40	10000	
Mn	55	45	He	149.658	149.658	3.62	290546	2.57	50000	
Fe	56	45	He	11345.380	11345.380	3.43	41768101	2.21	1000000	
Co	59	45	He	48.525	48.525	2.75	384333	1.74	10000	
Ni	60	45	He	49.780	49.780	2.60	114596	1.29	10000	
Cu	63	45	He	588.003	588.003	3.60	3778359	2.34	10000	
Zn	66	115	He	124.439	124.439	1.69	124761	1.11	50000	
As	75	115	He	47.252	47.252	1.22	25642	0.16	2000	
Se	78	72	H2	45.779	45.779	1.85	29763	0.35	10000	
Se	78	115	He	43.193	43.193	3.13	1257	3.03	10000	
Sr	88	115	NoGas	59.303	59.303	0.71	2762556	2.27	50000	
Mo	95	115	NoGas	64.518	64.518	1.18	617323	2.24	10000	
Ag	107	115	NoGas	18.013	18.013	3.61	473750	1.94	5000	
Cd	111	115	He	9.547	9.547	1.36	12236	0.31	10000	
Sn	118	115	He	55.275	55.275	0.57	118143	0.65	10000	
Sn	118	115	NoGas	55.259	55.259	1.39	810309	1.83	10000	
Sb	121	115	NoGas	39.890	39.890	2.58	854108	1.48	10000	
Ba	137	165	NoGas	90.960	90.960	2.98	640369	2.00	50000	
Tl	205	165	NoGas	46.533	46.533	1.33	2124916	2.80	5000	
Pb	208	165	NoGas	72.245	72.245	2.83	4335121	2.01	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	124343	3.20	155989	79.71	70	120	
Sc	45	H2	703811	2.21	788522	89.26	70	120	
Sc	45	He	48567	1.65	55083	88.17	70	120	
Sc	45	NoGas	2008085	5.75	2213509	90.72	70	120	
Ge	72	H2	198994	1.99	228382	87.13	70	120	
Ge	72	He	36593	1.82	41564	88.04	70	120	
Ge	72	NoGas	446568	2.74	493680	90.46	70	120	
In	115	H2	2658105	2.97	2933811	90.60	70	120	
In	115	He	310916	1.07	358672	86.69	70	120	
In	115	NoGas	3001390	2.99	3330807	90.11	70	120	
Tb	159	H2	4033823	1.14	4179923	96.50	70	120	
Tb	159	He	1509008	1.28	1624277	92.90	70	120	
Tb	159	NoGas	4501654	3.54	4702844	95.72	70	120	
Ho	165	H2	3908317	2.79	4040454	96.73	70	120	
Ho	165	He	1491725	0.90	1590248	93.80	70	120	
Ho	165	NoGas	4317880	3.27	4499866	95.96	70	120	

Sample Report

Sample Table

Sample Name	AZ79166S01 MSD DF100
Data File Name	114SMPL.d
Data Path Name	C:\Agilent\ICPMH\1\DATA\180914A.b
Acq Date Time	2018-09-14T17:37:41-07:00
Sample Type	Sample
Dilution	10
Comment	Megatron EJ
ISTD Ref FileName	008CALB.d
Sample QC Pass/Fail	Pass
ISTD Pass/Fail	Pass

QC Analyte Table

Name	Mass	ISTD Mass	Tune Mode	Conc	FinalConc	Conc %RSD	CPS	%RSD	LDR	QC Flag
Be	9	45	NoGas	0.910	9.102	3.29	7999	5.26	10000	
B	11	45	NoGas	7.470	74.703	8.00	247949	1.00	10000	
Na	23	45	He	446.293	4462.931	3.21	159859	0.52	1000000	
Mg	24	45	He	551.215	5512.146	4.02	72507	0.65	1000000	
Al	27	45	He	786.313	7863.130	2.90	19606	2.00	1000000	
P	31	45	He	156.637	1566.369	10.89	299	10.94	500000	
K	39	45	He	131.020	1310.204	6.37	10774	1.78	500000	
Ca	40	45	H2	579.184	5791.840	11.47	2590599	3.16	500000	
Ti	47	45	He	52.731	527.307	6.80	2059	8.98	10000	
V	51	45	He	6.021	60.209	4.51	13894	1.26	10000	
Cr	52	45	He	4.812	48.119	2.88	17179	0.70	10000	
Mn	55	45	He	13.700	136.997	5.50	13093	2.60	50000	
Fe	56	45	He	1074.220	10742.200	4.05	2672123	1.19	1000000	
Co	59	45	He	4.458	44.582	3.96	31974	1.11	10000	
Ni	60	45	He	4.756	47.557	3.26	10630	2.99	10000	
Cu	63	45	He	52.798	527.977	3.94	340340	0.64	10000	
Zn	66	115	He	12.120	121.201	7.16	8972	4.17	50000	
As	75	115	He	4.103	41.034	2.98	1529	6.00	2000	
Se	78	72	H2	4.142	41.416	11.47	3241	3.35	10000	
Se	78	115	He	4.541	45.412	25.78	53	24.09	10000	
Sr	88	115	NoGas	5.128	51.282	0.85	413253	1.58	50000	
Mo	95	115	NoGas	5.639	56.387	0.15	93385	1.71	10000	
Ag	107	115	NoGas	1.669	16.688	1.06	77596	0.93	5000	
Cd	111	115	He	0.837	8.373	4.99	801	3.50	10000	
Sn	118	115	He	4.932	49.325	5.92	6298	2.83	10000	
Sn	118	115	NoGas	4.906	49.057	1.63	124939	2.43	10000	
Sb	121	115	NoGas	3.547	35.474	0.34	132076	1.98	10000	
Ba	137	115	NoGas	8.327	83.273	0.82	100021	2.05	50000	
Tl	205	165	NoGas	3.951	39.509	1.23	313040	1.00	5000	
Pb	208	165	NoGas	6.422	64.224	1.62	679011	0.88	50000	

QC ISTD Table

Name	Mass	Tune Mode	CPS	%RSD	Ref CPS	%Rec	%QC Low	%QC High	QC Flag
Li	6	NoGas	270315	0.81	232772	116.13	70	120	
Sc	45	H2	421267	8.37	497417	84.69	70	120	
Sc	45	He	21961	3.30	26213	83.78	70	120	
Sc	45	NoGas	3094858	2.25	3271044	94.61	70	120	
Ge	72	H2	113700	7.95	130306	87.26	70	120	
Ge	72	He	21626	4.24	25369	85.25	70	120	
Ge	72	NoGas	757081	1.73	804525	94.10	70	120	
In	115	H2	2509908	7.08	2768793	90.65	70	120	
In	115	He	163552	3.08	184583	88.61	70	120	
In	115	NoGas	5119902	1.77	5159681	99.23	70	120	
Tb	159	H2	4672338	7.27	4956789	94.26	70	120	
Tb	159	He	1093362	3.49	1146052	95.40	70	120	
Tb	159	NoGas	7550772	1.22	7155958	105.52	70	120	
Ho	165	H2	4544136	6.66	4765312	95.36	70	120	
Ho	165	He	1103151	4.29	1131090	97.53	70	120	
Ho	165	NoGas	7331183	1.22	6876887	106.61	70	120	

Replicate Data: LLQC 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1946	0.1946	0.0021	0.0093	0.0022	11:53:04 AM	No
2	0.1955	0.1955	0.0021	0.0095	0.0022	11:53:27 AM	No
3	0.2021	0.2021	0.0022	0.0097	0.0023	11:53:50 AM	No
Mean:	0.1974	0.1974	0.0021				
SD:	0.00407	0.00407	0.0000				
%RSD:	2.06%	2.06%	2.06				

QC value within limits for Hg 253.7 Recovery = 94.89%
All analyte(s) passed QC.

Sequence No.: 11 Autosampler Location: 98
Sample ID: 180911A BLK Date Collected: 09/14/18 11:54:04 AM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:26 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.6 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: 180911A BLK Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0019	-0.0121	-0.0001	-0.0003	0.0000	11:54:44 AM	No
2	-0.0020	-0.0124	-0.0001	-0.0003	0.0000	11:55:07 AM	No
3	-0.0021	-0.0134	-0.0001	-0.0007	-0.0000	11:55:30 AM	No
Mean:	-0.0020	-0.0126	-0.0001				
SD:	0.00011	0.00070	0.0000				
%RSD:	5.52%	5.52%	5.52				

Sequence No.: 12 Autosampler Location: 99
Sample ID: 180911A LCS Date Collected: 09/14/18 11:55:45 AM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:26 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.6 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: 180911A LCS Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.7431	4.645	0.0497	0.2183	0.0498	11:56:25 AM	No
2	0.7384	4.615	0.0493	0.2146	0.0495	11:56:48 AM	No
3	0.7441	4.651	0.0497	0.2173	0.0499	11:57:12 AM	No

Matrix Recovery Check: 180911A LCS

Analyte	Expected Conc.	Measured Conc.	Std. Dev.	Units	Recovery (%)
Hg 253.7	0.6650	0.7419	0.003	mg/kg	111.5

Mean:	0.7419	4.637	0.0496
SD:	0.00305	0.0191	0.0002
%RSD:	0.41%	0.41%	0.41

Sequence No.: 13 Autosampler Location: 100
Sample ID: AZ79161S01 Date Collected: 09/14/18 11:57:27 AM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:26 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.58 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: AZ79161S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0993	0.5997	0.0064	0.0286	0.0066	11:58:07 AM	No
2	0.1003	0.6061	0.0065	0.0283	0.0066	11:58:31 AM	No
3	0.0992	0.5994	0.0064	0.0282	0.0065	11:58:54 AM	No

Mean:	0.0996	0.6017	0.0064
SD:	0.00063	0.00380	0.0000
%RSD:	0.63%	0.63%	0.63

==

Sequence No.: 14 Autosampler Location: 101
Sample ID: AZ79162S01 Date Collected: 09/14/18 11:59:09 AM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:26 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.63 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: AZ79162S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1200	0.7876	0.0084	0.0370	0.0086	11:59:49 AM	No
2	0.1187	0.7789	0.0083	0.0363	0.0085	12:00:12 PM	No
3	0.1197	0.7858	0.0084	0.0372	0.0085	12:00:36 PM	No
Mean:	0.1195	0.7841	0.0084				
SD:	0.00070	0.00458	0.0000				
%RSD:	0.58%	0.58%	0.58				

==

Sequence No.: 15 Autosampler Location: 102
Sample ID: AZ79163S01 Date Collected: 09/14/18 12:00:51 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:26 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.64 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: AZ79163S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1081	0.7208	0.0077	0.0339	0.0078	12:01:31 PM	No
2	0.1079	0.7196	0.0077	0.0334	0.0078	12:01:54 PM	No
3	0.1082	0.7212	0.0077	0.0338	0.0079	12:02:17 PM	No
Mean:	0.1081	0.7206	0.0077				
SD:	0.00012	0.00083	0.0000				
%RSD:	0.11%	0.11%	0.11				

==

Sequence No.: 16 Autosampler Location: 103
Sample ID: AZ79164S01 Date Collected: 09/14/18 12:02:32 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:26 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.64 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: AZ79164S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1191	0.7941	0.0085	0.0374	0.0086	12:03:12 PM	No
2	0.1182	0.7881	0.0084	0.0370	0.0086	12:03:36 PM	No
3	0.1190	0.7936	0.0085	0.0369	0.0086	12:03:59 PM	No
Mean:	0.1188	0.7919	0.0085				
SD:	0.00049	0.00328	0.0000				
%RSD:	0.41%	0.41%	0.41				

==

Sequence No.: 17 Autosampler Location: 104
Sample ID: AZ79165S01 Date Collected: 09/14/18 12:04:14 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:27 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.57 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: AZ79165S01 Analyte: Hg 253.7

Repl SampleConc StndConc BlnkCorr Peak Peak Time Peak

#	mg/kg	ug/L	Signal	Area	Height		Stored
1	0.1762	1.046	0.0112	0.0490	0.0113	12:04:54 PM	No
2	0.1747	1.037	0.0111	0.0482	0.0112	12:05:17 PM	No
3	0.1761	1.046	0.0112	0.0490	0.0113	12:05:40 PM	No
Mean:	0.1757	1.043	0.0112				
SD:	0.00084	0.0050	0.0001				
%RSD:	0.48%	0.48%	0.48				

==========

Sequence No.: 18
Autosampler Location: 105
Sample ID: AZ79166S01
Date Collected: 09/14/18 12:05:55 PM
Analyst: TH
Data Type: Reprocessed on 09/19/18 4:10:27 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.65 g
Initial Sample Vol:
Dilution:
Sample Prep Vol: 96 mL

Replicate Data: AZ79166S01
Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0247	0.1675	0.0018	0.0079	0.0019	12:06:35 PM	No
2	0.0241	0.1631	0.0017	0.0075	0.0019	12:06:59 PM	No
3	0.0252	0.1708	0.0018	0.0079	0.0020	12:07:22 PM	No
Mean:	0.0247	0.1672	0.0018				
SD:	0.00057	0.00387	0.0000				
%RSD:	2.32%	2.32%	2.32				

==========

Sequence No.: 19
Autosampler Location: 106
Sample ID: AZ79166S01 MS
Date Collected: 09/14/18 12:07:37 PM
Analyst: TH
Data Type: Reprocessed on 09/19/18 4:10:27 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.65 g
Initial Sample Vol:
Dilution:
Sample Prep Vol: 96 mL

Replicate Data: AZ79166S01 MS
Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.5991	4.057	0.0434	0.1891	0.0435	12:08:18 PM	No
2	0.5886	3.985	0.0426	0.1878	0.0428	12:08:41 PM	No
3	0.5835	3.951	0.0422	0.1869	0.0424	12:09:04 PM	No

Matrix Recovery Check: AZ79166S01 MS

Analyte	Expected Conc.	Measured Conc.	Std. Dev.	Units	Recovery (%)
Hg 253.7	0.6917	0.5904	0.008	mg/kg	84.8

Mean:	0.5904	3.998	0.0427
SD:	0.00796	0.0539	0.0006
%RSD:	1.35%	1.35%	1.35

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Sequence No.: 20
Autosampler Location: 107
Sample ID: AZ79166S01 MSD
Date Collected: 09/14/18 12:09:19 PM
Analyst: TH
Data Type: Reprocessed on 09/19/18 4:10:27 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.65 g
Initial Sample Vol:
Dilution:
Sample Prep Vol: 96 mL

Replicate Data: AZ79166S01 MSD
Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.6180	4.184	0.0447	0.1979	0.0449	12:10:00 PM	No
2	0.6138	4.156	0.0444	0.1957	0.0446	12:10:23 PM	No
3	0.6142	4.159	0.0445	0.1956	0.0446	12:10:46 PM	No

Duplicate Check: AZ79166S01 MSD

Analyte	Expected Conc.	Measured Conc.	Std. Dev.	Units	Difference (%)

Hg 253.7			0.5904	0.6153	0.002	mg/kg		4.1
Mean:	0.6153	4.166	0.0445					
SD:	0.00229	0.0155	0.0002					
%RSD:	0.37%	0.37%	0.37					

Sequence No.: 21 — **Autosampler Location: 108**
Sample ID: AZ79167S01 — **Date Collected: 09/14/18 12:11:01 PM**
Analyst: TH — **Data Type: Reprocessed on 09/19/18 4:10:27 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.58 g — **Initial Sample Vol:**
Dilution: — **Sample Prep Vol: 96 mL**

Replicate Data: AZ79167S01 — **Analyte: Hg 253.7**

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0360	0.2172	0.0023	0.0101	0.0025	12:11:41 PM	No
2	0.0359	0.2166	0.0023	0.0100	0.0025	12:12:04 PM	No
3	0.0360	0.2173	0.0023	0.0100	0.0025	12:12:27 PM	No
Mean:	0.0359	0.2170	0.0023				
SD:	0.00006	0.00034	0.0000				
%RSD:	0.16%	0.16%	0.16				

Sequence No.: 22 — **Autosampler Location: 109**
Sample ID: AZ79168S01 — **Date Collected: 09/14/18 12:12:42 PM**
Analyst: TH — **Data Type: Reprocessed on 09/19/18 4:10:28 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.59 g — **Initial Sample Vol:**
Dilution: — **Sample Prep Vol: 96 mL**

Replicate Data: AZ79168S01 — **Analyte: Hg 253.7**

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0499	0.3066	0.0033	0.0144	0.0034	12:13:22 PM	No
2	0.0503	0.3089	0.0033	0.0144	0.0034	12:13:46 PM	No
3	0.0510	0.3137	0.0034	0.0146	0.0035	12:14:09 PM	No
Mean:	0.0504	0.3097	0.0033				
SD:	0.00059	0.00362	0.0000				
%RSD:	1.17%	1.17%	1.17				

Sequence No.: 23 — **Autosampler Location: 110**
Sample ID: AZ79169S01 — **Date Collected: 09/14/18 12:14:24 PM**
Analyst: TH — **Data Type: Reprocessed on 09/19/18 4:10:28 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.59 g — **Initial Sample Vol:**
Dilution: — **Sample Prep Vol: 96 mL**

Replicate Data: AZ79169S01 — **Analyte: Hg 253.7**

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0249	0.1529	0.0016	0.0070	0.0018	12:15:04 PM	No
2	0.0244	0.1502	0.0016	0.0070	0.0017	12:15:27 PM	No
3	0.0244	0.1502	0.0016	0.0072	0.0017	12:15:50 PM	No
Mean:	0.0246	0.1511	0.0016				
SD:	0.00025	0.00155	0.0000				
%RSD:	1.03%	1.03%	1.03				

Sequence No.: 24 — **Autosampler Location: 111**
Sample ID: AZ79170S01 — **Date Collected: 09/14/18 12:16:05 PM**
Analyst: TH — **Data Type: Reprocessed on 09/19/18 4:10:28 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.61 g — **Initial Sample Vol:**
Dilution: — **Sample Prep Vol: 96 mL**

Replicate Data: AZ79170S01 — **Analyte: Hg 253.7**

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0234	0.1485	0.0016	0.0071	0.0017	12:16:46 PM	No
2	0.0239	0.1516	0.0016	0.0071	0.0018	12:17:09 PM	No
3	0.0236	0.1498	0.0016	0.0068	0.0017	12:17:32 PM	No
Mean:	0.0236	0.1500	0.0016				
SD:	0.00024	0.00154	0.0000				
%RSD:	1.03%	1.03%	1.03				

Sequence No.: 25
Sample ID: CCV 9/14/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 6
Date Collected: 09/14/18 12:17:48 PM
Data Type: Reprocessed on 09/19/18 4:10:28 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: CCV 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	5.166	5.166	0.0552	0.2411	0.0554	12:18:26 PM	No
2	5.112	5.112	0.0547	0.2407	0.0548	12:18:49 PM	No
3	5.108	5.108	0.0546	0.2398	0.0548	12:19:12 PM	No
Mean:	5.129	5.129	0.0548				
SD:	0.0321	0.0321	0.0003				
%RSD:	0.63%	0.63%	0.63				

QC value within limits for Hg 253.7 Recovery = 98.48%
All analyte(s) passed QC.

Sequence No.: 26
Sample ID: CCB 9/14/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 1
Date Collected: 09/14/18 12:19:26 PM
Data Type: Reprocessed on 09/19/18 4:10:28 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: CCB 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0008	0.0008	0.0000	-0.0001	0.0001	12:20:04 PM	No
2	0.0015	0.0015	0.0000	0.0001	0.0002	12:20:27 PM	No
3	0.0037	0.0037	0.0000	0.0002	0.0002	12:20:51 PM	No
Mean:	0.0020	0.0020	0.0000				
SD:	0.00148	0.00148	0.0000				
%RSD:	74.86%	74.86%	74.86				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 27
Sample ID: AZ79171S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.64 g
Dilution:

Autosampler Location: 112
Date Collected: 09/14/18 12:21:04 PM
Data Type: Reprocessed on 09/19/18 4:10:28 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79171S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0247	0.1648	0.0018	0.0080	0.0019	12:21:44 PM	No
2	0.0248	0.1654	0.0018	0.0081	0.0019	12:22:08 PM	No
3	0.0250	0.1664	0.0018	0.0079	0.0019	12:22:31 PM	No
Mean:	0.0248	0.1655	0.0018				
SD:	0.00012	0.00080	0.0000				
%RSD:	0.48%	0.48%	0.48				

Sequence No.: 28
Autosampler Location: 113

Sample ID: AZ79172S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.62 g
Dilution:

Date Collected: 09/14/18 12:22:46 PM
Data Type: Reprocessed on 09/19/18 4:10:28 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79172S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0805	0.5199	0.0056	0.0250	0.0057	12:23:27 PM	No
2	0.0812	0.5244	0.0056	0.0243	0.0057	12:23:50 PM	No
3	0.0815	0.5263	0.0056	0.0245	0.0058	12:24:13 PM	No
Mean:	0.0811	0.5236	0.0056				
SD:	0.00051	0.00327	0.0000				
%RSD:	0.62%	0.62%	0.62				

Sequence No.: 29
Sample ID: AZ79173S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.64 g
Dilution:

Autosampler Location: 114
Date Collected: 09/14/18 12:24:29 PM
Data Type: Reprocessed on 09/19/18 4:10:29 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79173S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.2721	1.814	0.0194	0.0851	0.0195	12:25:09 PM	No
2	0.2688	1.792	0.0192	0.0827	0.0193	12:25:32 PM	No
3	0.2718	1.812	0.0194	0.0848	0.0195	12:25:55 PM	No
Mean:	0.2709	1.806	0.0193				
SD:	0.00182	0.0121	0.0001				
%RSD:	0.67%	0.67%	0.67				

Sequence No.: 30
Sample ID: AZ79174S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.63 g
Dilution:

Autosampler Location: 115
Date Collected: 09/14/18 12:26:10 PM
Data Type: Reprocessed on 09/19/18 4:10:29 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79174S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0136	0.0889	0.0010	0.0045	0.0011	12:26:51 PM	No
2	0.0137	0.0898	0.0010	0.0041	0.0011	12:27:14 PM	No
3	0.0139	0.0911	0.0010	0.0049	0.0011	12:27:37 PM	No
Mean:	0.0137	0.0900	0.0010				
SD:	0.00017	0.00108	0.0000				
%RSD:	1.20%	1.20%	1.20				

Sequence No.: 31
Sample ID: AZ79175S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.65 g
Dilution:

Autosampler Location: 116
Date Collected: 09/14/18 12:27:52 PM
Data Type: Reprocessed on 09/19/18 4:10:29 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79175S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0138	0.0932	0.0010	0.0048	0.0011	12:28:33 PM	No
2	0.0137	0.0927	0.0010	0.0045	0.0011	12:28:56 PM	No
3	0.0142	0.0963	0.0010	0.0048	0.0012	12:29:19 PM	No
Mean:	0.0139	0.0941	0.0010				
SD:	0.00028	0.00192	0.0000				

%RSD: 2.04% 2.04% 2.04

Sequence No.: 32
Sample ID: AZ79176S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.59 g
Dilution:

Autosampler Location: 117
Date Collected: 09/14/18 12:29:34 PM
Data Type: Reprocessed on 09/19/18 4:10:29 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79176S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0162	0.0996	0.0011	0.0052	0.0012	12:30:15 PM	No
2	0.0171	0.1051	0.0011	0.0056	0.0013	12:30:37 PM	No
3	0.0165	0.1016	0.0011	0.0048	0.0012	12:31:01 PM	No
Mean:	0.0166	0.1021	0.0011				
SD:	0.00045	0.00277	0.0000				
%RSD:	2.71%	2.71%	2.71				

Sequence No.: 33
Sample ID: AZ79177S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.6 g
Dilution:

Autosampler Location: 118
Date Collected: 09/14/18 12:31:16 PM
Data Type: Reprocessed on 09/19/18 4:10:29 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79177S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0235	0.1469	0.0016	0.0078	0.0017	12:31:56 PM	No
2	0.0261	0.1628	0.0017	0.0066	0.0019	12:32:20 PM	No
3	0.0238	0.1489	0.0016	0.0075	0.0017	12:32:43 PM	No
Mean:	0.0245	0.1529	0.0016				
SD:	0.00139	0.00867	0.0001				
%RSD:	5.67%	5.67%	5.67				

Sequence No.: 34
Sample ID: AZ79178S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 0.65 g
Dilution:

Autosampler Location: 119
Date Collected: 09/14/18 12:32:58 PM
Data Type: Reprocessed on 09/19/18 4:10:30 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79178S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0208	0.1410	0.0015	0.0072	0.0016	12:33:38 PM	No
2	0.0112	0.0758	0.0008	0.0042	0.0010	12:34:02 PM	No
3	0.0208	0.1405	0.0015	0.0065	0.0016	12:34:25 PM	No
Mean:	0.0176	0.1191	0.0013				
SD:	0.00554	0.03749	0.0004				
%RSD:	31.48%	31.48%	31.48				

Sequence No.: 35
Sample ID: CCV 9/14/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 6
Date Collected: 09/14/18 12:34:40 PM
Data Type: Reprocessed on 09/19/18 4:10:30 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: CCV 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	5.144	5.144	0.0550	0.2417	0.0551	12:35:18 PM	No

2	5.141	5.141	0.0550	0.2391	0.0551	12:35:41 PM	No
3	5.151	5.151	0.0551	0.2410	0.0552	12:36:05 PM	No
Mean:	5.145	5.145	0.0550				
SD:	0.0054	0.0054	0.0001				
%RSD:	0.10%	0.10%	0.10				

QC value within limits for Hg 253.7 Recovery = 98.79%
All analyte(s) passed QC.

Sequence No.: 36 Autosampler Location: 1
Sample ID: CCB 9/14/18 TH Date Collected: 09/14/18 12:36:18 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:10:30 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: CCB 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0030	0.0030	0.0000	0.0005	0.0002	12:36:57 PM	No
2	0.0175	0.0175	0.0002	0.0005	0.0003	12:37:20 PM	No
3	-0.0003	-0.0003	-0.0000	-0.0002	0.0001	12:37:43 PM	No
Mean:	0.0067	0.0067	0.0001				
SD:	0.00947	0.00947	0.0001				
%RSD:	140.49%	140.49%	140.49				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 37 Autosampler Location: 120
Sample ID: 180913A BLK Date Collected: 09/14/18 12:37:57 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:30 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.5 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: 180913A BLK Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0021	0.0556	0.0006	0.0024	0.0007	12:38:37 PM	No
2	0.0018	0.0460	0.0005	0.0022	0.0006	12:39:00 PM	No
3	0.0015	0.0403	0.0004	0.0024	0.0006	12:39:23 PM	No
Mean:	0.0018	0.0473	0.0005				
SD:	0.00030	0.00769	0.0001				
%RSD:	16.27%	16.27%	16.27				

Sequence No.: 38 Autosampler Location: 121
Sample ID: 180913A LCS Date Collected: 09/14/18 12:39:38 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:10:30 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.5 g Initial Sample Vol:
Dilution: Sample Prep Vol: 96 mL

Replicate Data: 180913A LCS Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1700	4.428	0.0473	0.2091	0.0475	12:40:18 PM	No
2	0.1680	4.374	0.0468	0.2037	0.0469	12:40:42 PM	No
3	0.1691	4.405	0.0471	0.2047	0.0472	12:41:05 PM	No

Matrix Recovery Check: 180913A LCS

Analyte	Expected Conc.	Measured Conc.	Std. Dev.	Units	Recovery (%)
Hg 253.7	0.6688	0.1691	0.001	mg/kg	25.1

Mean:	0.1691	4.403	0.0471
SD:	0.00103	0.0269	0.0003
%RSD:	0.61%	0.61%	0.61

Sequence No.: 39
Sample ID: AZ79031S07
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.47 g
Dilution:

Autosampler Location: 122
Date Collected: 09/14/18 12:41:20 PM
Data Type: Reprocessed on 09/19/18 4:10:31 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79031S07 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.2477	6.374	0.0682	0.2992	0.0683	12:42:00 PM	No
2	0.2443	6.285	0.0672	0.2936	0.0673	12:42:24 PM	No
3	0.2455	6.315	0.0675	0.2960	0.0677	12:42:47 PM	No
Mean:	0.2458	6.325	0.0676				
SD:	0.00175	0.0451	0.0005				
%RSD:	0.71%	0.71%	0.71				

Sequence No.: 40
Sample ID: AZ79146S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.5 g
Dilution:

Autosampler Location: 123
Date Collected: 09/14/18 12:43:03 PM
Data Type: Reprocessed on 09/19/18 4:10:31 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79146S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0144	0.3761	0.0040	0.0166	0.0042	12:43:43 PM	No
2	0.0149	0.3882	0.0042	0.0166	0.0043	12:44:06 PM	No
3	0.0146	0.3803	0.0041	0.0168	0.0042	12:44:29 PM	No
Mean:	0.0147	0.3815	0.0041				
SD:	0.00024	0.00615	0.0001				
%RSD:	1.61%	1.61%	1.61				

Sequence No.: 41
Sample ID: AZ79147S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.54 g
Dilution:

Autosampler Location: 124
Date Collected: 09/14/18 12:44:45 PM
Data Type: Reprocessed on 09/19/18 4:10:31 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79147S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0201	0.5305	0.0057	0.0249	0.0058	12:45:25 PM	No
2	0.0197	0.5222	0.0056	0.0237	0.0057	12:45:48 PM	No
3	0.0199	0.5256	0.0056	0.0262	0.0058	12:46:11 PM	No
Mean:	0.0199	0.5261	0.0056				
SD:	0.00016	0.00417	0.0000				
%RSD:	0.79%	0.79%	0.79				

Sequence No.: 42
Sample ID: AZ79148S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.49 g
Dilution:

Autosampler Location: 125
Date Collected: 09/14/18 12:46:27 PM
Data Type: Reprocessed on 09/19/18 4:10:31 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79148S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0192	0.4992	0.0053	0.0202	0.0055	12:47:07 PM	No
2	0.0169	0.4387	0.0047	0.0182	0.0048	12:47:31 PM	No

3	0.0182	0.4715	0.0050	0.0234	0.0052	12:47:54 PM	No
Mean:	0.0181	0.4698	0.0050				
SD:	0.00117	0.03027	0.0003				
%RSD:	6.44%	6.44%	6.44				

Sequence No.: 43
Sample ID: AZ79149S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.45 g
Dilution:

Autosampler Location: 126
Date Collected: 09/14/18 12:48:09 PM
Data Type: Reprocessed on 09/19/18 4:10:31 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79149S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0184	0.4699	0.0050	0.0223	0.0052	12:48:50 PM	No
2	0.0178	0.4543	0.0049	0.0203	0.0050	12:49:13 PM	No
3	0.0177	0.4522	0.0048	0.0207	0.0050	12:49:36 PM	No
Mean:	0.0180	0.4588	0.0049				
SD:	0.00038	0.00962	0.0001				
%RSD:	2.10%	2.10%	2.10				

Sequence No.: 44
Sample ID: AZ79149S01 MS
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.45 g
Dilution:

Autosampler Location: 127
Date Collected: 09/14/18 12:49:52 PM
Data Type: Reprocessed on 09/19/18 4:10:31 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79149S01 MS Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1709	4.361	0.0466	0.2046	0.0468	12:50:32 PM	No
2	0.1719	4.388	0.0469	0.2071	0.0471	12:50:55 PM	No
3	0.1708	4.360	0.0466	0.2079	0.0468	12:51:19 PM	No

Matrix Recovery Check: AZ79149S01 MS

Analyte	Expected Conc.	Measured Conc.	Std. Dev.	Units	Recovery (%)
Hg 253.7	0.6850	0.1712	0.001	mg/kg	23.0

Mean:	0.1712	4.370	0.0467
SD:	0.00062	0.0157	0.0002
%RSD:	0.36%	0.36%	0.36

Sequence No.: 45
Sample ID: AZ79149S01 MSD
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.45 g
Dilution:

Autosampler Location: 128
Date Collected: 09/14/18 12:51:34 PM
Data Type: Reprocessed on 09/19/18 4:10:31 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79149S01 MSD Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1709	4.360	0.0466	0.2066	0.0468	12:52:14 PM	No
2	0.1712	4.370	0.0467	0.2051	0.0469	12:52:38 PM	No
3	0.1711	4.368	0.0467	0.2040	0.0468	12:53:01 PM	No

Duplicate Check: AZ79149S01 MSD

Analyte	Expected Conc.	Measured Conc.	Std. Dev.	Units	Difference (%)
Hg 253.7	0.1712	0.1711	0.000	mg/kg	0.1

Mean:	0.1711	4.366	0.0467
SD:	0.00019	0.0048	0.0001

%RSD: 0.11% 0.11% 0.11

Sequence No.: 46
Sample ID: AZ79150S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.5 g
Dilution:

Autosampler Location: 129
Date Collected: 09/14/18 12:53:16 PM
Data Type: Reprocessed on 09/19/18 4:10:32 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79150S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0196	0.5101	0.0055	0.0247	0.0056	12:53:56 PM	No
2	0.0171	0.4452	0.0048	0.0236	0.0049	12:54:19 PM	No
3	0.0181	0.4703	0.0050	0.0255	0.0052	12:54:42 PM	No
Mean:	0.0182	0.4752	0.0051				
SD:	0.00126	0.03271	0.0003				
%RSD:	6.88%	6.88%	6.88				

Sequence No.: 47
Sample ID: AZ79151S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.45 g
Dilution:

Autosampler Location: 130
Date Collected: 09/14/18 12:54:58 PM
Data Type: Reprocessed on 09/19/18 4:10:32 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79151S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0151	0.3857	0.0041	0.0173	0.0043	12:55:39 PM	No
2	0.0162	0.4140	0.0044	0.0193	0.0046	12:56:02 PM	No
3	0.0154	0.3919	0.0042	0.0181	0.0043	12:56:25 PM	No
Mean:	0.0156	0.3972	0.0042				
SD:	0.00058	0.01487	0.0002				
%RSD:	3.74%	3.74%	3.74				

Sequence No.: 48
Sample ID: AZ79152S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.55 g
Dilution:

Autosampler Location: 131
Date Collected: 09/14/18 12:56:41 PM
Data Type: Reprocessed on 09/19/18 4:10:32 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79152S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0145	0.3849	0.0041	0.0176	0.0043	12:57:21 PM	No
2	0.0149	0.3954	0.0042	0.0172	0.0044	12:57:44 PM	No
3	0.0148	0.3944	0.0042	0.0183	0.0044	12:58:08 PM	No
Mean:	0.0147	0.3916	0.0042				
SD:	0.00022	0.00579	0.0001				
%RSD:	1.48%	1.48%	1.48				

Sequence No.: 49
Sample ID: AZ79153S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.5 g
Dilution:

Autosampler Location: 132
Date Collected: 09/14/18 12:58:23 PM
Data Type: Reprocessed on 09/19/18 4:10:32 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79153S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0213	0.5538	0.0059	0.0249	0.0061	12:59:03 PM	No

2	0.0202	0.5251	0.0056	0.0245	0.0058	12:59:27 PM	No
3	0.0187	0.4871	0.0052	0.0225	0.0053	12:59:50 PM	No
Mean:	0.0200	0.5220	0.0056				
SD:	0.00129	0.03347	0.0004				
%RSD:	6.41%	6.41%	6.41				

Sequence No.: 50
Sample ID: AZ79154S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.49 g
Dilution:

Autosampler Location: 133
Date Collected: 09/14/18 1:00:05 PM
Data Type: Reprocessed on 09/19/18 4:10:32 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79154S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0100	0.2588	0.0028	0.0090	0.0029	1:00:46 PM	No
2	0.0182	0.4710	0.0050	0.0249	0.0052	1:01:09 PM	No
3	0.0103	0.2661	0.0028	0.0096	0.0030	1:01:32 PM	No
Mean:	0.0128	0.3320	0.0035				
SD:	0.00464	0.12043	0.0013				
%RSD:	36.28%	36.28%	36.28				

Sequence No.: 51
Sample ID: CCV 9/14/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 6
Date Collected: 09/14/18 1:01:48 PM
Data Type: Reprocessed on 09/19/18 4:10:32 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: CCV 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	5.141	5.141	0.0550	0.2414	0.0551	1:02:26 PM	No
2	5.043	5.043	0.0539	0.2324	0.0541	1:02:49 PM	No
3	5.015	5.015	0.0536	0.2319	0.0538	1:03:12 PM	No
Mean:	5.066	5.066	0.0542				
SD:	0.0662	0.0662	0.0007				
%RSD:	1.31%	1.31%	1.31				

QC value within limits for Hg 253.7 Recovery = 97.28%
All analyte(s) passed QC.

Sequence No.: 52
Sample ID: CCB 9/14/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:

Autosampler Location: 1
Date Collected: 09/14/18 1:05:57 PM
Data Type: Reprocessed on 09/19/18 4:10:33 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: CCB 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0524	0.0524	0.0006	0.0007	0.0007	1:06:35 PM	No
2	0.0658	0.0658	0.0007	0.0018	0.0008	1:06:58 PM	No
3	0.0722	0.0722	0.0008	0.0029	0.0009	1:07:21 PM	No
Mean:	0.0635	0.0635	0.0007				
SD:	0.01009	0.01009	0.0001				
%RSD:	15.89%	15.89%	15.89				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 53
Sample ID: AZ79155S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals

Autosampler Location: 134
Date Collected: 09/14/18 1:07:35 PM
Data Type: Reprocessed on 09/19/18 4:10:33 PM

Initial Sample Wt: 2.52 g
Initial Sample Vol:
Dilution:
Sample Prep Vol: 96 mL

Replicate Data: AZ79155S01
Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0131	0.3438	0.0037	0.0089	0.0038	1:08:15 PM	No
2	0.0145	0.3794	0.0041	0.0113	0.0042	1:08:39 PM	No
3	0.0137	0.3602	0.0039	0.0091	0.0040	1:09:02 PM	No
Mean:	0.0138	0.3612	0.0039				
SD:	0.00068	0.01782	0.0002				
%RSD:	4.93%	4.93%	4.93				

Sequence No.: 54
Autosampler Location: 135
Sample ID: AZ79156S01
Date Collected: 09/14/18 1:09:17 PM
Analyst: TH
Data Type: Reprocessed on 09/19/18 4:10:33 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.52 g
Initial Sample Vol:
Dilution:
Sample Prep Vol: 96 mL

Replicate Data: AZ79156S01
Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0160	0.4208	0.0045	0.0181	0.0046	1:09:58 PM	No
2	0.0156	0.4106	0.0044	0.0184	0.0045	1:10:21 PM	No
3	0.0155	0.4063	0.0043	0.0163	0.0045	1:10:45 PM	No
Mean:	0.0157	0.4126	0.0044				
SD:	0.00028	0.00743	0.0001				
%RSD:	1.80%	1.80%	1.80				

Sequence No.: 55
Autosampler Location: 136
Sample ID: AZ79157S01
Date Collected: 09/14/18 1:11:00 PM
Analyst: TH
Data Type: Reprocessed on 09/19/18 4:10:33 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.51 g
Initial Sample Vol:
Dilution:
Sample Prep Vol: 96 mL

Replicate Data: AZ79157S01
Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0067	0.1743	0.0019	0.0079	0.0020	1:11:41 PM	No
2	0.0169	0.4413	0.0047	0.0208	0.0049	1:12:04 PM	No
3	0.0186	0.4875	0.0052	0.0254	0.0054	1:12:27 PM	No
Mean:	0.0141	0.3677	0.0039				
SD:	0.00647	0.16907	0.0018				
%RSD:	45.98%	45.98%	45.98				

Sequence No.: 56
Autosampler Location: 137
Sample ID: AZ79158S01
Date Collected: 09/14/18 1:12:43 PM
Analyst: TH
Data Type: Reprocessed on 09/19/18 4:10:33 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.51 g
Initial Sample Vol:
Dilution:
Sample Prep Vol: 96 mL

Replicate Data: AZ79158S01
Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0176	0.4608	0.0049	0.0203	0.0051	1:13:23 PM	No
2	0.0181	0.4738	0.0051	0.0216	0.0052	1:13:46 PM	No
3	0.0039	0.1008	0.0011	-0.0018	0.0012	1:14:10 PM	No
Mean:	0.0132	0.3451	0.0037				
SD:	0.00810	0.21172	0.0023				
%RSD:	61.34%	61.34%	61.34				

Sequence No.: 57
Sample ID: AZ79159S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.48 g
Dilution:
Autosampler Location: 138
Date Collected: 09/14/18 1:14:25 PM
Data Type: Reprocessed on 09/19/18 4:10:33 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79159S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0155	0.4013	0.0043	0.0118	0.0044	1:15:06 PM	No
2	0.0189	0.4873	0.0052	0.0180	0.0053	1:15:29 PM	No
3	0.0176	0.4553	0.0049	0.0163	0.0050	1:15:52 PM	No
Mean:	0.0173	0.4480	0.0048				
SD:	0.00168	0.04344	0.0005				
%RSD:	9.70%	9.70%	9.70				

Sequence No.: 58
Sample ID: AZ79160S01
Analyst: TH
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: 2.45 g
Dilution:
Autosampler Location: 139
Date Collected: 09/14/18 1:16:08 PM
Data Type: Reprocessed on 09/19/18 4:10:34 PM
Initial Sample Vol:
Sample Prep Vol: 96 mL

Replicate Data: AZ79160S01 Analyte: Hg 253.7

Repl #	SampleConc mg/kg	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0062	0.1583	0.0017	0.0028	0.0018	1:16:48 PM	No
2	0.0062	0.1587	0.0017	0.0037	0.0018	1:17:12 PM	No
3	0.0140	0.3568	0.0038	0.0133	0.0040	1:17:35 PM	No
Mean:	0.0088	0.2246	0.0024				
SD:	0.00449	0.11451	0.0012				
%RSD:	50.98%	50.98%	50.98				

Sequence No.: 59
Sample ID: CCV 9/14/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:
Autosampler Location: 6
Date Collected: 09/14/18 1:17:51 PM
Data Type: Reprocessed on 09/19/18 4:10:34 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: CCV 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	4.792	4.792	0.0512	0.2233	0.0514	1:18:29 PM	No
2	5.059	5.059	0.0541	0.2382	0.0542	1:18:52 PM	No
3	4.801	4.801	0.0513	0.2295	0.0515	1:19:15 PM	No
Mean:	4.884	4.884	0.0522				
SD:	0.1515	0.1515	0.0016				
%RSD:	3.10%	3.10%	3.10				

QC value within limits for Hg 253.7 Recovery = 93.78%
All analyte(s) passed QC.

Sequence No.: 60
Sample ID: CCB 9/14/18 TH
Analyst:
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt:
Dilution:
Autosampler Location: 1
Date Collected: 09/14/18 1:19:29 PM
Data Type: Reprocessed on 09/19/18 4:10:34 PM
Initial Sample Vol:
Sample Prep Vol:

Replicate Data: CCB 9/14/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.0581	0.0581	0.0006	0.0023	0.0008	1:20:07 PM	No
2	0.0634	0.0634	0.0007	0.0019	0.0008	1:20:31 PM	No

3	0.0455	0.0455	0.0005	0.0014	0.0006	1:20:54 PM	No
Mean:	0.0557	0.0557	0.0006				
SD:	0.00919	0.00919	0.0001				
%RSD:	16.52%	16.52%	16.52				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: LLQC 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.1742	0.1742	0.0012	0.0068	0.0014	2:09:48 PM	No
2	0.1704	0.1704	0.0012	0.0066	0.0013	2:10:11 PM	No
3	0.1706	0.1706	0.0012	0.0067	0.0013	2:10:34 PM	No
Mean:	0.1717	0.1717	0.0012				
SD:	0.00214	0.00214	0.0000				
%RSD:	1.25%	1.25%	1.25				

QC value within limits for Hg 253.7 Recovery = 85.86%
All analyte(s) passed QC.

Sequence No.: 11 Autosampler Location: 6
Sample ID: CCV 9/19/18 TH Date Collected: 09/19/18 2:11:06 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:11 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: CCV 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	5.248	5.248	0.0355	0.1750	0.0357	2:11:44 PM	No
2	5.141	5.141	0.0348	0.1666	0.0350	2:12:08 PM	No
3	5.163	5.163	0.0350	0.1701	0.0352	2:12:31 PM	No
Mean:	5.184	5.184	0.0351				
SD:	0.0564	0.0564	0.0004				
%RSD:	1.09%	1.09%	1.09				

QC value within limits for Hg 253.7 Recovery = 103.68%
All analyte(s) passed QC.

Sequence No.: 12 Autosampler Location: 1
Sample ID: CCB 9/19/18 TH Date Collected: 09/19/18 2:12:44 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:11 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: CCB 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0137	-0.0137	-0.0001	0.0005	0.0001	2:13:23 PM	No
2	0.0002	0.0002	0.0000	0.0016	0.0002	2:13:46 PM	No
3	-0.0180	-0.0180	-0.0001	0.0002	0.0001	2:14:09 PM	No
Mean:	-0.0105	-0.0105	-0.0001				
SD:	0.00954	0.00954	0.0001				
%RSD:	91.03%	91.03%	91.03				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

Sequence No.: 13 Autosampler Location: 98
Sample ID: 180917B BLK Date Collected: 09/19/18 2:27:22 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:08:12 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: 180917B BLK Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0196	-0.0196	-0.0001	0.0003	0.0001	2:28:02 PM	No
2	-0.0178	-0.0178	-0.0001	0.0003	0.0001	2:28:25 PM	No

3	-0.0198	-0.0198	-0.0001	0.0001	0.0001	2:28:48 PM	No
Mean:	-0.0190	-0.0190	-0.0001				
SD:	0.00112	0.00112	0.0000				
%RSD:	5.88%	5.88%	5.88				

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Sequence No.: 14 **Autosampler Location: 99**
Sample ID: 180917B LCS **Date Collected: 09/19/18 2:29:04 PM**
Analyst: TH **Data Type: Reprocessed on 09/19/18 4:08:12 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: 180917B LCS **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	3.933	3.933	0.0266	0.1320	0.0268	2:29:44 PM	No
2	3.868	3.868	0.0262	0.1286	0.0264	2:30:07 PM	No
3	3.908	3.908	0.0265	0.1301	0.0267	2:30:30 PM	No

Matrix Recovery Check: 180917B LCS

Analyte	Expected Conc.	Measured Conc.	Std. Dev.	Units	Recovery (%)
Hg 253.7	3.981	3.903	0.033	ug/L	98.1

Mean:	3.903	3.903	0.0264
SD:	0.0332	0.0332	0.0002
%RSD:	0.85%	0.85%	0.85

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Sequence No.: 15 **Autosampler Location: 100**
Sample ID: 180917B LCSD **Date Collected: 09/19/18 2:30:45 PM**
Analyst: TH **Data Type: Reprocessed on 09/19/18 4:08:12 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: 180917B LCSD **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	4.085	4.085	0.0277	0.1359	0.0279	2:31:25 PM	No
2	4.095	4.095	0.0277	0.1353	0.0279	2:31:48 PM	No
3	4.098	4.098	0.0278	0.1359	0.0279	2:32:11 PM	No

Duplicate Check: 180917B LCSD

Analyte	Expected Conc.	Measured Conc.	Std. Dev.	Units	Difference (%)
Hg 253.7	3.903	4.093	0.007	ug/L	4.7

Mean:	4.093	4.093	0.0277
SD:	0.0067	0.0067	0.0000
%RSD:	0.16%	0.16%	0.16

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Sequence No.: 16 **Autosampler Location: 101**
Sample ID: LOD LCS **Date Collected: 09/19/18 2:32:26 PM**
Analyst: TH **Data Type: Reprocessed on 09/19/18 4:08:13 PM**
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: **Initial Sample Vol:**
Dilution: **Sample Prep Vol:**

Replicate Data: LOD LCS **Analyte: Hg 253.7**

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	0.3733	0.3733	0.0025	0.0132	0.0027	2:33:06 PM	No
2	0.3726	0.3726	0.0025	0.0130	0.0027	2:33:29 PM	No
3	0.3769	0.3769	0.0026	0.0134	0.0027	2:33:52 PM	No
Mean:	0.3743	0.3743	0.0025				
SD:	0.00227	0.00227	0.0000				

Replicate Data: AZ79106W15 Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0150	-0.0150	-0.0001	0.0004	0.0001	2:46:40 PM	No
2	-0.0187	-0.0187	-0.0001	0.0001	0.0001	2:47:03 PM	No
3	-0.0159	-0.0159	-0.0001	0.0003	0.0001	2:47:27 PM	No
Mean:	-0.0165	-0.0165	-0.0001				
SD:	0.00194	0.00194	0.0000				
%RSD:	11.71%	11.71%	11.71				

Sequence No.: 25 Autosampler Location: 110
Sample ID: AZ79107W15 Date Collected: 09/19/18 2:47:42 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:08:15 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: AZ79107W15 Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0175	-0.0175	-0.0001	0.0002	0.0001	2:48:22 PM	No
2	-0.0183	-0.0183	-0.0001	0.0002	0.0001	2:48:45 PM	No
3	-0.0181	-0.0181	-0.0001	0.0003	0.0001	2:49:09 PM	No
Mean:	-0.0180	-0.0180	-0.0001				
SD:	0.00039	0.00039	0.0000				
%RSD:	2.15%	2.15%	2.15				

Sequence No.: 26 Autosampler Location: 111
Sample ID: AZ79179W09 Date Collected: 09/19/18 2:49:24 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:08:15 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: AZ79179W09 Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0185	-0.0185	-0.0001	0.0001	0.0001	2:50:04 PM	No
2	-0.0140	-0.0140	-0.0001	0.0005	0.0001	2:50:28 PM	No
3	-0.0072	-0.0072	-0.0000	0.0006	0.0001	2:50:51 PM	No
Mean:	-0.0132	-0.0132	-0.0001				
SD:	0.00571	0.00571	0.0000				
%RSD:	43.18%	43.18%	43.18				

Sequence No.: 27 Autosampler Location: 6
Sample ID: CCV 9/19/18 TH Date Collected: 09/19/18 2:51:06 PM
Analyst: Data Type: Reprocessed on 09/19/18 4:08:15 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: CCV 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	5.182	5.182	0.0351	0.1729	0.0353	2:51:44 PM	No
2	5.190	5.190	0.0352	0.1722	0.0353	2:52:07 PM	No
3	5.176	5.176	0.0351	0.1714	0.0352	2:52:31 PM	No
Mean:	5.183	5.183	0.0351				
SD:	0.0073	0.0073	0.0000				
%RSD:	0.14%	0.14%	0.14				

QC value within limits for Hg 253.7 Recovery = 103.65%
All analyte(s) passed QC.

Sequence No.: 28 Autosampler Location: 1
Sample ID: CCB 9/19/18 TH Date Collected: 09/19/18 2:52:44 PM

Analyst: Data Type: Reprocessed on 09/19/18 4:08:15 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: CCB 9/19/18 TH Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0163	-0.0163	-0.0001	0.0001	0.0001	2:53:23 PM	No
2	-0.0110	-0.0110	-0.0001	0.0005	0.0001	2:53:46 PM	No
3	-0.0097	-0.0097	-0.0001	0.0005	0.0001	2:54:09 PM	No
Mean:	-0.0123	-0.0123	-0.0001				
SD:	0.00349	0.00349	0.0000				
%RSD:	28.26%	28.26%	28.26				

QC value within limits for Hg 253.7 Recovery = Not calculated
All analyte(s) passed QC.

===

Sequence No.: 29 Autosampler Location: 112
Sample ID: AZ79280W02 Date Collected: 09/19/18 3:01:56 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:08:15 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: AZ79280W02 Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0143	-0.0143	-0.0001	0.0003	0.0001	3:02:36 PM	No
2	-0.0108	-0.0108	-0.0001	0.0005	0.0001	3:02:59 PM	No
3	-0.0156	-0.0156	-0.0001	0.0003	0.0001	3:03:23 PM	No
Mean:	-0.0136	-0.0136	-0.0001				
SD:	0.00252	0.00252	0.0000				
%RSD:	18.54%	18.54%	18.54				

===

Sequence No.: 30 Autosampler Location: 113
Sample ID: AZ79281W02 Date Collected: 09/19/18 3:03:38 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:08:15 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: AZ79281W02 Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0162	-0.0162	-0.0001	0.0002	0.0001	3:04:19 PM	No
2	-0.0111	-0.0111	-0.0001	0.0007	0.0001	3:04:42 PM	No
3	-0.0174	-0.0174	-0.0001	0.0002	0.0001	3:05:05 PM	No
Mean:	-0.0149	-0.0149	-0.0001				
SD:	0.00334	0.00334	0.0000				
%RSD:	22.46%	22.46%	22.46				

===

Sequence No.: 31 Autosampler Location: 114
Sample ID: AZ79282W02 Date Collected: 09/19/18 3:05:20 PM
Analyst: TH Data Type: Reprocessed on 09/19/18 4:08:16 PM
Logged In Analyst (Original) : chemist_metals
Initial Sample Wt: Initial Sample Vol:
Dilution: Sample Prep Vol:

Replicate Data: AZ79282W02 Analyte: Hg 253.7

Repl #	SampleConc ug/L	StndConc ug/L	BlnkCorr Signal	Peak Area	Peak Height	Time	Peak Stored
1	-0.0152	-0.0152	-0.0001	0.0005	0.0001	3:06:01 PM	No
2	-0.0236	-0.0236	-0.0002	0.0001	0.0000	3:06:24 PM	No
3	-0.0234	-0.0234	-0.0002	-0.0001	0.0000	3:06:47 PM	No
Mean:	-0.0207	-0.0207	-0.0001				

US EPA Tune Check Sample Report

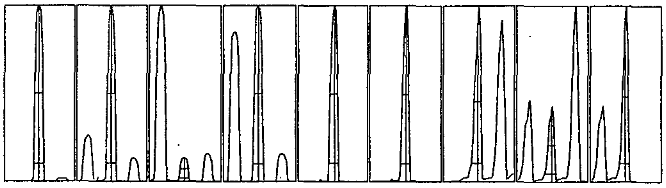
Batch Folder C:\Agilent\ICPMH\1\DATA\180913A.b
Report Comment C:\Agilent\ICPMH\Report Templates\en\Letter\Tune Report\New and Improved 200_8TuneCheckSampleReport.xltx
Instrument Name G3281A JP12101628

[NoGas]

Mass	Count (Mean)	RSD% (Actual)	RSD% (Required)	RSD% (Flag)
9	344188	0.41	5.00	
24	1047843	0.98	5.00	
25	138840	0.45	5.00	
26	161929	0.23	5.00	
59	1794711	0.96	5.00	
115	2218812	0.71	5.00	
206	523627	0.49	5.00	
207	497910	0.62	5.00	
208	991827	1.09	5.00	

Mass	Replicate 1 Count	Replicate 2 Count	Replicate 3 Count	Replicate 4 Count	Replicate 5 Count
9	343290	342629	344542	344189	346289
24	1046480	1047328	1049742	1033416	1062250
25	138559	139882	138684	138828	138250
26	161389	162375	162037	161765	162078
59	1797553	1771464	1819843	1790725	1793969
115	2208070	2203977	2215610	2243868	2222537
206	525622	527006	522113	522501	520895
207	493926	497054	502552	498175	497841
208	976556	989081	1000975	989154	1003367

Integration Time [sec] = 0.1



Mass	Peak Height	Axis (Actual)	Axis (Required)	Axis (Flag)	Width-X% (Actual)	Width-X% (Required)	Width-X% (Flag)
9	90868	9.00	8.9 - 9.1		0.478	0.900	
24	290434	24.00	23.9 - 24.1		0.473	0.900	
25	38321	25.00	24.9 - 25.1		0.446	0.900	
26	44947	26.00	25.9 - 26.1		0.486	0.900	
59	527588	59.05	58.9 - 59.1		0.466	0.900	
115	746995	115.05	114.9 - 115.1		0.435	0.900	
206	151477	206.00	205.9 - 206.1		0.491	0.900	
207	148054	207.00	206.9 - 207.1		0.500	0.900	
208	350788	208.00	207.9 - 208.1		0.457	0.900	

X% = 10 **Integration Time [sec] =** 0.1 **Acquisition Time [sec] =** 235 **Y Axis =** Linear

Tune Parameters

Plasma Paramters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
RF Power	1550	W	Carrier Gas	0.70	L/min			
RF Matching	1.50	V	Option Gas	0.0	%			
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps			
S/C Temp	2	°C						

Lenses Parameters

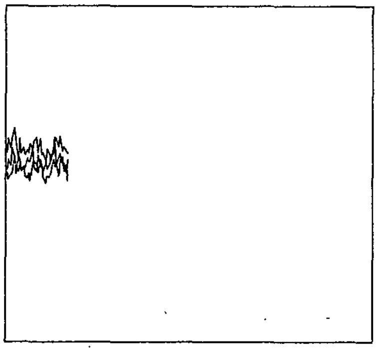
ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Extract 1	1.0	V	Omega Lens	9.9	V			
Extract 2	-160.0	V	Cell Entrance	-30	V			
Omega Bias	-80	V	Cell Exit	-50	V			
Deflect	13.6	V						

Cell Parameters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Use Gas	false		3rd Gas Flow	0	%			
He Flow	0.0	mL/min	OctP Bias	-8.0	V			
H2 Flow	0.0	mL/min	OctP RF	190	V			
Energy Discrimination	5.0	V						

Current Signal

[NoGas]



Mass	Range	Count	Avg. Count	RSD [%]
7	5000	2776	2872.4	4.29
59	10000	4737	5063.1	4.38
89	10000	7690	8020.0	3.82
140	20000	9876	9707.5	3.87
205	10000	5369	5303.4	4.41
156/140	2	0.770 %	0.788 %	14.44
70/140	5	3.109 %	2.741 %	8.33
115	100	41	50.7	15.47
165	20	4	5.6	47.68

Integration Time [sec] 0.10

Plasma Parameters

RF Power	1550	W	Carrier Gas	0.70	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			

Lenses Parameters

Extract 1	1.0	V	Omega Lens	9.9	V
Extract 2	-160.0	V	Cell Entrance	-30	V
Omega Bias	-80	V	Cell Exit	-50	V
Deflect	13.6	V			

Cell Parameters

Use Gas	false		3rd Gas Flow	0	%
He Flow	0.0	mL/min	OctP Bias	-8.0	V
H2 Flow	0.0	mL/min	OctP RF	190	V
Energy Discrimination	5.0	V			

Qpole Parameters

Mass Gain	124		Axis Gain	0.9998	
Mass Offset	135		Axis Offset	-0.02	
QP Bias	-3.0	V			

Torch Axis Parameters

Torch H	0.2	mm	Torch V	0.5	mm

EM Parameters

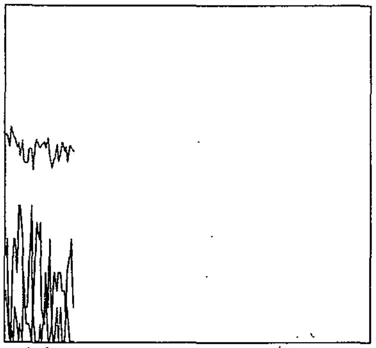
Discriminator	5.6	mV	Analog HV	1777	V
Pulse HV	1568	V			

Meters

IF/BK Press	2.47E+2	Pa	Ar Gas Tank Press	7.94E+2	kPa
Analyzer Press	2.16E-4	Pa	Reflected Power	15	W
Forward Power	1548	W			

Current Signal

[He]



Mass	Range	Count	Avg. Count	RSD [%]
59	2000	1122	1140.0	5.29
89	1000	623	707.1	6.20
140	5000	2599	2764.0	4.31
205	5000	2655	2758.8	3.87
156/140	2	0.462 %	0.524 %	29.22
75	20	2	4.0	57.47
78	20	0	0.9	121.29
Integration Time [sec]		0.10		

Plasma Parameters

RF Power	1550	W	Carrier Gas	0.70	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			

Lenses Parameters

Extract 1	1.0	V	Omega Lens	9.9	V
Extract 2	-160.0	V	Cell Entrance	-40	V
Omega Bias	-80	V	Cell Exit	-60	V
Deflect	1.0	V			

Cell Parameters

Use Gas	true		3rd Gas Flow	0	%
He Flow	4.6	mL/min	OctP Bias	-19.0	V
H2 Flow	0.0	mL/min	OctP RF	190	V
Energy Discrimination	5.0	V			

Qpole Parameters

Mass Gain	128		Axis Gain	0.9993	
Mass Offset	126		Axis Offset	0.09	
QP Bias	-14.0	V			

Torch Axis Parameters

Torch H	0.2	mm	Torch V	0.5	mm

EM Parameters

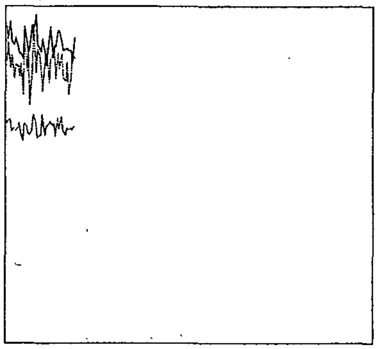
Discriminator	5.6	mV	Analog HV	1777	V
Pulse HV	1568	V			

Meters

IF/BK Press	2.48E+2	Pa	Ar Gas Tank Press	7.93E+2	kPa
Analyzer Press	3.39E-4	Pa	Reflected Power	16	W
Forward Power	1546	W			

Current Signal

[H2]



Mass	Range	Count	Avg. Count	RSD [%]
59	1000	844	824.7	6.23
89	10000	6401	6354.1	3.12
140	10000	4832	4962.5	3.47
205	5000	4549	4460.5	4.06
56	50000	8887	9736.4	21.16
78	20	0	0.7	139.99
80	100	43	45.9	20.38

Integration Time [sec] 0.10

Plasma Parameters

RF Power	1550	W	Carrier Gas	0.70	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			

Lenses Parameters

Extract 1	1.0	V	Omega Lens	9.9	V
Extract 2	-160.0	V	Cell Entrance	-30	V
Omega Bias	-80	V	Cell Exit	-60	V
Deflect	-1.6	V			

Cell Parameters

Use Gas	true		3rd Gas Flow	0	%
He Flow	0.0	mL/min	OctP Bias	-18.0	V
H2 Flow	5.2	mL/min	OctP RF	190	V
Energy Discrimination	3.0	V			

Qpole Parameters

Mass Gain	128		Axis Gain	0.9993	
Mass Offset	126		Axis Offset	0.09	
QP Bias	-15.0	V			

Torch Axis Parameters

Torch H	0.2	mm	Torch V	0.5	mm

EM Parameters

Discriminator	5.6	mV	Analog HV	1777	V
Pulse HV	1568	V			

Meters

IF/BK Press	2.53E+2	Pa	Ar Gas Tank Press	7.93E+2	kPa
Analyzer Press	1.10E-3	Pa	Reflected Power	16	W
Forward Power	1548	W			

US EPA Tune Check Sample Report

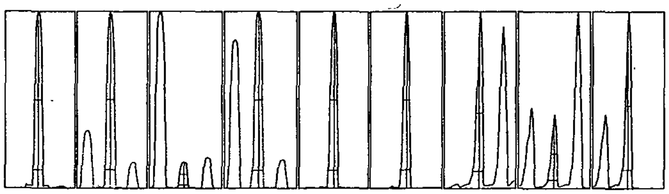
Batch Folder C:\Agilent\ICPMH\1\DATA\180914A.b
Report Comment C:\Agilent\ICPMH\Report Templates\en\Letter\Tune Report\New and Improved 200_8TuneCheckSampleReport.xltx
Instrument Name G3281A JP12101628

[NoGas]

Mass	Count (Mean)	RSD% (Actual)	RSD% (Required)	RSD% (Flag)
9	333540	1.37	5.00	
24	1230814	0.65	5.00	
25	178987	1.23	5.00	
26	211730	1.02	5.00	
59	2403852	0.69	5.00	
115	3007771	0.33	5.00	
206	660953	0.86	5.00	
207	597722	3.75	5.00	
208	1310146	1.15	5.00	

Mass	Replicate 1 Count	Replicate 2 Count	Replicate 3 Count	Replicate 4 Count	Replicate 5 Count
9	333090	328714	329580	338958	337357
24	1238741	1235399	1235470	1223483	1220975
25	176250	181360	181125	177768	178434
26	208518	213753	213429	210703	212244
59	2402854	2405219	2425076	2407681	2378432
115	3020709	3005218	3004629	3013834	2994467
206	667690	661868	661634	661656	651916
207	609359	627007	566690	591195	594358
208	1329583	1300292	1304297	1322299	1294260

Integration Time [sec] = 0.1



Mass	Peak Height	Axis (Actual)	Axis (Required)	Axis (Flag)	Width-X% (Actual)	Width-X% (Required)	Width-X% (Flag)
9	90011	8.95	8.9 - 9.1		0.470	0.900	
24	342042	23.95	23.9 - 24.1		0.474	0.900	
25	50274	24.95	24.9 - 25.1		0.439	0.900	
26	59603	25.95	25.9 - 26.1		0.486	0.900	
59	715110	59.00	58.9 - 59.1		0.458	0.900	
115	1065480	115.05	114.9 - 115.1		0.438	0.900	
206	190928	206.00	205.9 - 206.1		0.480	0.900	
207	192090	207.00	206.9 - 207.1		0.458	0.900	
208	461264	208.00	207.9 - 208.1		0.449	0.900	

X% = 10 **Integration Time [sec] =** 0.1 **Acquisition Time [sec] =** 235 **Y Axis =** Linear

Tune Parameters
Plasma Paramters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
RF Power	1550	W	Carrier Gas	0.89	L/min			
RF Matching	1.50	V	Option Gas	0.0	%			
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps			
S/C Temp	2	°C						

Lenses Parameters

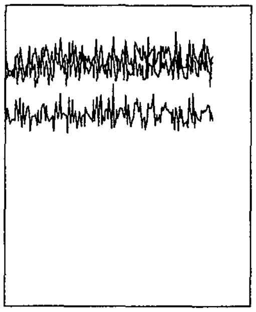
ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Extract 1	1.0	V	Omega Lens	10.0	V			
Extract 2	-195.0	V	Cell Entrance	-30	V			
Omega Bias	-95	V	Cell Exit	-50	V			
Deflect	14.0	V						

Cell Parameters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Use Gas	false		3rd Gas Flow	0	%			
He Flow	0.0	mL/min	OctP Bias	-8.0	V			
H2 Flow	0.0	mL/min	OctP RF	200	V			
Energy Discrimination	5.0	V						

Current Signal

[NoGas]



Mass	Range	Count	Avg. Count	RSD [%]
7	5000	3099	3188.2	4.80
59	10000	8115	8271.2	4.05
89	20000	12884	13137.9	3.75
140	20000	15502	15257.4	3.73
205	10000	8324	7947.7	4.03
156/140	2	0.729 %	0.897 %	11.20
70/140	5	1.948 %	2.459 %	8.00
115	100	27	30.3	25.49
165	50	30	29.6	20.90
Integration Time [sec]		0.10		

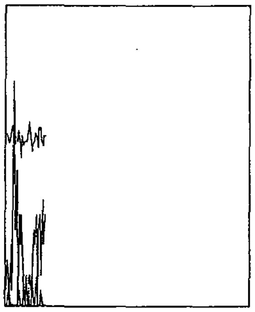
## Plasma Parameters ##					
RF Power	1550	W	Carrier Gas	0.89	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			
## Lenses Parameters ##					
Extract 1	1.0	V	Omega Lens	10.0	V
Extract 2	-195.0	V	Cell Entrance	-30	V
Omega Bias	-95	V	Cell Exit	-50	V
Deflect	14.0	V			
## Cell Parameters ##					
Use Gas	false		3rd Gas Flow	0	%
He Flow	0.0	mL/min	OctP Bias	-8.0	V
H2 Flow	0.0	mL/min	OctP RF	200	V
Energy Discrimination	5.0	V			
## Qpole Parameters ##					
Mass Gain	124		Axis Gain	0.9998	
Mass Offset	135		Axis Offset	-0.02	
QP Bias	-3.0	V			
## Torch Axis Parameters ##					
Torch H	0.2	mm	Torch V	0.5	mm
## EM Parameters ##					
Discriminator	5.1	mV	Analog HV	1811	V
Pulse HV	1558	V			

Meters

IF/BK Press	2.39E+2	Pa	Ar Gas Tank Press	7.94E+2	kPa
Analyzer Press	2.14E-4	Pa	Reflected Power	19	W
Forward Power	1551	W			

Current Signal

[He]



Mass	Range	Count	Avg. Count	RSD [%]
59	2000	1130	1113.4	4.82
89	500	392	375.5	7.24
140	5000	2078	2034.3	4.03
205	5000	2447	2478.3	4.99
156/140	1	0.481 %	0.380 %	39.06
75	20	6	3.8	90.75
78	20	0	0.4	192.23

Integration Time [sec] 0.10

Plasma Parameters

RF Power	1550	W	Carrier Gas	0.89	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			

Lenses Parameters

Extract 1	1.0	V	Omega Lens	10.0	V
Extract 2	-195.0	V	Cell Entrance	-40	V
Omega Bias	-95	V	Cell Exit	-60	V
Deflect	0.4	V			

Cell Parameters

Use Gas	true		3rd Gas Flow	0	%
He Flow	5.5	mL/min	OctP Bias	-19.0	V
H2 Flow	0.0	mL/min	OctP RF	200	V
Energy Discrimination	5.0	V			

Qpole Parameters

Mass Gain	128		Axis Gain	0.9993	
Mass Offset	126		Axis Offset	0.09	
QP Bias	-14.0	V			

Torch Axis Parameters

Torch H	0.2	mm	Torch V	0.5	mm

EM Parameters

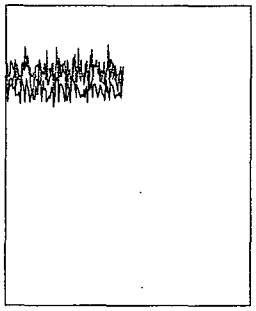
Discriminator	5.1	mV	Analog HV	1811	V
Pulse HV	1558	V			

Meters

IF/BK Press	2.41E+2	Pa	Ar Gas Tank Press	7.94E+2	kPa
Analyzer Press	3.71E-4	Pa	Reflected Power	19	W
Forward Power	1549	W			

Current Signal

[H2]



Mass	Range	Count	Avg. Count	RSD [%]
59	1000	763	774.6	5.35
89	10000	7978	7819.1	3.60
140	5000	3858	3676.1	4.26
205	10000	7568	7166.9	3.71
56	50000	8897	9391.3	15.14
78	20	0	0.3	234.48
80	100	30	32.9	22.88

Integration Time [sec] 0.10

Plasma Parameters

RF Power	1550	W	Carrier Gas	0.89	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			

Lenses Parameters

Extract 1	1.0	V	Omega Lens	10.0	V
Extract 2	-195.0	V	Cell Entrance	-30	V
Omega Bias	-95	V	Cell Exit	-60	V
Deflect	-1.6	V			

Cell Parameters

Use Gas	true		3rd Gas Flow	0	%
He Flow	0.0	mL/min	OctP Bias	-18.0	V
H2 Flow	6.0	mL/min	OctP RF	200	V
Energy Discrimination	3.0	V			

Qpole Parameters

Mass Gain	128		Axis Gain	0.9993	
Mass Offset	126		Axis Offset	0.09	
QP Bias	-15.0	V			

Torch Axis Parameters

Torch H	0.2	mm	Torch V	0.5	mm

EM Parameters

Discriminator	5.1	mV	Analog HV	1811	V
Pulse HV	1558	V			

Meters

IF/BK Press	2.46E+2	Pa	Ar Gas Tank Press	7.95E+2	kPa
Analyzer Press	1.23E-3	Pa	Reflected Power	19	W
Forward Power	1552	W			

US EPA Tune Check Sample Report

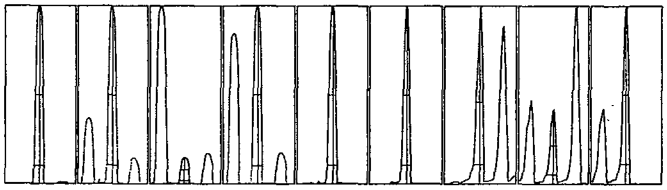
Batch Folder C:\Agilent\ICPMH\1\DATA\180918A.b
Report Comment C:\Agilent\ICPMH\Report Templates\en\Letter\Tune Report\New and Improved 200_8TuneCheckSampleReport.xltx
Instrument Name G3281A JP12101628

[NoGas]

Mass	Count (Mean)	RSD% (Actual)	RSD% (Required)	RSD% (Flag)
9	309467	0.55	5.00	
24	918427	0.46	5.00	
25	135474	0.22	5.00	
26	160372	0.55	5.00	
59	1630063	0.38	5.00	
115	2232533	0.56	5.00	
206	573364	0.72	5.00	
207	526067	1.87	5.00	
208	1118757	0.37	5.00	

Mass	Replicate 1 Count	Replicate 2 Count	Replicate 3 Count	Replicate 4 Count	Replicate 5 Count
9	309345	307432	312084	309651	308823
24	912955	920660	915659	923770	919090
25	135423	135802	135416	135029	135699
26	160353	161268	158976	160276	160984
59	1619860	1633029	1635712	1632604	1629109
115	2234754	2243911	2222989	2216329	2244683
206	577167	574318	570041	577140	568153
207	512959	518806	529175	533668	535725
208	1120969	1117284	1122208	1112227	1121098

Integration Time [sec] = 0.1



Mass	Peak Height	Axis (Actual)	Axis (Required)	Axis (Flag)	Width-X% (Actual)	Width-X% (Required)	Width-X% (Flag)
9	85226	9.00	8.9 - 9.1		0.462	0.900	
24	249433	24.00	23.9 - 24.1		0.500	0.900	
25	36361	24.95	24.9 - 25.1		0.452	0.900	
26	42726	26.00	25.9 - 26.1		0.476	0.900	
59	495013	59.05	58.9 - 59.1		0.465	0.900	
115	780831	115.05	114.9 - 115.1		0.435	0.900	
206	172125	206.00	205.9 - 206.1		0.489	0.900	
207	167036	207.00	206.9 - 207.1		0.498	0.900	
208	399039	208.00	207.9 - 208.1		0.462	0.900	

X% = 10 **Integration Time [sec] =** 0.1 **Acquisition Time [sec] =** 235 **Y Axis =** Linear

Tune Parameters
Plasma Paramters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
RF Power	1550	W	Carrier Gas	0.69	L/min			
RF Matching	1.50	V	Option Gas	0.0	%			
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps			
S/C Temp	2	°C						

Lenses Parameters

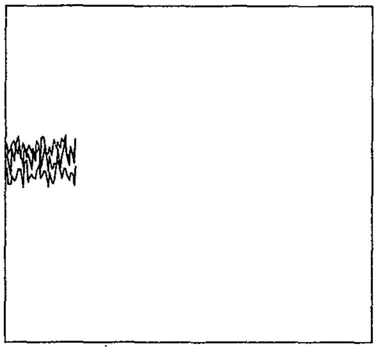
ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Extract 1	1.0	V	Omega Lens	10.5	V			
Extract 2	-200.0	V	Cell Entrance	-30	V			
Omega Bias	-105	V	Cell Exit	-50	V			
Deflect	14.0	V						

Cell Parameters

ParameterName	Value	Unit	ParameterName	Value	Unit	ParameterName	Value	Unit
Use Gas	false		3rd Gas Flow	0	%			
He Flow	0.0	mL/min	OctP Bias	-8.0	V			
H2 Flow	0.0	mL/min	OctP RF	170	V			
Energy Discrimination	5.0	V						

Current Signal

[NoGas]



Mass	Range	Count	Avg. Count	RSD [%]
7	5000	2920	2737.3	5.03
59	10000	5165	4922.5	4.53
89	10000	8989	8163.7	4.30
140	20000	10667	10112.4	3.86
205	10000	6008	5736.6	3.88
156/140	2	0.966 %	0.804 %	14.85
70/140	5	2.213 %	2.176 %	10.81
115	100	26	34.8	20.82
165	50	23	18.2	30.47

Integration Time [sec] 0.10

Plasma Parameters

RF Power	1550	W	Carrier Gas	0.69	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			

Lenses Parameters

Extract 1	1.0	V	Omega Lens	10.5	V
Extract 2	-200.0	V	Cell Entrance	-30	V
Omega Bias	-105	V	Cell Exit	-50	V
Deflect	14.0	V			

Cell Parameters

Use Gas	false		3rd Gas Flow	0	%
He Flow	0.0	mL/min	OctP Bias	-8.0	V
H2 Flow	0.0	mL/min	OctP RF	170	V
Energy Discrimination	5.0	V			

Qpole Parameters

Mass Gain	124		Axis Gain	0.9998	
Mass Offset	135		Axis Offset	-0.02	
QP Bias	-3.0	V			

Torch Axis Parameters

Torch H	0.2	mm	Torch V	0.5	mm

EM Parameters

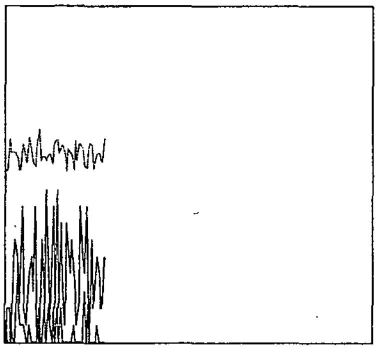
Discriminator	5.3	mV	Analog HV	1829	V
Pulse HV	1588	V			

Meters

IF/BK Press	2.42E+2	Pa	TMP Revolution	100.0	%
Analyzer Press	2.24E-4	Pa	Reflected Power	15	W
Forward Power	1550	W			

Current Signal

[He]



Mass	Range	Count	Avg. Count	RSD [%]
59	2000	1209	1114.2	5.58
89	1000	733	664.8	6.66
140	5000	2874	2794.4	4.05
205	5000	2943	2917.9	3.98
156/140	1	0.626 %	0.511 %	32.08
75	20	5	3.9	63.86
78	20	0	0.6	161.00
Integration Time [sec]		0.10		

Plasma Parameters

RF Power	1550	W	Carrier Gas	0.69	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			

Lenses Parameters

Extract 1	1.0	V	Omega Lens	10.5	V
Extract 2	-200.0	V	Cell Entrance	-40	V
Omega Bias	-105	V	Cell Exit	-60	V
Deflect	1.2	V			

Cell Parameters

Use Gas	true		3rd Gas Flow	0	%
He Flow	4.7	mL/min	OctP Bias	-19.0	V
H2 Flow	0.0	mL/min	OctP RF	170	V
Energy Discrimination	5.0	V			

Qpole Parameters

Mass Gain	128		Axis Gain	0.9993	
Mass Offset	126		Axis Offset	0.09	
QP Bias	-14.0	V			

Torch Axis Parameters

Torch H	0.2	mm	Torch V	0.5	mm

EM Parameters

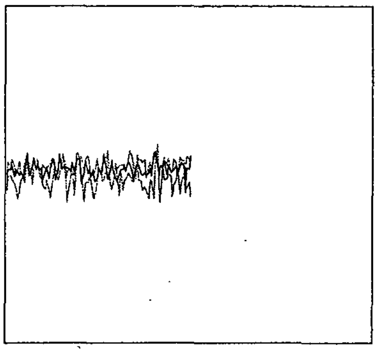
Discriminator	5.3	mV	Analog HV	1829	V
Pulse HV	1588	V			

Meters

IF/BK Press	2.42E+2	Pa	TMP Revolution	100.0	%
Analyzer Press	2.33E-4	Pa	Reflected Power	15	W
Forward Power	1551	W			

Current Signal

[H2]



Mass	Range	Count	Avg. Count	RSD [%]
59	1000	431	481.8	7.33
89	10000	5407	5254.6	3.91
140	5000	2975	2825.6	4.14
205	10000	5502	5125.8	4.07
56	20000	7362	6869.5	11.04
78	20	1	0.5	182.85
80	100	56	47.5	19.77

Integration Time [sec] 0.10

Plasma Parameters

RF Power	1550	W	Carrier Gas	0.69	L/min
RF Matching	1.50	V	Option Gas	0.0	%
Smpl Depth	8.0	mm	Nebulizer Pump	0.10	rps
S/C Temp	2	°C			

Lenses Parameters

Extract 1	1.0	V	Omega Lens	10.5	V
Extract 2	-200.0	V	Cell Entrance	-30	V
Omega Bias	-105	V	Cell Exit	-60	V
Deflect	-2.0	V			

Cell Parameters

Use Gas	true		3rd Gas Flow	0	%
He Flow	0.0	mL/min	OctP Bias	-18.0	V
H2 Flow	6.0	mL/min	OctP RF	170	V
Energy Discrimination	3.0	V			

Qpole Parameters

Mass Gain	128		Axis Gain	0.9993	
Mass Offset	126		Axis Offset	0.09	
QP Bias	-15.0	V			

Torch Axis Parameters

Torch H	0.2	mm	Torch V	0.5	mm

EM Parameters

Discriminator	5.3	mV	Analog HV	1829	V
Pulse HV	1588	V			

Meters

IF/BK Press	2.50E+2	Pa	TMP Revolution	100.0	%
Analyzer Press	1.26E-3	Pa	Reflected Power	16	W
Forward Power	1550	W			

ICP-MS Calibration Standard Prep

Prepared: 09/13/18
Expires: 09/20/18
1% HNO3 / 1%HCl Prep: 09/07/18

Prepared By (Initials): EJ

Calibration Standard 4

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
Solution A	Texas Scientific	HP1810-250	200 - 5000	m2meb662248-38391	10/11/20	50uL			100 - 2500
Solution B	Texas Scientific	HP1810-250	4000 - 10,000	m2meb662249-38389	10/11/20	50uL	100mL	1% HNO3 / 1%HCl	2000 - 5000
Solution C	Texas Scientific	HP1810-250	100 - 200	m2meb662250-38394	10/11/20	50uL			50 - 100

Calibration Standards 1,2,3

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/mL)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
ICP-MS Calib Standard 4	Texas Scientific	Standard 1	0.05 - 5.0			50uL			0.05 - 5.0
ICP-MS Calib Standard 4	Texas Scientific	Standard 2	0.05 - 5.0	Prepared 09/13/18	09/20/18	500uL	50mL	1% HNO3 / 1%HCl	0.5 - 50
ICP-MS Calib Standard 4	Texas Scientific	Standard 3	0.05 - 5.0			25mL			25 - 2500

ICP-MS Low Levels (LLICV)

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
LLICV 0.5ppb	Texas Scientific	Standard 2	0.5 - 50	Prepared 09/13/18	09/20/18	5mL	10mL	1% HNO3 / 1%HCl	0.25 - 25
LLICV 1.0ppb	Texas Scientific	Standard 2	0.5 - 50	Prepared 09/13/18	09/20/18	10mL	10mL	1% HNO3 / 1%HCl	0.5 - 50
LLICV 2.0ppb	Texas Scientific	Standard 3	25 - 2500	Prepared 09/13/18	09/20/18	400uL	10mL	1% HNO3 / 1%HCl	1 - 100
LLICV 4.0ppb	Texas Scientific	Standard 4	50 - 5000	Prepared 09/13/18	09/20/18	400uL	10mL	1% HNO3 / 1%HCl	2 - 200

ICP-MS ICV (SS)

Prepared: 09/13/18
Expires: 09/20/18
1% HNO3 / 1%HCl Prep: 09/07/18

Prepared By (Initials): EJ

ICP-MS ICV 1

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
QCS ICV Soln A	CPI	4400-070615RH01	50 - 500	10062445-5-39194	11/25/19	25uL	10mL	1% HNO3 / 1%HCl	25 - 1125
QCS ICV Soln B	CPI	4400-070615RH01	2500	10062445-6-39195	11/25/19	25uL			1125

ICP-MS ICV 2

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
Custom 23 Element Mix #314	O2SI	161314-01-03	50 - 250	10064561-8-39085	10/19/19	100uL	10mL	1% HNO3 / 1%HCl	500- 2500
Custom 23 Element Mix #315	O2SI	161314-01-03	10 - 25	10064561-7-39086	10/19/19	100uL			100 - 250

ICP-MS Interference Check Solution A

Prepared: 09/13/18
Expires: 09/20/18
1% HNO3 / 1%HCl Prep: 09/07/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (ug/mL)
ICSA	Inorganic Ventures	6020ICS-0A-125mL	20 - 1000	M2-MEB662772-38793	04/18/19	1mL (DF2)	10mL	1% HNO3 / 1%HCl	2 - 100

ICP-MS Interference Check Solution AB

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (ug/mL)
ICSA	Inorganic Ventures	6020ICS-0A-125mL	20 - 1000	K2-MEB651985-37768	10/04/20	1mL (DF2)	10mL	1% HNO3 / 1%HCl	2-100
Special Mix (Interference)	O2SI	160495-01-01	100	1097850-37132	10/20/18	100uL			1

ICP-MS Internal Standards

Prepared: 08/26/18
Expires: 11/24/18
1% HNO3 / 1%HCl Prep: 08/22/18

Prepared By (Initials): MM

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Lithium	Inorganic Ventures	35-APPLTSP-ISMIX	10000	N2-MEB667982-39122	07/13/19	2.5mL	250mL	1% HNO3 / 1%HCL	100
Scandium			50000						500
Germanium			50000						500
Indium			50000						500
Terbium			50000						500
Holmium			50000						500

ICP-MS Agilent Tune

Prepared: 09/10/18
Expires: 12/09/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc.(ug/L)
Tuning Solution, 5-25	o2si	160637-01-03	10	10070923-1-38610	05/16/19	10mL	100mL	DI Water	1

ICP-MS P/A Tune

Prepared: 06/20/18
Expires: 12/17/18
1% HNO3 / 1%HCl Prep: 06/19/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc.Range (mg/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (mg/L)
Tuning Solution #1	o2si	160812-01-01	2.5 - 20	10077126-1-38997	09/23/19	2.5mL	250mL	1% HNO3 / 1%HCL	0.025-0.2
Tuning Solution #2	o2si	160813-01-01	5 - 10	10077126-2-38996	09/23/19	2.5mL			0.05-0.1

ICP-MS EPA Tune

Prepared: 08/29/18
Expires: 08/06/19
1% HNO3 / 1%HCl Prep: 08/22/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc (ug/L)
Beryllium	Inorganic Ventures	35-APPLTSP-TUNE	10	N2-MEB6700091-39415	08/06/19	500uL	50mL	1% HNO3 / 1%HCL	100
Magnesium									
Cobalt									
Indium									
Lead									

ICP-MS Calibration Standard Prep

Prepared: 09/14/18
Expires: 09/21/18
1% HNO3 / 1%HCl Prep: 09/13/18

Prepared By (Initials): MM

Calibration Standard 4

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
Solution A	Texas Scientific	HP1810-250	200 - 5000	m2meb662248-38391	10/11/20	50uL	100mL	1% HNO3 / 1%HCl	100 - 2500
Solution B	Texas Scientific	HP1810-250	4000 - 10,000	m2meb662249-38389	10/11/20	50uL			2000 - 5000
Solution C	Texas Scientific	HP1810-250	100 - 200	m2meb662250-38394	10/11/20	50uL			50 - 100

Calibration Standards 1,2,3

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/mL)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
ICP-MS Calib Standard 4	Texas Scientific	Standard 1	0.05 - 5.0	Prepared 09/14/18	09/21/18	50uL	50mL	1% HNO3 / 1%HCl	0.05 - 5.0
ICP-MS Calib Standard 4	Texas Scientific	Standard 2	0.05 - 5.0			500uL			0.5 - 50
ICP-MS Calib Standard 4	Texas Scientific	Standard 3	0.05 - 5.0			25mL			25 - 2500

ICP-MS Low Levels (LLICV)

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
LLICV 0.5ppb	Texas Scientific	Standard 2	0.5 - 50	Prepared 09/14/18	09/21/18	5mL	10mL	1% HNO3 / 1%HCl	0.25 - 25
LLICV 1.0ppb	Texas Scientific	Standard 2	0.5 - 50	Prepared 09/14/18	09/21/18	10mL	10mL	1% HNO3 / 1%HCl	0.5 - 50
LLICV 2.0ppb	Texas Scientific	Standard 3	25 - 2500	Prepared 09/14/18	09/21/18	400uL	10mL	1% HNO3 / 1%HCl	1 - 100
LLICV 4.0ppb	Texas Scientific	Standard 4	50 - 5000	Prepared 09/14/18	09/21/18	400uL	10mL	1% HNO3 / 1%HCl	2 - 200

ICP-MS ICV (SS)

Prepared: 09/14/18
Expires: 09/21/18
1% HNO3 / 1%HCl Prep: 09/13/18

Prepared By (Initials): MM

ICP-MS ICV 1

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
QCS ICV Soln A	CPI	4400-070615RH01	50 - 500	10062445-5-39194	11/25/19	25uL	10mL	1% HNO3 / 1%HCl	25 - 1125
QCS ICV Soln B	CPI	4400-070615RH01	2500	10062445-6-39195	11/25/19	25uL			1125

ICP-MS ICV 2

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
Custom 23 Element Mix #314	O2SI	161314-01-03	50 - 250	10064561-8-39085	10/19/19	100uL	10mL	1% HNO3 / 1%HCl	500- 2500
Custom 23 Element Mix #315	O2SI	161314-01-03	10 - 25	10064561-7-39086	10/19/19	100uL			100 - 250

ICP-MS Interference Check Solution A

Prepared: 09/14/18
Expires: 09/21/18
1% HNO3 / 1%HCl Prep: 09/13/18

Prepared By (Initials): MM

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (ug/mL)
ICSA	Inorganic Ventures	6020ICS-0A-125mL	20 - 1000	M2-MEB662772-38793	04/18/19	1mL (DF2)	10mL	1% HNO3 / 1%HCl	2 - 100

ICP-MS Interference Check Solution AB

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (ug/mL)
ICSA	Inorganic Ventures	6020ICS-0A-125mL	20 - 1000	K2-MEB651985-37768	10/04/20	1mL (DF2)	10mL	1% HNO3 / 1%HCl	2-100
Special Mix (Interference)	O2SI	160495-01-01	100	1097850-37132	10/20/18	100uL			1

ICP-MS Internal Standards

Prepared: 08/26/18
Expires: 11/24/18
1% HNO3 / 1%HCl Prep: 08/22/18

Prepared By (Initials): MM

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Lithium	Inorganic Ventures	35-APPLTSP-ISMIX	10000	N2-MEB667982-39122	07/13/19	2.5mL	250mL	1% HNO3 / 1%HCL	100
Scandium			50000						500
Germanium			50000						500
Indium			50000						500
Terbium			50000						500
Holmium			50000						500

ICP-MS Agilent Tune

Prepared: 09/10/18
Expires: 12/09/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc.(ug/L)
Tuning Solution, 5-25	o2si	160637-01-03	10	10070923-1-38610	05/16/19	10mL	100mL	DI Water	1

ICP-MS P/A Tune

Prepared: 06/20/18
Expires: 12/17/18
1% HNO3 / 1%HCl Prep: 06/19/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc.Range (mg/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (mg/L)
Tuning Solution #1	o2si	160812-01-01	2.5 - 20	10077126-1-38997	09/23/19	2.5mL	250mL	1% HNO3 / 1%HCL	0.025-0.2
Tuning Solution #2	o2si	160813-01-01	5 - 10	10077126-2-38996	09/23/19	2.5mL			0.05-0.1

ICP-MS EPA Tune

Prepared: 08/29/18
Expires: 08/06/19
1% HNO3 / 1%HCl Prep: 08/22/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc (ug/L)
Beryllium	Inorganic Ventures	35-APPLTSP-TUNE	10	N2-MEB6700091-39415	08/06/19	500uL	50mL	1% HNO3 / 1%HCL	100
Magnesium									
Cobalt									
Indium									
Lead									

ICP-MS Calibration Standard Prep

Prepared: 09/18/18
Expires: 09/25/18
1% HNO3 / 1%HCl Prep: 09/13/18

Prepared By (Initials): EJ

Calibration Standard 4

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
Solution A	Texas Scientific	HP1810-250	200 - 5000	m2meb662248-38391	10/11/20	50uL	100mL	1% HNO3 / 1%HCl	100 - 2500
Solution B	Texas Scientific	HP1810-250	4000 - 10,000	m2meb662249-38389	10/11/20	50uL			2000 - 5000
Solution C	Texas Scientific	HP1810-250	100 - 200	m2meb662250-38394	10/11/20	50uL			50 - 100

Calibration Standards 1,2,3

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/mL)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
ICP-MS Calib Standard 4	Texas Scientific	Standard 1	0.05 - 5.0	Prepared 09/18/18	09/25/18	50uL	50mL	1% HNO3 / 1%HCl	0.05 - 5.0
ICP-MS Calib Standard 4	Texas Scientific	Standard 2	0.05 - 5.0			500uL			0.5 - 50
ICP-MS Calib Standard 4	Texas Scientific	Standard 3	0.05 - 5.0			25mL			25 - 2500

ICP-MS Low Levels (LLICV)

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
LLICV 0.5ppb	Texas Scientific	Standard 2	0.5 - 50	Prepared 09/18/18	09/25/18	5mL	10mL	1% HNO3 / 1%HCl	0.25 - 25
LLICV 1.0ppb	Texas Scientific	Standard 2	0.5 - 50	Prepared 09/18/18	09/25/18	10mL	10mL	1% HNO3 / 1%HCl	0.5 - 50
LLICV 2.0ppb	Texas Scientific	Standard 3	25 - 2500	Prepared 09/18/18	09/25/18	400uL	10mL	1% HNO3 / 1%HCl	1 - 100
LLICV 4.0ppb	Texas Scientific	Standard 4	50 - 5000	Prepared 09/18/18	09/25/18	400uL	10mL	1% HNO3 / 1%HCl	2 - 200

ICP-MS ICV (SS)

Prepared: 09/18/18
Expires: 09/25/18
1% HNO3 / 1%HCl Prep: 09/13/18

Prepared By (Initials): EJ

ICP-MS ICV 1

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
QCS ICV Soln A	CPI	4400-070615RH01	50 - 500	10062445-5-39194	11/25/19	25uL	10mL	1% HNO3 / 1%HCl	25 - 1125
QCS ICV Soln B	CPI	4400-070615RH01	2500	10062445-6-39195	11/25/19	25uL			1125

ICP-MS ICV 2

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. Range (ug/L)
Custom 23 Element Mix #314	O2SI	161314-01-03	50 - 250	10064561-8-39085	10/19/19	100uL	10mL	1% HNO3 / 1%HCl	500- 2500
Custom 23 Element Mix #315	O2SI	161314-01-03	10 - 25	10064561-7-39086	10/19/19	100uL			100 - 250

ICP-MS Interference Check Solution A

Prepared: 09/18/18
Expires: 09/25/18
1% HNO3 / 1%HCl Prep: 09/13/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (ug/mL)
ICSA	Inorganic Ventures	6020ICS-0A-125mL	20 - 1000	M2-MEB662772-38793	04/18/19	1mL (DF2)	10mL	1% HNO3 / 1%HCl	2 - 100

ICP-MS Interference Check Solution AB

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (ug/mL)
ICSA	Inorganic Ventures	6020ICS-0A-125mL	20 - 1000	K2-MEB651985-37768	10/04/20	1mL (DF2)	10mL	1% HNO3 / 1%HCl	2-100
Special Mix (Interference)	O2SI	160495-01-01	100	1097850-37132	10/20/18	100uL			1

ICP-MS Internal Standards

Prepared: 09/18/18
Expires: 12/17/18
1% HNO3 / 1%HCl Prep: 09/13/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc. (ug/mL)
Lithium	Inorganic Ventures	35-APPLTSP-ISMIX	10000	N2-MEB667982-39122	07/13/19	2.5mL	250mL	1% HNO3 / 1%HCL	100
Scandium			50000						500
Germanium			50000						500
Indium			50000						500
Terbium			50000						500
Holmium			50000						500

ICP-MS Agilent Tune

Prepared: 09/10/18
Expires: 12/09/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc (ug/L)
Tuning Solution, 5-25	o2si	160637-01-03	10	10070923-1-38610	05/16/19	10mL	100mL	DI Water	1

ICP-MS P/A Tune

Prepared: 06/20/18
Expires: 12/17/18
1% HNO3 / 1%HCl Prep: 06/19/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc.Range (mg/L)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc Range (mg/L)
Tuning Solution #1	o2si	160812-01-01	2.5 - 20	10077126-1-38997	09/23/19	2.5mL	250mL	1% HNO3 / 1%HCL	0.025-0.2
Tuning Solution #2	o2si	160813-01-01	5 - 10	10077126-2-38996	09/23/19	2.5mL			0.05-0.1

ICP-MS EPA Tune

Prepared: 08/29/18
Expires: 08/06/19
1% HNO3 / 1%HCl Prep: 08/22/18

Prepared By (Initials): EJ

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock	Final Volume	Solvent	Final Standard Conc (ug/L)
Beryllium	Inorganic Ventures	35-APPLTSP-TUNE	10	N2-MEB6700091-39415	08/06/19	500uL	50mL	1% HNO3 / 1%HCL	100
Magnesium									
Cobalt									
Indium									
Lead									

FIMS STOCK STD Prep

Hg STOCK STD

Prepared: 08/28/18 Prepared By (Initials): TH

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
1000ug/mL Mercury Standard	CPI	4400-1000331	1000	**143369-82-38876**	**08/16/19**	1	100	Milipore Water	10,000
Nitric Acid	BDH	txl187003261apl	100%	**1118050-12837**	**05/25/20**	1			1%

Hg STOCK ICV

Prepared: 08/28/18

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
1000ug/mL Mercury Standard	Ultra Sci	IAA-280	1000	**P00139-32881**	**03/31/19**	1	100	Milipore Water	10,000
Nitric Acid	BDH	txl187003261apl	100%	1118050-12837	05/25/20	1			1%

FIMS WORKING STD Prep

Prepared: 09/14/18

Expires: 09/25/18 Prepared By (Initials): TH

Hg WORKING STD

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name/ Supplier P/N#	Conc. Range (ug/mL)	Reference to APPL Prep Date/ Lot Number - QA Number	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
Hg STOCK STD	CPI	Hg STOCK STD	10	Prepared 08/28/18	09/25/18	1	200	Milipore Water	50
Nitric Acid	BDH	txl187003261apl	100%	**1118050-12829**	**05/25/20**	2			1%

Hg WORKING ICV

Prepared: 09/14/18

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name/ Supplier P/N#	Conc. Range (ug/mL)	Reference to APPL Prep Date/ Lot Number - QA Number	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
Hg STOCK ICV	Ultra Sci	Hg STOCK ICV	10	Prepared 08/28/18	09/25/18	1	200	Milipore Water	50
Nitric Acid	BDH	txl187003261apl	100%	1118050-12829	05/25/20	2			1%

FIMS Calibration Curve (245.1/7470)

Prepared: 08/28/18 Prepared By (Initials): TH

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
Hg Working STD	CPI	0	50	Prepared 08/28/18	09/25/18	0	72.25	Digested By 7470. See Reagent Prep **180724**	0
Hg Working STD	CPI	0.2	50	Prepared 08/28/18	09/25/18	0.2	72.25		0.2
Hg Working STD	CPI	0.5	50	Prepared 08/28/18	09/25/18	0.5	72.25		0.5
Hg Working STD	CPI	1.0	50	Prepared 08/28/18	09/25/18	1	72.25		1
Hg Working STD	CPI	2.0	50	Prepared 08/28/18	09/25/18	2	72.25		2
Hg Working STD	CPI	5.0	50	Prepared 08/28/18	09/25/18	5	72.25		5
Hg Working STD	CPI	10	50	Prepared 08/28/18	09/25/18	10	72.25		10
Hg Working ICV	Ultra Sci	ICV	50	Prepared 08/28/18	09/25/18	4	72.25		4

FIMS Calibration Curve (7471)

Prepared: 08/28/18 Prepared By (Initials): TH

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
Hg Working STD	CPI	0	50	Prepared 08/28/18	09/25/18	0	96	Digested By 7471. See Reagent Prep **180724**	0
Hg Working STD	CPI	0.2083	50	Prepared 08/28/18	09/25/18	0.4	96		0.2083
Hg Working STD	CPI	0.5208	50	Prepared 08/28/18	09/25/18	1	96		0.5208
Hg Working STD	CPI	1.0417	50	Prepared 08/28/18	09/25/18	2	96		1.0417
Hg Working STD	CPI	2.0830	50	Prepared 08/28/18	09/25/18	4	96		2.0830
Hg Working STD	CPI	5.2080	50	Prepared 08/28/18	09/25/18	10	96		5.2080
Hg Working STD	CPI	10.417	50	Prepared 08/28/18	09/25/18	20	96		10 4170
Hg Working ICV	Ultra Sci	ICV	50	Prepared 08/28/18	09/25/18	8	96		4.17

FIMS STOCK STD Prep

Hg STOCK STD

Prepared: 08/28/18 Prepared By (Initials): TH

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
1000ug/mL Mercury Standard	CPI	4400-1000331	1000	**143369-82-38876**	**08/16/19**	1	100	Milipore Water	10,000
Nitric Acid	BDH	txl187003261apl	100%	**1118050-12837**	**05/25/20**	1			1%

Hg STOCK ICV

Prepared: 08/28/18

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	Supplier P/N#	Conc. Range (ug/mL)	Lot Number - QA Number	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
1000ug/mL Mercury Standard	Ultra Sci	IAA-280	1000	**P00139-32881**	**03/31/19**	1	100	Milipore Water	10,000
Nitric Acid	BDH	txl187003261apl	100%	1118050-12837	05/25/20	1			1%

FIMS WORKING STD Prep

Prepared: 09/18/18

Expires: 09/25/18 Prepared By (Initials): TH

Hg WORKING STD

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name/ Supplier P/N#	Conc. Range (ug/mL)	Reference to APPL Prep Date/ Lot Number - QA Number	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
Hg STOCK STD	CPI	Hg STOCK STD	10	Prepared 08/28/18	09/25/18	1	200	Milipore Water	50
Nitric Acid	BDH	txl187003261apl	100%	**1118050-12827**	**05/25/20**	2			1%

Hg WORKING ICV

Prepared: 09/18/18

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name/ Supplier P/N#	Conc. Range (ug/mL)	Reference to APPL Prep Date/ Lot Number - QA Number	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
Hg STOCK ICV	Ultra Sci	Hg STOCK ICV	10	Prepared 08/28/18	09/25/18	1	200	Milipore Water	50
Nitric Acid	BDH	txl187003261apl	100%	1118050-12827	05/25/20	2			1%

FIMS Calibration Curve (245.1/7470)

Prepared: 08/28/18 Prepared By (Initials): TH

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc. Range (ug/L)
Hg Working STD	CPI	0	50	Prepared 08/28/18	09/25/18	0	72.25	Digested By 7470. See Reagent Prep **180724**	0
Hg Working STD	CPI	0.2	50	Prepared 08/28/18	09/25/18	0.2	72.25		0.2
Hg Working STD	CPI	0.5	50	Prepared 08/28/18	09/25/18	0.5	72.25		0.5
Hg Working STD	CPI	1.0	50	Prepared 08/28/18	09/25/18	1	72.25		1
Hg Working STD	CPI	2.0	50	Prepared 08/28/18	09/25/18	2	72.25		2
Hg Working STD	CPI	5.0	50	Prepared 08/28/18	09/25/18	5	72.25		5
Hg Working STD	CPI	10	50	Prepared 08/28/18	09/25/18	10	72.25		10
Hg Working ICV	Ultra Sci	ICV	50	Prepared 08/28/18	09/25/18	4	72.25		4

FIMS Calibration Curve (7471)

Prepared: 08/28/18 Prepared By (Initials): TH

Expires: 09/25/18

Initial Standard Information						Final Standard Information			
Name of Initial Standard (QAU Label)	Supplier	APPL Mix Name	Conc. Range (ug/L)	Reference to APPL Prep Date	Exp Date	Aliquot From Stock (mL)	Final Volume (mL)	Solvent	Final Standard Conc Range (ug/L)
Hg Working STD	CPI	0	50	Prepared 08/28/18	09/25/18	0	96	Digested By 7471. See Reagent Prep **180724**	0
Hg Working STD	CPI	0.2083	50	Prepared 08/28/18	09/25/18	0.4	96		0.2083
Hg Working STD	CPI	0.5208	50	Prepared 08/28/18	09/25/18	1	96		0.5208
Hg Working STD	CPI	1.0417	50	Prepared 08/28/18	09/25/18	2	96		1.0417
Hg Working STD	CPI	2.0830	50	Prepared 08/28/18	09/25/18	4	96		2.0830
Hg Working STD	CPI	5.2080	50	Prepared 08/28/18	09/25/18	10	96		5.2080
Hg Working STD	CPI	10.417	50	Prepared 08/28/18	09/25/18	20	96		10.4170
Hg Working ICV	Ultra Sci	ICV	50	Prepared 08/28/18	09/25/18	8	96		4.17

Metals Digestion Worksheet

Method Name 3010A Digestion **Prep Method** M3010 **Set** 180911A **Units** mL

Spikes			
Spiked ID 1	LCSW LOT# 10064561-8-39549		
Spiked ID 2	LCSW LOT# 10064561-7-39550		
Spiked ID 3			
Spiked ID 4			
Spiked By	NM	Date:	09/11/18 10:55:00 AM
Witnessed By	TH	Date:	09/11/18 10:55:00 AM

Starting Temp:	SLOT 56 91C
Ending Temp:	SLOT 56 90C
Temperature Type:	Mod Block
Sufficient Vol for Matrix QC:	YES
End Date/Time	09/11/18 20:16

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	180911A Blk				50mL	50mL	09/11/18 10:55	equip: DEENA
2	180911A LCS		500uL	1+2	50mL	50mL	09/11/18 10:55	equip: DEENA
3	180911A LCSD		500uL	1+2	50mL	50mL	09/11/18 10:55	equip: DEENA
4	AZ79016	AZ79016M01			1mL	50mL	09/11/18 10:55	equip: DEENA 86749 DF 50
5	AZ79017	AZ79017M01			1mL	50mL	09/11/18 10:55	equip: DEENA 86749 DF 50
6	AZ79102	AZ79102W15			50mL	50mL	09/11/18 10:55	equip: DEENA 86751
7	AZ79103	AZ79103W15			50mL	50mL	09/11/18 10:55	equip: DEENA 86751
8	AZ79104	AZ79104W15			50mL	50mL	09/11/18 10:55	equip: DEENA 86751
9	AZ79105	AZ79105W15			50mL	50mL	09/11/18 10:55	equip: DEENA 86751
10	AZ79106	AZ79106W15			50mL	50mL	09/11/18 10:55	equip: DEENA 86751
11	AZ79107	AZ79107W15			50mL	50mL	09/11/18 10:55	equip: DEENA 86751
12	AZ79179	AZ79179W09			50mL	50mL	09/11/18 10:55	equip: DEENA 86766
13	AZ79195	AZ79195W03			50mL	50mL	09/11/18 10:55	equip: DEENA 86772
14	AZ79196	AZ79196W03			50mL	50mL	09/11/18 10:55	equip: DEENA 86772
15	AZ79197	AZ79197W03			50mL	50mL	09/11/18 10:55	equip: DEENA 86772
16	AZ79198	AZ79198W03			50mL	50mL	09/11/18 10:55	equip: DEENA 86772
17	AZ79199	AZ79199W03			50mL	50mL	09/11/18 10:55	equip: DEENA 86772
18	AZ79199 DUP	AZ79199W03			50mL	50mL	09/11/18 10:55	equip: DEENA
19	AZ79199 MS	AZ79199W03	500uL	1+2	50mL	50mL	09/11/18 10:55	equip: DEENA

Solvent and Lot#
HNO3 BDH 1118050 12836
1:1 HCL 8-15-18

Sample COC Transfer	
Sample prep employee Initials	nm
Analyst's initials	PW
Date	9/12/18
Time	0857
Moved to	METALS

Technician's Initials	
Scanned By	nm
Sample Preparation	nm
Digestion	nm
Bring up to volume	nm
Modified	09/11/18 10:20:55 AM

Reviewed By: PW **Date:** 9/12/18

1300

_M3050

Metals Digestion Worksheet

Method Name 3050B Digestion **Prep Method** M3050 **Set** 180911A **Units mL**

Spikes	
Spiked ID 1	LCSW LOT# 10064561-8-39549
Spiked ID 2	LCSW LOT# 10064561-7-39550
Spiked ID 3	
Spiked ID 4	
Spiked By	NM Date: 09/11/18 9:26:00 AM
Witnessed By	MM Date: 09/11/18 9:26:00 AM

Starting Temp:	SLOT 3 94C
Ending Temp:	SLOT 3 93C
Temperature Type:	Mod Block
Sufficient Vol for Matrix QC:	YES
End Date/Time	09/11/18 14:48

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	180911A Blk				1.00g	100mL	09/11/18 9:26	equip: Modblock4
2	180911A LCS		1mL	1+2	1.00g	100mL	09/11/18 9:26	equip: Modblock4
3	AZ79161	AZ79161S01			0.97g	100mL	09/11/18 9:26	equip: Modblock4 86766
4	AZ79162	AZ79162S01			0.97g	100mL	09/11/18 9:26	equip: Modblock4 86766
5	AZ79163	AZ79163S01			0.96g	100mL	09/11/18 9:26	equip: Modblock3 86766
6	AZ79164	AZ79164S01			0.99g	100mL	09/11/18 9:26	equip: Modblock4 86766
7	AZ79165	AZ79165S01			0.97g	100mL	09/11/18 9:26	equip: Modblock4 86766
8	AZ79166	AZ79166S01			1.00g	100mL	09/11/18 9:26	equip: Modblock4 86766
9	AZ79166 MS	AZ79166S01	2mL	1+2	1.00g	100mL	09/11/18 9:26	equip: Modblock4
10	AZ79166 MSD	AZ79166S01	2mL	1+2	1.00g	100mL	09/11/18 9:26	equip: Modblock4
11	AZ79167	AZ79167S01			0.99g	100mL	09/11/18 9:26	equip: Modblock4 86766
12	AZ79168	AZ79168S01			1.05g	100mL	09/11/18 9:26	equip: Modblock4 86766
13	AZ79169	AZ79169S01			1.00g	100mL	09/11/18 9:26	equip: Modblock4 86766
14	AZ79170	AZ79170S01			1.01g	100mL	09/11/18 9:26	equip: Modblock4 86766
15	AZ79171	AZ79171S01			0.98g	100mL	09/11/18 9:26	equip: Modblock4 86766
16	AZ79172	AZ79172S01			0.98g	100mL	09/11/18 9:26	equip: Modblock4 86766
17	AZ79173	AZ79173S01			0.95g	100mL	09/11/18 9:26	equip: Modblock4 86766
18	AZ79174	AZ79174S01			1.02g	100mL	09/11/18 9:26	equip: Modblock4 86766
19	AZ79175	AZ79175S01			0.96g	100mL	09/11/18 9:26	equip: Modblock4 86766
20	AZ79176	AZ79176S01			1.06g	100mL	09/11/18 9:26	equip: Modblock4 86766
21	AZ79177	AZ79177S01			0.96g	100mL	09/11/18 9:26	equip: Modblock4 86766
22	AZ79178	AZ79178S01			1.02g	100mL	09/11/18 9:26	equip: Modblock4 86766

Solvent and Lot#
1:1 HNO3 8-15-18
HNO3 BDH 1118050 12836
H2O2 206292
HCL BDH 4118050 12974

Sample COC Transfer	
Sample prep employee Initials	nm
Analyst's initials	EJ
Date	9/13/18
Time	10:00
Moved to	metals

Technicians Initials	
Scanned By	nm
Sample Preparation	nm
Digestion	nm
Bring up to volume	nm
Modified	09/11/18 3:07:59 PM

Reviewed By: EJ 1301 **Date:** 9/19/18

Metals Digestion Worksheet

Method Name 3050B Dig (LOW LEVEL) (MULT IN **Prep Method** M3050LLMIS **Set** 180913A **Units** mL

Spikes	
Spiked ID 1	LCSW LOT#10064561-8-39549
Spiked ID 2	LCSW LOT#10064561-7-39550
Spiked ID 3	ICV SOLUTION A #10062445-5-39194
Spiked ID 4	ICV SOLUTION B #10062445-6-39195
Spiked By	NM Date: 09/13/18 7:36:00 AM
Witnessed By	EJ Date: 09/13/18 7:36:00 AM

Starting Temp:	SLOT 5 90C
Ending Temp:	SLOT 5 94C
Temperature Type:	Mod Block
Sufficient Vol for Matrix QC:	YES
End Date/Time	09/13/18 13:13

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	180913A Blk				10.00g	100mL	09/13/18 7:36	equip: Modblock4
2	180913A LCS		1mL	1+2	10.00g	100mL	09/13/18 7:36	equip: Modblock4
3	180913A LCSD		1mL	1+2	10.00g	100mL	09/13/18 7:36	equip: Modblock4
4	AZ79031	AZ79031S01			9.92g	100mL	09/13/18 7:36	equip: Modblock4 86752
5	AZ79146	AZ79146S01			10.02g	100mL	09/13/18 7:36	equip: Modblock4 86766
6	AZ79147	AZ79147S01			9.95g	100mL	09/13/18 7:36	equip: Modblock4 86766
7	AZ79148	AZ79148S01			10.03g	100mL	09/13/18 7:36	equip: Modblock4 86766
8	AZ79149	AZ79149S01			9.94g	100mL	09/13/18 7:36	equip: Modblock4 86766
9	AZ79149 MS	AZ79149S01	8mL	1+2	9.94g	100mL	09/13/18 7:36	equip: Modblock4
10	AZ79149 MSD	AZ79149S01	8mL	1+2	9.94g	100mL	09/13/18 7:36	equip: Modblock4
11	AZ79150	AZ79150S01			9.95g	100mL	09/13/18 7:36	equip: Modblock4 86766
12	AZ79151	AZ79151S01			9.97g	100mL	09/13/18 7:36	equip: Modblock4 86766
13	AZ79152	AZ79152S01			9.90g	100mL	09/13/18 7:36	equip: Modblock4 86766
14	AZ79153	AZ79153S01			9.92g	100mL	09/13/18 7:36	equip: Modblock4 86766
15	AZ79154	AZ79154S01			10.07g	100mL	09/13/18 7:36	equip: Modblock4 86766
16	AZ79155	AZ79155S01			9.94g	100mL	09/13/18 7:36	equip: Modblock4 86766
17	AZ79156	AZ79156S01			10.02g	100mL	09/13/18 7:36	equip: Modblock4 86766
18	AZ79157	AZ79157S01			9.95g	100mL	09/13/18 7:36	equip: Modblock4 86766
19	AZ79158	AZ79158S01			9.93g	100mL	09/13/18 7:36	equip: Modblock4 86766
20	AZ79159	AZ79159S01			9.91g	100mL	09/13/18 7:36	equip: Modblock4 86766
21	AZ79160	AZ79160S01			9.92g	100mL	09/13/18 7:36	equip: Modblock4 86766

Solvent and Lot#
1:1 HNO3 8-15-18
HNO3 Na
H2O2 J.T.B 197465
HCL BDH 4118050 12974

Sample COC Transfer	
Sample prep employee Initials	nm
Analyst's initials	EJ
Date	9/14/18
Time	10:00
Moved to	metals

Technician's Initials	
Scanned By	nm
Sample Preparation	nm
Digestion	nm
Bring up to volume	nm
Modified	09/13/18 2:33:26 PM

Reviewed By: EJ **Date:** 9/17/18

Mercury Digestion Worksheet

Method Name 7470A Mercury Digestion **Prep Method** M7470 **Set** 180917B **Units** mL

Spikes	
Spiked ID 1	Hg WORKING STANDARD prep 9-17-18
Spiked ID 2	HG WORKING ICV STANDARD 9-17-18
Spiked ID 3	
Spiked ID 4	
Spiked By	TH Date: 09/17/18 1:40:00 PM
Witnessed By	NM Date: 09/17/18 1:40:00 PM

Mercury Calibration			
Sample	**Spike Amount**	**Spike ID**	**Final Volume**
0 ppb		1	72.25 ml
0.2 ppb	0.2 ml	1	72.25 ml
0.5 ppb	0.5 ml	1	72.25 ml
1 ppb	1 ml	1	72.25 ml
2 ppb	2 ml	1	72.25 ml
5 ppb	5 ml	1	72.25 ml
5 ppb	5 ml	1	72.25 ml
10 ppb	10 ml	1	72.25 ml
ICV	4 ml	2	72.25 ml

Start Date/Time of Calibration 09/17/18 13:40

Starting Temp:	SLOT 8 95C
Ending Temp:	SLOT 8 94C
Temp Type:	Modblock1
End Date/Time	09/17/18 3:57:00 PM

Sufficient Vol for Matrix QC:	Yes

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	180917B Blk				50mL	72.25mL	09/17/18 13:40	equip: Modblock1
2	180917B LCS		4mL	1	50mL	72.25mL	09/17/18 13:40	equip: Modblock1
3	180917B LCSD		4mL	1	50mL	72.25mL	09/17/18 13:40	equip: Modblock1
4	AZ77571		150uL	1	50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86497
5	AZ79016	AZ79016M01			0.5mL	72.25mL	09/17/18 13:40	equip: Modblock1 86749 DF 100
6	AZ79017	AZ79017M01			100uL	72.25mL	09/17/18 13:40	equip: Modblock1 86749 DF 500
7	AZ79102	AZ79102W15			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86751
8	AZ79103	AZ79103W15			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86751
9	AZ79104	AZ79104W15			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86751
10	AZ79105	AZ79105W15			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86751
11	AZ79106	AZ79106W15			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86751
12	AZ79107	AZ79107W15			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86751
13	AZ79179	AZ79179W09			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86766
14	AZ79280	AZ79280W02			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86786
15	AZ79281	AZ79281W02			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86786
16	AZ79282	AZ79282W02			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86786
17	AZ79283	AZ79283W02			50mL	72.25mL	09/17/18 13:40	equip: Modblock1 86786
18	AZ79283 DUP	AZ79283W02			50mL	72.25mL	09/17/18 13:40	equip: Modblock1
19	AZ79283 MS	AZ79283W02	4mL	1	50mL	72.25mL	09/17/18 13:40	equip: Modblock1
20	LOD LCS		400uL	1	50mL	72.25mL	09/17/18 13:40	equip: Modblock1

Solvent and Lot#
HNO3 BDH 1118050 12827
H2SO4 J.T.B. 194786 12849
KMnO4 9-11-18
K2s2o8 7-17-18
Decolorizer 9-7-18

Sample COC Transfer	
Sample prep employee Initials	TH
Analyst's initials	TH
Date	9/14/18
Time	14:40
Moved to	mtms

Technician's Initials	
Scanned By	TH
Sample Preparation	TH
Digestion	TH
Bring up to volume	TH
Modified	09/17/18 1:29:07 PM

Reviewed By: TH 1303 **Date:** 9/14/18

Mercury Digestion Worksheet

Method Name 7471A Mercury Digestion **Prep Method** M7471 **Set** 180911A **Units** mL

Spikes			
Spiked ID 1	Hg WORKING STANDARD PREP 9-11-18		
Spiked ID 2	Hg WORKING ICV PREP 9-11-18		
Spiked ID 3			
Spiked ID 4			
Spiked By	TH	Date:	09/11/18 11:18:00 AM
Witnessed By	NM	Date:	09/11/18 11:18:00 AM

Starting Temp:	SLOT 4 93C
Ending Temp:	SLOT 4 94C
Temp Type:	Modblock1
End Date/Time	09/11/18 12:14:00 PM

Mercury Calibration			
Sample	Spike Amount	Spike ID	Final Volume
0 ppb		1	96 ml
0.2083 ppb	0.4 ml	1	96 ml
0.5208 ppb	1 ml	1	96 ml
1.0417 ppb	2 ml	1	96 ml
2.083 ppb	4ml	1	96 ml
5.208 ppb	10 ml	1	96 ml
5.208 ppb	10 ml	1	96 ml
10.417 ppb	20 ml	1	96 ml
ICV	8 ml	2	96 ml

Start Date/Time of Calibration 09/11/18 11:18

Sufficient Vol for Matrix QC: Yes

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	180911A Blk				0.60g	96mL	09/11/18 11:18	equip: Modblock1
2	180911A LCS		8mL	1	0.60g	96mL	09/11/18 11:18	equip: Modblock1
3	AZ79161	AZ79161S01			0.58g	96mL	09/11/18 11:18	equip: Modblock1 86766
4	AZ79162	AZ79162S01			0.63g	96mL	09/11/18 11:18	equip: Modblock1 86766
5	AZ79163	AZ79163S01			0.64g	96mL	09/11/18 11:18	equip: Modblock1 86766
6	AZ79164	AZ79164S01			0.64g	96mL	09/11/18 11:18	equip: Modblock1 86766
7	AZ79165	AZ79165S01			0.57g	96mL	09/11/18 11:18	equip: Modblock1 86766
8	AZ79166	AZ79166S01			0.65g	96mL	09/11/18 11:18	equip: Modblock1 86766
9	AZ79166 MS	AZ79166S01	8mL	1	0.65g	96mL	09/11/18 11:18	equip: Modblock1
10	AZ79166 MSD	AZ79166S01	8mL	1	0.65g	96mL	09/11/18 11:18	equip: Modblock1
11	AZ79167	AZ79167S01			0.58g	96mL	09/11/18 11:18	equip: Modblock1 86766
12	AZ79168	AZ79168S01			0.59g	96mL	09/11/18 11:18	equip: Modblock1 86766
13	AZ79169	AZ79169S01			0.59g	96mL	09/11/18 11:18	equip: Modblock1 86766
14	AZ79170	AZ79170S01			0.61g	96mL	09/11/18 11:18	equip: Modblock1 86766
15	AZ79171	AZ79171S01			0.64g	96mL	09/11/18 11:18	equip: Modblock1 86766
16	AZ79172	AZ79172S01			0.62g	96mL	09/11/18 11:18	equip: Modblock1 86766
17	AZ79173	AZ79173S01			0.64g	96mL	09/11/18 11:18	equip: Modblock1 86766
18	AZ79174	AZ79174S01			0.63g	96mL	09/11/18 11:18	equip: Modblock1 86766
19	AZ79175	AZ79175S01			0.65g	96mL	09/11/18 11:18	equip: Modblock1 86766
20	AZ79176	AZ79176S01			0.59g	96mL	09/11/18 11:18	equip: Modblock1 86766
21	AZ79177	AZ79177S01			0.60g	96mL	09/11/18 11:18	equip: Modblock1 86766

Solvent and Lot#
AQUAREGIA 9-11-18
KMnO4 8-20-18
DECOLORIZER 9-7-18

Sample COC Transfer	
Sample prep employee Initials	TH
Analyst's initials	TH
Date	9/14/18
Time	11:52
Moved to	metals

Technician's Initials	
Scanned By	TH
Sample Preparation	TH
Digestion	TH
Bring up to volume	TH
Modified	09/11/18 1:25:59 PM

Reviewed By: TH **Date:** 9/14/18

Mercury Digestion Worksheet

Method Name 7471A Mercury Digestion **Prep Method** M7471 **Set** 180911A **Units** mL

Spikes	
Spiked ID 1	Hg WORKING STANDARD PREP 9-11-18
Spiked ID 2	Hg WORKING ICV PREP 9-11-18
Spiked ID 3	
Spiked ID 4	
Spiked By	TH Date: 09/11/18 11:18:00 AM
Witnessed By	NM Date: 09/11/18 11:18:00 AM

Starting Temp:	SLOT 4 93C
Ending Temp:	SLOT 4 94C
Temp Type:	Modblock1 86766
End Date/Time	09/11/18 12:14:00 PM

Mercury Calibration

Sample	Spike Amount	Spike ID	Final Volume
0 ppb		1	96 ml
0.2083 ppb	0.4 ml	1	96 ml
0.5208 ppb	1 ml	1	96 ml
1.0417 ppb	2 ml	1	96 ml
2.083 ppb	4ml	1	96 ml
5.208 ppb	10 ml	1	96 ml
5.208 ppb	10 ml	1	96 ml
10.417 ppb	20 ml	1	96 ml
ICV	8 ml	2	96 ml

Start Date/Time of Calibration 09/11/18 11:18

Sufficient Vol for Matrix QC:	Yes

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
22	AZ79178	AZ79178S01			0.65g	96mL	09/11/18 11:18	equip: Modblock1 86766

Solvent and Lot#
AQUAREGIA 9-11-18
KMnO4 8-20-18
DECOLORIZER 9-7-18

Sample COC Transfer	
Sample prep employee Initials	TH
Analyst's initials	TH
Date	9/14/18
Time	11:52
Moved to	metals

Technician's Initials	
Scanned By	TH
Sample Preparation	TH
Digestion	TH
Bring up to volume	TH
Modified	09/11/18 1:25:59 PM

Reviewed By: TH 1305 **Date:** 9/14/18

_M7471MIS

Mercury Digestion Worksheet

Method Name 7471A Digestion (Mult Incr Sampl) **Prep Method** M7471MIS **Set** 180913A **Units** mL

Spikes	
Spiked ID 1	Hg WORKING STANDARD 9-13-18
Spiked ID 2	Hg WORKING ICV 9-13-18
Spiked ID 3	
Spiked ID 4	
Spiked By	TH Date: 09/13/18 10:58:00 AM
Witnessed By	NM Date: 09/13/18 10:58:00 AM

Starting Temp:	SLOT 6 92C
Ending Temp:	SLOT 6 94C
Temp Type:	Modblock1
End Date/Time	09/13/18 11:41:00 AM

Mercury Calibration

Sample	Spike Amount	Spike ID	Final Volume
0 ppb		1	96 ml
0.2083 ppb	0.4 ml	1	96 ml
0.5208 ppb	1 ml	1	96 ml
1.0417 ppb	2 ml	1	96 ml
2.083 ppb	4ml	1	96 ml
5.208 ppb	10 ml	1	96 ml
5.208 ppb	10 ml	1	96 ml
10.417 ppb	20 ml	1	96 ml
ICV	8 ml	2	96 ml

Start Date/Time of Calibration 09/13/18 10:58

Sufficient Vol for Matrix QC: Yes

	Sample	Sample Container	Spike Amount	Spike ID	Digested Amount	Final Volume	Start Date/Time	Comments
1	180913A Blk				2.50g	96mL	09/13/18 10:58	equip: Modblock1
2	180913A LCS		8mL	1	2.50g	96mL	09/13/18 10:58	equip: Modblock1
3	AZ79031	AZ79031S07			2.47g	96mL	09/13/18 10:58	equip: Modblock1 86752
4	AZ79146	AZ79146S01			2.50g	96mL	09/13/18 10:58	equip: Modblock1 86766
5	AZ79147	AZ79147S01			2.54g	96mL	09/13/18 10:58	equip: Modblock1 86766
6	AZ79148	AZ79148S01			2.49g	96mL	09/13/18 10:58	equip: Modblock1 86766
7	AZ79149	AZ79149S01			2.45g	96mL	09/13/18 10:58	equip: Modblock1 86766
8	AZ79149 MS	AZ79149S01	8mL	1	2.45g	96mL	09/13/18 10:58	equip: Modblock1
9	AZ79149 MSD	AZ79149S01	8mL	1	2.45g	96mL	09/13/18 10:58	equip: Modblock1
10	AZ79150	AZ79150S01			2.50g	96mL	09/13/18 10:58	equip: Modblock1 86766
11	AZ79151	AZ79151S01			2.45g	96mL	09/13/18 10:58	equip: Modblock1 86766
12	AZ79152	AZ79152S01			2.55g	96mL	09/13/18 10:58	equip: Modblock1 86766
13	AZ79153	AZ79153S01			2.50g	96mL	09/13/18 10:58	equip: Modblock1 86766
14	AZ79154	AZ79154S01	TH 9/14/18 Does not match raw data.		~~2.59g~~ 2.49g	96mL	09/13/18 10:58	equip: Modblock1 86766
15	AZ79155	AZ79155S01			2.52g	96mL	09/13/18 10:58	equip: Modblock1 86766
16	AZ79156	AZ79156S01			2.52g	96mL	09/13/18 10:58	equip: Modblock1 86766
17	AZ79157	AZ79157S01			2.51g	96mL	09/13/18 10:58	equip: Modblock1 86766
18	AZ79158	AZ79158S01			2.51g	96mL	09/13/18 10:58	equip: Modblock1 86766
19	AZ79159	AZ79159S01			2.48g	96mL	09/13/18 10:58	equip: Modblock1 86766
20	AZ79160	AZ79160S01			2.45g	96mL	09/13/18 10:58	equip: Modblock1 86766

Solvent and Lot#
AQUAREGIA 9-13-18
KMnO4 9-11-18
DECOLORIZER 9-7-18

Sample COC Transfer	
Sample prep employee Initials	TH
Analyst's initials	TH
Date	9/14/18
Time	11:51
Moved to	Metals

Technician's Initials	
Scanned By	TH
Sample Preparation	TH
Digestion	TH
Bring up to volume	TH
Modified	09/13/18 1:27:35 PM

Reviewed By: TH **Date:** 9/14/18

6020A/3050B Injection Log

Directory: K:\ICP-MS Megatron\raw data output csv\

RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
1	13 Sep 2018	12:20	Calibration Blank 9/13/18		180914A Ba1	1.
2	13 Sep 2018	12:24	Standard 1 9/13/18		180914A Ba1	1.
3	13 Sep 2018	12:28	Standard 2 9/13/18		180914A Ba1	1.
4	13 Sep 2018	12:32	Standard 3 9/13/18		180914A Ba1	1.
5	13 Sep 2018	12:36	Standard 4 9/13/18		180914A Ba1	1.
6	13 Sep 2018	12:40	ICV 180913		180914A Ba1	1.
7	13 Sep 2018	12:44	ICV 2 180913		180914A Ba1	1.
8	13 Sep 2018	12:53	0.5 ppb LLICV 180913		180914A Ba1	1.
10	13 Sep 2018	13:01	2.0 ppb LLICV 180913		180914A Ba1	1.
12	13 Sep 2018	13:11	ICB 180913		180914A Ba1	1.
13	13 Sep 2018	13:15	ICSA 180913		180914A Ba1	1.
14	13 Sep 2018	13:19	ICSAB 180913		180914A Ba1	1.
24	13 Sep 2018	14:18	CCV 180913		180914A Ba1	1.
25	13 Sep 2018	14:22	CCB 180913		180914A Ba1	1.
26	13 Sep 2018	14:26	180911A BLK 3050		180914A Ba1	1.
27	13 Sep 2018	14:30	180911A LCS 3050 DF5		180914A Ba1	5.
28	13 Sep 2018	14:34	AZ79161S01 DF10		180914A Ba1	10.
29	13 Sep 2018	14:38	AZ79162S01 DF10		180914A Ba1	10.
30	13 Sep 2018	14:41	AZ79163S01 DF10		180914A Ba1	10.
31	13 Sep 2018	14:45	AZ79164S01 DF10		180914A Ba1	10.
32	13 Sep 2018	14:49	AZ79165S01 DF10		180914A Ba1	10.
33	13 Sep 2018	14:53	AZ79166S01 DF10		180914A Ba1	10.
34	13 Sep 2018	14:57	AZ79177S01 DF10		180914A Ba1	10.
35	13 Sep 2018	15:01	AZ79178S01 DF10		180914A Ba1	10.
36	13 Sep 2018	15:05	AZ79166S01 MS DF10		180914A Ba1	10.
37	13 Sep 2018	15:09	AZ79166S01 MSD DF10		180914A Ba1	10.
38	13 Sep 2018	15:13	AZ79166S01-A DF10		180914A Ba1	10.
39	13 Sep 2018	15:17	AZ79166S01-DT DF50		180914A Ba1	50.
40	13 Sep 2018	16:13	CCV 180913		180914A Ba1	1.
41	13 Sep 2018	16:17	CCB 180913		180914A Ba1	1.
42	13 Sep 2018	16:21	AZ79167S01 DF10		180914A Ba1	10.
43	13 Sep 2018	16:25	AZ79168S01 DF10		180914A Ba1	10.
44	13 Sep 2018	16:29	AZ79169S01 DF10		180914A Ba1	10.
45	13 Sep 2018	16:33	AZ79170S01 DF10		180914A Ba1	10.
46	13 Sep 2018	16:37	AZ79171S01 DF10		180914A Ba1	10.
47	13 Sep 2018	16:41	AZ79172S01 DF10		180914A Ba1	10.
48	13 Sep 2018	16:45	AZ79173S01 DF10		180914A Ba1	10.
49	13 Sep 2018	16:49	AZ79174S01 DF10		180914A Ba1	10.
50	13 Sep 2018	16:53	AZ79175S01 DF10		180914A Ba1	10.
51	13 Sep 2018	16:57	AZ79176S01 DF10		180914A Ba1	10.
52	13 Sep 2018	17:01	CCV 180913		180914A Ba1	1.
53	13 Sep 2018	17:05	CCB 180913		180914A Ba1	1.

6020A/3015 Injection Log

Directory: K:\ICP-MS Megatron\raw data output csv\

RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
54	14 Sep 2018	09:56	Calibration Blank 9/14/18		180914A Ba1	1.
55	14 Sep 2018	10:00	Standard 1 9/14/18		180914A Ba1	1.
56	14 Sep 2018	10:04	Standard 2 9/14/18		180914A Ba1	1.
57	14 Sep 2018	10:14	Standard 3 9/14/18		180914A Ba1	1.
58	14 Sep 2018	10:18	Standard 4 9/14/18		180914A Ba1	1.
59	14 Sep 2018	10:22	ICV 180914		180914A Ba1	1.
60	14 Sep 2018	10:26	ICV 2 180914		180914A Ba1	1.
61	14 Sep 2018	10:42	0.5 ppb LLICV 180914		180914A Ba1	1.
62	14 Sep 2018	10:46	1.0 ppb LLICV 180914		180914A Ba1	1.
63	14 Sep 2018	10:54	4.0 ppb LLICV 180914		180914A Ba1	1.
64	14 Sep 2018	10:58	ICB 180914		180914A Ba1	1.
65	14 Sep 2018	11:02	ICSA 180914		180914A Ba1	1.
66	14 Sep 2018	11:06	ICSAB 180914		180914A Ba1	1.
67	14 Sep 2018	11:14	180911A BLK 3010		180914A Ba1	1.
68	14 Sep 2018	11:18	180911A LCS 3010 DF5		180914A Ba1	5.
78	14 Sep 2018	12:41	180913A BLK DF10		180914A Ba1	10.
80	14 Sep 2018	12:49	180913A LCS DF10		180914A Ba1	10.
81	14 Sep 2018	12:53	CCV 180914		180914A Ba1	1.
82	14 Sep 2018	12:56	CCB 180914		180914A Ba1	1.
85	14 Sep 2018	13:08	AZ79179W09 DF10		180914A Ba1	10.
90	14 Sep 2018	13:28	AZ79147S01 DF100		180914A Ba1	100.
91	14 Sep 2018	13:32	AZ79148S01 DF100		180914A Ba1	100.
92	14 Sep 2018	13:36	AZ79149S01 DF100		180914A Ba1	100.
93	14 Sep 2018	13:41	AZ79149S01 MS DF100		180914A Ba1	100.
94	14 Sep 2018	13:45	AZ79149S01 MSD DF100		180914A Ba1	100.
95	14 Sep 2018	13:49	AZ79149S01-A DF100		180914A Ba1	100.
96	14 Sep 2018	13:53	AZ79149S01 DF500 DT		180914A Ba1	500.
97	14 Sep 2018	13:56	AZ79150S01 DF100		180914A Ba1	100.
98	14 Sep 2018	14:00	AZ79151S01 DF100		180914A Ba1	100.
102	14 Sep 2018	14:42	CCV 180914		180914A Ba1	1.
103	14 Sep 2018	14:46	CCB 180914		180914A Ba1	1.
134	14 Sep 2018	16:59	CCV 180914		180914A Ba1	1.
135	14 Sep 2018	17:03	CCB 180914		180914A Ba1	1.
136	14 Sep 2018	17:13	AZ79161S01 DF50		180914A Ba1	50.
137	14 Sep 2018	17:17	AZ79162S01 DF100		180914A Ba1	100.
138	14 Sep 2018	17:21	AZ79165S01 DF50		180914A Ba1	50.
139	14 Sep 2018	17:25	AZ79165S01 DF200		180914A Ba1	200.
140	14 Sep 2018	17:29	AZ79166S01 DF100		180914A Ba1	100.
141	14 Sep 2018	17:33	AZ79166S01 MS DF100		180914A Ba1	100.
142	14 Sep 2018	17:37	AZ79166S01 MSD DF100		180914A Ba1	100.
144	14 Sep 2018	17:45	AZ79166S01 DF500 DT		180914A Ba1	500.
145	14 Sep 2018	17:49	AZ79167S01 DF20		180914A Ba1	20.
146	14 Sep 2018	17:53	AZ79168S01 DF100		180914A Ba1	100.

147	14 Sep 2018	17:57	AZ79169S01 DF50	180914A Ba1	50.
148	14 Sep 2018	18:01	AZ79172S01 DF100	180914A Ba1	100.
149	14 Sep 2018	18:05	AZ79172S01 DF500	180914A Ba1	500.
150	14 Sep 2018	18:09	AZ79173S01 DF50	180914A Ba1	50.
151	14 Sep 2018	18:13	AZ79175S01 DF50	180914A Ba1	50.
152	14 Sep 2018	18:17	CCV 180914	180914A Ba1	1.
153	14 Sep 2018	18:21	CCB 180914	180914A Ba1	1.

6020A/3050B Injection Log

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RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
1	18 Sep 2018	08:24	Calibration Blank 9/18/18		180918A Be6	1.
2	18 Sep 2018	08:28	Standard 1 9/18/18		180918A Be6	1.
3	18 Sep 2018	08:32	Standard 2 9/18/18		180918A Be6	1.
4	18 Sep 2018	08:36	Standard 3 9/18/18		180918A Be6	1.
5	18 Sep 2018	08:40	Standard 4 9/18/18		180918A Be6	1.
6	18 Sep 2018	08:43	ICV 180918		180918A Be6	1.
7	18 Sep 2018	08:47	ICV 2 180918		180918A Be6	1.
8	18 Sep 2018	08:51	0.5 ppb LLICV 180918		180918A Be6	1.
9	18 Sep 2018	08:55	1.0 ppb LLICV 180918		180918A Be6	1.
10	18 Sep 2018	08:59	2.0 ppb LLICV 180918		180918A Be6	1.
11	18 Sep 2018	09:07	ICB 180918		180918A Be6	1.
12	18 Sep 2018	09:11	ICSA 180918		180918A Be6	1.
13	18 Sep 2018	09:15	ICSAB 180918		180918A Be6	1.
23	18 Sep 2018	10:00	AZ79171S01 DF50		180918A Be6	50.
37	18 Sep 2018	11:07	CCV 180918		180918A Be6	1.
38	18 Sep 2018	11:11	CCB 180918		180918A Be6	1.
146	18 Sep 2018	18:51	CCV 180918		180918A Be6	1.
147	18 Sep 2018	18:55	CCB 180918		180918A Be6	1.
148	18 Sep 2018	19:01	AZ79152S01 DF100		180918A Be6	100.
149	18 Sep 2018	19:05	AZ79153S01 DF100		180918A Be6	100.
150	18 Sep 2018	19:09	AZ79154S01 DF100		180918A Be6	100.
151	18 Sep 2018	19:13	AZ79155S01 DF100		180918A Be6	100.
152	18 Sep 2018	19:17	AZ79156S01 DF100		180918A Be6	100.
153	18 Sep 2018	19:21	AZ79157S01 DF100		180918A Be6	100.
154	18 Sep 2018	19:25	AZ79158S01 DF100		180918A Be6	100.
155	18 Sep 2018	19:29	AZ79159S01 DF100		180918A Be6	100.
156	18 Sep 2018	19:33	AZ79160S01 DF100		180918A Be6	100.
158	18 Sep 2018	19:53	CCV 180918		180918A Be6	1.
159	18 Sep 2018	19:57	CCB 180918		180918A Be6	1.

7471A/7471A Injection Log

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RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
1	14 Sep 2018	11:37	Calib. Blank		180914S	1.
2	14 Sep 2018	11:39	ICAL 0.208ppb 9/14/18 TH		180914S	1.
3	14 Sep 2018	11:40	ICAL 0.520ppb 9/14/18 TH		180914S	1.
4	14 Sep 2018	11:42	ICAL 1.041ppb 9/14/18 TH		180914S	1.
5	14 Sep 2018	11:44	ICAL 2.083ppb 9/14/18 TH		180914S	1.
6	14 Sep 2018	11:45	ICAL 5.208ppb 9/14/18 TH		180914S	1.
7	14 Sep 2018	11:47	ICAL 10.417ppb 9/14/18 TH		180914S	1.
8	14 Sep 2018	11:49	ICV 9/14/18 TH		180914S	1.
9	14 Sep 2018	11:50	ICB 9/14/18 TH		180914S	1.
11	14 Sep 2018	11:54	180911A BLK		180914S	1.
12	14 Sep 2018	11:55	180911A LCS		180914S	1.
13	14 Sep 2018	11:57	AZ79161S01		180914S	1.
14	14 Sep 2018	11:59	AZ79162S01		180914S	1.
15	14 Sep 2018	12:00	AZ79163S01		180914S	1.
16	14 Sep 2018	12:02	AZ79164S01		180914S	1.
17	14 Sep 2018	12:04	AZ79165S01		180914S	1.
18	14 Sep 2018	12:05	AZ79166S01		180914S	1.
19	14 Sep 2018	12:07	AZ79166S01 MS		180914S	1.
20	14 Sep 2018	12:09	AZ79166S01 MSD		180914S	1.
21	14 Sep 2018	12:11	AZ79167S01		180914S	1.
22	14 Sep 2018	12:12	AZ79168S01		180914S	1.
23	14 Sep 2018	12:14	AZ79169S01		180914S	1.
24	14 Sep 2018	12:16	AZ79170S01		180914S	1.
25	14 Sep 2018	12:17	CCV 9/14/18 TH		180914S	1.
26	14 Sep 2018	12:19	CCB 9/14/18 TH		180914S	1.
27	14 Sep 2018	12:21	AZ79171S01		180914S	1.
28	14 Sep 2018	12:22	AZ79172S01		180914S	1.
29	14 Sep 2018	12:24	AZ79173S01		180914S	1.
30	14 Sep 2018	12:26	AZ79174S01		180914S	1.
31	14 Sep 2018	12:27	AZ79175S01		180914S	1.
32	14 Sep 2018	12:29	AZ79176S01		180914S	1.
33	14 Sep 2018	12:31	AZ79177S01		180914S	1.
34	14 Sep 2018	12:32	AZ79178S01		180914S	1.
35	14 Sep 2018	12:34	CCV 9/14/18 TH		180914S	1.
36	14 Sep 2018	12:36	CCB 9/14/18 TH		180914S	1.
37	14 Sep 2018	12:37	180913A BLK		180914S	1.
38	14 Sep 2018	12:39	180913A LCS		180914S	1.
40	14 Sep 2018	12:43	AZ79146S01		180914S	1.
41	14 Sep 2018	12:44	AZ79147S01		180914S	1.
42	14 Sep 2018	12:46	AZ79148S01		180914S	1.
43	14 Sep 2018	12:48	AZ79149S01		180914S	1.
44	14 Sep 2018	12:49	AZ79149S01 MS		180914S	1.
45	14 Sep 2018	12:51	AZ79149S01 MSD		180914S	1.

46	14 Sep 2018	12:53	AZ79150S01	180914S	1.
47	14 Sep 2018	12:54	AZ79151S01	180914S	1.
48	14 Sep 2018	12:56	AZ79152S01	180914S	1.
49	14 Sep 2018	12:58	AZ79153S01	180914S	1.
50	14 Sep 2018	13:00	AZ79154S01	180914S	1.
51	14 Sep 2018	13:01	CCV 9/14/18 TH	180914S	1.
52	14 Sep 2018	13:05	CCB 9/14/18 TH	180914S	1.
53	14 Sep 2018	13:07	AZ79155S01	180914S	1.
54	14 Sep 2018	13:09	AZ79156S01	180914S	1.
55	14 Sep 2018	13:11	AZ79157S01	180914S	1.
56	14 Sep 2018	13:12	AZ79158S01	180914S	1.
57	14 Sep 2018	13:14	AZ79159S01	180914S	1.
58	14 Sep 2018	13:16	AZ79160S01	180914S	1.
59	14 Sep 2018	13:17	CCV 9/14/18 TH	180914S	1.
60	14 Sep 2018	13:19	CCB 9/14/18 TH	180914S	1.

7470A/7470A Injection Log

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RunID	Injected		Sample Name	Misc Info	FileName	Multiplier
1	19 Sep 2018	12:33	Calib. Blank		180919W-2	1.
2	19 Sep 2018	12:35	ICAL 0.2ppb 9/19/18 TH		180919W-2	1.
3	19 Sep 2018	12:37	ICAL 0.5ppb 9/19/18 TH		180919W-2	1.
4	19 Sep 2018	12:38	ICAL 1ppb 9/19/18 TH		180919W-2	1.
5	19 Sep 2018	12:40	ICAL 2ppb 9/19/18 TH		180919W-2	1.
6	19 Sep 2018	12:42	ICAL 5ppb 9/19/18 TH		180919W-2	1.
7	19 Sep 2018	12:43	ICAL 10ppb 9/19/18 TH		180919W-2	1.
8	19 Sep 2018	12:45	ICV 9/19/18 TH		180919W-2	1.
9	19 Sep 2018	12:47	ICB 9/19/18 TH		180919W-2	1.
11	19 Sep 2018	14:11	CCV 9/19/18 TH		180919W-2	1.
12	19 Sep 2018	14:12	CCB 9/19/18 TH		180919W-2	1.
13	19 Sep 2018	14:27	180917B BLK		180919W-2	1.
14	19 Sep 2018	14:29	180917B LCS		180919W-2	1.
15	19 Sep 2018	14:30	180917B LCSD		180919W-2	1.
26	19 Sep 2018	14:49	AZ79179W09		180919W-2	1.
27	19 Sep 2018	14:51	CCV 9/19/18 TH		180919W-2	1.
28	19 Sep 2018	14:52	CCB 9/19/18 TH		180919W-2	1.

Appendix F

COPC Selection for Human and Ecological Receptors

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APPENDIX F1
SCREENING LEVEL EVALUATION OF SURFACE SOIL
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Units	Surface Soil Summary Statistics							Current Project Screening Levels						Above Lowest SL? (COPC)		Above Lowest SL? (Inadequate MDL)	
					Number of Samples		Detection Frequency (%)	Mean (ND@0.5* MDL)	Maximum Detect	Method Detection Limit Range for Non-detects		Human Health			Ecological (NPS COPC Selection ESV)						
					Detect	Total				Minimum	Maximum	USEPA RSL [HQ=0.1] Resident Soil [a]	DTSC HERO Resident Soil	Lowest Screening Level	Plants / Soil Invertebrates	Birds / Mammals	Lowest Screening Level	Max Detect (HH)	Max Detect (Eco)	Max MDL (HH)	Max MDL (Eco)
EPA 6020A	Metals	ANTIMONY	7440-36-0	mg/kg	13	20	65%	0.55	2.2	0.07	0.07	3.1	---	3.1	5	0.248	0.2	no	yes	no	no
		ARSENIC	7440-38-2	mg/kg	20	20	100%	1.5	2.3	0.07	0.07	0.68	0.11	0.11	6.8	0.25	0.3	yes	yes	---	---
		BARIUM	7440-39-3	mg/kg	20	20	100%	21	26	0.07	0.074	1500	---	1500	110	17.2	17.2	no	yes	---	---
		BERYLLIUM	7440-41-7	mg/kg	20	20	100%	0.24	0.41	0.07	0.07	16	15	15	2.5	2.42	2.4	no	no	---	---
		CADMIUM	7440-43-9	mg/kg	20	20	100%	0.10	0.23	0.03	0.03	7.1	5.2	5.2	4	0.27	0.3	no	no	---	---
		CHROMIUM	7440-47-3	mg/kg	20	20	100%	4.6	13	0.07	0.07	0.3	36000	0.3	0.34	28	0.3	yes	yes	---	---
		COBALT	7440-48-4	mg/kg	20	20	100%	2.0	2.8	0.02	0.02	2.3	---	2.3	13	76	13.0	yes	no	---	---
		COPPER	7440-50-8	mg/kg	20	20	100%	23	111	0.04	0.21	310	---	310	50	14	14.0	no	yes	---	---
		LEAD	7439-92-1	mg/kg	20	20	100%	11	40	0.02	0.02	400	80	80	50	0.94	0.9	no	yes	---	---
		MOLYBDENUM	7439-98-7	mg/kg	20	20	100%	12	25	0.01	0.01	39	---	39	2	0.52	0.5	no	yes	---	---
		NICKEL	7440-02-0	mg/kg	20	20	100%	8.3	23	0.1	0.11	150	490	150	30	10	10.0	no	yes	---	---
		SELENIUM	7782-49-2	mg/kg	19	20	95%	0.10	0.18	0.05	0.05	39	---	39	0.52	0.331	0.3	no	no	---	---
		SILVER	7440-22-4	mg/kg	20	20	100%	0.089	0.39	0.02	0.02	39	390	39	2	2.6	2.0	no	no	---	---
		THALLIUM	7440-28-0	mg/kg	20	20	100%	0.069	0.10	0.02	0.02	0.078	---	0.078	0.05	0.027	0.0	yes	yes	---	---
		VANADIUM	7440-62-2	mg/kg	20	20	100%	21	32	0.05	0.05	39	390	39	2	0.714	0.7	no	yes	---	---
		ZINC	7440-66-6	mg/kg	20	20	100%	36	89	0.75	0.8	2300	---	2300	6.62	12	6.6	no	yes	---	---
EPA 7471A	Metals	MERCURY	7439-97-6	mg/kg	6	20	30%	0.023	0.12	0.02	0.02	1.1	1	1.0	0.05	0.013	0.0	no	yes	no	yes
8270C-LL	PAHs / PCP	1-METHYLNAPHTHALENE	90-12-0	mg/kg	0	12	0%	0.013	All ND	0.02	0.042	18	---	18	---	---	---	All ND	All ND	no	no
		2-METHYLNAPHTHALENE	91-57-6	mg/kg	0	12	0%	0.012	All ND	0.018	0.038	24	---	24	---	16	16.0	All ND	All ND	no	no
		ACENAPHTHENE	83-32-9	mg/kg	0	12	0%	0.013	All ND	0.02	0.042	360	---	360	0.25	130	0.3	All ND	All ND	no	no
		ACENAPHTHYLENE	208-96-8	mg/kg	0	12	0%	0.012	All ND	0.018	0.038	---	---	---	---	120	120.0	All ND	All ND	no	no
		ANTHRACENE	120-12-7	mg/kg	0	12	0%	0.010	All ND	0.016	0.034	1800	---	1800	6.8	210	6.8	All ND	All ND	no	no
		BENZO(A)ANTHRACENE	56-55-3	mg/kg	2	12	17%	0.018	0.072	0.018	0.038	1.1	---	1.1	18	0.73	0.7	no	no	no	no
		BENZO(A)PYRENE	50-32-8	mg/kg	1	12	8%	0.016	0.059	0.018	0.038	0.11	---	0.11	---	62	62.0	no	no	no	no
		BENZO(B)FLUORANTHENE	205-99-2	mg/kg	0	12	0%	0.014	All ND	0.022	0.047	1.1	---	1.1	18	44	18.0	All ND	All ND	no	no
		BENZO(GHI)PERYLENE	191-24-2	mg/kg	1	12	8%	0.019	0.040	0.026	0.055	---	---	---	---	1.98	2.0	no	no	no	no
		BENZO(K)FLUORANTHENE	207-08-9	mg/kg	1	12	8%	0.015	0.036	0.02	0.042	11	---	11	---	71	71.0	no	no	no	no
		CHRYSENE	218-01-9	mg/kg	1	12	8%	0.017	0.086	0.016	0.034	110	---	110	---	3.1	3.1	no	no	no	no
		DIBENZ(A,H)ANTHRACENE	53-70-3	mg/kg	0	12	0%	0.012	All ND	0.018	0.038	0.11	---	0.11	---	14	14.0	All ND	All ND	no	no
		FLUORANTHENE	206-44-0	mg/kg	1	12	8%	0.022	0.095	0.024	0.051	240	---	240	10	22	10.0	no	no	no	no
		FLUORENE	86-73-7	mg/kg	0	12	0%	0.013	All ND	0.02	0.042	240	---	240	3.7	250	3.7	All ND	All ND	no	no
		INDENO(1,2,3-CD)PYRENE	193-39-5	mg/kg	0	12	0%	0.012	All ND	0.018	0.038	1.1	---	1.1	---	71	71.0	All ND	All ND	no	no
		NAPHTHALENE	91-20-3	mg/kg	0	12	0%	0.012	All ND	0.018	0.038	3.8	---	3.8	1	3.4	1.0	All ND	All ND	no	no
		PENTACHLOROPHENOL	87-86-5	mg/kg	1	12	8%	0.14	0.54	0.16	0.34	1	---	1.0	3	0.36	0.4	no	yes	no	no
		PHENANTHRENE	85-01-8	mg/kg	0	12	0%	0.014	All ND	0.022	0.047	---	---	---	5.5	11	5.5	All ND	All ND	no	no
		PYRENE	129-00-0	mg/kg	1	12	8%	0.022	0.085	0.024	0.051	180	---	180	10	23	10.0	no	no	no	no
EPA 8270C	SVOCs	1,2,4-TRICHLOROBENZENE	120-82-1	mg/kg	0	12	0%	0.63	All ND	0.98	2.1	5.8	---	5.8	1.2	0.27	0.3	All ND	All ND	no	yes
		1,2-DICHLOROBENZENE	95-50-1	mg/kg	0	12	0%	0.67	All ND	1	2.2	180	---	180	20	0.92	0.9	All ND	All ND	no	yes
		1,3-DICHLOROBENZENE	541-73-1	mg/kg	0	12	0%	0.67	All ND	1	2.2	---	---	---	20	0.74	0.7	All ND	All ND	no	yes
		1,4-DICHLOROBENZENE	106-46-7	mg/kg	0	12	0%	0.63	All ND	0.98	2.1	2.6	---	2.6	1.2	0.89	0.9	All ND	All ND	no	yes
		2,4,5-TRICHLOROPHENOL	95-95-4	mg/kg	0	12	0%	0.78	All ND	1.2	2.5	630	---	630	4	---	4.0	All ND	All ND	no	no
		2,4,6-TRICHLOROPHENOL	88-06-2	mg/kg	0	12	0%	0.62	All ND	0.96	2	6.3	7.5	6.3	10	---	10.0	All ND	All ND	no	no
		2,4-DICHLOROPHENOL	120-83-2	mg/kg	0	12	0%	0.67	All ND	1	2.2	19	---	19	---	---	---	All ND	All ND	no	no
		2,4-DIMETHYLPHENOL	105-67-9	mg/kg	0	12	0%	0.57	All ND	0.88	1.9	130	---	130	0.01	---	0.0	All ND	All ND	no	yes

APPENDIX F1
SCREENING LEVEL EVALUATION OF SURFACE SOIL
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Units	Surface Soil Summary Statistics: Number of Samples		Detection Frequency (%)	Mean (ND@0.5* MDL)	Maximum Detect	Method Detection Limit Range for Non-detects		Current Project Screening Levels: Human Health			Ecological (NPS COPC Selection ESV)			Above Lowest SL? (COPC)		Above Lowest SL? (Inadequate MDL)	
					Detect	Total				Minimum	Maximum	USEPA RSL [HQ=0.1] Resident Soil [a]	DTSC HERO Resident Soil	Lowest Screening Level	Plants / Soil Invertebrates	Birds / Mammals	Lowest Screening Level	Max Detect (HH)	Max Detect (Eco)	Max MDL (HH)	Max MDL (Eco)
EPA 8270C	SVOCs	2,4-DINITROPHENOL	51-28-5	mg/kg	0	12	0%	0.70	All ND	1.1	2.3	13	---	13	20	---	20.0	All ND	All ND	no	no
		2,4-DINITROTOLUENE	121-14-2	mg/kg	0	12	0%	0.82	All ND	1.3	2.7	1.7	---	1.7	6	14	6.0	All ND	All ND	yes	no
		2,6-DINITROTOLUENE	606-20-2	mg/kg	0	12	0%	0.79	All ND	1.2	2.6	0.36	---	0.36	30	4	4.0	All ND	All ND	yes	no
		2-CHLORONAPHTHALENE	91-58-7	mg/kg	0	12	0%	0.68	All ND	1	2.2	480	---	480	---	---	---	All ND	All ND	no	no
		2-CHLOROPHENOL	95-57-8	mg/kg	0	12	0%	0.57	All ND	0.88	1.9	39	---	39	---	0.39	0.4	All ND	All ND	no	yes
		2-METHYLPHENOL	95-48-7	mg/kg	0	12	0%	0.58	All ND	0.9	1.9	320	---	320	0.67	580	0.7	All ND	All ND	no	yes
		2-NITROANILINE	88-74-4	mg/kg	0	12	0%	0.80	All ND	1.2	2.6	63	---	63	---	5.3	5.3	All ND	All ND	no	no
		2-NITROPHENOL	88-75-5	mg/kg	0	12	0%	0.62	All ND	0.96	2	---	---	---	7	---	7.0	All ND	All ND	no	no
		3,3´-DICHLOROBENZIDINE	91-94-1	mg/kg	0	12	0%	0.73	All ND	1.1	2.4	1.2	1.2	1.2	---	---	---	All ND	All ND	yes	no
		3/4-METHYLPHENOL	m,p-Cresols, coelution	mg/kg	0	12	0%	0.59	All ND	0.92	1.9	---	---	---	---	---	---	All ND	All ND	no	no
		3-NITROANILINE	99-09-2	mg/kg	0	12	0%	0.79	All ND	1.2	2.6	---	---	---	---	---	---	All ND	All ND	no	no
		4,6-DINITRO-2-METHYLPHENOL	534-52-1	mg/kg	0	12	0%	0.73	All ND	1.1	2.4	0.51	---	0.51	---	---	---	All ND	All ND	yes	no
		4-BROMOPHENYL PHENYL ETHER	101-55-3	mg/kg	0	12	0%	0.74	All ND	1.1	2.4	---	---	---	---	---	---	All ND	All ND	no	no
		4-CHLORO-3-METHYLPHENOL	59-50-7	mg/kg	0	12	0%	0.76	All ND	1.2	2.5	630	---	630	---	---	---	All ND	All ND	no	no
		4-CHLOROANILINE	106-47-8	mg/kg	0	12	0%	0.22	All ND	0.34	0.72	2.7	---	2.7	1	---	1.0	All ND	All ND	no	no
		4-CHLOROPHENYL PHENYL ETHER	7005-72-3	mg/kg	0	12	0%	0.79	All ND	1.2	2.6	---	---	---	---	---	---	All ND	All ND	no	no
		4-NITROANILINE	100-01-6	mg/kg	0	12	0%	0.95	All ND	1.5	3.1	25	---	25	---	---	---	All ND	All ND	no	no
		4-NITROPHENOL	100-02-7	mg/kg	0	12	0%	0.78	All ND	1.2	2.5	---	---	---	7	---	7.0	All ND	All ND	no	no
		BENZOIC ACID	65-85-0	mg/kg	0	12	0%	0.39	All ND	0.6	1.3	25000	---	25000	---	---	---	All ND	All ND	no	no
		BENZYL ALCOHOL	100-51-6	mg/kg	0	12	0%	0.73	All ND	1.1	2.4	630	---	630	---	---	---	All ND	All ND	no	no
		BIS (2-CHLORETHOXY) METHANE	111-91-1	mg/kg	0	12	0%	0.64	All ND	1	2.1	19	---	19	---	---	---	All ND	All ND	no	no
		BIS (2-CHLOROETHYL) ETHER	111-44-4	mg/kg	0	12	0%	0.64	All ND	1	2.1	0.23	---	0.23	---	---	---	All ND	All ND	yes	no
		BIS (2-CHLOROISOPROPYL) ETHER	39638-32-9	mg/kg	0	12	0%	0.61	All ND	0.94	2	---	---	---	---	---	---	All ND	All ND	no	no
		BIS (2-ETHYLHEXYL) PHTHALATE	117-81-7	mg/kg	0	12	0%	0.80	All ND	1.2	2.6	39	---	39	---	0.02	0.0	All ND	All ND	no	yes
		BUTYL BENZYL PHTHALATE	85-68-7	mg/kg	0	12	0%	0.73	All ND	1.1	2.4	290	---	290	---	90	90.0	All ND	All ND	no	no
		CARBAZOLE	86-74-8	mg/kg	0	12	0%	1.1	All ND	1.6	3.5	---	---	---	---	79	79.0	All ND	All ND	no	no
		DIBENZOFURAN	132-64-9	mg/kg	0	12	0%	0.74	All ND	1.1	2.4	7.3	---	7.3	6.1	---	6.1	All ND	All ND	no	no
		DIETHYL PHTHALATE	84-66-2	mg/kg	0	12	0%	0.80	All ND	1.2	2.6	5100	---	5100	100	3600	100.0	All ND	All ND	no	no
		DIMETHYL PHTHALATE	131-11-3	mg/kg	0	12	0%	0.82	All ND	1.3	2.7	---	---	---	10	38	10.0	All ND	All ND	no	no
		DI-N-BUTYL PHTHALATE	84-74-2	mg/kg	0	12	0%	0.86	All ND	1.3	2.8	630	---	630	160	0.011	0.0	All ND	All ND	no	yes
		DI-N-OCTYL PHTHALATE	117-84-0	mg/kg	0	12	0%	0.75	All ND	1.2	2.5	63	---	63	---	0.91	0.9	All ND	All ND	no	yes
		HEXACHLOROBENZENE	118-74-1	mg/kg	0	12	0%	0.78	All ND	1.2	2.5	0.21	---	0.21	10	0.079	0.1	All ND	All ND	yes	yes
		HEXACHLOROBUTADIENE	87-68-3	mg/kg	0	12	0%	0.68	All ND	1	2.2	1.2	1.2	1.2	---	---	---	All ND	All ND	yes	no
		HEXACHLOROETHANE	67-72-1	mg/kg	0	12	0%	0.64	All ND	1	2.1	1.8	---	1.8	---	---	---	All ND	All ND	yes	no
		ISOPHORONE	78-59-1	mg/kg	0	12	0%	0.74	All ND	1.1	2.4	570	---	570	---	---	---	All ND	All ND	no	no
		NITROBENZENE	98-95-3	mg/kg	0	12	0%	0.64	All ND	1	2.1	5.1	---	5.1	2.2	4.8	2.2	All ND	All ND	no	no
		N-NITROSODIMETHYLAMINE	62-75-9	mg/kg	0	12	0%	1.1	All ND	1.7	3.7	0.002	---	0.0020	---	---	---	All ND	All ND	yes	no
		N-NITROSODI-N-PROPYLAMINE	621-64-7	mg/kg	0	12	0%	0.70	All ND	1.1	2.3	0.078	---	0.078	---	---	---	All ND	All ND	yes	no
		N-NITROSODIPHENYLAMINE	86-30-6	mg/kg	0	12	0%	0.67	All ND	1	2.2	110	---	110	20	---	20.0	All ND	All ND	no	no
		PHENOL	108-95-2	mg/kg	0	12	0%	0.56	All ND	0.86	1.8	1900	---	1900	0.79	37	0.8	All ND	All ND	no	yes
EPA 8290	Dioxin / Furan	1,2,3,4,6,7,8-HPCDD	35822-46-9	pg/g	1	4	25%	6.3	21	0.2	21	---	---	---	---	---	---	no	no	no	no
		1,2,3,4,6,7,8-HPCDF	67562-39-4	pg/g	1	4	25%	1.9	6.4	0.16	6.4	---	---	---	---	---	---	no	no	no	no
		1,2,3,4,7,8,9-HPCDF	55673-89-7	pg/g	0	4	0%	0.25	All ND	0.2	0.84	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,4,7,8-HXCDD	39227-28-6	pg/g	0	4	0%	0.25	All ND	0.17	0.63	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,4,7,8-HXCDF	70648-26-9	pg/g	0	4	0%	0.15	All ND	0.083	0.75	---	---	---	---	---	---	All ND	All ND	no	no

APPENDIX F1
SCREENING LEVEL EVALUATION OF SURFACE SOIL
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Units	Surface Soil Summary Statistics: Number of Samples: Detect	Number of Samples: Total	Detection Frequency (%)	Mean (ND@0.5*MDL)	Maximum Detect	Method Detection Limit Range for Non-detects: Minimum	Method Detection Limit Range for Non-detects: Maximum	Current Project Screening Levels: Human Health: USEPA RSL [HQ=0.1] Resident Soil [a]	Human Health: DTSC HERO Resident Soil	Human Health: Lowest Screening Level	Ecological (NPS COPC Selection ESV): Plants / Soil Invertebrates	Ecological: Birds / Mammals	Ecological: Lowest Screening Level	Above Lowest SL? (COPC): Max Detect (HH)	Above Lowest SL? (COPC): Max Detect (Eco)	Above Lowest SL? (Inadequate MDL): Max MDL (HH)	Above Lowest SL? (Inadequate MDL): Max MDL (Eco)
EPA 8290	Dioxin / Furan	1,2,3,6,7,8-HXCDD	57653-85-7	pg/g	0	4	0%	0.21	All ND	0.18	0.54	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,6,7,8-HXCDF	57117-44-9	pg/g	0	4	0%	0.13	All ND	0.074	0.67	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,7,8,9-HXCDD	19408-74-3	pg/g	0	4	0%	0.26	All ND	0.19	0.81	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,7,8,9-HXCDF	72918-21-9	pg/g	0	4	0%	0.17	All ND	0.097	0.88	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,7,8-PECDD	40321-76-4	pg/g	0	4	0%	0.16	All ND	0.17	0.48	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,7,8-PECDF	57117-41-6	pg/g	0	4	0%	0.14	All ND	0.12	0.52	---	---	---	---	---	---	All ND	All ND	no	no
		2,3,4,6,7,8-HXCDF	60851-34-5	pg/g	0	4	0%	2.6	All ND	0.34	16	---	---	---	---	---	---	All ND	All ND	no	no
		2,3,4,7,8-PECDF	57117-31-4	pg/g	0	4	0%	0.14	All ND	0.13	0.53	---	---	---	---	---	---	All ND	All ND	no	no
		2,3,7,8-TCDD	1746-01-6	pg/g	0	4	0%	0.059	All ND	0.07	0.19	4.8	---	4.8	5000000	0.29	0.3	All ND	All ND	no	no
		2,3,7,8-TCDF	51207-31-9	pg/g	0	4	0%	0.14	All ND	0.12	0.44	---	---	---	---	---	---	All ND	All ND	no	no
		OCDD	3268-87-9	pg/g	4	4	100%	47	130	3.4	130	---	---	---	---	---	---	no	no	---	---
		OCDF	39001-02-0	pg/g	0	4	0%	2.4	All ND	0.22	15	---	---	---	---	---	---	All ND	All ND	no	no
		TEQ	TEQ	pg/g	4	4	100%	0.082	0.31	0	0	4.8	---	4.8	5000000	0.29	0.3	no	yes	---	---
EPA 8082A	PCBs	AROCLOR 1221	11104-28-2	mg/kg	0	12	0%	0.0030	All ND	0.006	0.006	0.2	---	0.20	---	---	---	All ND	All ND	no	no
		AROCLOR 1232	11141-16-5	mg/kg	0	12	0%	0.0020	All ND	0.004	0.004	0.17	---	0.17	---	---	---	All ND	All ND	no	no
		AROCLOR 1242	53469-21-9	mg/kg	0	12	0%	0.0020	All ND	0.004	0.004	0.23	---	0.23	---	0.041	0.0	All ND	All ND	no	no
		AROCLOR 1248	12672-29-6	mg/kg	0	12	0%	0.0020	All ND	0.004	0.004	0.23	---	0.23	---	0.0073	0.0	All ND	All ND	no	no
		AROCLOR 1254	11097-69-1	mg/kg	0	12	0%	0.0020	All ND	0.004	0.004	0.12	---	0.12	160	0.041	0.0	All ND	All ND	no	no
		AROCLOR 1260	11096-82-5	mg/kg	0	12	0%	0.0020	All ND	0.004	0.004	0.24	---	0.24	---	0.88	0.9	All ND	All ND	no	no
		AROCLOR 1262	37324-23-5	mg/kg	0	12	0%	0.0030	All ND	0.006	0.006	---	---	---	---	---	---	All ND	All ND	no	no
		AROCLOR 1268	11100-14-4	mg/kg	0	12	0%	0.0030	All ND	0.006	0.006	---	---	---	---	---	---	All ND	All ND	no	no
		TOTAL PCBS	1336-36-3	mg/kg	0	12	0%	0.0020	All ND	0.004	0.004	0.23	---	0.23	40	---	40.0	All ND	All ND	no	no
EPA 8081A	Pesticides	4,4'-DDD	72-54-8	mg/kg	0	12	0%	0.00090	All ND	0.0018	0.0018	0.19	---	0.19	---	0.0063	0.0	All ND	All ND	no	no
		4,4'-DDE	72-55-9	mg/kg	0	12	0%	0.00080	All ND	0.0016	0.0016	2	---	2.0	---	0.021	0.0	All ND	All ND	no	no
		4,4'-DDT	50-29-3	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	1.9	---	1.9	4.1	0.021	0.0	All ND	All ND	no	no
		ALDRIN	309-00-2	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	0.039	---	0.039	0.00332	0.037	0.0	All ND	All ND	no	no
		ALPHA-BHC	319-84-6	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	0.086	---	0.086	---	0.1	0.1	All ND	All ND	no	no
		ALPHA-CHLORDANE	5103-71-9	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	---	---	---	2.2	0.27	0.3	All ND	All ND	no	no
		BETA-BHC	319-85-7	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	0.3	---	0.30	0.00398	0.27	0.0	All ND	All ND	no	no
		DELTA-BHC	319-86-8	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	0.1	0.1	All ND	All ND	no	no
		DIELDRIN	60-57-1	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	0.034	---	0.034	10	0.0045	0.0	All ND	All ND	no	no
		ENDOSULFAN I	959-98-8	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	---	---	All ND	All ND	no	no
		ENDOSULFAN II	33213-65-9	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	---	---	All ND	All ND	no	no
		ENDOSULFAN SULFATE	1031-07-8	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	---	---	All ND	All ND	no	no
		ENDRIN	72-20-8	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	1.9	---	1.9	0.0034	0.0014	0.0	All ND	All ND	no	no
		ENDRIN ALDEHYDE	7421-93-4	mg/kg	0	12	0%	0.0010	All ND	0.002	0.002	---	---	---	---	---	---	All ND	All ND	no	no
		ENDRIN KETONE	53494-70-5	mg/kg	0	12	0%	0.0010	All ND	0.002	0.002	---	---	---	---	---	---	All ND	All ND	no	no
		GAMMA-BHC	58-89-9	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	0.57	---	0.57	0.0050	0.0095	0.0050	All ND	All ND	no	no
		GAMMA-CHLORDANE	5566-34-7	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	---	---	All ND	All ND	no	no
		HEPTACHLOR	76-44-8	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	0.13	---	0.13	0.4	0.059	0.1	All ND	All ND	no	no
		HEPTACHLOR EPOXIDE	1024-57-3	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	0.07	---	0.07	---	---	---	All ND	All ND	no	no
		METHOXYCHLOR	72-43-5	mg/kg	0	12	0%	0.00040	All ND	0.0008	0.0008	32	---	32	---	5.1	5.1	All ND	All ND	no	no
		TOXAPHENE	8001-35-2	mg/kg	0	12	0%	0.0075	All ND	0.015	0.015	0.49	---	0.49	---	4.1	4.1	All ND	All ND	no	no

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SCREENING LEVEL EVALUATION OF SURFACE SOIL
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Units	Surface Soil Summary Statistics							Current Project Screening Levels						Above Lowest SL? (COPC)		Above Lowest SL? (Inadequate MDL)	
					Number of Samples		Detection Frequency (%)	Mean (ND@0.5* MDL)	Maximum Detect	Method Detection Limit Range for Non-detects		Human Health			Ecological (NPS COPC Selection ESV)						
					Detect	Total				Minimum	Maximum	USEPA RSL [HQ=0.1] Resident Soil [a]	DTSC HERO Resident Soil	Lowest Screening Level	Plants / Soil Invertebrates	Birds / Mammals	Lowest Screening Level	Max Detect (HH)	Max Detect (Eco)	Max MDL (HH)	Max MDL (Eco)
EPA 8015B-e	TPH-Diesel / Motor Oil	DIESEL FUEL (C10-24)	TPH-DRO	mg/kg	12	12	100%	107	250	0.5	0.53	255	---	255	---	---	---	no	no	---	---
		MOTOR OIL (C24-C36)	TPH-Motor Oil	mg/kg	12	12	100%	194	370	3.5	3.7	12033	---	12033	---	---	---	no	no	---	---
EPA 8015B-e	TPH-Diesel / Motor Oil w/ SGC	DIESEL FUEL	TPH-DRO w/SGC	mg/kg	12	12	100%	6.7	18	0.5	0.53	255	---	255	---	---	---	no	no	---	---
		MOTOR OIL	TPH-Motor Oil w/SGC	mg/kg	11	12	92%	8.4	14	3.5	3.7	12033	---	12033	---	---	---	no	no	---	---

Notes:

[a] There are no EPA RSL for TPH-DRO and TPH-MO. The values presented for TPH-DRO and TPH-MO under EPA RSL are the Environmental Screening Levels (ESLs) from the San Francisco Regional Water Quality Control Board, January 2019. Values were obtained from Table S-1, Direct Exposure Human Health Risk Levels, shallow soil residential exposure.

--- = screening level not available
% = percent
CASRN = Chemical Abstracts Service Registry Number
COPC = chemical of potential concern
DTSC HERO = California Department of Toxic Substances Office of Human and Ecological Risk
Eco = cological
ESL = environmental screening level
ESV = ecological screening value
HH= human health
HQ = hazard quotient
MDL = method detection limit
mg/kg = milligram per kilogram
ND = non-detect
NPS = National Park Service
PAH = polyaromatic hydrocarbon
pg/g = picogram per gram
RSL = regional screening level
RWQCB = Regional Water Quality Control Boards
SGC = silica gel cleanup
SL = screening level
SVOC = semi-volatile organic compound
TPH = total petroleum hydrocarbon
USEPA = U.S. Environmental Protection Agency

APPENDIX F2
SCREENING LEVEL EVALUATION OF SUBSURFACE SOIL
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Units	Subsurface Soil Summary Statistics							Current Project Screening Levels						Above Lowest SL? (COPC)		Above Lowest SL? (Inadequate MDL)	
					Number of Samples		Detection Frequency (%)	Mean (ND@0.5* MDL)	Maximum Detect	Method Detection Limit Range for Non-detects		Human Health			Ecological (NPS COPC Selection ESV)						
					Detect	Total				Minimum	Maximum	USEPA RSL [HQ=0.1] Resident Soil [a]	DTSC HERO Resident Soil	Lowest Screening Level	Plants / Soil Invertebrates	Birds / Mammals	Lowest Screening Level	Max Detect (HH)	Max Detect (Eco)	Max MDL (HH)	Max MDL (Eco)
EPA 6020A	Metals	ANTIMONY	7440-36-0	mg/kg	13	13	100%	39	320	0.070	0.87	3.1	---	3.1	5	0.25	0.25	yes	yes	---	---
		ARSENIC	7440-38-2	mg/kg	13	13	100%	8.7	35	0.070	0.09	0.68	0.11	0.11	6.8	0.25	0.25	yes	yes	---	---
		BARIUM	7440-39-3	mg/kg	13	13	100%	62	190	0.070	0.87	1500	---	1500	110	17.2	17.2	no	yes	---	---
		BERYLLIUM	7440-41-7	mg/kg	13	13	100%	0.22	0.31	0.070	0.09	16	15	15	2.5	2.42	2.4	no	no	---	---
		CADMIUM	7440-43-9	mg/kg	13	13	100%	0.48	1.2	0.030	0.04	7.1	5.2	5.2	4	0.27	0.27	no	yes	---	---
		CHROMIUM	7440-47-3	mg/kg	13	13	100%	25	69	0.070	0.09	0.3	36000	0.3	0.34	28	0.34	yes	yes	---	---
		COBALT	7440-48-4	mg/kg	13	13	100%	8.6	30	0.020	0.03	2.3	---	2.3	13	76	13	yes	yes	---	---
		COPPER	7440-50-8	mg/kg	13	13	100%	394	1990	0.040	2.5	310	---	310	50	14	14	yes	yes	---	---
		LEAD	7439-92-1	mg/kg	13	13	100%	275	815	0.020	0.25	400	80	80	50	0.94	0.94	yes	yes	---	---
		MOLYBDENUM	7439-98-7	mg/kg	13	13	100%	17	24	0.010	0.01	39	---	39	2	0.52	0.5	no	yes	---	---
		NICKEL	7440-02-0	mg/kg	13	13	100%	29	79	0.10	0.13	150	490	150	30	10	10.0	no	yes	---	---
		SELENIUM	7782-49-2	mg/kg	13	13	100%	0.17	0.31	0.050	0.06	39	---	39	0.52	0.33	0.3	no	no	---	---
		SILVER	7440-22-4	mg/kg	13	13	100%	0.96	8.0	0.020	0.03	39	390	39	2	2.6	2.0	no	yes	---	---
		THALLIUM	7440-28-0	mg/kg	13	13	100%	0.084	0.14	0.020	0.03	0.078	---	0.078	0.05	0.027	0.027	yes	yes	---	---
		VANADIUM	7440-62-2	mg/kg	13	13	100%	22	29	0.050	0.06	39	390	39	2	0.71	0.71	no	yes	---	---
		ZINC	7440-66-6	mg/kg	13	13	100%	159	341	0.75	9.9	2300	---	2300	6.6	12	6.6	no	yes	---	---
EPA 7471A	Metals	MERCURY	7439-97-6	mg/kg	9	13	69%	0.083	0.33	0.02	0.03	1.1	1.0	1.0	0.050	0.013	0.013	no	yes	no	yes
8270C-LL	PAHs / PCP	1-METHYLNAPHTHALENE	90-12-0	mg/kg	0	3	0%	0.011	All ND	0.021	0.021	18	---	18	---	---	---	All ND	All ND	no	no
		2-METHYLNAPHTHALENE	91-57-6	mg/kg	0	3	0%	0.0095	All ND	0.019	0.019	24	---	24	---	16	16.0	All ND	All ND	no	no
		ACENAPHTHENE	83-32-9	mg/kg	0	3	0%	0.011	All ND	0.021	0.021	360	---	360	0.25	130	0.3	All ND	All ND	no	no
		ACENAPHTHYLENE	208-96-8	mg/kg	0	3	0%	0.0095	All ND	0.019	0.019	---	---	---	---	120	120.0	All ND	All ND	no	no
		ANTHRACENE	120-12-7	mg/kg	0	3	0%	0.0085	All ND	0.017	0.017	1800	---	1800	6.8	210	6.8	All ND	All ND	no	no
		BENZO(A)ANTHRACENE	56-55-3	mg/kg	0	3	0%	0.0095	All ND	0.019	0.019	1.1	---	1.1	18	0.73	0.7	All ND	All ND	no	no
		BENZO(A)PYRENE	50-32-8	mg/kg	0	3	0%	0.0095	All ND	0.019	0.019	0.11	---	0.11	---	62	62.0	All ND	All ND	no	no
		BENZO(B)FLUORANTHENE	205-99-2	mg/kg	0	3	0%	0.012	All ND	0.023	0.023	1.1	---	1.1	18	44	18.0	All ND	All ND	no	no
		BENZO(GHI)PERYLENE	191-24-2	mg/kg	0	3	0%	0.014	All ND	0.027	0.027	---	---	---	---	1.98	2.0	All ND	All ND	no	no
		BENZO(K)FLUORANTHENE	207-08-9	mg/kg	0	3	0%	0.011	All ND	0.021	0.021	11	---	11	---	71	71.0	All ND	All ND	no	no
		CHRYSENE	218-01-9	mg/kg	0	3	0%	0.0085	All ND	0.017	0.017	110	---	110	---	3.1	3.1	All ND	All ND	no	no
		DIBENZ(A,H)ANTHRACENE	53-70-3	mg/kg	0	3	0%	0.0095	All ND	0.019	0.019	0.11	---	0.11	---	14	14.0	All ND	All ND	no	no
		FLUORANTHENE	206-44-0	mg/kg	0	3	0%	0.013	All ND	0.025	0.025	240	---	240	10	22	10.0	All ND	All ND	no	no
		FLUORENE	86-73-7	mg/kg	0	3	0%	0.011	All ND	0.021	0.021	240	---	240	3.7	250	3.7	All ND	All ND	no	no
		INDENO(1,2,3-CD)PYRENE	193-39-5	mg/kg	0	3	0%	0.0095	All ND	0.019	0.019	1.1	---	1.1	---	71	71.0	All ND	All ND	no	no
		NAPHTHALENE	91-20-3	mg/kg	0	3	0%	0.0095	All ND	0.019	0.019	3.8	---	3.8	1	3.4	1.0	All ND	All ND	no	no
		PENTACHLOROPHENOL	87-86-5	mg/kg	0	3	0%	0.085	All ND	0.17	0.17	1	---	1.0	3	0.36	0.4	All ND	All ND	no	no
		PHENANTHRENE	85-01-8	mg/kg	0	3	0%	0.012	All ND	0.023	0.023	---	---	---	5.5	11	5.5	All ND	All ND	no	no
		PYRENE	129-00-0	mg/kg	0	3	0%	0.013	All ND	0.025	0.025	180	---	180	10	23	10.0	All ND	All ND	no	no
EPA 8270C	SVOCs	1,2,4-TRICHLOROBENZENE	120-82-1	mg/kg	0	3	0%	0.5	All ND	1	1	5.8	---	5.8	1.2	0.27	0.3	All ND	All ND	no	yes
		1,2-DICHLOROBENZENE	95-50-1	mg/kg	0	3	0%	0.55	All ND	1.1	1.1	180	---	180	20	0.92	0.9	All ND	All ND	no	yes
		1,3-DICHLOROBENZENE	541-73-1	mg/kg	0	3	0%	0.55	All ND	1.1	1.1	---	---	---	20	0.74	0.7	All ND	All ND	no	yes
		1,4-DICHLOROBENZENE	106-46-7	mg/kg	0	3	0%	0.5	All ND	1	1	2.6	---	2.6	1.2	0.89	0.9	All ND	All ND	no	yes
		2,4,5-TRICHLOROPHENOL	95-95-4	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	630	---	630	4	---	4.0	All ND	All ND	no	no
		2,4,6-TRICHLOROPHENOL	88-06-2	mg/kg	0	3	0%	0.5	All ND	1	1	6.3	7.5	6.3	10	---	10.0	All ND	All ND	no	no
		2,4-DICHLOROPHENOL	120-83-2	mg/kg	0	3	0%	0.55	All ND	1.1	1.1	19	---	19	---	---	---	All ND	All ND	no	no
		2,4-DIMETHYLPHENOL	105-67-9	mg/kg	0	3	0%	0.46	All ND	0.92	0.92	130	---	130	0.01	---	0.0	All ND	All ND	no	yes

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Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Units	Subsurface Soil Summary Statistics: Number of Samples		Detection Frequency (%)	Mean (ND@0.5* MDL)	Maximum Detect	Method Detection Limit Range for Non-detects		Current Project Screening Levels: Human Health			Ecological (NPS COPC Selection ESV)			Above Lowest SL? (COPC)		Above Lowest SL? (Inadequate MDL)	
					Detect	Total				Minimum	Maximum	USEPA RSL [HQ=0.1] Resident Soil [a]	DTSC HERO Resident Soil	Lowest Screening Level	Plants / Soil Invertebrates	Birds / Mammals	Lowest Screening Level	Max Detect (HH)	Max Detect (Eco)	Max MDL (HH)	Max MDL (Eco)
EPA 8270C	SVOCs	2,4-DINITROPHENOL	51-28-5	mg/kg	0	3	0%	0.55	All ND	1.1	1.1	13	---	13	20	---	20.0	All ND	All ND	no	no
		2,4-DINITROTOLUENE	121-14-2	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	1.7	---	1.7	6	14	6.0	All ND	All ND	no	no
		2,6-DINITROTOLUENE	606-20-2	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	0.36	---	0.36	30	4	4.0	All ND	All ND	yes	no
		2-CHLORONAPHTHALENE	91-58-7	mg/kg	0	3	0%	0.55	All ND	1.1	1.1	480	---	480	---	---	---	All ND	All ND	no	no
		2-CHLOROPHENOL	95-57-8	mg/kg	0	3	0%	0.46	All ND	0.92	0.92	39	---	39	---	0.39	0.4	All ND	All ND	no	yes
		2-METHYLPHENOL	95-48-7	mg/kg	0	3	0%	0.47	All ND	0.94	0.95	320	---	320	0.67	580	0.7	All ND	All ND	no	yes
		2-NITROANILINE	88-74-4	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	63	---	63	---	5.3	5.3	All ND	All ND	no	no
		2-NITROPHENOL	88-75-5	mg/kg	0	3	0%	0.5	All ND	1	1	---	---	---	7	---	7.0	All ND	All ND	no	no
		3,3´-DICHLOROBENZIDINE	91-94-1	mg/kg	0	3	0%	0.6	All ND	1.2	1.2	1.2	1.2	1.2	---	---	---	All ND	All ND	no	no
		3/4-METHYLPHENOL	m,p-Cresols, coelution	mg/kg	0	2	0%	0.48	All ND	0.96	0.97	---	---	---	---	---	---	All ND	All ND	no	no
		3-NITROANILINE	99-09-2	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	---	---	---	---	---	---	All ND	All ND	no	no
		4,6-DINITRO-2-METHYLPHENOL	534-52-1	mg/kg	0	3	0%	0.6	All ND	1.2	1.2	0.51	---	0.51	---	---	---	All ND	All ND	yes	no
		4-BROMOPHENYL PHENYL ETHER	101-55-3	mg/kg	0	3	0%	0.6	All ND	1.2	1.2	---	---	---	---	---	---	All ND	All ND	no	no
		4-CHLORO-3-METHYLPHENOL	59-50-7	mg/kg	0	3	0%	0.6	All ND	1.2	1.2	630	---	630	---	---	---	All ND	All ND	no	no
		4-CHLOROANILINE	106-47-8	mg/kg	0	3	0%	0.18	All ND	0.35	0.36	2.7	---	2.7	1	---	1.0	All ND	All ND	no	no
		4-CHLOROPHENYL PHENYL ETHER	7005-72-3	mg/kg	0	2	0%	0.65	All ND	1.3	1.3	---	---	---	---	---	---	All ND	All ND	no	no
		4-NITROANILINE	100-01-6	mg/kg	0	3	0%	0.75	All ND	1.5	1.5	25	---	25	---	---	---	All ND	All ND	no	no
		4-NITROPHENOL	100-02-7	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	---	---	---	7	---	7.0	All ND	All ND	no	no
		BENZOIC ACID	65-85-0	mg/kg	0	3	0%	0.32	All ND	0.63	0.63	25000	---	25000	---	---	---	All ND	All ND	no	no
		BENZYL ALCOHOL	100-51-6	mg/kg	0	3	0%	0.60	All ND	1.2	1.2	630	---	630	---	---	---	All ND	All ND	no	no
		BIS (2-CHLORETHOXY) METHANE	111-91-1	mg/kg	0	3	0%	0.53	All ND	1	1.1	19	---	19	---	---	---	All ND	All ND	no	no
		BIS (2-CHLOROETHYL) ETHER	111-44-4	mg/kg	0	3	0%	0.53	All ND	1	1.1	0.23	---	0.23	---	---	---	All ND	All ND	yes	no
		BIS (2-CHLOROISOPROPYL) ETHER	39638-32-9	mg/kg	0	3	0%	0.49	All ND	0.98	0.99	---	---	---	---	---	---	All ND	All ND	no	no
		BIS (2-ETHYLHEXYL) PHTHALATE	117-81-7	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	39	---	39	---	0.02	0.0	All ND	All ND	no	yes
		BUTYL BENZYL PHTHALATE	85-68-7	mg/kg	0	3	0%	0.6	All ND	1.2	1.2	290	---	290	---	90	90.0	All ND	All ND	no	no
		CARBAZOLE	86-74-8	mg/kg	0	3	0%	0.85	All ND	1.7	1.7	---	---	---	---	79	79.0	All ND	All ND	no	no
		DIBENZOFURAN	132-64-9	mg/kg	0	3	0%	0.6	All ND	1.2	1.2	7.3	---	7.3	6.1	---	6.1	All ND	All ND	no	no
		DIETHYL PHTHALATE	84-66-2	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	5100	---	5100	100	3600	100.0	All ND	All ND	no	no
		DIMETHYL PHTHALATE	131-11-3	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	---	---	---	10	38	10.0	All ND	All ND	no	no
		DI-N-BUTYL PHTHALATE	84-74-2	mg/kg	0	3	0%	0.7	All ND	1.4	1.4	630	---	630	160	0.011	0.0	All ND	All ND	no	yes
		DI-N-OCTYL PHTHALATE	117-84-0	mg/kg	0	3	0%	0.6	All ND	1.2	1.2	63	---	63	---	0.91	0.9	All ND	All ND	no	yes
		HEXACHLOROBENZENE	118-74-1	mg/kg	0	3	0%	0.65	All ND	1.3	1.3	0.21	---	0.21	10	0.079	0.1	All ND	All ND	yes	yes
		HEXACHLOROBUTADIENE	87-68-3	mg/kg	0	3	0%	0.55	All ND	1.1	1.1	1.2	1.2	1.2	---	---	---	All ND	All ND	no	no
		HEXACHLOROETHANE	67-72-1	mg/kg	0	3	0%	0.53	All ND	1	1.1	1.8	---	1.8	---	---	---	All ND	All ND	no	no
		ISOPHORONE	78-59-1	mg/kg	0	3	0%	0.6	All ND	1.2	1.2	570	---	570	---	---	---	All ND	All ND	no	no
		NITROBENZENE	98-95-3	mg/kg	0	3	0%	0.53	All ND	1	1.1	5.1	---	5.1	2.2	4.8	2.2	All ND	All ND	no	no
		N-NITROSODIMETHYLAMINE	62-75-9	mg/kg	0	3	0%	0.90	All ND	1.8	1.8	0.002	---	0.0020	---	---	---	All ND	All ND	yes	no
		N-NITROSODI-N-PROPYLAMINE	621-64-7	mg/kg	0	3	0%	0.58	All ND	1.1	1.2	0.078	---	0.078	---	---	---	All ND	All ND	yes	no
		N-NITROSODIPHENYLAMINE	86-30-6	mg/kg	0	3	0%	0.55	All ND	1.1	1.1	110	---	110	20	---	20.0	All ND	All ND	no	no
		PHENOL	108-95-2	mg/kg	0	3	0%	0.45	All ND	0.9	0.9	1900	---	1900	0.79	37	0.8	All ND	All ND	no	yes
EPA 8290	Dioxin / Furan	1,2,3,4,6,7,8-HPCDD	35822-46-9	pg/g	1	1	100%	12	12	12	12	---	---	---	---	---	---	no	no	---	---
		1,2,3,4,6,7,8-HPCDF	67562-39-4	pg/g	0	1	0%	0.95	All ND	1.9	1.9	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,4,7,8,9-HPCDF	55673-89-7	pg/g	0	1	0%	1	All ND	2	2	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,4,7,8-HXCDD	39227-28-6	pg/g	0	1	0%	0.23	All ND	0.46	0.46	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,4,7,8-HXCDF	70648-26-9	pg/g	0	1	0%	0.325	All ND	0.65	0.65	---	---	---	---	---	---	All ND	All ND	no	no

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Analysis Method	Chemical Group	Chemical Name	CASRN	Units	Subsurface Soil Summary Statistics							Current Project Screening Levels						Above Lowest SL? (COPC)		Above Lowest SL? (Inadequate MDL)	
					Number of Samples		Detection Frequency (%)	Mean (ND@0.5*MDL)	Maximum Detect	Method Detection Limit Range for Non-detects		Human Health			Ecological (NPS COPC Selection ESV)						
					Detect	Total				Minimum	Maximum	USEPA RSL [HQ=0.1] Resident Soil [a]	DTSC HERO Resident Soil	Lowest Screening Level	Plants / Soil Invertebrates	Birds / Mammals	Lowest Screening Level	Max Detect (HH)	Max Detect (Eco)	Max MDL (HH)	Max MDL (Eco)
EPA 8290	Dioxin / Furan	1,2,3,6,7,8-HXCDD	57653-85-7	pg/g	0	1	0%	0.375	All ND	0.75	0.75	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,6,7,8-HXCDF	57117-44-9	pg/g	0	1	0%	0.295	All ND	0.59	0.59	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,7,8,9-HXCDD	19408-74-3	pg/g	0	1	0%	0.485	All ND	0.97	0.97	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,7,8,9-HXCDF	72918-21-9	pg/g	0	1	0%	0.385	All ND	0.77	0.77	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,7,8-PECDD	40321-76-4	pg/g	0	1	0%	0.38	All ND	0.76	0.76	---	---	---	---	---	---	All ND	All ND	no	no
		1,2,3,7,8-PECDF	57117-41-6	pg/g	0	1	0%	0.23	All ND	0.46	0.46	---	---	---	---	---	---	All ND	All ND	no	no
		2,3,4,6,7,8-HXCDF	60851-34-5	pg/g	0	1	0%	2.6	All ND	5.2	5.2	---	---	---	---	---	---	All ND	All ND	no	no
		2,3,4,7,8-PECDF	57117-31-4	pg/g	0	1	0%	0.235	All ND	0.47	0.47	---	---	---	---	---	---	All ND	All ND	no	no
		2,3,7,8-TCDD	1746-01-6	pg/g	0	1	0%	0.10	All ND	0.2	0.2	4.8	---	4.8	5000000	0.29	0.3	All ND	All ND	no	no
		2,3,7,8-TCDF	51207-31-9	pg/g	0	1	0%	0.16	All ND	0.31	0.31	---	---	---	---	---	---	All ND	All ND	no	no
		OCDD	3268-87-9	pg/g	1	1	100%	71	71	71	71	---	---	---	---	---	---	no	no	---	---
		OCDF	39001-02-0	pg/g	0	1	0%	1.85	All ND	3.7	3.7	---	---	---	---	---	---	All ND	All ND	no	no
		TEQ	TEQ	pg/g	1	1	100%	0.14	0.14	0	0	4.8	---	4.8	5000000	0.29	0.3	no	no	---	---
EPA 8082A	PCBs	AROCLOR 1221	11104-28-2	mg/kg	0	3	0%	0.0030	All ND	0.006	0.006	0.2	---	0.20	---	---	---	All ND	All ND	no	no
		AROCLOR 1232	11141-16-5	mg/kg	0	3	0%	0.0020	All ND	0.004	0.004	0.17	---	0.17	---	---	---	All ND	All ND	no	no
		AROCLOR 1242	53469-21-9	mg/kg	0	3	0%	0.0020	All ND	0.004	0.004	0.23	---	0.23	---	0.041	0.0	All ND	All ND	no	no
		AROCLOR 1248	12672-29-6	mg/kg	0	3	0%	0.0020	All ND	0.004	0.0040	0.23	---	0.23	---	0.0073	0.0	All ND	All ND	no	no
		AROCLOR 1254	11097-69-1	mg/kg	0	3	0%	0.0020	All ND	0.004	0.004	0.12	---	0.12	160	0.041	0.0	All ND	All ND	no	no
		AROCLOR 1260	11096-82-5	mg/kg	0	3	0%	0.0020	All ND	0.004	0.004	0.24	---	0.24	---	0.88	0.9	All ND	All ND	no	no
		AROCLOR 1262	37324-23-5	mg/kg	0	3	0%	0.0030	All ND	0.006	0.006	---	---	---	---	---	---	All ND	All ND	no	no
		AROCLOR 1268	11100-14-4	mg/kg	0	3	0%	0.0030	All ND	0.006	0.006	---	---	---	---	---	---	All ND	All ND	no	no
		TOTAL PCBS	1336-36-3	mg/kg	0	3	0%	0.0020	All ND	0.004	0.004	0.23	---	0.23	40	---	40.0	All ND	All ND	no	no
EPA 8081A	Pesticides	4,4'-DDD	72-54-8	mg/kg	0	3	0%	0.00090	All ND	0.0018	0.0018	0.19	---	0.19	---	0.0063	0.0	All ND	All ND	no	no
		4,4'-DDE	72-55-9	mg/kg	0	3	0%	0.00080	All ND	0.0016	0.0016	2	---	2.0	---	0.021	0.0	All ND	All ND	no	no
		4,4'-DDT	50-29-3	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	1.9	---	1.9	4.1	0.021	0.0	All ND	All ND	no	no
		ALDRIN	309-00-2	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	0.039	---	0.039	0.00332	0.037	0.0	All ND	All ND	no	no
		ALPHA-BHC	319-84-6	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	0.086	---	0.086	---	0.1	0.1	All ND	All ND	no	no
		ALPHA-CHLORDANE	5103-71-9	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	---	---	---	2.2	0.27	0.3	All ND	All ND	no	no
		BETA-BHC	319-85-7	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	0.3	---	0.30	0.00398	0.27	0.0	All ND	All ND	no	no
		DELTA-BHC	319-86-8	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	0.1	0.1	All ND	All ND	no	no
		DIELDRIN	60-57-1	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	0.034	---	0.034	10	0.0045	0.0	All ND	All ND	no	no
		ENDOSULFAN I	959-98-8	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	---	---	All ND	All ND	no	no
		ENDOSULFAN II	33213-65-9	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	---	---	All ND	All ND	no	no
		ENDOSULFAN SULFATE	1031-07-8	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	---	---	All ND	All ND	no	no
		ENDRIN	72-20-8	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	1.9	---	1.9	0.0034	0.0014	0.0	All ND	All ND	no	no
		ENDRIN ALDEHYDE	7421-93-4	mg/kg	0	3	0%	0.0010	All ND	0.002	0.002	---	---	---	---	---	---	All ND	All ND	no	no
		ENDRIN KETONE	53494-70-5	mg/kg	0	3	0%	0.0010	All ND	0.002	0.002	---	---	---	---	---	---	All ND	All ND	no	no
		GAMMA-BHC	58-89-9	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	0.57	---	0.57	0.005	0.0095	0.0	All ND	All ND	no	no
		GAMMA-CHLORDANE	5566-34-7	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	---	---	---	---	---	---	All ND	All ND	no	no
		HEPTACHLOR	76-44-8	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	0.13	---	0.13	0.4	0.059	0.1	All ND	All ND	no	no
		HEPTACHLOR EPOXIDE	1024-57-3	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	0.07	---	0.070	---	---	---	All ND	All ND	no	no
		METHOXYCHLOR	72-43-5	mg/kg	0	3	0%	0.00040	All ND	0.0008	0.0008	32	---	32	---	5.1	5.1	All ND	All ND	no	no
		TOXAPHENE	8001-35-2	mg/kg	0	3	0%	0.0075	All ND	0.015	0.015	0.49	---	0.49	---	4.1	4.1	All ND	All ND	no	no

APPENDIX F2
SCREENING LEVEL EVALUATION OF SUBSURFACE SOIL
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Analysis Method	Chemical Group	Chemical Name	CASRN	Units	Subsurface Soil Summary Statistics							Current Project Screening Levels						Above Lowest SL? (COPC)		Above Lowest SL? (Inadequate MDL)	
					Number of Samples		Detection Frequency (%)	Mean (ND@0.5* MDL)	Maximum Detect	Method Detection Limit Range for Non-detects		Human Health			Ecological (NPS COPC Selection ESV)						
					Detect	Total				Minimum	Maximum	USEPA RSL [HQ=0.1] Resident Soil [a]	DTSC HERO Resident Soil	Lowest Screening Level	Plants / Soil Invertebrates	Birds / Mammals	Lowest Screening Level	Max Detect (HH)	Max Detect (Eco)	Max MDL (HH)	Max MDL (Eco)
EPA 8015B-e	TPH-Diesel / Motor Oil	DIESEL FUEL (C10-24)	TPH-DRO	mg/kg	3	3	100%	35	38	0.52	0.53	255	---	255	---	---	---	no	no	---	---
		MOTOR OIL (C24-C36)	TPH-Motor Oil	mg/kg	3	3	100%	74	76	3.7	3.7	12033	---	12033	---	---	---	no	no	---	---
EPA 8015B-e	TPH-Diesel / Motor Oil w/ SGC	DIESEL FUEL	TPH-DRO w/SGC	mg/kg	3	3	100%	3.5	3.7	0.52	0.53	255	---	255	---	---	---	no	no	---	---
		MOTOR OIL	TPH-Motor Oil w/SGC	mg/kg	3	3	100%	8	9.7	3.7	3.7	12033	---	12033	---	---	---	no	no	---	---

Notes:

[a] There are no EPA RSL for TPH-DRO and TPH-MO. The values presented for TPH-DRO and TPH-MO under EPA RSL are the Environmental Screening Levels (ESLs) from the San Francisco Regional Water Quality Control Board, January 2019. Values were obtained from Table S-1, Direct Exposure Human Health Risk Levels, shallow soil residential exposure.

--- = screening level not available
% = percent
CASRN = Chemical Abstracts Service Registry Number
COPC = chemical of potential concern
DTSC HERO = California Department of Toxic Substances Office of Human and Ecological Risk
Eco = cological
ESL = environmental screening level
ESV = ecological screening value
HH= human health
HQ = hazard quotient
MDL = method detection limit
mg/kg = milligram per kilogram
ND = non-detect
NPS = National Park Service
PAH = polyaromatic hydrocarbon
pg/g = picogram per gram
RSL = regional screening level
RWQCB = Regional Water Quality Control Boards
SGC = silica gel cleanup
SL = screening level
SVOC = semi-volatile organic compound
TPH = total petroleum hydrocarbon
USEPA = U.S. Environmental Protection Agency

Appendix G

Statistical Evaluation of Site versus Background Soil

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APPENDIX G
COMPARISON OF SITE SOIL TO BACKGROUND SOIL
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Chemical Name	DU	Soil Type	ISM Replicate Concentration (mg/kg)			ISM Replicate Result [ln-transformed]			Mean	Standard Deviation	Number of Samples	Site vs. Background (DU4)						
												s2p	t-test	One-tail test		2-tail	Different?	
			Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3						sig (1 > 2)	sig (2 > 1)	sig (1<>2)	1-tail	2-tail
Antimony	DU01	Subsurface Soil	0.46	1	1.8	-0.78	0.00	0.59	-0.06	6.8E-01	3	2.3E-01	6.571	0.999	0.001	0.003	yes	yes
	DU01	Surface Soil	0.5	0.57	1.6	-0.69	-0.56	0.47	-0.26	6.4E-01	3	2.0E-01	6.518	0.999	0.001	0.003	yes	yes
	DU02	Surface Soil	1	0.29	0.07	0.00	-1.24	-2.66	-1.30	1.3E+00	3	8.9E-01	1.770	0.924	0.076	0.15	yes	yes
	DU03	Surface Soil	0.34	0.2	0.07	-1.08	-1.61	-2.66	-1.78	8.0E-01	3	3.2E-01	1.888	0.934	0.066	0.1320	yes	yes
	DU04	Surface Soil	0.07	0.07	0.07	-2.66	-2.66	-2.66	-2.66	0.0E+00	3							
Arsenic	DU01	Subsurface Soil	2.1	1.8	1.9	0.74	0.59	0.64	0.66	7.8E-02	3	6.0E-03	3.654	0.989	0.011	0.021690	yes	yes
	DU01	Surface Soil	1.3	1.4	1.4	0.26	0.34	0.34	0.31	4.3E-02	3	3.9E-03	-2.234	0.045	0.955	0.91079	no	yes
	DU02	Surface Soil	1.3	1	1.3	0.26	0.00	0.26	0.17	1.5E-01	3	1.4E-02	-2.554	0.032	0.968	0.936935	no	yes
	DU03	Surface Soil	1.3	1.2	1.2	0.26	0.18	0.18	0.21	4.6E-02	3	4.0E-03	-4.172	0.007	0.993	0.9859885	no	no
	DU04	Surface Soil	1.6	1.6	1.4	0.47	0.47	0.34	0.43	7.7E-02	3							
Barium	DU01	Subsurface Soil	18.5	17.3	21.1	2.92	2.85	3.05	2.94	1.0E-01	3	1.2E-02	1.909	0.936	0.064	0.12888	yes	yes
	DU01	Surface Soil	20.2	20.8	24.3	3.01	3.03	3.19	3.08	9.9E-02	3	1.2E-02	3.490	0.987	0.013	0.025	yes	yes
	DU02	Surface Soil	26.1	18.1	24.1	3.26	2.90	3.18	3.11	1.9E-01	3	2.5E-02	2.648	0.971	0.029	0.05708	yes	yes
	DU03	Surface Soil	17.7	18.9	18	2.87	2.94	2.89	2.90	3.4E-02	3	7.2E-03	1.883	0.934	0.066	0.133	yes	yes
	DU04	Surface Soil	15.8	18	14.3	2.76	2.89	2.66	2.77	1.2E-01	3							
Cadmium	DU01	Subsurface Soil	0.12	0.15	0.17	-2.12	-1.90	-1.77	-1.93	1.8E-01	3	1.8E-02	12.616	1.000	0.000	0.000227	yes	yes
	DU01	Surface Soil	0.1	0.088	0.18	-2.30	-2.43	-1.71	-2.15	3.8E-01	3	7.6E-02	5.241	0.997	0.003	0.00634	yes	yes
	DU02	Surface Soil	0.15	0.12	0.073	-1.90	-2.12	-2.62	-2.21	3.7E-01	3	7.1E-02	5.131	0.997	0.003	0.007	yes	yes
	DU03	Surface Soil	0.064	0.056	0.041	-2.75	-2.88	-3.19	-2.94	2.3E-01	3	2.9E-02	2.767	0.975	0.025	0.0505	yes	yes
	DU04	Surface Soil	0.037	0.038	0.033	-3.30	-3.27	-3.41	-3.33	7.5E-02	3							
Chromium	DU01	Subsurface Soil	4.3	4.30	4.70	1.46	1.46	1.55	1.49	5.1E-02	3	1.3E-02	4.566	0.995	0.005	0.010	yes	yes
	DU01	Surface Soil	2.5	3.10	3.70	0.92	1.13	1.31	1.12	2.0E-01	3	3.1E-02	0.430	0.655	0.345	0.690	yes	yes
	DU02	Surface Soil	3.5	2.30	2.90	1.25	0.83	1.06	1.05	2.1E-01	3	3.4E-02	-0.043	0.484	0.516	0.032	yes	yes
	DU03	Surface Soil	2.6	2.70	2.70	0.96	0.99	0.99	0.98	2.2E-02	3	1.2E-02	-0.837	0.225	0.775	0.550	yes	yes
	DU04	Surface Soil	2.8	3.4	2.5	1.03	1.22	0.92	1.06	1.6E-01	3							
Cobalt	DU01	Subsurface Soil	2	2	2	0.69	0.69	0.69	0.69	0.0E+00	3	1.7E-03	4.813	0.996	0.004	0.009	yes	yes
	DU01	Surface Soil	1.8	1.7	1.8	0.59	0.53	0.59	0.57	3.3E-02	3	2.3E-03	1.007	0.815	0.185	0.3708	yes	yes
	DU02	Surface Soil	2	1.8	2.5	0.69	0.59	0.92	0.73	1.7E-01	3	1.6E-02	1.977	0.940	0.060	0.119	yes	yes
	DU03	Surface Soil	1.7	1.7	1.7	0.53	0.53	0.53	0.53	0.0E+00	3	1.7E-03	0.034	0.513	0.487	0.9745	yes	yes
	DU04	Surface Soil	1.8	1.7	1.6	0.59	0.53	0.47	0.53	5.9E-02	3							
Copper	DU01	Subsurface Soil	24.8	23	56.8	3.21	3.14	4.04	3.46	5.0E-01	3	1.3E-01	4.779	0.996	0.004	0.0088	yes	yes
	DU01	Surface Soil	14.5	17.4	33.3	2.67	2.86	3.51	3.01	4.4E-01	3	9.9E-02	3.710	0.990	0.010	0.0207	yes	yes
	DU02	Surface Soil	32.2	10.8	8.7	3.47	2.38	2.16	2.67	7.0E-01	3	2.5E-01	1.499	0.896	0.104	0.20820	yes	yes
	DU03	Surface Soil	18.1	14.1	11.5	2.90	2.65	2.44	2.66	2.3E-01	3	2.9E-02	4.321	0.994	0.006	0.01	yes	yes
	DU04	Surface Soil	7.6	8.6	7.4	2.03	2.15	2.00	2.06	8.0E-02	3							
Lead	DU01	Subsurface Soil	16.5	17.7	29.4	2.80	2.87	3.38	3.02	3.2E-01	3	5.5E-02	7.619	0.999	0.001	0.00	yes	yes
	DU01	Surface Soil	8.7	11.5	19.1	2.16	2.44	2.95	2.52	4.0E-01	3	8.5E-02	4.035	0.992	0.008	0.016	yes	yes
	DU02	Surface Soil	23	18	5.2	3.14	2.89	1.65	2.56	8.0E-01	3	3.2E-01	2.155	0.951	0.049	0.0975	yes	yes
	DU03	Surface Soil	5.4	4.9	4.7	1.69	1.59	1.55	1.61	7.1E-02	3	8.0E-03	0.680	0.733	0.267	0.5340	yes	yes
	DU04	Surface Soil	4.7	5.3	4.3	1.55	1.67	1.46	1.56	1.0E-01	3							

APPENDIX G

COMPARISON OF SITE SOIL TO BACKGROUND SOIL

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

Chemical Name	DU	Soil Type	ISM Replicate Concentration (mg/kg)			ISM Replicate Result [ln-transformed]			Mean	Standard Deviation	Number of Samples	Site vs. Background (DU4)						
												s2p	t-test	One-tail test		2-tail	Different?	
			Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3						sig (1 > 2)	sig (2 > 1)	sig (1<>2)	1-tail	2-tail
Mercury	DU01	Subsurface Soil	0.02	0.02	0.02	-3.91	-3.91	-3.91	-3.91	0.0E+00	3	0.0E+00	--	--	--	--	no	no
	DU01	Surface Soil	0.02	0.021	0.02	-3.91	-3.86	-3.91	-3.90	2.8E-02	3	4.0E-04	1.000	0.813	0.187	0.374	yes	yes
	DU02	Surface Soil	0.02	0.021	0.02	-3.91	-3.86	-3.91	-3.90	2.8E-02	3	4.0E-04	1.000	0.813	0.187	0.3739	yes	yes
	DU03	Surface Soil	0.02	0.02	0.02	-3.91	-3.91	-3.91	-3.91	0.0E+00	3	0.0E+00	--	--	--	--	no	no
	DU04	Surface Soil	0.02	0.02	0.02	-3.91	-3.91	-3.91	-3.91	0.0E+00	3							
Nickel	DU01	Subsurface Soil	3.4	3	4.1	1.22	1.10	1.41	1.24	1.6E-01	3	3.6E-02	-6.704	0.001	0.999	1.00	no	no
	DU01	Surface Soil	10	23.3	11.2	2.30	3.15	2.42	2.62	4.6E-01	3	1.3E-01	1.168	0.846	0.154	0.31	yes	yes
	DU02	Surface Soil	14.2	7.3	9.5	2.65	1.99	2.25	2.30	3.4E-01	3	8.0E-02	0.075	0.528	0.472	0.94	yes	yes
	DU03	Surface Soil	9.1	10.5	7.9	2.21	2.35	2.07	2.21	1.4E-01	3	3.4E-02	-0.477	0.329	0.671	0.34	yes	yes
	DU04	Surface Soil	8	12.3	9.5	2.08	2.51	2.25	2.28	2.2E-01	3							
Silver	DU01	Subsurface Soil	0.076	0.11	0.1	-2.58	-2.21	-2.30	-2.36	1.9E-01	3	2.3E-02	8.008	0.999	0.001	0.0013	yes	yes
	DU01	Surface Soil	0.053	0.093	0.11	-2.94	-2.38	-2.21	-2.51	3.8E-01	3	7.8E-02	3.728	0.990	0.010	0.02033	yes	yes
	DU02	Surface Soil	0.12	0.075	0.041	-2.12	-2.59	-3.19	-2.63	5.4E-01	3	1.5E-01	2.282	0.958	0.042	0.08458	yes	yes
	DU03	Surface Soil	0.07	0.077	0.053	-2.66	-2.56	-2.94	-2.72	1.9E-01	3	2.3E-02	5.078	0.996	0.004	0.007092	yes	yes
	DU04	Surface Soil	0.033	0.039	0.033	-3.41	-3.24	-3.41	-3.36	9.6E-02	3							
Thallium	DU01	Subsurface Soil	0.042	0.069	0.057	-3.17	-2.67	-2.86	-2.90	2.5E-01	3	4.0E-02	-1.718	0.081	0.919	0.8390	yes	yes
	DU01	Surface Soil	0.04	0.047	0.043	-3.22	-3.06	-3.15	-3.14	8.1E-02	3	1.2E-02	-5.857	0.002	0.998	0.99576	no	no
	DU02	Surface Soil	0.065	0.06	0.082	-2.73	-2.81	-2.50	-2.68	1.6E-01	3	2.2E-02	-0.497	0.323	0.677	0.35450	yes	yes
	DU03	Surface Soil	0.059	0.067	0.064	-2.83	-2.70	-2.75	-2.76	6.4E-02	3	1.1E-02	-1.643	0.088	0.912	0.824264	yes	yes
	DU04	Surface Soil	0.072	0.083	0.064	-2.63	-2.49	-2.75	-2.62	1.3E-01	3							
Vanadium	DU01	Subsurface Soil	19.7	20.9	20	2.98	3.04	3.00	3.01	3.1E-02	3	4.6E-03	2.904	0.978	0.022	0.0440	yes	yes
	DU01	Surface Soil	15.8	17.8	17.8	2.76	2.88	2.88	2.84	6.9E-02	3	6.5E-03	-0.069	0.474	0.526	0.05199	yes	yes
	DU02	Surface Soil	19	13.4	18.7	2.94	2.60	2.93	2.82	2.0E-01	3	2.4E-02	-0.170	0.437	0.563	0.12665	yes	yes
	DU03	Surface Soil	20.9	18.8	17.4	3.04	2.93	2.86	2.94	9.2E-02	3	8.4E-03	1.328	0.873	0.127	0.254943	yes	yes
	DU04	Surface Soil	16.8	19	15.9	2.82	2.94	2.77	2.84	9.1E-02	3							
Zinc	DU01	Subsurface Soil	39.1	41.6	56.2	3.67	3.73	4.03	3.81	1.9E-01	3	2.3E-02	6.760	0.999	0.001	0.0025	yes	yes
	DU01	Surface Soil	31.4	31.8	50.2	3.45	3.46	3.92	3.61	2.7E-01	3	4.0E-02	3.897	0.991	0.009	0.01759	yes	yes
	DU02	Surface Soil	58.3	29.2	24	4.07	3.37	3.18	3.54	4.7E-01	3	1.1E-01	2.066	0.946	0.054	0.10770	yes	yes
	DU03	Surface Soil	27.7	24	20.3	3.32	3.18	3.01	3.17	1.6E-01	3	1.6E-02	1.900	0.935	0.065	0.130175	yes	yes
	DU04	Surface Soil	19.7	21.3	17.8	2.98	3.06	2.88	2.97	9.0E-02	3							

Notes:

DU = decision unit

ISM = incremental sampling methodology

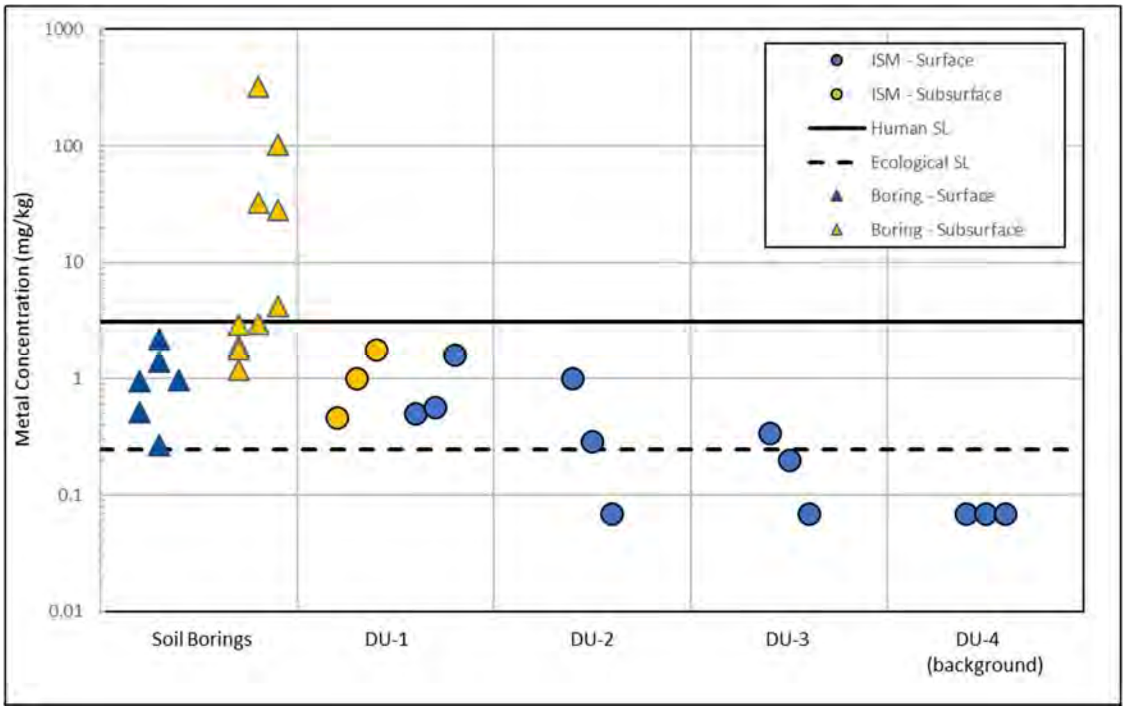
ln = natural logarithm

mg/kg = milligram per kilogram

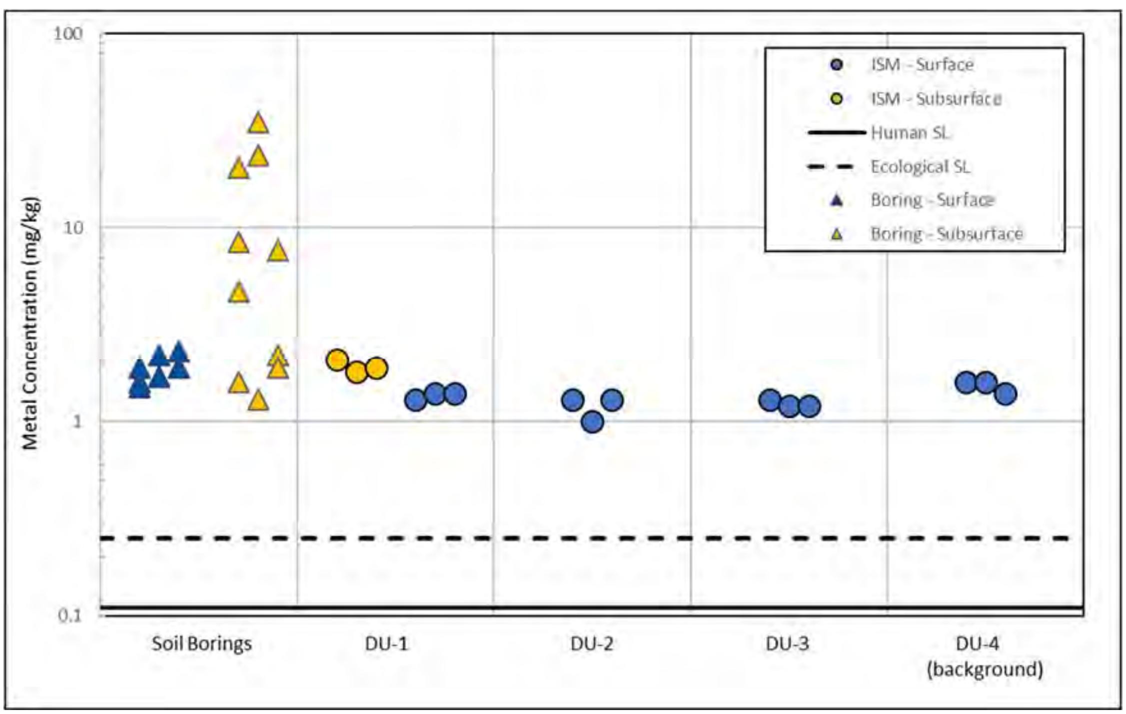
Rep = replicate

APPENDIX H
COMPARISON OF METAL CONCENTRIONS IN SOIL BY DECISION UNIT
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

ANTIMONY



ARSENIC



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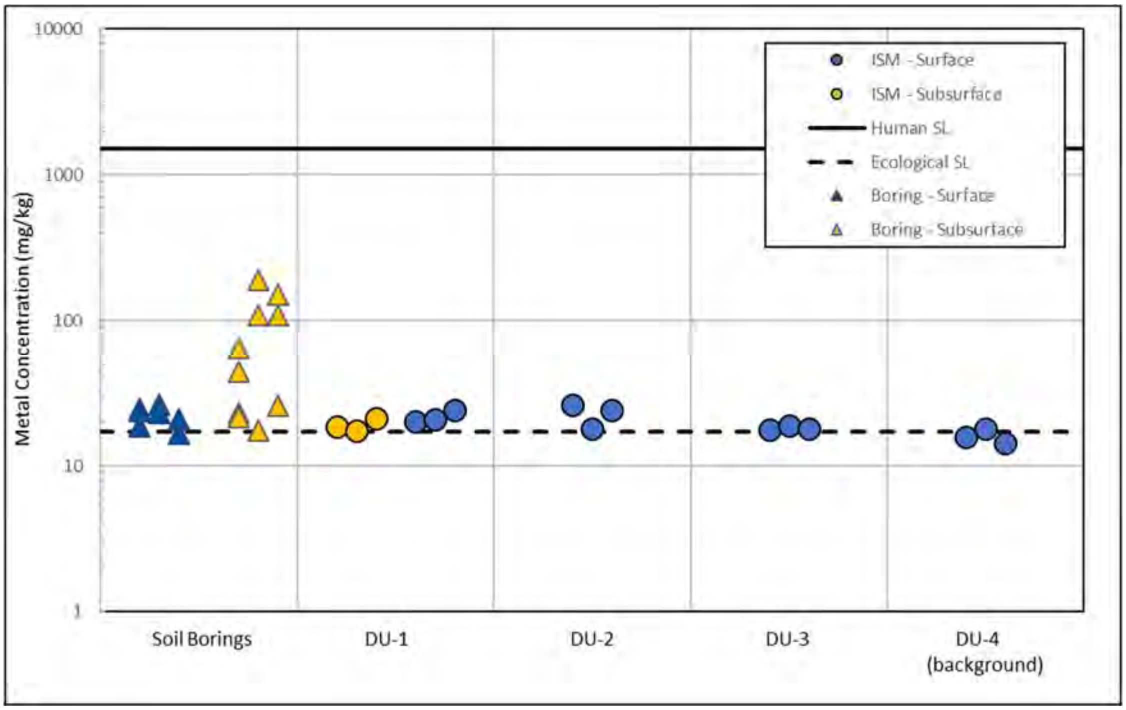
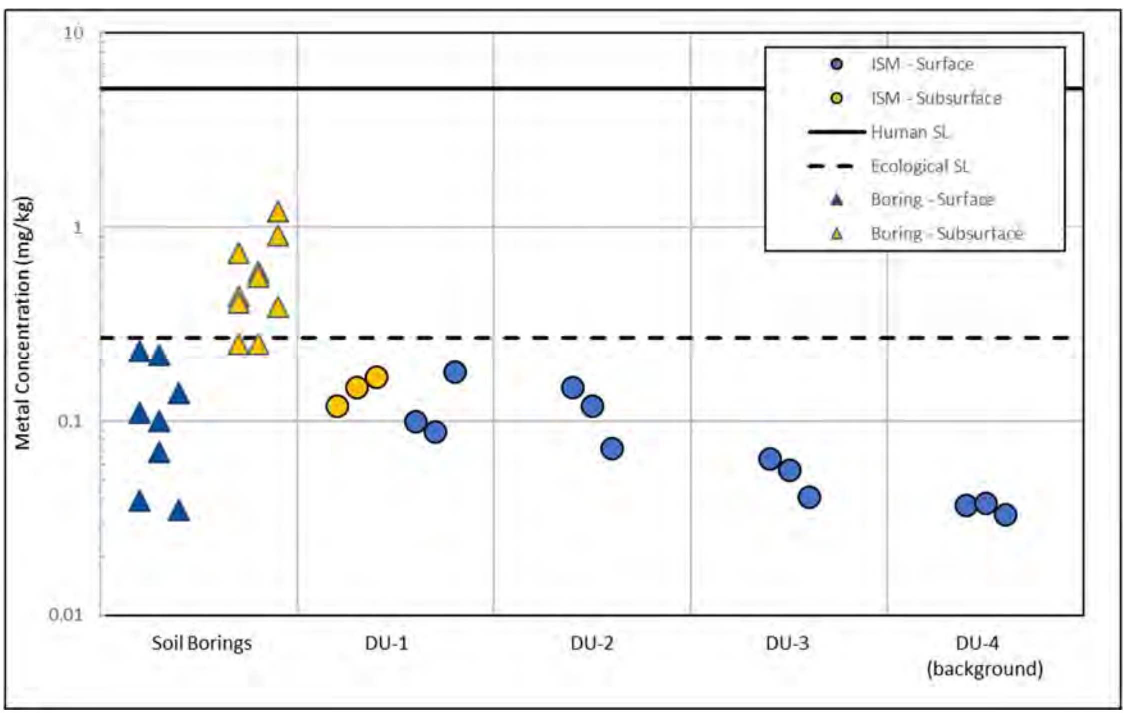
COMPARISON OF METAL CONCENTRIONS IN SOIL BY DECISION UNIT

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

BARIUM



CADMIUM



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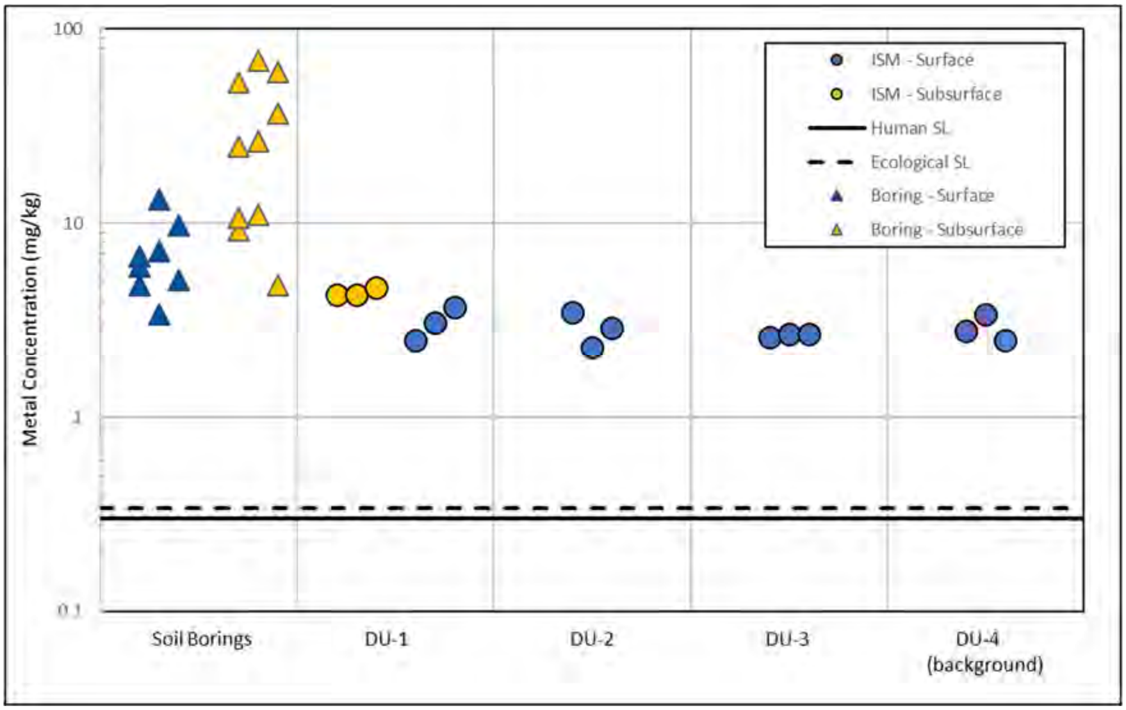
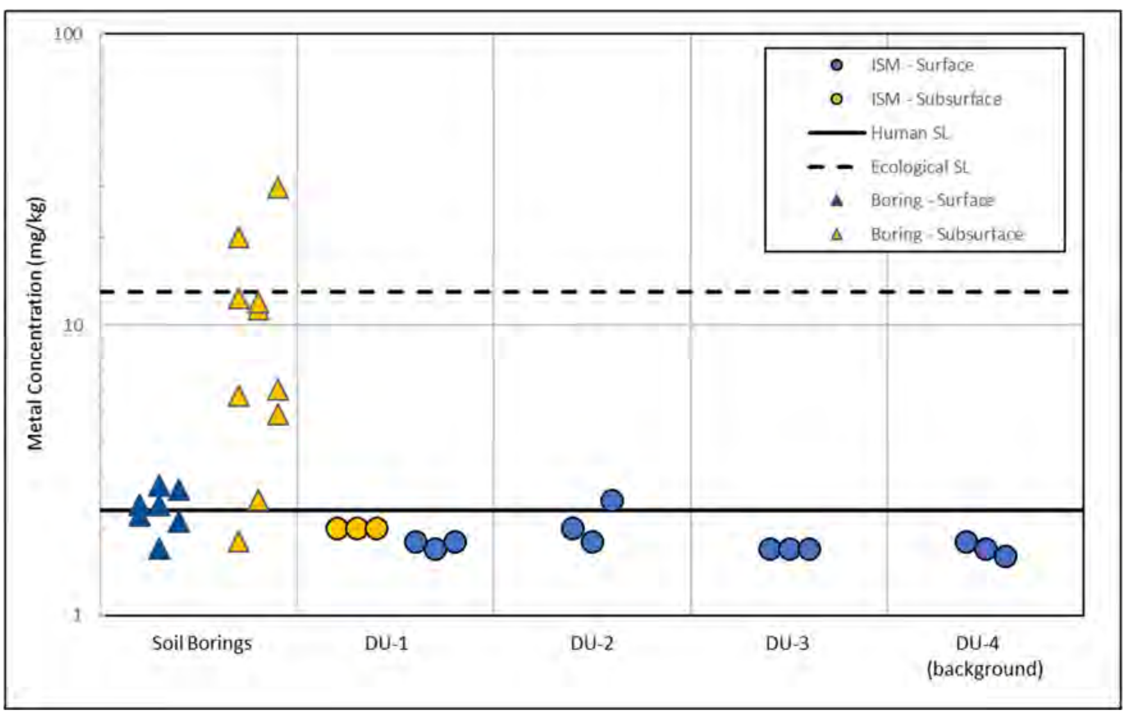
CHROMIUM



COBALT



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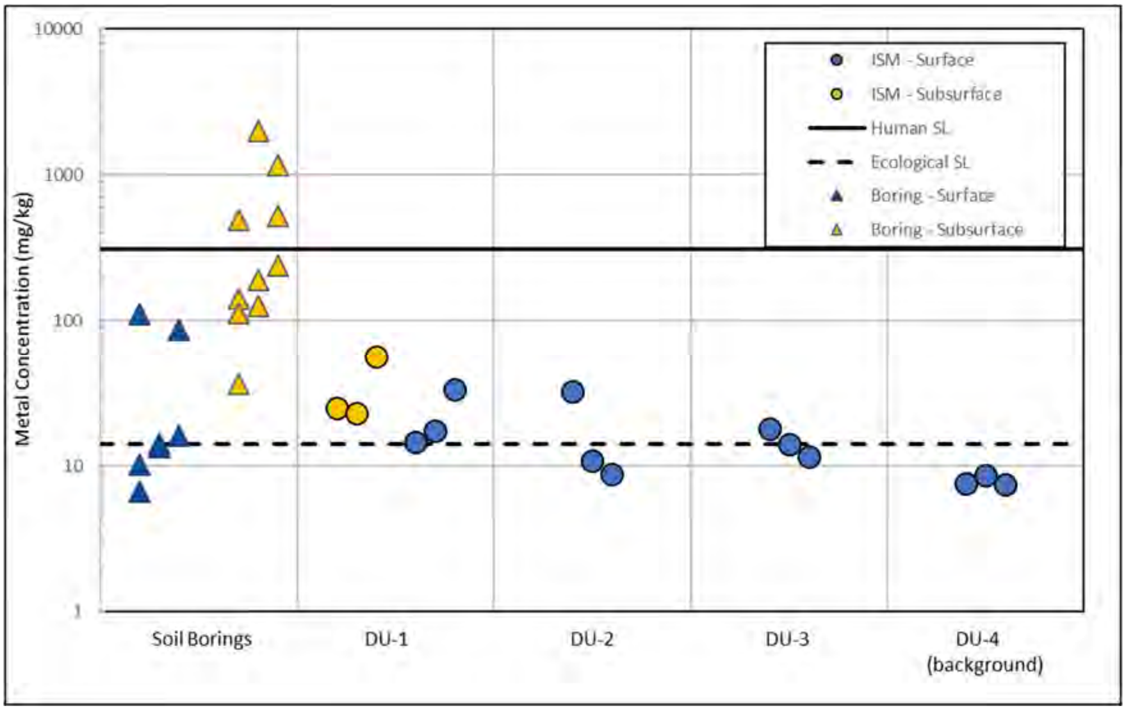
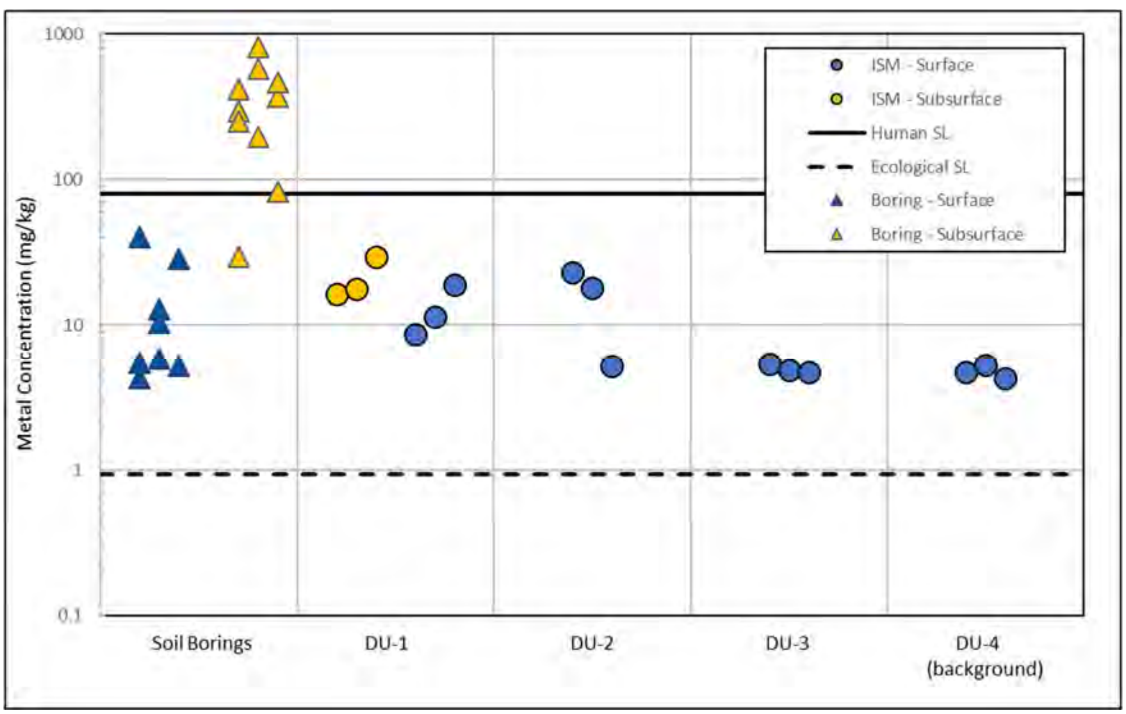
COPPER



LEAD



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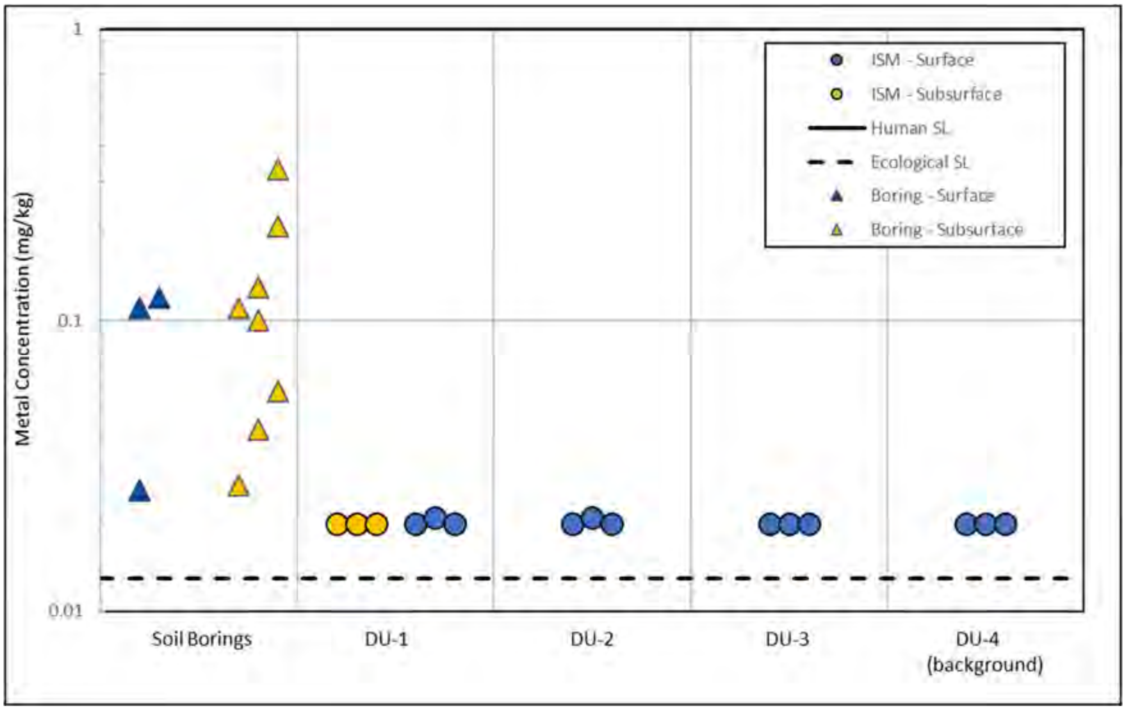
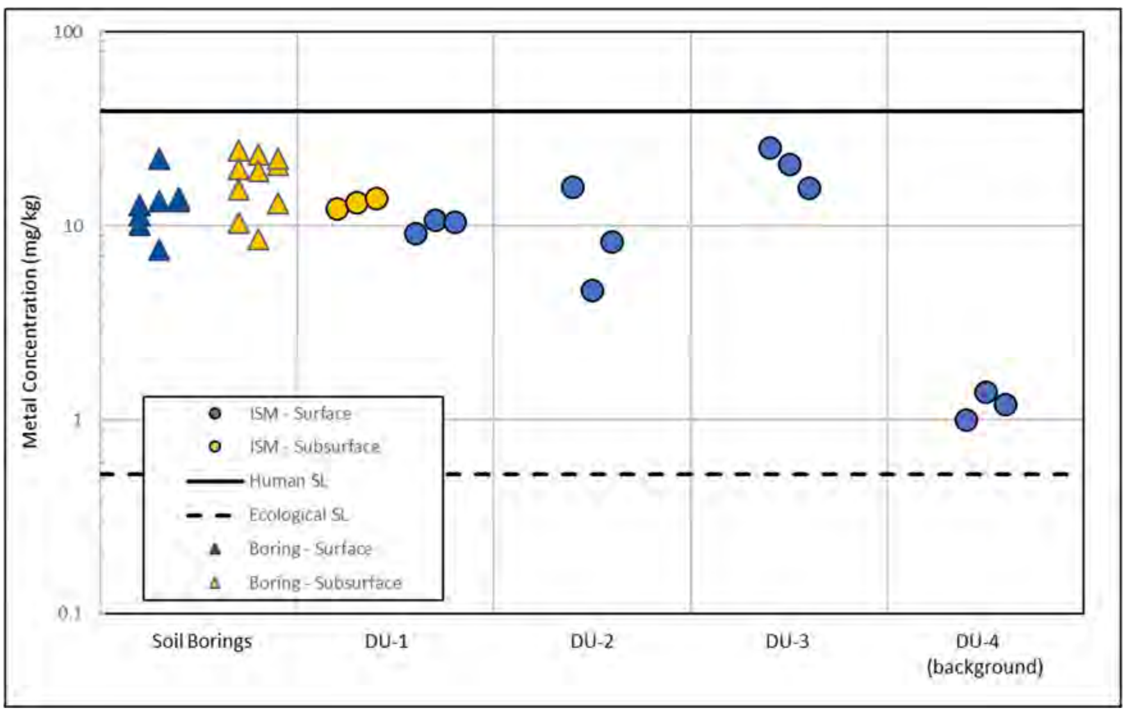
COMPARISON OF METAL CONCENTRIONS IN SOIL BY DECISION UNIT

Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

MERCURY



MOLYBDENUM



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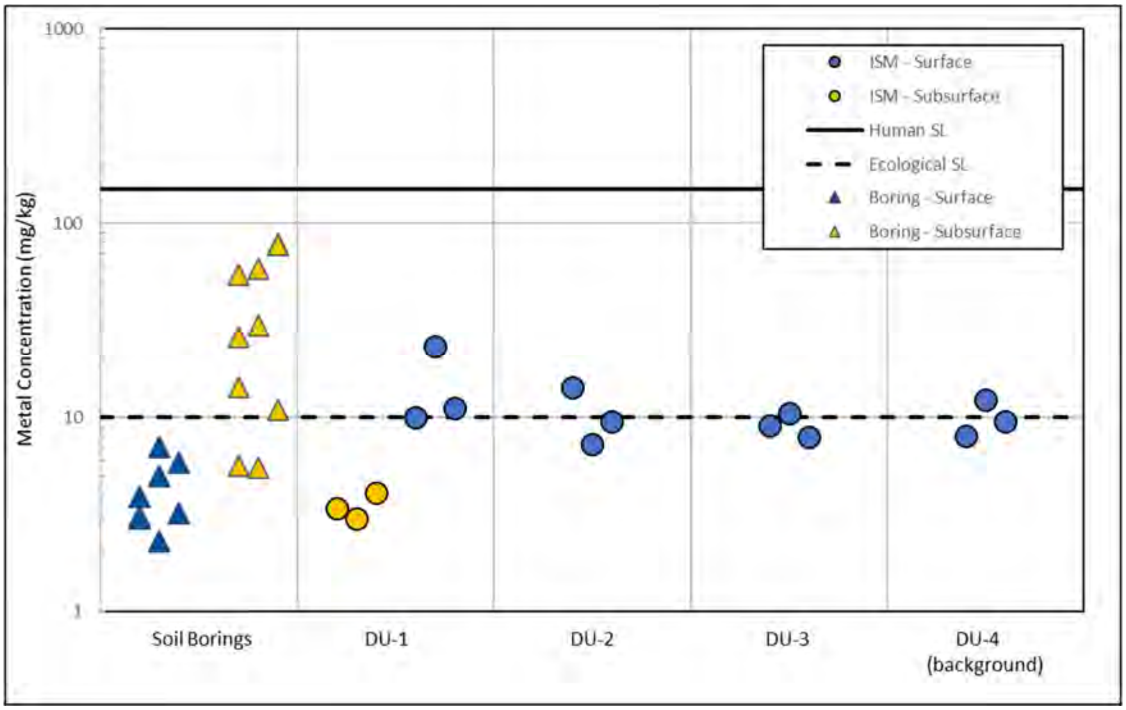
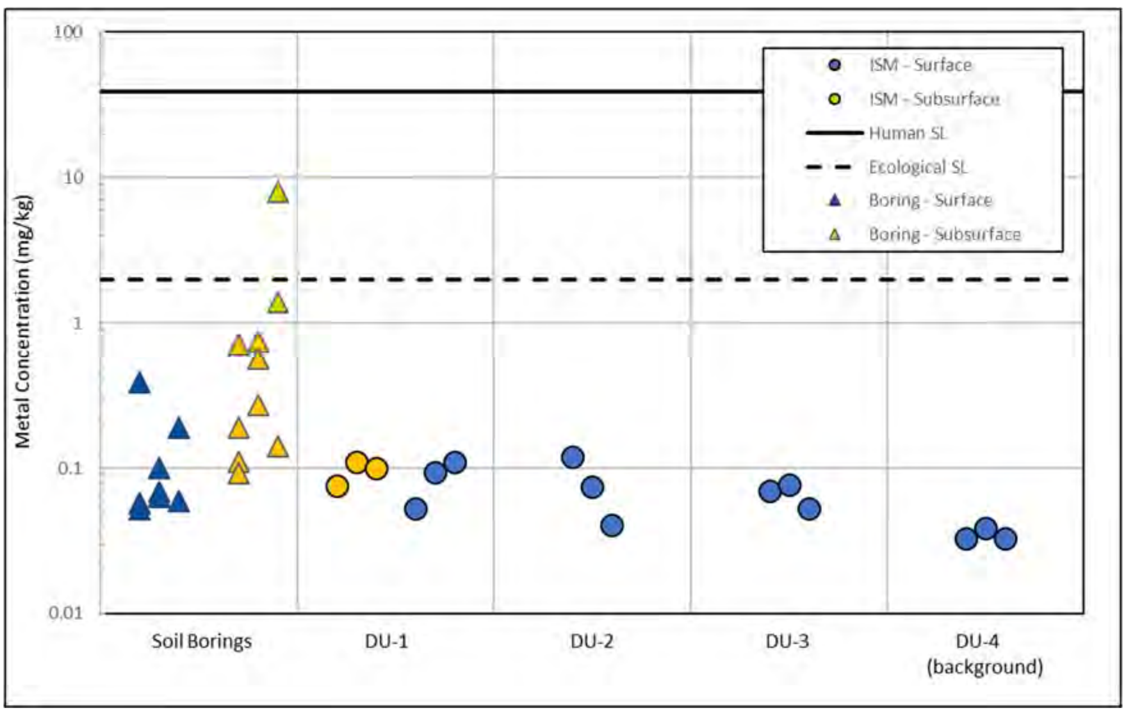
Vogelsang Former Waste Disposal Area, National Park Service, Yosemite National Park, California

NICKEL



SILVER



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COMPARISON OF METAL CONCENTRIONS IN SOIL BY DECISION UNIT
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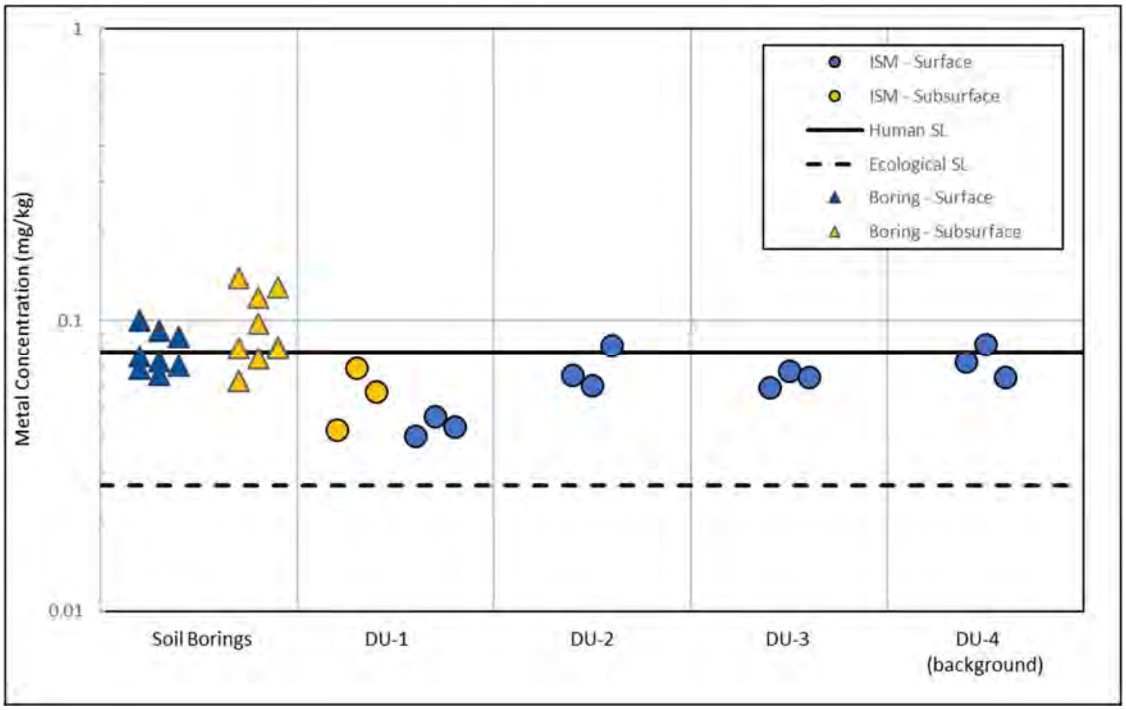
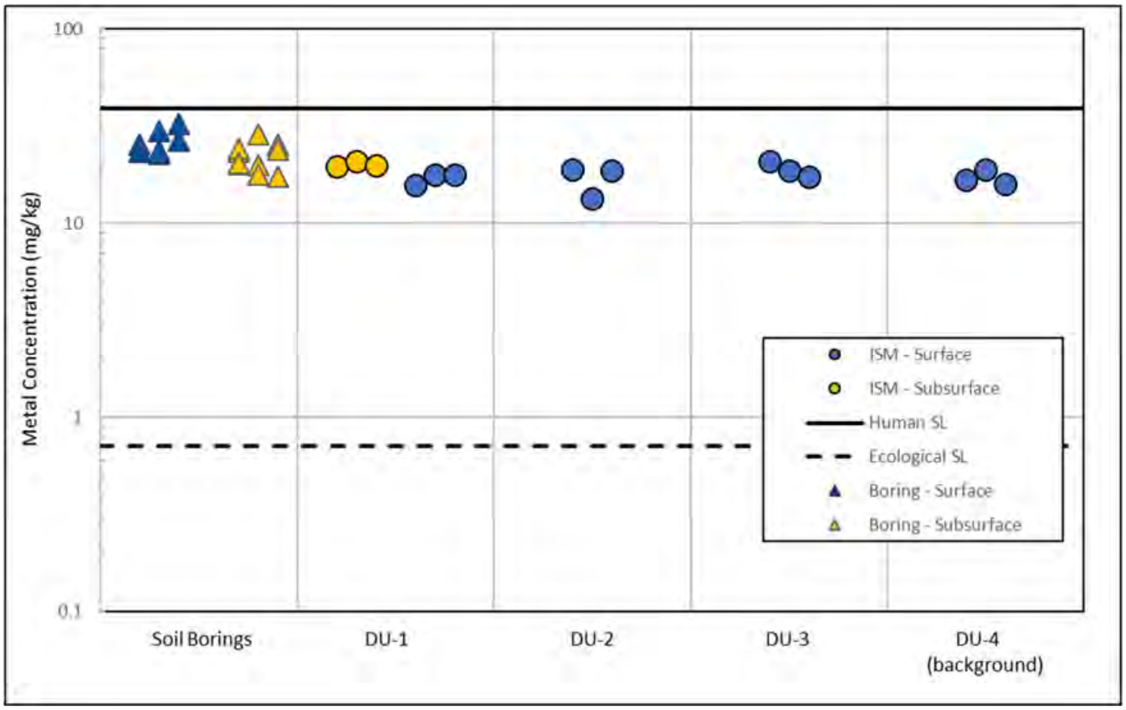
THALLIUM



VANADIUM



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COMPARISON OF METAL CONCENTRIONS IN SOIL BY DECISION UNIT
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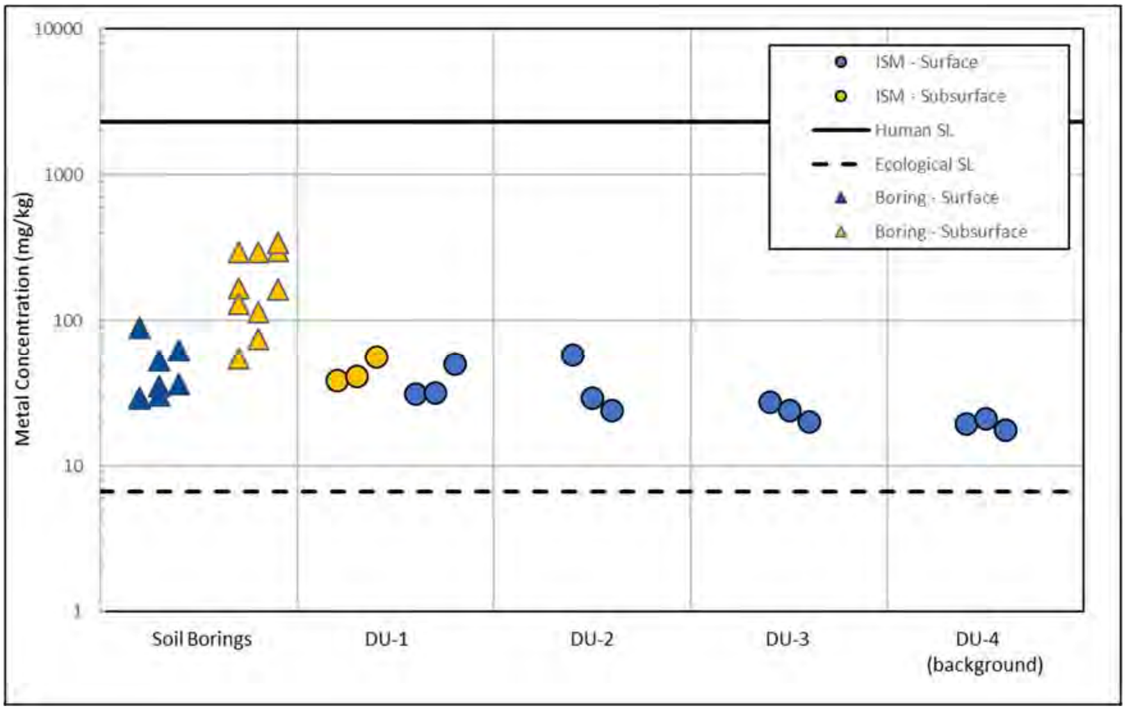
ZINC



Notes:

Non-detects reported at the MDL.
DU = decision unit
ISM = incremental sampling methodology
MDL = method detection limit
mg/kg = milligram per kilogram
SL = screening level

Attachments

Attachments

Attachment 1

FSI of the Vogelsang FWDA (IT Corporation 2002)

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DRAFT FINAL REPORT

FOCUSED SITE INSPECTION
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

SACRAMENTO TERC II
USACE CONTRACT NO. DACW05-96-D-0011
CTO NO. 08 - WAD NO. 02

Document Control Number : ACE08-199-H

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CQC System Manager	Signature	Date

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LIST OF ACRONYMS AND ABBREVIATIONS

AUF	Area Use Factor
BAF/BCF	Bioaccumulation/Bioconcentration Factor
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPEC	Constituent of Potential Ecological Concern
DDD	4,4'-Dichlorodiphenyldichloroethane
DDE	4,4'-Dichlorodiphenyldichloroethylene
DDT	4,4'-Dichlorodiphenyltrichloroethane
DTSC	[California Environmental Protection Agency] Department of Toxic Substances Control
EPC	Exposure Point Concentration
ESV	Ecological Screening Values
IT	IT Corporation
LOAEL	Lowest Observable Adverse Effects Level
MADEP	Massachusetts Department of Environmental Protection
μg/kg	Micrograms per Kilogram
μg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NOAEL	No Observable Adverse Effects Level
NPS	National Park Service
PA/SI	Preliminary Assessment/Site Inspection
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
pg/g	picograms per gram
PQL	Practical Quantitation Limit
PRG	[USEPA] Preliminary Remediation Goal
QC	Quality Control
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RWQCB	Regional Water Quality Control Board
SVOC	Semivolatile Organic Compounds
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEF	Toxicity Equivalency Factor
TEQ	Toxic Equivalency
TERC	Total Environmental Restoration Contract
TPH-d/mo	Total Petroleum Hydrocarbons as diesel/motor oil
UCL	Upper Confidence Limit
USACE	U.S. Army Corps of Engineers, Sacramento District
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds
WAA	Waste Accumulation Area

EXECUTIVE SUMMARY

In August 2001, IT Corporation (IT) conducted a focused site inspection of the Vogelsang waste accumulation area (WAA) in the Cathedral Range south of Tuolumne Meadows in Yosemite National Park, California. The WAA is located adjacent to the Vogelsang High Sierra Camp and comprises a surface area of approximately 19,500 square feet. The National Park Service (NPS) estimates that the WAA served as a dump site for the High Sierra Camp from the early 1930s to the late 1960s or early 1970s. Debris observed at the site consisted of domestic waste including crushed, rusted metal cans and metal household objects; broken glass; and broken china.

For this inspection, four test pits were located approximately 50 feet from one-another within the boundary of the WAA. Three test pits were also located approximately 120 feet up-slope of the WAA site for up-slope background sample collection, and three test pits were located down slope of the WAA for down-slope sample collection. Soil samples were collected and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH) as diesel and motor oil, pesticides, polychlorinated biphenyls (PCBs), metals, and hexavalent chromium. In addition, selected samples were analyzed for dioxins and furans.

Of 12 metals detected in test pit samples, six (cadmium, copper, lead, molybdenum, nickel, and zinc) had one or more detections that exceeded their Yosemite upper tolerance limit UTL background statistics. Of these, cadmium concentrations were found to be significantly different (greater) than the background Yosemite data set, and also greater than the human health residential preliminary residential goals (PRG), but less than the industrial PRG.

Several organic compounds exceeded their site-specific background values; however, all VOC, SVOC, PAH, pesticide, and PCB results were below their respective human health PRGs. All diesel and most motor oil detections exceeded the site-specific background values; however, all were less than screening criteria.

Based on the information presented in the screening level ecological risk assessment, localized populations of Montane or Trowbridge Shrew may be adversely impacted by soil concentrations of cadmium, molybdenum, and 2,3,7,8-TCDD toxic equivalency (TEQ) and localized populations of American Robin may be adversely impacted by soil concentrations of cadmium, lead, molybdenum, and 2,3,7,8-TCDD TEQ in WAA soils if these constituents of potential ecological concerns (COPECs) are bioaccumulating in earthworms and are subsequently being consumed by shrews and robins feeding exclusively in this area. However, this conclusion is based on conservative assumptions and actual conditions probably reduce the estimated impact to wildlife receptors.

Assessment of the nature and extent of chemical detections in soil samples from the Vogelsang WAA indicate that no further action is required at this site for human health concerns, assuming residential use of the site does not occur. The estimated effects on wildlife receptors are based on conservative assumptions; actual conditions probably reduce the estimated impact.

1.0 INTRODUCTION

In August 2001, IT Corporation (IT) conducted a focused site inspection of the Vogelsang waste accumulation area (WAA) located in the Cathedral Range south of Tuolumne Meadows, Yosemite National Park, California. The WAA is located adjacent to the Vogelsang High Sierra Camp. This investigation was conducted to determine the nature and extent of chemicals in the soil as a result of waste accumulation from the High Sierra Camp from the early 1930s to the late 1960s or early 1970s. Previous soil sampling was conducted by the National Park Service (NPS) at the Vogelsang WAA in 1998. Laboratory analysis of these samples indicated the presence of polychlorinated biphenyls (PCBs), minor hydrocarbon compounds within the motor oil range, and metals.

The present work was performed for the NPS under the Total Environmental Restoration Contract (TERC) II, Contract Number DACW05-96-D-0011, Contract Task Order Number 8, Work Authorization Directive Number 2, for the U.S. Army Corps of Engineers (USACE), Sacramento District. The field investigation consisted of visual observation of waste type, the collection of soil samples from test pits hand-excavated at the site, and shipment of the samples to an analytical laboratory.

1.1 PROJECT OBJECTIVES AND SCOPE OF WORK

The primary objectives of the Vogelsang WAA investigation were to:

- Determine the lateral and vertical extent of debris within the WAA;
- Make visual observations of the types of waste present; and
- Obtain initial samples from subsurface soil within the WAA for laboratory analysis.

IT performed this focused site inspection to determine the nature and extent of the waste and to evaluate whether certain chemicals may be present in soil at the Vogelsang WAA. The analytical sample results are used in this report to evaluate whether the Vogelsang WAA may contain hazardous substances, pollutants, or contaminants that require further investigation or remediation pursuant to NPS responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), or other federal, state, and local requirements.

The scope of this project required hand-excavation of test pits to observe waste distribution within the Vogelsang WAA. The scope of work included the following tasks:

- Preparation of the Work Plan/Sampling and Analysis Plan;
- Procurement of field personnel and supplies;
- Hand excavation of test pits;
- Logging soil types and trash debris in test pit sidewalls;
- Collection and analysis of soil samples from test pits within the WAA;
- Backfilling the test pits with excavated soils;
- Restoration of the WAA surface and access routes as needed; and
- Preparation of this report.

NPS archeologists observed the excavation and backfilling of the test pits by IT site personnel, and catalogued items found during test pit excavation. The IT site geologist described the soil observed in each test pit and IT sampling personnel collected the samples and shipped them to the laboratory for analysis.

1.2 PROJECT GUIDANCE

This investigation was conducted in accordance with the *Work Plan & Sampling and Analysis Plan for Focused Site Inspection/Initial RCRA Facility Investigation of Vogelsang, Baseline, and Mather Waste Accumulation Areas, Yosemite National Park, California* (Plan) (IT, 2001). The Plan presented the objectives, methods, and procedures for the implementation of the initial site subsurface inspection activities. Specific tasks were performed as directed in the standard operating procedures (SOPs) presented in the Plan.

1.3 REPORT OBJECTIVES

This report presents the investigation methods and results. It also presents conclusions and recommendations based on the investigation results. Specifically, the objectives of this report are to:

- Present site background information including historical data provided by NPS;
- Document the investigation field procedures and methods;
- Present the investigation data and evaluate the quality and completeness of the data;
- Delineate the nature and extent of chemicals detected in soil samples in this investigation;
- Use the background information in a preliminary assessment of the Vogelsang WAA as a potential hazardous waste site; and
- Evaluate the risks posed to human health and the environment by site-related chemicals.

This report presents an assessment of the site data obtained by this investigation.

1.4 REPORT ORGANIZATION

Section 2.0 of this report describes the site's physical characteristics and presents the known history of waste accumulation activities. Section 3.0 describes field activities and observations during this investigation. Section 4.0 presents analytical data, summarizes the detections, and provides the comparison to risk-based screening criteria for soil. Section 5.0 presents the screening level ecological risk assessment. Section 6.0 presents conclusions and recommendations. References are listed in Section 7.0.

The U.S. Environmental Protection Agency (USEPA) Potential Hazardous Waste Site Preliminary Assessment Form is contained in Appendix A to this report. Test pit logs are contained in Appendix B. The laboratory analytical reports and completed chain-of-custody forms are presented in Appendix C. Appendices D and E present the background evaluations (Appendix D - Background Assessment Using Upper Tolerance Limit Approach and Appendix E - Refined Background Assessment Using Mann Whitney U Test Approach). Appendix F presents the derivation of site-specific risk-based ecological preliminary remediation goals (PRGs).

2.0 SITE DESCRIPTION

Figure 2-1 shows the location of Vogelsang WAA in Yosemite National Park, California. This section describes the site and its history. Information presented in this section is included in the USEPA Potential Hazardous Waste Site Preliminary Assessment Form (Appendix A).

2.1 PHYSICAL SETTING

The Vogelsang WAA is located in the Cathedral Range south of Tuolumne Meadows at an elevation of approximately 10,100 feet above mean sea level. The site is located within a sparsely vegetated subalpine pine forest and is accessed from Tuolumne Meadows via a 7.5-mile horse and hiking trail along Rafferty Creek (Figure 2-1). The WAA is located adjacent to the Vogelsang High Sierra Camp approximately 200 feet southwest of the tent cabins.

2.2 GEOLOGY AND HYDROLOGY

The Vogelsang WAA is located within the Sierra Nevada granitic batholith. The native soil at the site consists mostly of sand and silt with minor clay and gravel. The soil materials are primarily granitic in origin with lesser amounts derived from local metamorphic rocks. The depth to bedrock within the main portion of the WAA varied between 2.5 and 3.5 feet below ground surface (bgs).

No evidence of surface drainage or ponding was observed on the Vogelsang WAA during this focused site inspection. The nearest down-slope surface water occurrence is Fletcher Creek, approximately 350 feet southwest of the WAA. Fletcher Creek flows southwest into the Merced River drainage.

No groundwater monitoring wells exist within or near the boundary of the WAA, and groundwater was not encountered in any of the test pits that were excavated; therefore, depth to groundwater is unknown at the site. The nearest drinking water well is located at the Tuolumne Meadows Ranger Station, 7.5 miles north of Vogelsang in the Tuolumne River drainage system. The nearest drinking water wells in the Merced River drainage are at Yosemite Lodge, approximately 16 miles from the WAA.

2.3 SITE HISTORY

The Vogelsang High Sierra Camp, which consists of several tent cabins, a kitchen and dining tent, and stable facilities, was established in the 1930s as a refuge for backpackers and hikers. The NPS estimates that the Vogelsang WAA served as a dump site for household debris from the High Sierra Camp until the late 1960s or early 1970s.

2.4 PREVIOUS INVESTIGATION

No site-specific hydrologic investigations have been conducted at the Vogelsang WAA. The NPS conducted a field investigation of soils at the Vogelsang WAA in August 1998 (*Yosemite National Park Landfill Inventory Report Form,* NPS, 1998). Soil core samples from depths of two feet or less at four locations were combined into one composite soil sample that was analyzed for extractable petroleum hydrocarbons, volatile organic compounds (VOCs), organochlorine pesticides, PCBs, and metals. The results are shown in Table 2-1. All detections were less than PRGs except arsenic, which exceeded its residential soil PRG but was less than its industrial soil PRG. The laboratory indicated the detection of motor oil range hydrocarbons contained "additional compounds uncharacteristic of common fuels and lubricants."

3.0 SITE INSPECTION

The following sections describe the sampling objectives, field activities, and quality assurance activities involved in the August 2001 site inspection.

3.1 INSPECTION OBJECTIVES

The site inspection was intended to

- Assess the lateral and vertical extent of waste debris;
- Determine if chemicals are present in subsurface soils at the site; and
- Evaluate potential health risks posed by site-related chemicals.

The objectives were developed through application of the data quality objectives process. The data quality objectives are presented in the Plan.

3.2 INSPECTION ACTIVITIES

IT personnel hand-excavated four test pits within the main debris area at the Vogelsang WAA at locations agreed upon at the site by representatives of the NPS, IT, and the Department of Toxic Substance Control (DTSC). When each of the test pit excavations was completed, the IT sampling crew then collected soil samples from the test pit sidewalls. Following completion of the sample collection activities, and with permission of the on-site NPS archeologists, IT personnel backfilled the test pits. Three additional test pits were hand-excavated up-slope of the WAA for background sample collection, and three test pits were excavated down-slope of the WAA for down-slope sample collection.

3.2.1 Pre-Inspection Activities

Due to the isolated wilderness location of the Vogelsang WAA, a utility clearance was not required or conducted at the site.

3.2.2 Site Access and Restoration

All site personnel hiked to the site via the Rafferty Creek trail, and supplies were carried in by mules. No heavy equipment or mechanized tools were used at the Vogelsang site. Upon completion of the site inspection, the surface was restored to its original grade and condition, and all samples, supplies, and trash were packed out on mules.

3.2.3 Sample Location Selection

Four test pits were located within the boundary of the Vogelsang WAA, approximately 50 feet apart. The three up-slope background test pits were located approximately 120 to 140 feet northeast of the WAA boundary. Three additional test pits were located down-slope of the WAA and adjacent to the WAA boundary. All test pit locations are shown on Figure 2-2.

3.2.4 Excavation and Backfilling of Test Pits

The test pits at the Vogelsang WAA were hand-excavated by IT personnel using hand tools. Debris items were catalogued as they were removed from the excavations by archeologists from the Western Archeological Center of the NPS. Each test pit was backfilled by the IT crew following completion of soil logging, soil sampling, and debris cataloging. The soil and debris excavated from the pits were returned to their original depth in the test pit.

3.2.5 Site Monitoring

The NPS archeologists observed excavation of each test pit at the Vogelsang WAA and were present during soil sample collection activities. While the test pits were open, the archeologists maintained custody of the debris items removed from the test pit excavations. IT personnel did not become involved in archeological monitoring at the site. The results of the archeological monitoring will be produced in a separate report by the NPS.

3.3 FIELD OBSERVATIONS

As each test pit was excavated, the site geologist described the soil exposed in the test pit sidewall on a test pit log. Copies of the logs are presented in Appendix B. The native soil was composed mainly of medium to dark red-brown sand with varying amounts of silt and/or clay and scattered pebbles. The soil commonly exhibited a slight cohesion due to a small moisture content. The soil matrix within the debris layer was composed of unconsolidated sand and silty sand, ranging from light tan to yellow in color. Test pits TP02, TP03, and TP04 were terminated on bedrock at 2.6 feet, 2.6 feet, and 3.6 feet bgs, respectively. Bedrock was not encountered in TP01, nor in any up-slope or down-slope test pits, all of which were terminated at one foot bgs because they contained no debris. Ash layers were observed at shallow depths (six to eight inches bgs) in two of the test pits within the main WAA area. No discolored or odorous soil was observed in any of the test pits at the Vogelsang site.

During this site inspection, the boundary of the Vogelsang WAA was designated as the limits of surface debris occurrences (Figure 2-2). The lateral extent of surface debris at Vogelsang WAA is approximately 19,500 square feet. Except at the test pit locations, there is no information about the existence or depth of subsurface debris across the remainder of the site. Four test pits were excavated within the WAA boundary. Three of the test pits encountered waste debris extending continuously from the surface to depths ranging from 2.5 to 3.5 feet bgs. Test pit TP01 did not encounter subsurface debris and therefore was only excavated to 1 foot bgs. Test pits TP02, TP03, and TP04, which contained subsurface debris, define a roughly triangular surface area. Assuming the subsurface debris is continuous between these three test pits and extends several feet beyond their localized area, then the estimated lateral extent of subsurface debris in this occurrence is approximately 1,800 square feet. Using an average depth of debris of 3 feet bgs, the estimated debris volume of this localized area is 200 cubic yards.

3.4 SAMPLING METHODS

Subsurface debris was observed in test pits TP02, TP03, and TP04, but not in TP01 and not in any up-slope or down-slope test pits. In the three test pits with subsurface debris, the debris layer extended from the ground surface to the bedrock surface.

Discrete soil samples were collected at two different depths from each of the test pits with trash present in the sidewall: one was collected at the midpoint and one at the lowest extent of the exposed debris layer. Test pits with no debris in the sidewall were sampled at one location at the bottom of the sidewall. Field quality control (QC) samples including field duplicate, equipment rinse, source blank, and trip blank samples were also collected at the Vogelsang site.

3.4.1 Soil Sample Collection

IT site personnel, working under the direction of the IT site supervisor, collected discrete soil samples from the exposed sidewalls of each test pit. Soil samples from the test pits located up-slope and down-slope of the WAA were collected from one sidewall sample location at approximately 1 foot bgs. Soil samples from test pits TP02, TP03, and TP04 within the WAA were collected at two different depths: at the midpoint of the debris layer and at the base of the debris layer within the test pit sidewall. Debris was not encountered in WAA test pit TP01; therefore, samples were collected from only one depth within that test pit, at approximately 1 foot bgs.

Sampling began at each location by first collecting soil for VOC analysis using EnCore™ samplers. Following completion of EnCore™ sampling activities, soil samples were then collected at the same sidewall location using 2-inch diameter by 6-inch long stainless steel sleeves. These samples were analyzed for semi-volatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH)-d/mo, pesticides, PCBs, metals, and hexavalent chromium. Discrete samples were also collected within an ash layer exposed in the sidewalls of test pits TP03 and TP04 at 6 inches and 8 inches bgs, respectively; these samples were analyzed for dioxins and furans only.

Because the remote location of the Vogelsang site prohibited daily sample shipment, all soil and EnCore™ samples were stored on dry ice upon collection. Freezing the volatile samples extended the holding time to seven days as proposed in the USEPA Region 9 memorandum *Regional Interim Policy for Determination of Volatile Organic Concentrations in Soil and Solid Matrices*, *Attachment A* (USEPA, 1999). Upon arrival at the laboratory, the EnCore™ samples were extruded from the sampler, placed in a vial containing distilled water, and analyzed immediately.

3.4.2 Aqueous Sample Collection

In order to provide for reliability of field sampling procedures and materials, QC samples were collected for each medium sampled, sample shipment, and sampling event. QC samples included a laboratory-prepared trip blank, a field-collected source blank, an equipment rinse sample, a field duplicate, and an increased sample volume for a matrix spike/matrix spike duplicate (MS/MSD). The field duplicate and equipment rinse results are discussed in Section 3.6.1.

A source blank was collected from the lot of distilled water used for the final rinse during decontamination. The source blank was poured directly from a newly-opened bottle of distilled water into laboratory-prepared containers. The source blank sample was then analyzed for the same parameters as the associated soil samples.

MS/MSD analyses were performed on the field samples selected by the laboratory at a frequency of five percent of the field samples collected and at least one MS/MSD sample per analytical batch.

Field duplicate samples were collected at a rate of ten percent of the field samples collected. Field duplicate samples were collected beginning with the first normal investigative sample and thereafter for every ten normal samples that were collected. All field duplicate samples were collocated with a normal sample and analyzed for the same parameters.

3.4.3 Sample Labeling

Samples were labeled in accordance with the system defined in the Plan: YW (Yosemite Waste Accumulation Area) V (Vogelsang) – TP01 (test pit number 1) – SO (soil sample) – 1033 (unique identification number). Up-gradient and down-gradient locations are indicated as "UG" and "DG," respectively. For ease of comparison, only sample locations (e.g., TP01; UG02) are used in the text, although complete sample numbers appear in the data tables and analytical reports.

3.4.4 Sample Handling and Shipping

Because of the remote location of the Vogelsang WAA, all soil samples were stored at the site on dry ice upon collection and shipped on the same day they were transported by horseback from the site to Tuolumne Meadows. Immediately following collection, each sample was labeled, placed in a resealable plastic bag, and then stored on dry ice in a sample cooler. The completed chain-of-custody form was placed in the cooler prior to shipment.

3.5 ANALYTICAL STRATEGY

In August 2001, soil samples were collected and analyzed for chemicals that may be present within the Vogelsang WAA based on the analytical results of soil samples collected at the site during the previous investigation (NPS, 1998), and visual observation of surface debris at the site in 1998.

There are no written records of a disposal history or types of waste materials within the site. Debris observed on the surface and in test pits included crushed and rusted metal, broken glass, and broken household china.

Soil samples collected from test pits at the Vogelsang WAA were analyzed for the following parameters (also shown on Table 3-1). The up-slope and down-slope test pits were also analyzed for the same parameters.

- VOCs by USEPA Method 8260B;
- SVOCs by USEPA Method 8270C;
- PAHs by USEPA Method 8310;
- TPH as diesel and motor oil by USEPA Method 8015B;
- Pesticides by USEPA Method 8081A;
- PCBs by USEPA Method 8082;
- Metals by USEPA Method 6010B/7471A;
- Hexavalent Chromium by USEPA 7196A; and
- Dioxins/Furans by USEPA Method 8290.

A field duplicate sample was analyzed for the same parameters as the collocated primary sample.

The analytical methods are all described in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846, Update II) (USEPA, 1998).

3.6 QUALITY CONTROL

3.6.1 Field Quality Control Samples

In order to provide for reliability of field sampling procedures and materials, QC samples were collected for each medium sampled, sample shipment, and sampling event. QC samples included a laboratory-prepared trip blank, a field-collected source blank, an equipment rinse sample, a field duplicate, and an increased sample volume for a MS/MSD.

A source blank was collected from the lot of distilled water used for the final rinse during decontamination. The source blank was poured directly from a newly-opened bottle of distilled water into laboratory-prepared containers. The source blank sample was then analyzed for the same parameters as the associated soil samples.

MS/MSD analyses were performed on the field samples selected by the laboratory at a frequency of five percent of the field samples collected and at least one MS/MSD sample per analytical batch.

Field duplicate samples were collected at a rate of ten percent of the field samples collected. Field duplicate samples were collected beginning with the first normal investigative sample and thereafter for every ten normal samples that were collected. All field duplicate samples were collocated with a normal sample and analyzed for the same parameters.

Field aqueous QC samples included one equipment rinse sample and one trip blank sample. The equipment rinse sample was analyzed for the same parameters as the field investigative samples. In the equipment rinse, antimony, barium, chromium, copper, lead, mercury, diesel, and motor oil were reported at estimated values well below their respective practical quantitation limit (PQL). Chromium, lead, mercury, and diesel were also detected in the source water at approximately the same concentration found in the equipment rinse sample. Zinc was reported above the PQL at 22.2 micrograms per liter (μg/L), but zinc was also detected in the source water at a concentration of 9.8 μg/L. In general, zinc may be considered to be a laboratory contaminant. As a result, chromium, lead, mercury, zinc, and diesel in the equipment rinse sample are considered to be non-detected. No other parameters were detected in the equipment rinse, indicating acceptable equipment decontamination. No detections of VOCs were reported in the trip blank sample.

One field duplicate sample was collected in test pit TP01. The data from the duplicate pair were compared using relative percent difference (RPD) calculations. Results of the calculations are presented in Table 3-2. The RPD acceptance limit specified in the plan for precision between duplicate soil samples is 50 percent. All of the RPDs for Vogelsang duplicate samples were within the acceptance limit except for the following: toluene (127 percent); diesel without silica gel cleanup (100 percent) and with silica gel cleanup (57 percent); motor oil without silica gel cleanup (79 percent) and with silica gel cleanup (58 percent); and mercury (56 percent). Data are not qualified based on the field duplicate RPD results. Field duplicate imprecision may be due to sample non-homogeneity and matrix effects. Since the majority of the field duplicate results were within the acceptance limit, the non-compliant field duplicate results have minimal impact on data quality and usability.

3.6.2 Laboratory Data Quality Assessment

A Level III data review was performed on all analytical results. The review was conducted in accordance with the guidelines and control criteria specified in the following documents:

- *National Functional Guidelines for Organic Data Review*, (USEPA, 1999);
- *National Functional Guidelines for Inorganic Data Review*, (USEPA, 1994b); and
- *Work Plan & Sampling and Analysis Plan, For Focused Site Inspection/Initial RCRA Facility Investigation of Vogelsang, Baseline, and Mather Waste Accumulation Areas at Yosemite National Park, California* (IT, 2001).

The following QC elements were included in the Level III data review:

- Sample holding times;
- Surrogate recoveries;
- Laboratory Control Sample/Laboratory Control Sample Duplicate recoveries;
- MS/MSD recoveries;
- Relative Percent Differences;
- Internal Standard Recoveries;
- Initial calibrations;
- Continuing calibrations;
- Laboratory Method Blanks; and
- Field Blanks.

The following sections provide a discussion of the review. The discussion focuses on the QC analytical results that were outside their respective control criteria and the potential impact of non-compliant issues on the data usability. The discussion does not include sample results associated with acceptable control limits. Qualified data and their associated sampling locations are identified in Table 3-3.

- **Method Blank Contamination, Reason Code B.** Detected results for methylene chloride in all of the soil samples and for beryllium in one soil sample were qualified as non-detected (U) because these analytes were also detected in the associated method blank. Sample results with concentrations less than ten times the blank concentration for methylene chloride and five times the blank concentration for beryllium were qualified as non-detected (U). Qualified sample results less than the reporting limit were raised to the laboratory reporting limit. Laboratory blank contamination did not significantly affect data quality and usability;

- **Continuing Calibration Verification, Reason Code C.** Detected results for acetone in six soil samples and the quantitation limits for 2,4-dinitrophenol in four soil samples were qualified as estimated (J/UJ) because the percent deviations for acetone and 2,4-dinitrophenol in the continuing calibrations did not meet the percent recovery acceptance criteria. Qualified data for acetone have the potential to be biased high, while qualified data for 2,4-dinitrophenol have the potential to be biased low. The non-compliant continuing calibrations have minimal impact on data quality and usability;

- **Holding Time, Reason Code H.** Results for hexavalent chromium and pH in all of the soil samples and for dioxins/furans in two soil samples were qualified as estimated (J/UJ) because of holding time violations. Qualified data for hexavalent chromium in all of the soil samples have the potential to be biased low, and qualified data for pH in all of the soil samples have the potential to be quantitatively inaccurate. Since the two soil samples for dioxins/furans marginally exceeded the preparation holding time by one day, these preparation holding time deviations have no significant impact on the dioxins/furans data quality and usability. Overall, the holding time deviations have minimal impact on data quality and usability;

- **Trip Blank, Reason Code K.** TPH as gasoline result was qualified as not detected (U) in source blank YWV-MB-WH-1018 because of contamination in the associated trip blank. There is no effect on data usability;

- **Laboratory Control Sample, Reason Code L.** The recovery of bromomethane was 68 percent in the laboratory control sample associated with source blank YWV-MB-WH-1018. The bromomethane quantitation limit in this sample was qualified as estimated (UJ). The recovery of bromomethane is slightly less than the 75 percent lower control limit and there is no negative effect on data usability;

- **Matrix Spike, Reason Code M.** The detected result for 1,2-dichlorobenzene and the quantitation limits for 1,3-dichlorobenzene, 1,4-dichlorobenzene, and vinyl acetate in the unspiked QC soil sample were qualified as estimated (J/UJ) because the percent recoveries for these analytes in the matrix spike sample did not meet the acceptance criteria for accuracy. Qualified data for the affected spiked analytes have the potential to be biased low. Since the percent recoveries for the non-compliant spiked analytes were marginally below the lower control limit, the matrix spike deviations have minimal impact on data quality and usability; and

- **Surrogate, Reason Code S.** The quantitation limits for all of the base/neutral semivolatile analytes in one soil sample were qualified as estimated (UJ) because the percent recoveries of two base/neutral surrogates did not meet the acceptance criteria for accuracy. Detected results and quantitation limits for pesticides in six soil samples and one equipment blank and for PCBs in one equipment blank were qualified as estimated (J/UJ) because one of the surrogates did not meet the acceptance criteria for accuracy. Qualified data for the affected analytes have the potential to be biased low. Since the outlying surrogate recoveries for semivolatiles and pesticides were marginally below the lower control limit and the other surrogates were acceptable, the non-compliant surrogates have no significant impact on data quality and usability.

The laboratory data quality for the sampling event met the quality assurance objectives and project goals specified in the Plan.

3.7 Deviations from the Plan

There were no deviations from the Plan during the focused site inspection of the Vogelsang WAA.

4.0 ANALYTICAL DATA SUMMARY AND EVALUATION

This section presents the analytical results for soil samples collected at the Vogelsang WAA. The samples were analyzed for metals (including hexavalent chromium), TPH as diesel and motor oil, and organic compounds (VOCs, PAHs, pesticides, and PCBs); selected samples were also analyzed for dioxins/furans. Chemical detections in soil samples are summarized on Tables 4-1 through 4-4. The laboratory analytical reports and chain of custody records are presented in Appendix C. All results are reported on a dry weight basis. The PQLs indicated in the laboratory reports are adjusted for percent moisture and dilutions as appropriate.

To assist in distinguishing site-related chemical contamination from constituents occurring in native soil, three background sample were collected from native soil up-slope of the Vogelsang WAA site. The three background locations (UG01, UG02, and UG03) shown on Figure 2-2 are approximately 120 to 140 feet northeast of the WAA boundary. Each background sample was analyzed for the same parameters as the WAA test pit samples.

A more robust background assessment of metals was performed using background soil samples collected up-slope from ten WAAs (including Vogelsang) at Yosemite National Park, to calculate an upper tolerance limit (UTL) background statistic (Appendix D). Metals with maximum soil concentrations greater than the (1) UTL statistic; and (2) available PRGs, were further evaluated in a more refined background assessment using the Mann Whitney U Test statistical approach (Appendix E).

4.1 NATURE AND EXTENT OF CHEMICAL DETECTIONS

The following sections summarize the detections of metals, petroleum hydrocarbons, organic compounds, and dioxins/furans in Vogelsang WAA test pit samples. The metal detections are compared with Yosemite background UTL statistics; all other results are compared to the site-specific background sample values.

4.1.1 Metals

Soil samples were analyzed for CAM-17 metals and for hexavalent chromium. All eight WAA test pit soil samples contained twelve metals (arsenic, barium, cadmium, total chromium, cobalt, copper, lead, mercury, molybdenum, nickel, vanadium, and zinc). One metal, beryllium, was detected in one up-slope background soil sample, but was not detected in any of the WAA test pit or down-slope soil samples. Hexavalent chromium was not detected in any sample.

Of the twelve metals detected in soil samples, six (cadmium, copper, lead, molybdenum, nickel, and zinc) exceeded their Yosemite UTL background statistics in one or more test pit. All up-slope detections were less than UTLs. Molybdenum exceeded its background UTL in all down-slope samples, and two down-slope detections were higher than any test pit results. All other metals were less than UTLs in down-slope samples.

4.1.2 Total Petroleum Hydrocarbons

All soil samples were analyzed for TPH as diesel and motor oil. Separate aliquots of each sample were analyzed with and without silica gel cleanup. Silica gel cleanup is routinely used to remove naturally-occurring hydrocarbons with signatures in the diesel and motor oil chromatogram ranges. In all but one sample from this site (diesel in UG01) the use of silica gel cleanup resulted in a lower concentration, indicating that naturally-occurring hydrocarbons are present in site soils. All up-slope diesel results, with and without silca gel cleanup, are estimated values below the PQL. The results discussed in this section are all for analyses performed with silica gel cleanup.

Diesel was detected below the PQL in all three background samples, with a maximum concentration of 6 milligrams per kilogram (mg/kg). Diesel was reported in all but one of the WAA test pit and down-slope samples at concentrations ranging from 5 to 38 mg/kg. Of these detections, the highest concentrations were from samples collected from WAA test pits TP02 and TP03.

Motor oil was found in the upslope samples from 21 to 56 mg/kg. Motor oil was also found in all of the WAA test pit and downslope samples at concentrations ranging from 13 to 110 mg/kg. Of these detections, the highest concentration was reported from test pit TP02.

4.1.3 Organic Compounds

Soil samples from the Vogelsang WAA were analyzed for organic compounds, including VOCs, SVOCs, PAHs, pesticides, and PCBs (Table 3-1). Detections are presented in Table 4-3.

One VOC, toluene, was detected in one of the background samples (UG01). One or more of five VOCs (1,2-dichlorobenzene, acetone, methyl ethyl ketone, methyl isobutyl ketone, and toluene) were detected in the WAA test pit soil samples. The greatest number of compounds, and highest detections of those compounds, were found in test pit TP02. Acetone was detected in one down-slope sample.

No SVOCs were detected in any of the background samples collected at the Vogelsang site. One SVOC (bis[2-ethylhexy] phthalate) was detected in test pit TP02 and in down-slope location DG01. No other SVOCs were found in any Vogelsang soil samples.

One PAH compound (chrysene) was detected in up-slope location UG03, in six of the eight WAA test pit soil samples, and in all three down-slope samples. No other PAHs were detected in any Vogelsang WAA samples.

No pesticide compounds were detected in any of the up-slope or down-slope soil samples collected at the Vogelsang WAA. However, five pesticide compounds (DDD, DDE, DDT, dieldrin, and heptachlor epoxide) were detected in one or more WAA test pit soil samples. Four of the five pesticide compounds were detected in test pit TP02, which also had the highest concentration of each compound detected.

No PCBs were detected in any of the up-slope background or down-slope samples collected at the Vogelsang WAA. One PCB compound, Aroclor-1260, was detected at 11 to 45 micrograms per kilogram (μg/kg) in soil samples collected from three of the four WAA test pits.

4.1.4 Dioxins/Furans

An ash layer was observed in the sidewall of test pits TP03 and TP04 at approximately 6 and 8 inches bgs, respectively. A biased sample of the ash layer in each of these test pits was collected and analyzed for dioxins and furans. Since chlorinated pesticides and PCBs were detected in the soil sample from test pit TP02, this sample was also analyzed for dioxins and furans. In addition, one background soil sample from up-slope test pit UG03 was analyzed for dioxins and furans.

Table 4-4 presents the analytical results for dioxins and furans in the four soil samples. The results show no dioxin or furan target compounds in the up-slope background sample. Various dioxin and furan congeners were detected in the three WAA test pit soil samples.

Table 4-4 also shows the results of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) Toxic Equivalency (TEQ) calculation to obtain the total concentration of chlorinated dioxins and furans expressed as an equivalent concentration of 2,3,7,8-TCDD TEQ. In the 2,3,7,8-TCDD TEQ method, each dioxin and furan is assigned a toxicity equivalency factor (TEF) based on its toxicity relative to the most toxic chlorinated dioxin congener, 2,3,7,8-TCDD. The concentration of each congener is then multiplied by its respective TEF to obtain the 2,3,7,8-TCDD TEQ. The sum of the TEQ concentrations for the individual congeners detected in the sample is the 2,3,7,8-TCDD TEQ. The 2,3,7,8-TCDD TEQs for Vogelsang test pit samples ranged from 0.094 to 12.5 picograms per gram (pg/g).

4.2 IDENTIFICATION OF POTENTIAL SITE-RELATED CHEMICALS

Chemicals are considered to be potentially site-related if they are detected in test pit samples at concentrations above their respective background values.

Six metals (cadmium, copper, lead, molybdenum, nickel, and zinc) exceeded their respective Yosemite UTL background statistics in test pit samples, and one metal (molybdenum) exceeded its UTL in down-slope samples.

Most diesel and motor oil detections in test pit samples exceeded their respective site-specific background values.

Five VOCs (1,2-dichlorobenzene, acetone, methyl ethyl ketone, methyl isobutyl ketone, and toluene) were detected in the WAA test pit soil samples but not up-slope samples (except for toluene and chrysene).

One SVOC (bis[2-ethylhexy] phthalate), one PAH (chrysene), one PCB (Aroclor-1260), and five pesticide compounds (DDD, DDE, DDT, dieldrin, and heptachlor epoxide) were detected in Vogelsang WAA soil samples at concentrations above background.

These results suggest that a number of chemicals are potentially site-related, although the majority of site-related detections do not exceed background values in down-slope samples.

4.3 COMPARISON OF DATA TO SCREENING CRITERIA

Detections of potentially site-related chemicals were compared to the appropriate screening criteria, as described in this section.

4.3.1 Preliminary Remediation Goals

Chemical-specific USEPA Region 9 PRGs are risk-based tools for evaluating contaminated sites in relation to human health risks. The Region 9 PRG table combines current USEPA toxicity values with standard default exposure factors to estimate chemical concentrations in environmental media that correspond to a cancer risk of 1E-06 for carcinogens or a hazard index of 1 for non-carcinogenic effects.

The derivation of soil PRGs assumes exposure to particulates in soil via incidental ingestion, dermal contact, or inhalation. Exposure in an industrial scenario assumes that a worker is exposed for 265 days a year for 25 years. Exposure in a residential scenario assumes that a resident is exposed for 365 days a year for 30 years. Since the Vogelsang WAA site is located in a remote area away from residential development, industrial PRGs for soil could be considered appropriate and conservative for risk screening purposes; however, residential PRGs for soil are more protective of human health and the environment.

Accordingly, the data presented in this report are compared to both residential and industrial PRGs. Any actual exposure of NPS workers or visitors to the chemical concentrations detected in site soils would be expected to occur much less frequently than the exposure assumptions used in the derivation of both industrial and residential soil PRGs.

All of the potentially site-related metals (Section 4.2) were less than their respective residential and industrial PRGs (Table 4-1) except one detection of cadmium in TP03. All diesel, motor oil, VOCs, SVOCs, PAHs, pesticides, and PCBs were less than both residential and industrial PRGs.

Although the 2,3,7,8-TCDD TEQ in TP04 exceeded its residential PRG, it was less than its industrial PRG. All other 2,3,7,8-TCDD TEQs were less than both the residential and industrial PRGs.

4.3.2 Risk-Based Screening Levels for Petroleum Hydrocarbons

Because there are no PRGs for TPH, diesel and motor oil detections were compared to risk-based screening levels (RBSLs), described in this section. The Massachusetts Department of Environmental Protection (MADEP) has established a soil cleanup standard of 5,000 mg/kg for TPH in isolated subsurface soils that may experience a groundwater discharge to surface water. The California Regional Water Quality Control Board (RWQCB) has set forth RBSLs for TPH in soil that are based on ceiling concentrations from MADEP and modified (i.e., lowered) by RWQCB based on odor and general nuisance concerns (Section 4 of Appendix 1 of RWQCB, 2000). The RWQCB RBSLs are 500 mg/kg for diesel and 1,000 mg/kg for motor oil. All diesel and motor oil detections at Vogelsang WAA are below both the RWQCB RBSLs and the MADEP soil cleanup standard.

4.4 CHEMICAL FATE AND TRANSPORT

Detections of potentially site-related chemicals that exceeded screening criteria included cadmium in one sample and 2,3,7,8-TCDD TEQ in one sample. Metals are insoluble and tend to adsorb very strongly to soil particles thus they experience little or no leaching into groundwater.

5.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

This section presents the results of a screening level ecological risk assessment conducted to determine whether potential unacceptable ecological risks may occur at the Vogelsang WAA as a result of previous site activities.

5.1 SELECTION OF COPECS

Constituents of potential ecological concern (COPECs) were initially selected by comparing the maximum detected soil concentrations with ecological screening values (ESVs). The ESVs were selected using the following hierarchy of sources: (1) PRGs from Efroymson et al. (1997); and (2) Ecological Data Quality Levels (USEPA Region 5, 1999). Based on this comparison (Tables 4-4, 5-1, and 5-2), the following nine COPECs were selected:

- Cadmium
- Chromium (total)
- Copper
- Lead
- Mercury
- Molybdenum
- Vanadium
- Zinc
- 2,3,7,8-TCDD TEQ

Of these, three (chromium, mercury, vanadium) were determined not to be significantly greater than background, as they had maximum concentrations less than their associated UTL background statistic (Appendix D). The five remaining inorganic COPECs (cadmium, copper, lead, molybdenum, and zinc) were carried forward to the refined background evaluation, and concentrations of all but zinc were determined to be significantly different (greater) than background using the Mann Whitney U Test (Appendix E).

Therefore, cadmium, copper, lead, molybdenum, and 2,3,7,8-TCDD TEQ were carried forward in the screening level ecological risk assessment.

5.2 SELECTION OF ASSESSMENT ENDPOINT AND REPRESENTATIVE SENSITIVE RECEPTORS

In order to assess whether or not there are potential unacceptable ecological risks at the WAA, a simple food-chain modeling approach was employed to estimate potential hazards to representative sensitive terrestrial wildlife receptors. The assessment endpoint selected for this screening level ecological risk assessment was “protection of long-term survival and reproductive capabilities for vermivorous (earthworm consuming) mammal and bird populations.” The measurement endpoint selected to evaluate this assessment endpoint included the calculation of site-specific and COPEC-specific PRGs based on a simple food-chain model using the hazard quotient method (Section 5.3).

Based on Yosemite National Park wildlife species information provided by Thompson (2002), two sensitive representative species[1] were selected for use in this screening level ecological risk assessment - the Short-tailed Shrew (*Blarina brevicauda*) as a surrogate for the Montane Shrew (*Sorex monticolus*) or Trowbridge Shrew (*Sorex trowbridgii*) and the American Robin (*Turdus migratorius*). Both the Montane or Trowbridge Shrew and the American Robin are found in the Park, and may be present at the WAA if suitable habitat exists. Both the shrew and the robin have small home ranges, relatively high metabolisms and thus elevated food intake per unit body weight, and prey on earthworms that are expected to bioaccumulate some of the chemicals detected in WAA soils. Given the low water solubility of the chemicals of concern at the WAAs, uptake by plants is not as great a concern compared with potential uptake by earthworms, therefore the selection of herbivores as receptors is not warranted at this time. The selection of mammalian and avian receptor species is expected to provide an estimate of potential hazards to both these classes of wildlife. Although there are some differences between the surrogate Short-tailed Shrew and the Montane or Trowbridge Shrew, such as the Short-tailed Shrew being approximately 50 percent heavier (15 g vs. 6 – 9 g, respectively), these differences are expected to be relatively minor. It is conservative and health-protective to use a heavier wildlife receptor (such as the Short-tailed Shrew, instead of the Montane or Trowbridge Shrew) in the food-chain model because mammals with a greater body weight have a slower metabolism and are therefore expected to process and excrete contaminants at a slower rate, making them more susceptible to potential adverse effects from the ingestion of COPECs.

5.3 EXPOSURE ASSESSMENT

Routes of exposure by which the two selected sensitive wildlife receptors may be exposed to COPECs in soil include incidental soil ingestion, dermal absorption, inhalation of soil particulates and vapors, and ingestion of COPECs that may have bioaccumulated in prey items such as plants and animals. The most significant exposure pathway is assumed to be the ingestion of earthworms that have bioaccumulated soil COPECs in their tissues. Incidental soil ingestion is possible, but is assumed for purposes of this screening level ecological risk assessment to be a minor contributor to total exposure. Dermal absorption is also possible, but fur and/or feathers act to limit the dermal transfer of COPECs from soil through the skin of a wildlife receptor, and the dermal exposure pathway is rarely quantified in ecological risk assessments. Inhalation of wind-mobilized soil particulates or VOCs that have off-gassed from soil is also possible, but this route of exposure is assumed to be a minor contributor to total exposure, and the inhalation exposure pathway is also rarely quantified in ecological risk assessments. Bioaccumulation of soil COPECs in plant tissue is possible, but is generally insignificant for relatively insoluble chemicals such as the COPECs identified at this WAA.

In order to estimate soil COPEC concentrations in earthworm tissue, bioaccumulation/bioconcentration factors (BAF/BCF) are required. These factors, and the approaches recommended to obtain these factors, are presented in Table 5-3. The molybdenum BAF/BCF value recommended is 1.3, which represents the average of 13 inorganic median values from USEPA (2000) (Table 5-3). For cadmium, copper, lead and 2,3,7,8-TCDD TEQ, chemical-specific regression equations are recommended to estimate the BAF/BCF values, as uptake has been shown to be related to COPEC soil concentration (Table 5-3).

To use the BAF/BCF regression equations, an exposure point concentration (EPC) for the soil COPEC is required. A typical EPC used in risk assessment is the 95 percent upper confidence limit (95% UCL) of the mean, as it represents a conservative high-end exposure value. The calculation of the 95% UCL is dependent on the data distribution of the COPEC concentrations. Data sets were tested for normality and lognormality with the Shapiro-Wilk test (USEPA, 1992). Either a normal or lognormal UCL was

[1] The list of available wildlife receptors for use in this screening level ecological risk assessment was limited to the 20 receptors listed in Sample et al. (1996). Selection of a receptor species from this list avoided the need to calculate toxicological benchmarks, as they are already provided by Sample et al. (1996) (Section 5.4).

calculated, whichever provided the better fit in the Shapiro-Wilk test. A nonparametric 95% UCL was used when the data fit neither a normal or lognormal distribution (i.e., the data distribution was undefined). These three EPC approaches are presented in the following section. It should be noted that in the calculation of UCLs, sample and sample duplicate results have been averaged, and when results were non-detect, one-half of the analytical detection limit (i.e., the PQL) was used.

The UCL is calculated for a normal distribution as follows (USEPA, 1992):

$$UCL = \bar{x} + t_{1-\alpha,n-1}\, x\, (s/\sqrt{n}\,)$$

where:

$\bar{x}$ = sample arithmetic mean
t_1 = critical value for student's plus distribution
α = 0.05 (95 percent confidence limit for a one-tailed test)
n = number of samples in the set
s = sample standard deviation.

The UCL is calculated for a lognormal distribution as follows (Gilbert, 1987):

$$UCL = e^{\left(\bar{y} + (0.5 \bullet s_y^2) + \left[H_{0.95} \bullet \frac{s_y}{(n-1)^{0.5}}\right]\right)}$$

where:

$\bar{y}$ = $\sum y/n$ = sample arithmetic mean of the log-transformed data, y = ln x
s_y = sample standard deviation of the log-transformed data
n = number of samples in the data set
$H_{0.95}$ = value for computing the one-sided 95 percent UCL on a lognormal mean from standard statistical tables (Land, 1975).

The UCL is calculated for an undefined chemical concentration statistical distribution using a nonparametric statistical approach as follows:

The data point selected as the nonparametric UCL is the 95 percent UCL rank order on the median (or 50th percentile) of the data set. It is estimated by ranking the data observations from smallest to largest. The rank order of the data point selected as the UCL is estimated from the following equation (Equation 13.22 in Gilbert, 1987). If the calculated rank is greater than the sample size, the maximum detected value is reported. If a fractional rank is calculated, the rank equivalent value is interpolated.

$$u = [(n+1)/2] + \{[Z_{1-\alpha}\sqrt{n}\,]/2\}$$

where:

u = rank order of value selected as upper confidence limit, calculated
n = number of samples in the data set
α = confidence limit (95 percent)
$Z_{1-\alpha}$ = normal deviate variable (one-sided) (1.645).

For the four COPECs for which an EPC is required for the BAF/BCF regression equation (i.e., cadmium, copper, lead and 2,3,7,8-TCDD TEQ), the following information is presented, along with the estimated earthworm BAF/BCF value, using the recommended regression equation in Table 5-3. An EPC is also presented for molybdenum, to assist in PRG comparisons (Section 5.6). Where the estimated 95% UCL was greater than the maximum detected concentration (e.g., copper), the EPC defaulted to the maximum concentration. As only four samples were analyzed for dioxins and furans, no data distribution was determined and the EPC defaulted to the maximum concentration.

Soil COPEC	Data Distribution	Maximum (mg/kg)	95% UCL (mg/kg)	EPC (mg/kg)	Earthworm Concentration (mg/kg)	BAF/BCF
Cadmium	undefined	14.8	14.8	14.8	74	5.0
Copper	lognormal	373	538	373	25	0.067
Lead	lognormal	91.5	81.4	81.4	29	0.36
Molybdenum	lognormal	88.6	63.6	63.6	-	-
2,3,7,8-TCDD TEQ	-	12.5E-6	-	12.5E-6	5.6E-5	4.5

Another factor related to potential exposure of wildlife to soil COPECs is the area use factor (AUF). The AUF accounts for the fact that wildlife receptors such as the shrew and the American Robin will not feed exclusively at the WAA, but will forage throughout their home range.

Estimation of an AUF was performed as follows:

$$\text{AUF} = \frac{\text{Area of potential wildlife exposure at the WAA (acres)}}{\text{Receptor Home Range (acres)}}$$

For the selected representative wildlife receptors, the estimated home ranges are 1.0 acre for the Short-tailed Shrew and 1.2 acres for the American Robin (USEPA, 1993).

5.4 EFFECTS ASSESSMENT

Appropriate toxicological benchmarks have been selected for the COPECs at this WAA. These benchmarks focus on the growth, survival, and reproduction of species and/or populations. Both no observable adverse effects level (NOAEL) and lowest observable adverse effects level (LOAEL) derived benchmarks are used, from Sample et al. (1996). The NOAEL is a dose of each COPEC that will produce no known adverse effects in the selected receptor species. The NOAEL was judged to be an appropriate toxicological endpoint since it would provide the greatest degree of protection to the receptor species. In addition, the LOAEL is used as a point of comparison for decision-making for risk management purposes. In instances where data were unavailable for a COPEC, toxicological information for an appropriate surrogate chemical was used.

Dietary toxicological benchmarks (for food) are presented in Table 5-4 for the selected representative wildlife receptors – the Short-tailed Shrew and the American Robin. These benchmarks represent the concentration in food items, such as earthworms, that are expected to be associated with no adverse effects and lowest observed adverse effects. Because NOAELs and LOAELs for the selected wildlife receptor species are based on NOAELs and LOAELs from test species, the latter have been converted to NOAELs and LOAELs by Sample et al. (1996). The conversion used by Sample et al. (1996) is specific to the shrew and robin and is based on the use of a power function of the ratio of body weights, as shown below. A body weight scaling factor of 0.25 was used by Sample et al. (1996) for mammals, whereas a body weight scaling factor of 0 was used for birds.

$$NOAEL_W = NOAEL_T \left(\frac{BW_T}{BW_W} \right)^s$$

where:

$NOAEL_W$ = the No Observed Adverse Effect Level for the wildlife indicator species (mg/kg-day)
$NOAEL_T$ = the No Observed Adverse Effect Level for the test species (mg/kg-day)
BW_T = the body weight of the test species (kg)
BW_W = the body weight of the wildlife indicator species (kg)
s = a body weight scaling factor (s = 0.25 for mammals and s = 0 for birds).

5.5 DERIVATION OF SITE-SPECIFIC RISK-BASED ECOLOGICAL PRGS

Site-specific ecological PRGs (ePRGs) for Vogelsang WAA were estimated for cadmium, copper, lead, molybdenum, and 2,3,7,8-TCDD TEQ as follows, using the selected sensitive wildlife receptors, the Short-tailed Shrew and the American Robin (Section 5.2), COPEC- and WAA-specific information (Section 5.3), and toxicity benchmarks for these five COPECs (from Sample et. al., [1996]) (Section 5.4), as follows:

$ePRG_{COPEC}$ = (Receptor $Benchmark_{COPEC}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]

The calculations are presented in Appendix F.

5.6 COMPARISON OF COPEC CONCENTRATIONS TO SITE-SPECIFIC ECOLOGICAL PRGS

Soil COPEC concentrations at the Vogelsang WAA (expressed as 95% UCL EPCs) are compared with the derived site-specific ePRGs (Appendix F) in the following table:

COPECs	Site-Specific Ecological PRGs (mg/kg)				WAA Exposure Point Concentration (mg/kg)	Exceedences?
	Short-tailed Shrew		American Robin			
	NOAEL	LOAEL	NOAEL	LOAEL		
Cadmium	1.4	14	0.6	7.9	14.8	Yes, 4/4 PRGs
Copper	1,663	2,188	1,382	1,816	373	No
Lead	163	1,628	6.2	62	81.4	Yes, 2/4 PRGs
Molybdenum	0.8	7.9	5.3	54	63.6	Yes, 4/4 PRGs
2,3,7,8-TCDD TEQ	1.6E-6	1.6E-5	6.1E-6	6.1E-5	12.5E-6	Yes, 2/4 PRGs

This comparison suggests that localized populations of Montane or Trowbridge Shrew may be adversely impacted by concentrations of cadmium, molybdenum, and 2,3,7,8-TCDD TEQ and that localized populations of American Robin may be adversely impacted by concentrations of cadmium, lead, molybdenum, and 2,3,7,8-TCDD TEQ in WAA soils if these COPECs are bioaccumulating in earthworms and are subsequently being consumed by shrews and robins feeding exclusively in this area.

5.7 UNCERTAINTY ANALYSIS

There are many uncertainties inherent in the approach used for this screening level ecological risk assessment. Most of the uncertainties are biased toward heath protectiveness, in order to overestimate, rather than underestimate hazards. Some of the more important uncertainties and/or assumptions are listed as follows:

1. It is assumed that the selected representative wildlife receptors are the most sensitive to the WAA COPECs. It is possible that other species (such as plants or amphibians) may be more sensitive to these COPECs, but it is likely many others would be less sensitive.

2. It is assumed that the selected representative wildlife receptors will actually forage at the WAA. Habitat conditions at the WAA, however, may be suboptimal, and the selected receptors may not be present, or may only be present for short periods of time. For example, as a migratory species, the robin would not be expected to be at the WAA year-round.

3. It is assumed that the selected assessment endpoint (protection of long-term survival and reproductive capabilities for vermivorous [earthworm consuming] mammal and bird populations) is adequate for this ecological assessment. Many other assessment endpoints could have been selected, however, it is assumed that screening-level decisions may be based on the selected assessment endpoint.

4. It is assumed that the selected measurement endpoint (i.e., calculation of site-specific and COPEC-specific PRGs based on a simple food-chain model using the hazard quotient method) to evaluate the assessment endpoint is adequate for this ecological assessment. Many other measurement endpoints could have been selected, however, it is assumed that screening-level decisions may be based on the selected measurement endpoint.

5. It is assumed that the BAF/BCF values used to estimate earthworm COPEC concentrations are accurate. Actual bioaccumulation at the WAA may be significantly less than estimated by the model. A variety of factors could result in lower COPEC tissue concentrations in earthworms, such as low COPEC bioavailability.

6. The calculated COPEC EPCs in soil, using the 95% UCL approach, may overestimate exposure due to (1) small sample sizes resulting in elevated variability and/or the need to default to the maximum measured concentration; (2) poor estimating capability of the lognormal UCL equation for certain data sets; and (3) a biased soil sampling program that focused on collecting samples from areas where contamination was expected.

7. It is conservatively assumed that all soil samples collected at the WAA are equally available for exposure to earthworms and subsequent exposure to earthworm-consuming shrews and robins. Deeper subsurface soil samples (e.g., below 30 cm) may actually be outside the depth range of either earthworms or burrowing mammals like the shrew. Thus, 95% UCL EPCs that are significantly influenced by elevated COPEC concentrations at depth will overestimate exposure.

8. It is conservatively assumed that the wildlife receptors' diet is 100 percent earthworms. The proportion of the diet that is actually other items (such as plants or insects), and the degree to which these other food items bioaccumulate lower concentrations of COPECs from soil, would tend to reduce the modeled exposure.

9. It is possible that the toxicological benchmarks available from the literature overestimate hazards for the COPECs measured in soils collected from this WAA. For example, if copper oxide is the basis for the avian benchmark, the actual form of copper at the WAA may be copper sulfate or some other form of copper that is less toxic.

10. The mammalian toxicological benchmarks used are based on a body-weight scaling factor. As the Montane or Trowbridge Shrew is lighter than the Short-tailed Shrew that was used as a surrogate species, and smaller mammals are expected to be less sensitive to toxicants, hazards are likely overestimated for the Montane or Trowbridge Shrew.

11. It is assumed that NOAEL and/or LOAEL toxicological endpoints have biological significance at the species population level. This is unlikely true for the NOAEL endpoint, and may or may not be true for the LOAEL endpoint.

5.8 CONCLUSIONS

Based on the information presented in this screening level ecological risk assessment, localized populations of Montane or Trowbridge Shrew may be adversely impacted by soil concentrations of cadmium, molybdenum, and 2,3,7,8-TCDD TEQ and that localized populations of American Robin may be adversely impacted by soil concentrations of cadmium, lead, molybdenum, and 2,3,7,8-TCDD TEQ in WAA soils if these COPECs are bioaccumulating in earthworms and are subsequently being consumed by shrews and robins feeding exclusively in this area.

6.0 CONCLUSIONS

This section summarizes the results of this inspection and makes recommendations based on those results.

6.1 RECONCILIATION WITH INSPECTION OBJECTIVES

The inspection met the project objectives of collecting soil samples from test pits and obtaining laboratory analytical data for the samples. The field inspection and sample collection activities were conducted in accordance with the plan and SOPs. The inspection also met the objective of observing the nature of the waste present in the WAA.

The inspection met the objective of determining the vertical extent of waste. A minimum subsurface debris volume of 200 cubic yards was estimated using measurements of vertical extent in test pits. Waste was observed on the surface over a lateral extent of approximately 19,500 square feet.

6.2 NATURE AND EXTENT OF CHEMICAL DETECTIONS

Of the inorganic analytes detected in soil samples from the Vogelsang WAA test pits, six metals (cadmium, copper, lead, molybdenum, nickel, and zinc) were detected at concentrations above their Yosemite UTL background statistics. All of these detections except one occurrence of cadmium were below their human health PRGs. Cadmium detections were found to be significantly different (greater) than the background Yosemite data set, and one detection was also greater than the human health residential PRG, but less than the industrial PRG. The results of the inorganic analytes detected in soil samples from the Vogelsang WAA test pits are consistent with the nature of the waste debris observed (rusted metal, metal cans, etc.) during test pit trenching activities.

Of the organic constituents, 1,2-dichlorobenzene, acetone, methyl ethyl ketone, methyl isobutyl ketone, bis(2-ethylhexyl) phthalate, DDD, DDE, DDT, dieldrin, heptachlor epoxide, and Aroclor 1260 were detected in test pit soils and not in the background soil samples. Chlorinated dioxins and furans were detected in ash layers in the test pits at concentrations greater than those encountered in the background samples. Chrysene was detected in several test pits as well as one background sample. However, all detections of organic constituents were below their respective human health PRGs, except for concentrations of dioxins in one sample that were found to be above the residential PRG, but not the industrial PRG.

Based on these results, none of the constituents detected would be expected to potentially impact surrounding soil or other environmental media at the site. The direct comparison of the potentially site-related chemicals to human health risk-based soil screening criteria indicates that the constituents detected in Vogelsang WAA soils would not pose unacceptable risks to human receptors visiting the site. Based on these results, a quantitative human health risk assessment was not conducted, because only residential PRGs were exceeded, not industrial PRGs, and residential exposure is not expected at this site.

Based on the information presented in the screening level ecological risk assessment, localized populations of Montane or Trowbridge Shrew may be adversely impacted by soil concentrations of cadmium, molybdenum, and 2,3,7,8-TCDD TEQ, and that localized populations of American Robin may be adversely impacted by soil concentrations of cadmium, lead, molybdenum, and 2,3,7,8-TCDD TEQ in WAA soils if these COPECs are bioaccumulating in earthworms and are subsequently being consumed by shrews and robins feeding exclusively in this area. This conclusion is based on conservative assumptions; actual conditions probably reduce the estimated impact to wildlife receptors.

6.3 RECOMMENDATIONS

Based on the assessment of the nature and extent of chemical detections in soil samples from the Vogelsang WAA, this report recommends that no further action is required at this site for potential human health concerns, assuming residential use of the site does not occur. The estimated ecological risk is likely mitigated by actual conditions.

7.0 REFERENCES

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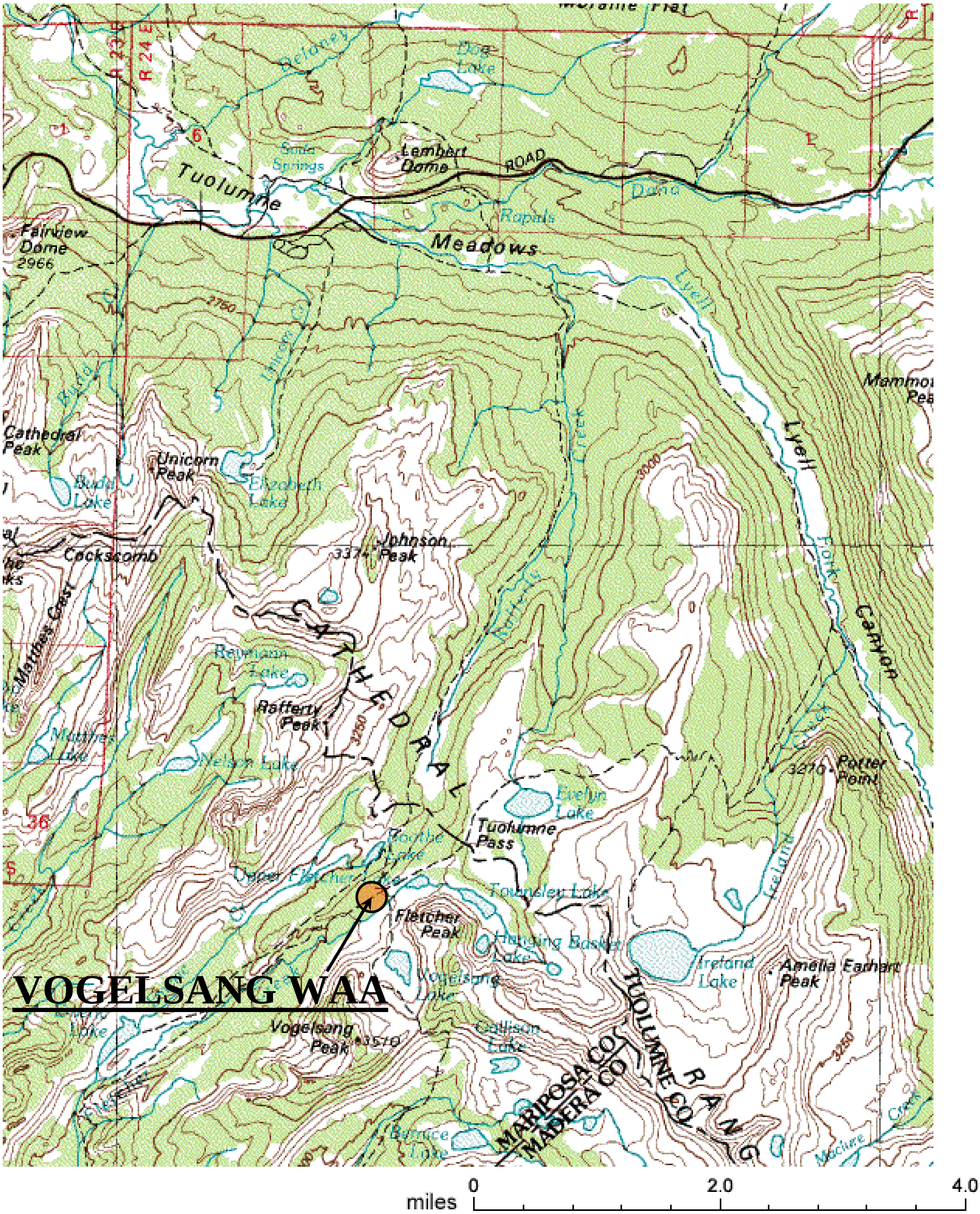

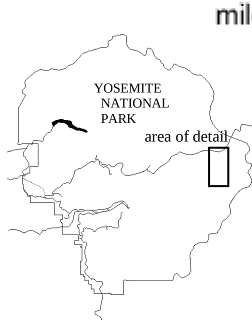

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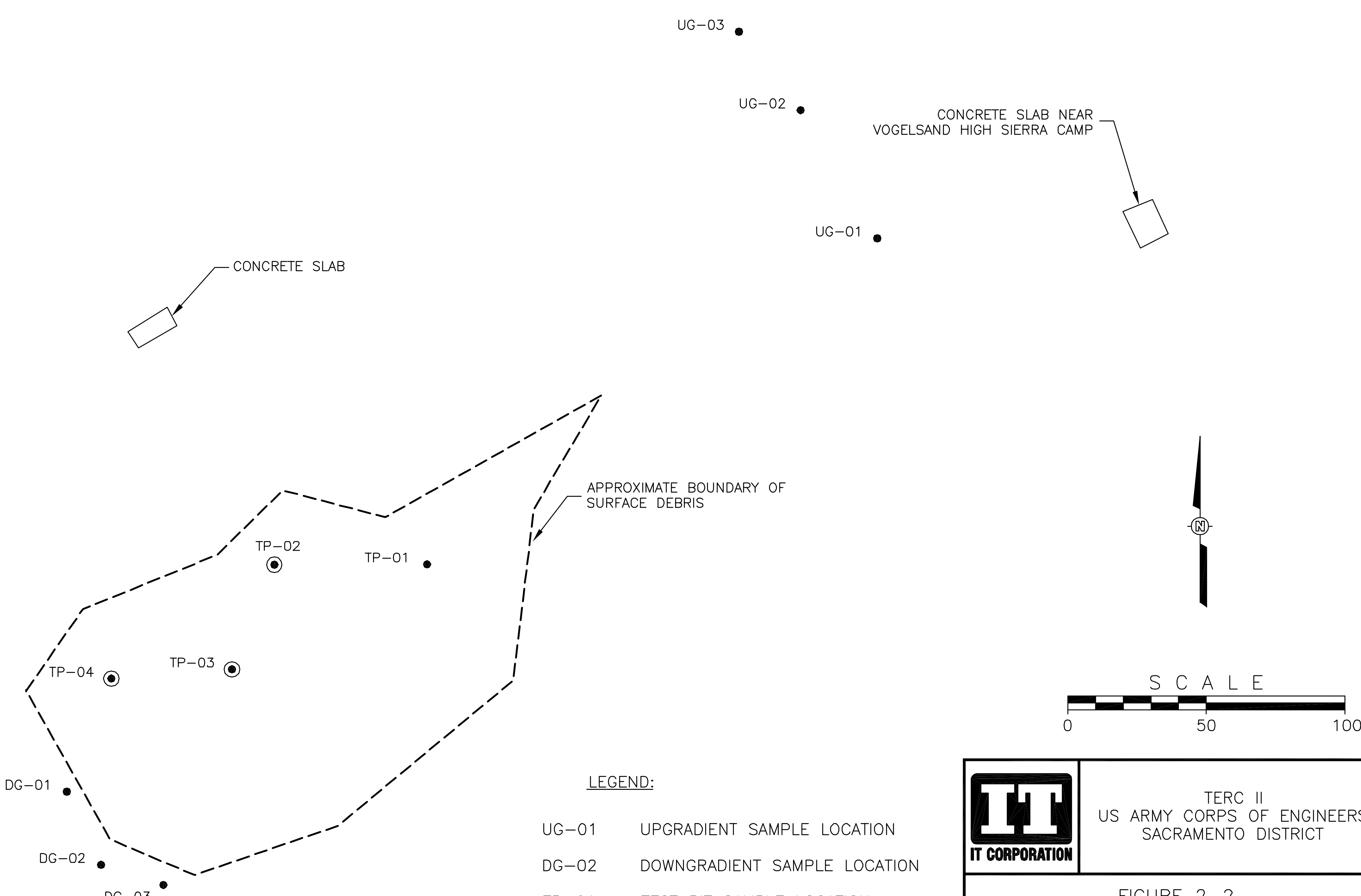
FIGURE 2-1
LOCATION OF VOGELSANG
WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK
CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
---	---	Concord	RB	11/28/01					870508-A49



LEGEND:

UG-01	UPGRADIENT SAMPLE LOCATION
DG-02	DOWNGRADIENT SAMPLE LOCATION
TP-01	TEST PIT SAMPLE LOCATION
•	TEST PIT WITH NO DEBRIS
⦿	TEST PIT WITH SUBSURFACE DEBRIS

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FIGURE 2-2

SITE MAP OF VOGELSANG WAA
WITH TEST PIT SAMPLE LOCATIONS
YOSEMITE NATIONAL PARK CALIFORNIA

TABLE 2-1: COMPOUNDS DETECTED IN PREVIOUS INVESTIGATION VOGELSANG WASTE ACCUMULATION AREA YOSEMITE NATIONAL PARK, CALIFORNIA

All data in mg/kg

		Preliminary Remediation Goals	
Compound	**Result**	**Residential**	**Industrial**
Metals			
Antimony	0.6	31	820
Arsenic	1.6	0.39	2.7
Barium	17	5,400	100,000
Total Chromium	4.4	100,000	100,000
Cobalt	2.0	4,700	100,000
Copper	63	2,900	76,000
Lead	50	400	750
Mercury	1.3	23	610
Molybdenum	10	390	10,000
Nickel	4.8	1,600	41,000
Vanadium	16	550	14,000
Zinc	83	23,000	100,000
PCBs			
Aroclor-1260	0.120	0.22	1.0
Petroleum Hydrocarbons		**RWQCB RBSL**	**MADEP Standard**
Motor Oil [a]	27	1,000	5,000

[a] Components in the range of motor oil contain additional compounds uncharacteristic of common fuels and lubricants.

TABLE 3-1: SUMMARY OF ANALYSES PERFORMED
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Matrix	Sample Type	VOCs 8260B	SVOCs 8270C	PAHs 8310	TPH-extractable 8015E	OCPs 8081A	PCBs 8082	Metals 6010B/7470A	Hexavalent Chromium 7196A	Dioxins/ Furans 8290
Up-slope												
YWV-UG01-SO-1019	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-UG02-SO-1020	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-UG03-SO-1021	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	x
Test Pit												
YWV-TP01-SO-1033	8/22/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP01-SO-1034	8/22/2001	Soil	Field Duplicate	x	x	x	x	x	x	x	x	
YWV-TP02-SO-1031	8/22/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	x
YWV-TP02-SO-1032	8/22/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP03-SO-1025	8/21/2001	Soil	Biased Sample									x
YWV-TP03-SO-1026	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP03-SO-1027	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP04-SO-1029	8/22/2001	Soil	Biased Sample									x
YWV-TP04-SO-1030	8/22/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP04-SO-1028	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
Down-slope												
YWV-DG01-SO-1022	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-DG02-SO-1023	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-DG03-SO-1024	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
Quality Control Sample												
YWV-MB-WH-1018	8/16/2001	Aqueous	Source Blank	x	x	x	x	x	x	x	x	
YWV-TB-WT-1017	8/16/2001	Aqueous	Trip Blank	x								
YWV-EB-WH-1035	8/23/2001	Aqueous	Rinse Blank	x	x	x	x	x	x	x	x	
YWV-TB-WT-1036	8/23/2001	Aqueous	Trip Blank	x								

x indicates analysis performed

TABLE 3-2: RELATIVE PERCENT DIFFERENCE BETWEEN FIELD DUPLICATE PAIRS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Depth (feet)	Analyte Name	NS	FD	RPD %
YWV-TP01	**0.5-1**				
VOCs (µg/kg)		Methylene chloride	13	9	36
		Toluene	4	0.9	**127**
TPH as Diesel (mg/kg)		Diesel fuel	24	8	**100**
		Diesel fuel (with silica gel cleanup)	9	5	**57**
		Motor Oils	160	69	**79**
		Motor Oils (with silica gel cleanup)	87	48	**58**
Total Metals (mg/kg)		Arsenic	2.9	3.2	10
		Barium	13.5	13	4
		Chromium	3.1	2.9	7
		Cobalt	2.9	2.8	4
		Copper	16	16.1	1
		Lead	4.3	4.2	2
		Molybdenum	19.6	21.3	8
		Nickel	1.9	1.6	17
		Vanadium	31.9	35	9
		Zinc	24	21.9	9
Mercury (mg/kg)		Total Mercury	0.13	0.23	**56**
pH		pH	6.36	6.15	3

Notes

Field duplicate RPD goal is 50.
FD = Field Duplicate
NS = Normal Sample

RPD = Relative Percent Difference = { (NS - FD) / (NS + FD) / 2 } x 100
RPD is calculated and shown only when both NS and FD are detected

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-UG01-SO-1019							
	01-5474-15	Chromium, hexavalent	<0.52	mg/kg	0.52	UJ	H
	01-5474-15	Methylene chloride	<12	µg/kg	12	U	B
	01-5474-15	pH	5.88		0.01	J	H
YWV-UG02-SO-1020							
	01-5474-16	Chromium, hexavalent	<0.53	mg/kg	0.53	UJ	H
	01-5474-16	Methylene chloride	<13	µg/kg	13	U	B
	01-5474-16	pH	5.44		0.01	J	H
YWV-UG03-SO-1021							
	G1I190244001	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	<0.65	pg/g	0.65	UJ	H
	G1I190244001	1,2,3,4,6,7,8-heptachlorodibenzofuran	<0.36	pg/g	0.36	UJ	H
	G1I190244001	1,2,3,4,7,8,9-heptachlorodibenzofuran	<0.44	pg/g	0.44	UJ	H
	G1I190244001	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	<0.79	pg/g	0.79	UJ	H
	G1I190244001	1,2,3,4,7,8-hexachlorodibenzofuran	<0.76	pg/g	0.76	UJ	H
	G1I190244001	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	<0.86	pg/g	0.86	UJ	H
	G1I190244001	1,2,3,6,7,8-hexachlorodibenzofuran	<0.76	pg/g	0.76	UJ	H
	G1I190244001	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	<0.76	pg/g	0.76	UJ	H
	G1I190244001	1,2,3,7,8,9-hexachlorodibenzofuran	<0.89	pg/g	0.89	UJ	H
	G1I190244001	1,2,3,7,8-pentachlorodibenzo-p-dioxin	<0.7	pg/g	0.7	UJ	H
	G1I190244001	1,2,3,7,8-pentachlorodibenzofuran	<0.6	pg/g	0.6	UJ	H
	G1I190244001	2,3,4,6,7,8-hexachlorodibenzofuran	<0.82	pg/g	0.82	UJ	H
	G1I190244001	2,3,4,7,8-pentachlorodibenzofuran	<0.6	pg/g	0.6	UJ	H
	G1I190244001	2,3,7,8-tetrachlorodibenzo-p-dioxin	<0.48	pg/g	0.48	UJ	H
	G1I190244001	2,3,7,8-tetrachlorodibenzofuran	<0.44	pg/g	0.44	UJ	H
	01-5474-17	4,4'-DDD	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	4,4'-DDE	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	4,4'-DDT	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Aldrin	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	alpha-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	alpha-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	beta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-17	delta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Dieldrin	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endosulfan I	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Endosulfan II	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endosulfan sulfate	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endrin	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endrin aldehyde	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endrin ketone	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	gamma-BHC	<1.1	µg/kg	1.1	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-UG03-SO-1021							
	01-5474-17	gamma-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Heptachlor	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Heptachlor epoxide	<1.1	µg/kg	1.1	UJ	S
	G1I190244001	Heptachlorinated dibenzo-p-dioxins, (total)	<0.65	pg/g	0.65	UJ	H
	G1I190244001	Heptachlorinated dibenzofurans, (total)	<0.44	pg/g	0.44	UJ	H
	G1I190244001	Hexachlorinated dibenzo-p-dioxins, (total)	<0.86	pg/g	0.86	UJ	H
	G1I190244001	Hexachlorinated dibenzofurans, (total)	<0.89	pg/g	0.89	UJ	H
	01-5474-17	Methoxychlor	<11	µg/kg	11	UJ	S
	G1I190244001	Octachlorodibenzo-p-Dioxin	<1.1	pg/g	1.1	UJ	H
	G1I190244001	Octachlorodibenzofuran	<0.82	pg/g	0.82	UJ	H
	G1I190244001	Pentachlorinated dibenzo-p-dioxins, (total)	<0.7	pg/g	0.7	UJ	H
	G1I190244001	Pentachlorinated dibenzofurans, (total)	<0.6	pg/g	0.6	UJ	H
	G1I190244001	Tetrachlorinated dibenzo-p-dioxins, (total)	<0.48	pg/g	0.48	UJ	H
	01-5474-17	Toxaphene	<110	µg/kg	110	UJ	S
	01-5474-17	Methylene chloride	<15	µg/kg	15	U	B
	01-5474-17	pH	5.48		0.01	J	H
	G1I190244001	Tetrachlorinated dibenzofurans, (total)	37	pg/g	1.1	J -	H
YWV-TP01-SO-1033							
	01-5474-6	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-6	Methylene chloride	<23	µg/kg	23	U	B
	01-5474-6	pH	6.36		0.01	J	H
YWV-TP01-SO-1034							
	01-5474-7	2,4-Dinitrophenol	<1800	µg/kg	1800	UJ	C
	01-5474-7	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-7	Methylene chloride	<15	µg/kg	15	U	B
	01-5474-7	Acetone	51	µg/kg	76	J	CTr
	01-5474-7	pH	6.15		0.01	J	H
YWV-TP02-SO-1031							
	G1I190244002	1,2,3,4,7,8,9-heptachlorodibenzofuran	<0.66	pg/g	0.66	UJ	H
	G1I190244002	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	<0.98	pg/g	0.98	UJ	H
	G1I190244002	1,2,3,4,7,8-hexachlorodibenzofuran	<0.75	pg/g	0.75	UJ	H
	G1I190244002	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	<2.4	pg/g	2.4	UJ	H
	G1I190244002	1,2,3,6,7,8-hexachlorodibenzofuran	<0.75	pg/g	0.75	UJ	H
	G1I190244002	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	<1.6	pg/g	1.6	UJ	H
	G1I190244002	1,2,3,7,8,9-hexachlorodibenzofuran	<0.88	pg/g	0.88	UJ	H
	G1I190244002	1,2,3,7,8-pentachlorodibenzo-p-dioxin	<1	pg/g	1	UJ	H
	G1I190244002	1,2,3,7,8-pentachlorodibenzofuran	<0.73	pg/g	0.73	UJ	H
	G1I190244002	2,3,4,6,7,8-hexachlorodibenzofuran	<0.8	pg/g	0.8	UJ	H
	G1I190244002	2,3,4,7,8-pentachlorodibenzofuran	<0.73	pg/g	0.73	UJ	H
	G1I190244002	2,3,7,8-tetrachlorodibenzo-p-dioxin	<0.52	pg/g	0.52	UJ	H

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-TP02-SO-1031							
	01-5474-8	2,4-Dinitrophenol	<1900	µg/kg	1900	UJ	C
	01-5474-8	4,4'-DDT	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Aldrin	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	alpha-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	alpha-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	beta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Chromium, hexavalent	<0.57	mg/kg	0.57	UJ	H
	01-5474-8	delta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Endosulfan I	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Endosulfan II	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Endosulfan sulfate	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Endrin	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Endrin aldehyde	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Endrin ketone	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	gamma-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	gamma-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Heptachlor	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Methoxychlor	<11	µg/kg	11	UJ	S
	G1I190244002	Pentachlorinated dibenzo-p-dioxins, (total)	<1	pg/g	1	UJ	H
	G1I190244002	Pentachlorinated dibenzofurans, (total)	<1.6	pg/g	1.6	UJ	H
	01-5474-8	Toxaphene	<110	µg/kg	110	UJ	S
	01-5474-8	Methylene chloride	<16	µg/kg	16	U	B
	G1I190244002	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	42	pg/g	5.3	J -	H
	G1I190244002	1,2,3,4,6,7,8-heptachlorodibenzofuran	5.3	pg/g	5.3	J -	H
	G1I190244002	2,3,7,8-tetrachlorodibenzofuran	1.8	pg/g	1.1	J -	H
	01-5474-8	4,4'-DDD	31	µg/kg	2.3	J -	S
	01-5474-8	4,4'-DDE	22	µg/kg	2.3	J -	S
	01-5474-8	Acetone	370	µg/kg	79	J	C
	01-5474-8	Dieldrin	2	µg/kg	2.3	J -	S
	01-5474-8	Heptachlor epoxide	0.7	µg/kg	1.1	J -	S
	G1I190244002	Heptachlorinated dibenzo-p-dioxins, (total)	71	pg/g	5.3	J -	H
	G1I190244002	Heptachlorinated dibenzofurans, (total)	19	pg/g	5.3	J -	H
	G1I190244002	Hexachlorinated dibenzo-p-dioxins, (total)	4.9	pg/g	5.3	J -	H
	G1I190244002	Hexachlorinated dibenzofurans, (total)	4.4	pg/g	5.3	J -	H
	G1I190244002	Octachlorodibenzo-p-Dioxin	320	pg/g	11	J -	H
	G1I190244002	Octachlorodibenzofuran	11	pg/g	11	J -	H
	01-5474-8	pH	5.97		0.01	J	H
	G1I190244002	Tetrachlorinated dibenzo-p-dioxins, (total)	1.8	pg/g	1.1	J -	H
	G1I190244002	Tetrachlorinated dibenzofurans, (total)	5	pg/g	1.1	J -	H

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-TP02-SO-1032							
	01-5474-9	2,4-Dinitrophenol	<1800	µg/kg	1800	UJ	C
	01-5474-9	Chromium, hexavalent	<0.53	mg/kg	0.53	UJ	H
	01-5474-9	Methylene chloride	<12	µg/kg	12	U	B
	01-5474-9	pH	6.36		0.01	J	H
YWV-TP03-SO-1026							
	01-5474-11	2,4-Dinitrophenol	<1800	µg/kg	1800	UJ	C
	01-5474-11	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-11	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-11	Acetone	110	µg/kg	70	J	C
	01-5474-11	pH	6.2		0.01	J	H
YWV-TP03-SO-1027							
	01-5474-12	1,2,4-Trichlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	1,2-Dichlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	1,3-Dichlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	1,4-Dichlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	2,4-Dinitrotoluene	<360	µg/kg	360	UJ	S
	01-5474-12	2,6-Dinitrotoluene	<360	µg/kg	360	UJ	S
	01-5474-12	2-Chloronaphthalene	<360	µg/kg	360	UJ	S
	01-5474-12	2-Methylnaphthalene	<360	µg/kg	360	UJ	S
	01-5474-12	2-Nitroaniline	<1800	µg/kg	1800	UJ	S
	01-5474-12	3,3'-Dichlorobenzidine	<720	µg/kg	720	UJ	S
	01-5474-12	3-Nitroaniline	<1800	µg/kg	1800	UJ	S
	01-5474-12	4-Bromophenylphenyl ether	<360	µg/kg	360	UJ	S
	01-5474-12	4-Chloroaniline	<810	µg/kg	810	UJ	S
	01-5474-12	4-Chlorophenylphenyl ether	<360	µg/kg	360	UJ	S
	01-5474-12	4-Nitroaniline	<1800	µg/kg	1800	UJ	S
	01-5474-12	Acenaphthene	<360	µg/kg	360	UJ	S
	01-5474-12	Acenaphthylene	<360	µg/kg	360	UJ	S
	01-5474-12	Anthracene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(a)anthracene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(a)pyrene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(b)fluoranthene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(g,h,i)perylene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(k)fluoranthene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzyl alcohol	<360	µg/kg	360	UJ	S
	01-5474-12	Benzyl butyl phthalate	<360	µg/kg	360	UJ	S
	01-5474-12	bis(2-Chloroethoxy)methane	<360	µg/kg	360	UJ	S
	01-5474-12	bis(2-Chloroethyl)ether	<360	µg/kg	360	UJ	S
	01-5474-12	bis(2-chloroisopropyl) ether	<360	µg/kg	360	UJ	S
	01-5474-12	bis(2-Ethylhexyl)phthalate	<360	µg/kg	360	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-TP03-SO-1027							
	01-5474-12	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-12	Chrysene	<360	µg/kg	360	UJ	S
	01-5474-12	Di-n-butyl phthalate	<360	µg/kg	360	UJ	S
	01-5474-12	Di-n-octyl phthalate	<360	µg/kg	360	UJ	S
	01-5474-12	Dibenz(a,h)anthracene	<360	µg/kg	360	UJ	S
	01-5474-12	Dibenzofuran	<360	µg/kg	360	UJ	S
	01-5474-12	Diethylphthalate	<360	µg/kg	360	UJ	S
	01-5474-12	Dimethylphthalate	<360	µg/kg	360	UJ	S
	01-5474-12	Fluoranthene	<360	µg/kg	360	UJ	S
	01-5474-12	Fluorene	<360	µg/kg	360	UJ	S
	01-5474-12	Hexachlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	Hexachlorobutadiene	<360	µg/kg	360	UJ	S
	01-5474-12	Hexachlorocyclopentadiene	<1800	µg/kg	1800	UJ	S
	01-5474-12	Hexachloroethane	<360	µg/kg	360	UJ	S
	01-5474-12	Indeno(1,2,3-c,d)pyrene	<360	µg/kg	360	UJ	S
	01-5474-12	Isophorone	<360	µg/kg	360	UJ	S
	01-5474-12	N-Nitrosodi-n-propylamine	<360	µg/kg	360	UJ	S
	01-5474-12	N-Nitrosodiphenylamine	<360	µg/kg	360	UJ	S
	01-5474-12	Naphthalene	<360	µg/kg	360	UJ	S
	01-5474-12	Nitrobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	Phenanthrene	<360	µg/kg	360	UJ	S
	01-5474-12	Pyrene	<360	µg/kg	360	UJ	S
	01-5474-12	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-12	Acetone	79	µg/kg	68	J	C
	01-5474-12	pH	6.13		0.01	J	H
YWV-TP04-SO-1030							
	01-5474-14	1,3-Dichlorobenzene	<7.1	µg/kg	7.1	UJ	M
	01-5474-14	1,4-Dichlorobenzene	<7.1	µg/kg	7.1	UJ	M
	01-5474-14	4,4'-DDD	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	4,4'-DDT	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	Aldrin	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	alpha-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	alpha-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	beta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Chromium, hexavalent	<0.57	mg/kg	0.57	UJ	H
	01-5474-14	delta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Endosulfan I	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Endosulfan II	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	Endosulfan sulfate	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	Endrin	<2.3	µg/kg	2.3	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-TP04-SO-1030							
	01-5474-14	Endrin aldehyde	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	Endrin ketone	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	gamma-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	gamma-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Heptachlor	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Heptachlor epoxide	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Methoxychlor	<11	µg/kg	11	UJ	S
	01-5474-14	Toxaphene	<110	µg/kg	110	UJ	S
	01-5474-14	Vinyl acetate	<14	µg/kg	14	UJ	M
	01-5474-14	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-14	1,2-Dichlorobenzene	1	µg/kg	7.1	J -	MTr
	01-5474-14	4,4'-DDE	0.5	µg/kg	2.3	J -	S
	01-5474-14	Dieldrin	0.5	µg/kg	2.3	J -	S
	01-5474-14	pH	6.03		0.01	J	H
YWV-TP04-SO-1028							
	01-5474-13	4,4'-DDD	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	4,4'-DDE	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	4,4'-DDT	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Aldrin	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	alpha-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	alpha-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	beta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Chromium, hexavalent	<0.56	mg/kg	0.56	UJ	H
	01-5474-13	delta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Dieldrin	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endosulfan I	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Endosulfan II	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endosulfan sulfate	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endrin	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endrin aldehyde	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endrin ketone	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	gamma-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	gamma-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Heptachlor	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Heptachlor epoxide	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Methoxychlor	<11	µg/kg	11	UJ	S
	01-5474-13	Toxaphene	<110	µg/kg	110	UJ	S
	01-5474-13	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-13	Acetone	61	µg/kg	70	J	C
	01-5474-13	pH	6.07		0.01	J	H

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-DG01-SO-1022							
	01-5474-3	4,4'-DDD	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	4,4'-DDE	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	4,4'-DDT	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Aldrin	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	alpha-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	alpha-Chlordane	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	beta-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Chromium, hexavalent	<0.61	mg/kg	0.61	UJ	H
	01-5474-3	delta-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Dieldrin	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endosulfan I	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Endosulfan II	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endosulfan sulfate	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endrin	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endrin aldehyde	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endrin ketone	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	gamma-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	gamma-Chlordane	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Heptachlor	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Heptachlor epoxide	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Methoxychlor	<12	µg/kg	12	UJ	S
	01-5474-3	Toxaphene	<120	µg/kg	120	UJ	S
	01-5474-3	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-3	pH	7.38		0.01	J	H
YWV-DG02-SO-1023							
	01-5474-4	4,4'-DDD	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	4,4'-DDE	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	4,4'-DDT	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Aldrin	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	alpha-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	alpha-Chlordane	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	beta-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Chromium, hexavalent	<0.58	mg/kg	0.58	UJ	H
	01-5474-4	delta-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Dieldrin	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Endosulfan I	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Endosulfan II	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Endosulfan sulfate	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Endrin	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Endrin aldehyde	<2.3	µg/kg	2.3	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-DG02-SO-1023							
	01-5474-4	Endrin ketone	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	gamma-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	gamma-Chlordane	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Heptachlor	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Heptachlor epoxide	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Methoxychlor	<12	µg/kg	12	UJ	S
	01-5474-4	Toxaphene	<120	µg/kg	120	UJ	S
	01-5474-4	Methylene chloride	<16	µg/kg	16	U	B
	01-5474-4	Acetone	31	µg/kg	81	J	CTr
	01-5474-4	pH	7.08		0.01	J	H
YWV-DG03-SO-1024							
	01-5474-5	Chromium, hexavalent	<0.53	mg/kg	0.53	UJ	H
	01-5474-5	Beryllium	<0.85	mg/kg	0.85	U	B
	01-5474-5	Methylene chloride	<18	µg/kg	18	U	B
	01-5474-5	pH	6.74		0.01	J	H
YWV-MB-WH-1018							
	01-5321-2	2,4-Dinitrophenol	<50	µg/L	50	UJ	C
	01-5321-2	Bromomethane	<0.5	µg/L	0.5	UJ	CLM
	01-5321-2	TPH, as gasoline	<0.05	mg/L	0.05	U	K
YWV-TB-WT-1017							
	01-5321-1	Bromomethane	<0.5	µg/L	0.5	UJ	C
YWV-EB-WH-1035							
	01-5474-1	4,4'-DDD	<0.1	µg/L	0.1	UJ	S
	01-5474-1	4,4'-DDE	<0.1	µg/L	0.1	UJ	S
	01-5474-1	4,4'-DDT	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Aldrin	<0.05	µg/L	0.05	UJ	S
	01-5474-1	alpha-BHC	<0.05	µg/L	0.05	UJ	S
	01-5474-1	alpha-Chlordane	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Aroclor-1016	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1221	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1232	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1242	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1248	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1254	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1260	<1	µg/L	1	UJ	S
	01-5474-1	beta-BHC	<0.05	µg/L	0.05	UJ	S
	01-5474-1	delta-BHC	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Dieldrin	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Endosulfan I	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Endosulfan II	<0.1	µg/L	0.1	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-EB-WH-1035							
	01-5474-1	Endosulfan sulfate	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Endrin	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Endrin aldehyde	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Endrin ketone	<0.1	µg/L	0.1	UJ	S
	01-5474-1	gamma-BHC	<0.05	µg/L	0.05	UJ	S
	01-5474-1	gamma-Chlordane	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Heptachlor	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Heptachlor epoxide	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Methoxychlor	<2	µg/L	2	UJ	S
	01-5474-1	Toxaphene	<5	µg/L	5	UJ	S

Note:

Qualifiers

-	Bias low
J	The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U	The analyte was analyzed for, but was not detected above the reporting limit.
UJ	The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Reason Codes

B	Laboratory Blank Contamination
C	The continuing calibration statistic outside acceptance criteria
H	Holding time violation
K	Field Blank Contamination
L	Compound recovered outside the laboratory control sample acceptance criteria
M	Compound recovered outside the matrix spike/spike duplicate acceptance criteria
S	Surrogate recovery outside control limit.
Tr	Value reported detected between the MDL and PQL

TABLE 4-1: INORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO PRELIMINARY REMEDIATION GOALS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	CAM 17 Metals by EPA Methods 6010B and 7470A (mg/kg)																	EPA Method 7196 (mg/kg)
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Hexavalent Chromium
YWV-UG01-SO-1019	08/21/2001	0.5	<5.2	2.2	21.4	<0.21	0.0096 J^	1.6	3.3	11.8	3.5	0.075 J^	0.61	1.8	<0.52	<0.52	<0.52	15.5	21.8	<0.52 UJ
YWV-UG02-SO-1020	08/21/2001	0.5	<5.3	0.92	4.2	<0.21	<0.11	1.2	1	4	1.4	0.13 J^	0.34	0.59	<0.53	<0.53	<0.53	10.3	11.4	<0.53 UJ
YWV-UG03-SO-1021	08/21/2001	0.5	<22	2.5	43.6	0.59 J^	0.25 J^	6.5	4.6	27.7	8.7	0.13 J^	1.3	5.3	<2.2	<2.2	<2.2	20.7	31.6	<0.54 UJ
YWV-TP01-SO-1033	08/22/2001	0.5	<21	2.9	13.5	<0.86	<0.43	3.1	2.9	16	4.3	0.13 J^	19.6	1.9	<2.1	<2.1	<2.1	31.9	24	<0.54 UJ
YWV-TP01-SO-1034 (FD)	08/22/2001	0.5	<21	3.2	13	<0.86	<0.43	2.9	2.8	16.1	4.2	0.23	21.3	1.6	<2.1	<2.1	<2.1	35	21.9	<0.54 UJ
YWV-TP02-SO-1031	08/22/2001	0.7	<23	6.4	28.1	<0.91	0.3 J^	7.8	8.8	163	64.6	0.25	5.5	26	<2.3	<2.3	<2.3	23.5	233	<0.57 UJ
YWV-TP02-SO-1032	08/22/2001	2	<21	3.6	11.1	<0.85	0.13 J^	4.7	3.4	152	13.4	0.16 J^	25.8	3.5	<2.1	<2.1	<2.1	25.3	80	<0.53 UJ
YWV-TP03-SO-1026	08/21/2001	0.7	<22	2.3	32.6	<0.86	14.8	3.6	8.4	31.4	9.7	0.13 J^	20	10.1	<2.2	<2.2	<2.2	26.2	128	<0.54 UJ
YWV-TP03-SO-1027	08/21/2001	2	<22	3.1	26.3	<0.87	1	3.5	5.9	46.1	91.5	0.66	24.3	8.2	<2.2	<2.2	<2.2	28.9	456	<0.54 UJ
YWV-TP04-SO-1030	08/22/2001	1.1	<5.7	2.9	27.2	<0.23	0.28	4.2	3.8	373	8.9	0.14 J^	10.6	5.4	<0.57	<0.57	<0.57	25.9	102	<0.57 UJ
YWV-TP04-SO-1028	08/21/2001	2.8	<22	1.9	32.9	<0.89	0.45	2.7	3.1	262	29.4	0.15 J^	4	5.2	<2.2	<2.2	<2.2	16	131	<0.56 UJ
YWV-DG01-SO-1022	08/21/2001	0.5	<24	2.7	17.2	<0.98	<0.49	3.2	3.5	23.9	5.3	0.25	88.6	4.5	<2.4	<2.4	<2.4	34.6	61.5	<0.61 UJ
YWV-DG02-SO-1023	08/21/2001	0.5	<23	2.3	15.2	<0.93	<0.46	3.4	3.3	18.3	5	0.11 J^	32.5	2.5	<2.3	<2.3	<2.3	27.9	29.2	<0.58 UJ
YWV-DG03-SO-1024	08/21/2001	0.5	<21	2.9	18.2	<0.85 U	<0.43	4.3	3.1	15.5	5.2	0.24	22.7	2.8	<2.1	<2.1	<2.1	28.1	24.5	<0.53 UJ
Preliminary Remediation Goals (Res. Soil):			31	0.39	5400	150	9	210	4700	2900	400	23	390	150	390	390	5.2	550	23000	0.2
Preliminary Remediation Goals (Ind. Soil):			820	2.7	1E+05	2200	810	450	1E+05	76000	750	610	10000	41000	10000	10000	130	14000	1E+05	64
Yosemite UTL Background Statistic:			28.8	19.4	211	1.12	0.46	13.8	18.5	50.9	33.9	1.2	1.32	8.48	2.93	2.95	2.44	76.1	84.1	0.7

(FD): field duplicate
fbgs: feet below ground surface
Res. Soil: Residential Soil
Ind. Soil: Industrial Soil

J^ Reported between method detection limit and practical quantitation limit
U The analyte was analyzed for, but was not detected above the reporting limit.
UJ The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
Detections shown in bold, circled if above Residential Preliminary Remediation Goals, boxed if above Industrial Preliminary Remediation Goals, and underlined if above UTL Background Statistic.

TABLE 4-2: TOTAL PETROLEUM HYDROCARBONS IN SOIL SAMPLES
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	Moisture Content (%)	EPA METHOD 8015B (mg/kg)			
				TPH-diesel	TPH-diesel (SGC)	TPH-motor oil	TPH-motor oil (SGC)
YWV-UG01-SO-1019	08/21/2001	0.5-1	3.1	**3 J^**	**5 J^**	**24**	**21**
YWV-UG02-SO-1020	08/21/2001	0.5-1	5.4	**7 J^**	**6 J^**	**81**	**56**
YWV-UG03-SO-1021	08/21/2001	0.5-1	7	**6 J^**	**5 J^**	**51**	**41**
YWV-TP01-SO-1033	08/22/2001	0.5-1	6.8	**24**	**9 J^**	**160**	**87**
YWV-TP01-SO-1034 (FD)	08/22/2001	0.5-1	7	**8 J^**	**5 J^**	**69**	**48**
YWV-TP02-SO-1031	08/22/2001	0.7-1.2	12.2	**57**	**38**	**160**	**110**
YWV-TP02-SO-1032	08/22/2001	2-2.5	5.5	<11	<11	**17**	**13**
YWV-TP03-SO-1026	08/21/2001	0.7-1.2	7.4	**16**	**9 J^**	**110**	**73**
YWV-TP03-SO-1027	08/21/2001	2-2.5	7.9	**43**	**29**	**73**	**50**
YWV-TP04-SO-1030	08/22/2001	1.1-1.6	11.7	**11**	**7 J^**	**55**	**34**
YWV-TP04-SO-1028	08/21/2001	2.8-3.3	10.1	**12**	**8 J^**	**56**	**39**
YWV-DG01-SO-1022	08/21/2001	0.5-1	18	**14**	**8 J^**	**62**	**37**
YWV-DG02-SO-1023	08/21/2001	0.5-1	14	**18**	**6 J^**	**83**	**42**
YWV-DG03-SO-1024	08/21/2001	0.5-1	6.3	**12**	**6 J^**	**74**	**37**
MADEP Cleanup Standards for soil:				5,000	5,000	5,000	5,000
RWQCB Risk Based Screening Level:				500	500	1,000	1,000

(FD): field duplicate
fbgs: feet below ground surface
SGC: with silica gel cleanup
MADEP: Massachusetts Department of Environmental Protection
RWQCB: Regional Water Quality Control Board

J The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U The analyte was analyzed for, but was not detected above the reporting limit.

TABLE 4-3: ORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO PRELIMINARY REMEDIATION GOALS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	VOCs (µg/kg) EPA Method 8260						SVOCs (µg/kg) EPA Method 8270	PAHS (µg/kg) EPA Method 8310	Pesticides/PCBs (µg/kg) EPA Method 8081					
			1,2-Dichlorobenzene	Acetone	Methyl ethyl ketone	Methyl isobutyl ketone	Methylene chloride	Toluene	Bis(2-ethylhexyl) phthalate	Chrysene	DDD44	DDE44	DDT44	Dieldrin	Heptachlor epoxide	PCB-1260 (Aroclor 1260)
YWV-UG01-SO-1019	8/21/2001	0.5-1	<5.8	<58	<58	<5.8	<12 U	**0.8 J^**	<340	<340	<2.1	<2.1	<2.1	<2.1	<1	<26
YWV-UG02-SO-1020	8/21/2001	0.5-1	<6.5	<65	<65	<6.5	<13 U	<6.5	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<26
YWV-UG03-SO-1021	8/21/2001	0.5-1	<7.6	<76	<76	<7.6	<15 U	<7.6	<350	**6.7**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	<27
YWV-TP01-SO-1033	8/22/2001	0.5-1	<350	<110	<110	<11	<23 U	**4 J^**	<350	**6.2**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP01-SO-1034 (FD)	8/22/2001	0.5-1	<7.6	**51 J**	**9 J^**	<7.6	<15 U	**0.9 J^**	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP02-SO-1031	8/22/2001	0.7-1.2	<7.9	**370 J**	**18 J^**	**1 J^**	<16 U	<7.9	**85 J^**	**4**	**31 J-**	**22 J-**	<2.3 UJ	**2 J-**	**0.7 J-**	**45**
YWV-TP02-SO-1032	8/22/2001	2-2.5	<6	<60	<60	<6	<12 U	<6	<350	<350	<2.1	**0.4 J^**	<2.1	<2.1	<1.1	**11 J^**
YWV-TP03-SO-1026	8/21/2001	0.7-1.2	<7	**110 J**	<70	<7	<14 U	<7	<360	**12**	<2.2	<2.2	<2.2	<2.2	<1.1	<27
YWV-TP03-SO-1027	8/21/2001	2-2.5	<6.8	**79 J**	<68	<6.8	<14 U	<6.8	<360 UJ	**5.3**	<2.2	<2.2	**2 J^**	<2.2	<1.1	**13 J^**
YWV-TP04-SO-1030	8/22/2001	1.1-1.6	**1 J-**	<71	<71	<7.1	<14 U	<7.1	<370	**5.2**	<2.3 UJ	**0.5 J-**	<2.3 UJ	**0.5 J-**	<1.1 UJ	<28
YWV-TP04-SO-1028	8/21/2001	2.8-3.3	<7	**61 J**	**8 J^**	<7	<14 U	**1 J^**	<370	**4**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	**17 J^**
YWV-DG01-SO-1022	8/21/2001	0.5-1	<7.1	<71	<71	<7.1	<14 U	<7.1	**240 J^**	**52**	<2.4 UJ	<2.4 UJ	<2.4 UJ	<2.4 UJ	<1.2 UJ	<30
YWV-DG02-SO-1023	8/21/2001	0.5-1	<8.1	**31 J**	<81	<8.1	<16 U	<8.1	<380	**25**	<2.3 UJ	<2.3 UJ	<2.3 UJ	<2.3 UJ	<1.2 UJ	<29
YWV-DG03-SO-1024	8/21/2001	0.5-1	<8.8	<88	<88	<8.8	<18 U	<8.8	<350	**16**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
Preliminary Remediation Goals: (Res. Soil):			2E+06	370000	7E+06	790000	8900	520000	35000	6100	2400	1700	1700	30	53	220
Preliminary Remediation Goals: (Ind. Soil):			6E+06	370000	3E+07	3E+06	21000	520000	180000	290000	17000	12000	12000	150	270	1000

(FD): field duplicate
fbgs: feet below ground surface
Res. Soil Residential Soil
Ind. Soil Industrial Soil

J^: Reported between method detection limit and practical quantitation limit
J: The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U: The analyte was analyzed for, but was not detected above the reporting limit.
UJ: The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
\- Bias low
Detections shown in bold.

TABLE 4-4: DIOXINS AND FURANS IN SOIL SAMPLES AND 2,3,7,8-TCDD TOXIC EQUIVALENCE CALCULATIONS VOGELSANG WASTE ACCUMULATION AREA YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Analyte Group	Compound	Result		TEQ Factor	TEQ Result	Units
YWV-UG03-SO-1021	**8/21/2001**							
		Dioxins	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzo-p-dioxin	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzo-p-dioxin	0	ND	1	0	PG/G
			Octachlorodibenzo-p-Dioxin	0	ND	0.001	0	PG/G
						Dioxins SubTotal:	0	PG/G
		Furans	1,2,3,4,6,7,8-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8,9-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzofuran	0	ND	0.05	0	PG/G
			2,3,4,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			2,3,4,7,8-pentachlorodibenzofuran	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzofuran	0	ND	0.1	0	PG/G
			Octachlorodibenzofuran	0	ND	0.001	0	PG/G
						Furans SubTotal:	0	PG/G
						YWV-UG03-SO-1021 TEQ:	**0**	**PG/G**
Residential Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.9**	**PG/G**
Industrial Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**27**	**PG/G**
Ecological Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.15**	**PG/G**

TABLE 4-4: DIOXINS AND FURANS IN SOIL SAMPLES AND 2,3,7,8-TCDD TOXIC EQUIVALENCE CALCULATIONS VOGELSANG WASTE ACCUMULATION AREA YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Analyte Group	Compound	Result		TEQ Factor	TEQ Result	Units
YWV-TP02-SO-1031	**8/22/2001**							
		Dioxins	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	42		0.01	0.42	PG/G
			1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzo-p-dioxin	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzo-p-dioxin	0	ND	1	0	PG/G
			Octachlorodibenzo-p-Dioxin	320		0.001	0.32	PG/G
						Dioxins SubTotal:	0.74	PG/G
		Furans	1,2,3,4,6,7,8-heptachlorodibenzofuran	5.3		0.01	0.053	PG/G
			1,2,3,4,7,8,9-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzofuran	0	ND	0.05	0	PG/G
			2,3,4,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			2,3,4,7,8-pentachlorodibenzofuran	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzofuran	1.8		0.1	0.18	PG/G
			Octachlorodibenzofuran	11		0.001	0.011	PG/G
						Furans SubTotal:	0.244	PG/G
				YWV-TP02-SO-1031 TEQ:			**0.984**	**PG/G**
Residential Soil Preliminary Remediation Goal:				**2,3,7,8-tetrachlorodibenzo-p-dioxin:**			**3.9**	**PG/G**
Industrial Soil Preliminary Remediation Goal:				**2,3,7,8-tetrachlorodibenzo-p-dioxin:**			**27**	**PG/G**
Ecological Soil Preliminary Remediation Goal:				**2,3,7,8-tetrachlorodibenzo-p-dioxin:**			**3.15**	**PG/G**

TABLE 4-4: DIOXINS AND FURANS IN SOIL SAMPLES AND 2,3,7,8-TCDD TOXIC EQUIVALENCE CALCULATIONS VOGELSANG WASTE ACCUMULATION AREA YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Analyte Group	Compound	Result		TEQ Factor	TEQ Result	Units
YWV-TP03-SO-1025	**8/21/2001**							
		Dioxins	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	6.3		0.01	0.063	PG/G
			1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzo-p-dioxin	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzo-p-dioxin	0	ND	1	0	PG/G
			Octachlorodibenzo-p-Dioxin	31		0.001	0.031	PG/G
						Dioxins SubTotal:	0.094	PG/G
		Furans	1,2,3,4,6,7,8-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8,9-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzofuran	0	ND	0.05	0	PG/G
			2,3,4,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			2,3,4,7,8-pentachlorodibenzofuran	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzofuran	0	ND	0.1	0	PG/G
			Octachlorodibenzofuran	0	ND	0.001	0	PG/G
						Furans SubTotal:	0	PG/G
						YWV-TP03-SO-1025 TEQ:	**0.094**	**PG/G**

Residential Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.9**	**PG/G**
Industrial Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**27**	**PG/G**
Ecological Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.15**	**PG/G**

TABLE 4-4: DIOXINS AND FURANS IN SOIL SAMPLES
AND 2,3,7,8-TCDD TOXIC EQUIVALENCE CALCULATIONS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Analyte Group	Compound	Result		TEQ Factor	TEQ Result	Units
YWV-TP04-SO-1029	**8/22/2001**							
		Dioxins	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	26		0.01	0.26	PG/G
			1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	3.5		0.1	0.35	PG/G
			1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	3.3		0.1	0.33	PG/G
			1,2,3,7,8-pentachlorodibenzo-p-dioxin	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzo-p-dioxin	6.5		1	6.5	PG/G
			Octachlorodibenzo-p-Dioxin	69		0.001	0.069	PG/G
						Dioxins SubTotal:	7.509	PG/G
		Furans	1,2,3,4,6,7,8-heptachlorodibenzofuran	9.9		0.01	0.099	PG/G
			1,2,3,4,7,8,9-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzofuran	3.8		0.1	0.38	PG/G
			1,2,3,6,7,8-hexachlorodibenzofuran	3.2		0.1	0.32	PG/G
			1,2,3,7,8,9-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzofuran	3.1		0.05	0.155	PG/G
			2,3,4,6,7,8-hexachlorodibenzofuran	4.4		0.1	0.44	PG/G
			2,3,4,7,8-pentachlorodibenzofuran	6.1		0.5	3.05	PG/G
			2,3,7,8-tetrachlorodibenzofuran	5.6		0.1	0.56	PG/G
			Octachlorodibenzofuran	0	ND	0.001	0	PG/G
						Furans SubTotal:	5.004	PG/G
						YWV-TP04-SO-1029 TEQ:	**12.513**	**PG/G**

Residential Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.9**	**PG/G**
Industrial Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**27**	**PG/G**
Ecological Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.15**	**PG/G**

NOTES:

PG/G: picograms per gram
ND: Non-detect result
TEQ: Toxicity Equivalence (Risk Based). See Reference (Cancer Potency Factor Update DTSC/Sacramento CalEPA, 1997)

TABLE 5-1: INORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO ECOLOGICAL SCREENING VALUES
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	CAM 17 Metals by EPA Methods 6010B and 7470A (mg/kg)																	EPA Method 7196 (mg/kg)
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Hexavalent Chromium
YWV-UG01-SO-1019	8/21/2001	0.5	<5.2	**2.2**	**21.4**	<0.21	**0.0096 J^**	**1.6**	**3.3**	**11.8**	**3.5**	**0.075 J^**	**0.61**	**1.8**	<0.52	<0.52	<0.52	**15.5**	**21.8**	<0.52 UJ
YWV-UG02-SO-1020	8/21/2001	0.5	<5.3	**0.92**	**4.2**	<0.21	<0.11	**1.2**	**1**	**4**	**1.4**	**0.13 J^**	**0.34**	**0.59**	<0.53	<0.53	<0.53	**10.3**	**11.4**	<0.53 UJ
YWV-UG03-SO-1021	8/21/2001	0.5	<22	**2.5**	**43.6**	**0.59 J^**	**0.25 J^**	**6.5**	**4.6**	**27.7**	**8.7**	**0.13 J^**	**1.3**	**5.3**	<2.2	<2.2	<2.2	**20.7**	**31.6**	<0.54 UJ
YWV-TP01-SO-1033	8/22/2001	0.5	<21	**2.9**	**13.5**	<0.86	<0.43	**3.1**	**2.9**	**16**	**4.3**	**0.13 J^**	**19.6**	**1.9**	<2.1	<2.1	<2.1	**31.9**	**24**	<0.54 UJ
YWV-TP01-SO-1034 (FD)	8/22/2001	0.5	<21	**3.2**	**13**	<0.86	<0.43	**2.9**	**2.8**	**16.1**	**4.2**	**0.23**	**21.3**	**1.6**	<2.1	<2.1	<2.1	**35**	**21.9**	<0.54 UJ
YWV-TP02-SO-1031	8/22/2001	0.7	<23	**6.4**	**28.1**	<0.91	**0.3 J^**	**7.8**	**8.8**	**163**	**64.6**	**0.25**	**5.5**	**26**	<2.3	<2.3	<2.3	**23.5**	**233**	<0.57 UJ
YWV-TP02-SO-1032	8/22/2001	2	<21	**3.6**	**11.1**	<0.85	**0.13 J^**	**4.7**	**3.4**	**152**	**13.4**	**0.16 J^**	**25.8**	**3.5**	<2.1	<2.1	<2.1	**25.3**	**80**	<0.53 UJ
YWV-TP03-SO-1026	8/21/2001	0.7	<22	**2.3**	**32.6**	<0.86	**14.8**	**3.6**	**8.4**	**31.4**	**9.7**	**0.13 J^**	**20**	**10.1**	<2.2	<2.2	<2.2	**26.2**	**128**	<0.54 UJ
YWV-TP03-SO-1027	8/21/2001	2	<22	**3.1**	**26.3**	<0.87	**1**	**3.5**	**5.9**	**46.1**	**91.5**	**0.66**	**24.3**	**8.2**	<2.2	<2.2	<2.2	**28.9**	**456**	<0.54 UJ
YWV-TP04-SO-1030	8/22/2001	1.1	<5.7	**2.9**	**27.2**	<0.23	**0.28**	**4.2**	**3.8**	**373**	**8.9**	**0.14 J^**	**10.6**	**5.4**	<0.57	<0.57	<0.57	**25.9**	**102**	<0.57 UJ
YWV-TP04-SO-1028	8/21/2001	2.8	<22	**1.9**	**32.9**	<0.89	**0.45**	**2.7**	**3.1**	**262**	**29.4**	**0.15 J^**	**4**	**5.2**	<2.2	<2.2	<2.2	**16**	**131**	<0.56 UJ
YWV-DG01-SO-1022	8/21/2001	0.5	<24	**2.7**	**17.2**	<0.98	<0.49	**3.2**	**3.5**	**23.9**	**5.3**	**0.25**	**88.6**	**4.5**	<2.4	<2.4	<2.4	**34.6**	**61.5**	<0.61 UJ
YWV-DG02-SO-1023	8/21/2001	0.5	<23	**2.3**	**15.2**	<0.93	<0.46	**3.4**	**3.3**	**18.3**	**5**	**0.11 J^**	**32.5**	**2.5**	<2.3	<2.3	<2.3	**27.9**	**29.2**	<0.58 UJ
YWV-DG03-SO-1024	8/21/2001	0.5	<21	**2.9**	**18.2**	<0.85 U	<0.43	**4.3**	**3.1**	**15.5**	**5.2**	**0.24**	**22.7**	**2.8**	<2.1	<2.1	<2.1	**28.1**	**24.5**	<0.53 UJ
Ecological Screening Values:			5	9.9	280	10	4	0.4	20	60	41	0.00051	2	30	0.21	2	1	2	8.5	NA

(FD): field duplicate
fbgs: feet below ground surface

J^ Reported between method detection limit and practical quantitation limit
U The analyte was analyzed for, but was not detected above the reporting limit.
UJ The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
Detections shown in bold, detections above Ecological Screening Values are circled.

TABLE 5-2: ORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO ECOLOGICAL SCREENING VALUES
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	VOCs (µg/kg) EPA Method 8260						SVOCs (µg/kg) EPA Method 8270	PAHS (µg/kg) EPA Method 8310	Pesticides/PCBs (µg/kg) EPA Method 8081					
			1,2-Dichlorobenzene	Acetone	Methyl ethyl ketone	Methyl isobutyl ketone	Methylene chloride	Toluene	Bis(2-ethylhexyl) phthalate	Chyrsene	DDD44	DDE44	DDT44	Dieldrin	Heptachlor epoxide	PCB-1260 (Aroclor 1260)
YWV-UG01-SO-1019	8/21/2001	0.5-1	<5.8	<58	<58	<5.8	<12 U	**0.8 J^**	<340	<340	<2.1	<2.1	<2.1	<2.1	<1	<26
YWV-UG02-SO-1020	8/21/2001	0.5-1	<6.5	<65	<65	<6.5	<13 U	<6.5	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<26
YWV-UG03-SO-1021	8/21/2001	0.5-1	<7.6	<76	<76	<7.6	<15 U	<7.6	<350	**6.7**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	<27
YWV-TP01-SO-1033	8/22/2001	0.5-1	<350	<110	<110	<11	<23 U	**4 J^**	<350	**6.2**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP01-SO-1034 (FD)	8/22/2001	0.5-1	<7.6	**51 J**	**9 J^**	<7.6	<15 U	**0.9 J^**	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP02-SO-1031	8/22/2001	0.7-1.2	<7.9	**370 J**	**18 J^**	**1 J^**	<16 U	<7.9	**85 J^**	**4**	**31 J-**	**22 J-**	<2.3 UJ	**2 J-**	**0.7 J-**	**45**
YWV-TP02-SO-1032	8/22/2001	2-2.5	<6	<60	<60	<6	<12 U	<6	<350	<350	<2.1	**0.4 J^**	<2.1	<2.1	<1.1	**11 J^**
YWV-TP03-SO-1026	8/21/2001	0.7-1.2	<7	**110 J**	<70	<7	<14 U	<7	<360	**12**	<2.2	<2.2	<2.2	<2.2	<1.1	<27
YWV-TP03-SO-1027	8/21/2001	2-2.5	<6.8	**79 J**	<68	<6.8	<14 U	<6.8	<360 UJ	**5.3**	<2.2	<2.2	**2 J^**	<2.2	<1.1	**13 J^**
YWV-TP04-SO-1030	8/22/2001	1.1-1.6	**1 J-**	<71	<71	<7.1	<14 U	<7.1	<370	**5.2**	<2.3 UJ	**0.5 J-**	<2.3 UJ	**0.5 J-**	<1.1 UJ	<28
YWV-TP04-SO-1028	8/21/2001	2.8-3.3	<7	**61 J**	**8 J^**	<7	<14 U	**1 J^**	<370	**4**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	**17 J^**
YWV-DG01-SO-1022	8/21/2001	0.5-1	<7.1	<71	<71	<7.1	<14 U	<7.1	**240 J^**	**52**	<2.4 UJ	<2.4 UJ	<2.4 UJ	<2.4 UJ	<1.2 UJ	<30
YWV-DG02-SO-1023	8/21/2001	0.5-1	<8.1	**31 J**	<81	<8.1	<16 U	<8.1	<380	**25**	<2.3 UJ	<2.3 UJ	<2.3 UJ	<2.3 UJ	<1.2 UJ	<29
YWV-DG03-SO-1024	8/21/2001	0.5-1	<8.8	<88	<88	<8.8	<18 U	<8.8	<350	**16**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
Ecological Screening Values:			2500	3000	90000	440000	4100	200000	930	4700	760	600	18	2.4	150	370

(FD): field duplicate
fbgs: feet below ground surface

J^: Reported between method detection limit and practical quantitation limit
J: The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U: The analyte was analyzed for, but was not detected above the reporting limit.
UJ: The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- Bias low
Detections shown in bold.

TABLE 5-3: RECOMMENDED BIOACCUMULATION/BIOCONCENTRATION FACTORS
SOIL-TO-EARTHWORM PATHWAY
VOGELSANG WASTE ACCUMULATION AREA, YOSEMITE NATIONAL PARK, CALIFORNIA

	Sample, et. al.[a]					
Constituent	**Median BAF/BCF**	**90th Percentile BAF/BCF**	**Maximum BAF/BCF**	**Regression Equation [b]**	**Recommended BAF/BCF**	**Rationale for Recommended BAF/BCF**
Cadmium	7.708	40.69	190	ln (EW)=0.55(ln[soil])+2.82	Regression Equation	Chemical-specific Regression Eq.
Copper	0.515	1.531	5.492	ln (EW)=0.24(ln[soil])+1.80	Regression Equation	Chemical-specific Regression Eq.
Lead	0.266	1.522	228.261	ln (EW)=0.81(ln[soil])-0.21	Regression Equation	Chemical-specific Regression Eq.
Molybdenum	--[c]	--	--		1.3	Average of 13 inorganic BAF median values from USEPA (2000)
TCDD, 2,3,7,8	11.01	22.23	42.07	ln (EW)=1.18(ln[soil])+3.53	Regression Equation	Chemical-specific Regression Eq.

NOTES:

[a] Sample, B. E, et. al., 1998. Development and Validation of Bioaccumulation Models for Earthworms, ES/ER/TM-220.

[b] Sample, B.E, et. al., 1999, Literature-Derived Bioaccumulation Models for Earthworms: Development and Validation, Environ. Toxicol. Chem., 18:9, 2,110-2,120. (models from Table 3 of publication). EW = earthworm tissue concentration.

[c] -- indicates that a BAF/BCF is not available.

TABLE 5-4: TOXICOLOGICAL BENCHMARKS FOR SELECTED WILDLIFE RECEPTORS
VOGELSANG WASTE ACCUMULATION AREA, YOSEMITE NATIONAL PARK, CALIFORNIA

	Food (mg/kg) [b]				
	Short-Tailed Shrew		American Robin		
Constituent [a]	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**Comments**
Cadmium	3.533	35.33	1.2	16.56	For cadmium chloride.
Copper	55.7	73.3	38.9	51.1	Copper sulfate used for shrew, copper oxide used for robin.
Lead	29.3	293.04	0.94	9.36	For lead acetate.
Molybdenum	0.52	5.15	2.9	29.23	For MnO_4.
TCDD, 2,3,7,8	0.0000037	0.0000366	0.0000116	0.0001159	

NOTES:

[a] Constituents presented are those with (1) maximum soil concentrations greater than the selected ecological preliminary remediation goals (PRGs); and (2) not related to background (using the upper tolerance limit and/or Mann Whitney U Test statistical approach).

[b] Toxicological benchmarks are from Table 12 of Sample et al. (1996).

NOAEL = no observed adverse effect level.

LOAEL = lowest observed adverse effect level.

APPENDIX A

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM

OMB Approval Number: 2050-0095
Approved for Use Through: 1/92

EPA Potential Hazardous Waste Site Preliminary Assessment Form

Identification	
State:	CERCLIS Number.
CERCLIS Discovery Date:	

1. General Site Information

Name: Vogelsang Waste Accumulation Area	Street Address: n/a				
City: n/a (Yosemite National Park)	State: CA	Zip Code: n/a	County: Mariposa	Co. Code:	Cong. Dist.
Latitude: 37° 47' 43" Longitude: 119° 21' 10"	Approximate Area of Site: 0.45 Acre; 19,500 Square Feet		Status of Site: ☐ Active X Inactive ☐ Not Specified ☐ NA (GW plume, etc.)		

2. Owner/Operator Information

Owner: National Park Service	Operator: same
Street Address: P.O. Box 577	Street Address:
City: Yosemite	City:
State: CA; Zip Code: 95389; Telephone: (209) 379-3262	State: ; Zip Code: ; Telephone: ( )
Type of Ownership: ☐ Private X Federal Agency Name DOI ☐ State ☐ Indian ☐ County ☐ Municipal ☐ Not Specified ☐ Other ____	How Initially Identified: ☐ Citizen Complaint ☐ PA Petition ☐ State/Local Program ☐ RCRA/CERCLA Notification ☐ Federal Program ☐ Incidental X Not Specified ☐ Other ____

3. Site Evaluator Information

Name of Evaluator: IT Corp	Agency/Organization: n/a	Date Prepared: 11-26-01
Street Address: 4005 Port Chicago Hwy	City: Concord	State: CA
Name of EPA or State Agency Contact: Larry Woods, Federal Facilities Compliance Program, US EPA Region IX	Street Address: 75 Hawthorne Street	
City: San Francisco	State: CA	Telephone: (415) 744-1580

4. Site Disposition (for EPA use only)

Emergency Response/Removal Assessment Recommendation: ☐ Yes ☐ No Date: ____	CERCLIS Recommendation: ☐ Higher Priority SI ☐ Lower Priority SI ☐ NFRAP ☐ RCRA ☐ Other ____ Date: ____	Signature: Name (Typed): Position:

EPA **Potential Hazardous Waste Site Preliminary Assessment Form - Page 2 of 4**	CERCLIS Number:

5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site (check all that apply):

- ☐ Industrial
- ☐ Commercial
- ☐ Residential
- X Forest/Fields
- ☐ Agriculture
- ☐ Mining
- ☐ DOD
- ☐ DOE
- ☐ DOI
- ☐ Other Federal Facility ____________
- ☐ Other ____________

Site Setting:

- ☐ Urban
- ☐ Suburban
- X Rural

Years of Operation:

Beginning Year 1930s

Ending Year 1970s

☐ Unknown

Type of Site Operations (check all that apply):

- ☐ Manufacturing (must check subcategory)
  - ☐ Lumber and Wood Products
  - ☐ Inorganic Chemicals
  - ☐ Plastic and/or Rubber Products
  - ☐ Paints, Varnishes
  - ☐ Industrial Organic Chemicals
  - ☐ Agricultural Chemicals (e.g., pesticides, fertilizers)
  - ☐ Miscellaneous Chemical Products (e.g., adhesives, explosives, ink)
  - ☐ Primary Metals
  - ☐ Metal Coating, Plating, Engraving
  - ☐ Metal Forging, Stamping
  - ☐ Fabricated Structural Metal Products
  - ☐ Electronic Equipment
  - ☐ Other Manufacturing
- ☐ Mining
  - ☐ Metals
  - ☐ Coal
  - ☐ Oil and Gas
  - ☐ Non-metallic Minerals
- ☐ Retail
- ☐ Recycling
- ☐ Junk/Salvage Yard
- X Municipal Landfill
- ☐ Other Landfill
- ☐ DOD
- ☐ DOE
- ☐ DOI
- ☐ Other Federal Facility ____________
- ☐ RCRA
  - ☐ Treatment, Storage, or Disposal
  - ☐ Large Quantity Generator
  - ☐ Small Quantity Generator
  - ☐ Subtitle D
    - ☐ Municipal
    - ☐ Industrial
  - ☐ "Converter"
  - ☐ "Protective Filer"
  - ☐ "Non- or Late Filer"
- ☐ Not Specified
- ☐ Other ____________

Waste Generated:

- X Onsite
- ☐ Offsite
- ☐ Onsite and Offsite

Waste Deposition Authorized By:

- ☐ Present Owner
- ☐ Former Owner
- X Present & Former Owner
- ☐ Unauthorized
- ☐ Unknown

Waste Accessible to the Public:

- ☐ Yes
- X No

Distance to Nearest Dwelling, School, or Workplace:

350 Feet ~~Mile~~

Note: seasonal dwellings only

6. Waste Characteristics Information

Source Type: (check all that apply)	Source Waste Quantity: (include nnits)	Tier *:
☐ Landfill		
☐ Surface Impoundment		
☐ Drums		
☐ Tanks and Non-Drum Containers		
☐ Chemical Waste Pile		
☐ Scrap Metal or Junk Pile		
☐ Tailings Pile		
X Trash Pile (open dump)	unknown	
☐ Land Treatment		
☐ Contaminated Ground Water Plume (unidentified source)		
☐ Contaminated Surface Water / Sediment (unidentified source)		
☐ Contaminated Soil		
☐ Other ____________		
☐ No Sources		

* C = Constituent, W = Wastestream, V = Volume, A = Area

General Types of Waste (check all that apply)

- ☐ Metals
- ☐ Organics
- ☐ Inorganics
- ☐ Solvents
- ☐ Paints/Pigments
- ☐ Laboratory/Hospital Waste
- ☐ Radioactive Waste
- ☐ Construction/Demolition Waste
- ☐ Pesticides/Herbicides
- ☐ Acids/Bases
- ☐ Oily Waste
- X Municipal Waste
- ☐ Mining Waste
- ☐ Explosives
- ☐ Other ____________

Physical State of Waste as Deposited (check all that apply):

- X Solid
- ☐ Sludge
- ☐ Powder
- ☐ Liquid
- ☐ Gas

EPA Potential Hazardous Waste Site Preliminary Assessment Form - Page 3 of 4	CERCLIS Number:

7. Ground Water Pathway

Is Ground Water Used for Drinking Water Within 4 Miles:
- X Yes *
- ☐ No

Type of Drinking Water Wells Within 4 Miles (check all that apply):
- ☐ Municipal
- ☐ Private
- X None *

* Drinking water source is a spring up-gradient from the site.

Is There a Suspected Release to Ground Water:
- ☐ Yes
- X No

Have Primary Target Drinking Water Wells Been Identified:
- ☐ Yes
- X No

If Yes, Enter Primary Target Population:

_________ People

List Secondary Target Population Served by Ground Water Withdrawn From:

0 - ¼ Mile	100*
> ¼ - ½ Mile	0
> ½ - 1 Mile	0
> 1 - 2 Miles	0
> 2 - 3 Miles	0
> 3 - 4 Miles	0
Total Within 4 Miles	0

* seasonal population only.

Depth to Shallowest Aquifer:

unknown Feet

Karst Terrain/Aquifer Present:
- ☐ Yes
- X No

Nearest Designated Wellhead Protection Area:
- ☐ Underlies Site
- ☐ >0 - 4 Miles
- X None Within 4 Miles

8. Surface Water Pathway

Type of Surface Water Draining Site and 15 Miles Dowustream (check all that apply):

X Stream X River ☐ Pond X Lake
☐ Bay ☐ Ocean ☐ Other __________

Shortest Overland Distance From Any Source to Surface Water:

350 Feet

_________ Miles

Is There a Suspected Release to Surface Water:
- ☐ Yes
- X No

Site is Located in:
- ☐ Annual - 10 yr Floodplain
- ☐ > 10 yr - 100 yr Floodplain
- ☐ > 100 yr - 500 yr Floodplain
- X > 500 yr Flood plain

Drinking Water Intakes Located Along the Surface Water Migration Path:
- ☐ Yes
- X No

Have Primary Target Drinking Water Intakes Been Identified:
- ☐ Yes
- X No

If Yes, Enter Population Served by Primary Target Intakes:

__________ People

List All Secondary Target Drinking Water Intakes:

Name	Water Body	Flow (cfs)	Population Served

Total Within 15 Miles __________

Fisheries Located Along the Surface Water Migration Path:
- X Yes
- ☐ No

Have Primary Target Fisheries Been Identified:
- ☐ Yes
- X No

List All Secondary Target Fisheries:

Water Body/Fishery Name	Flow (cfs)
Merced Lake	n/a
Merced River	<200

EPA — Potential Hazardous Waste Site Preliminary Assessment Form - Page 4 of 4	CERCLIS Number:

8. Surface Water Pathway (continued)

Wetlands Located Along the Surface Water Migration Path:
- X Yes
- ☐ No

Have Primary Target Wetlands Been Identified:
- ☐ Yes
- X No

List Secondary Target Wetlands:

Water Body	Flow (cfs)	Frontage Miles
Merced River	<200	

Other Sensitive Environments Located Along the Surface Water Migration Path:
- ☐ Yes
- X No

Have Primary Target Sensitive Environments Been Identified:
- ☐ Yes
- X No

List Secondary Target Sensitive Environments:

Water Body	Flow (cfs)	Sensitive Environment Type

9. Soil Exposure Pathway

Are People Occupying Residences or Attending School or Daycare on or Within 200 Feet of Areas of Known or Suspected Contamination:
- ☐ Yes
- X No

If Yes, Enter Total Resident Population:

__________ People

Number of Workers Onsite:
- X None
- ☐ 1 - 100
- ☐ 101 - 1,000
- ☐ < 1,000

Have Terrestrial Sensitive Environments Been Identified on or Within 200 Feet of Areas of Known or Suspected Contamination:
- ☐ Yes
- X No

If Yes, List Each Terrestrial Sensitive Environment:

10. Air Pathway

Is There a Suspected Release to Air:
- ☐ Yes
- X No

Enter Total Population on or Within:

Onsite	0
0 - ¼ Mile	100*
> ¼ - ½ Mile	0
> ½ - 1 Mile	0
> 1 - 2 Miles	0
> 2 - 3 Miles	0
> 3 - 4 Miles	0
Total Within 4 Miles	100*

*seasonal population only.

Wetlands Located Within 4 Miles of the Site:
- X Yes
- ☐ No

Other Sensitive Environments Located Within 4 Miles of the Site:
- ☐ Yes
- X No

List All Sensitive Environments Within ½ Mile of the Site:

Distance	Sensitive Environment Type/Wetland Area (acres)
Onsite	
0 - ¼ Mile	
> ¼ - ½ Mile	

APPENDIX B

TEST PIT LOGS

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110		PROJECT NAME: NPS Yosemite - Vogelsang WAA	
TEST PIT NUMBER YWV-TP01	COORDINATES:		DATE: 8/22/01
ELEVATION:	GWL Depth na	Date/Time na	TIME STARTED: 1340
ENGINEER/GEOLOGIST: D. Bero	Depth na	Date/Time na	TIME COMPLETED: 1430
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTION	REMARKS
		na	na	Dark red-brown sandy soil containing scattered pebbles; loose, moist; roots and organic material to approx. 1 ft bgs. No debris present in test pit.	SW	na	na	
1	X			Dark red-brown sandy soil containing pebbles.	SW			Sample #YWV-TP01-1033 Sample #YWV-TP01-1034 (dup)
2								
3								
4								

Detections:

Sample #YWV-TP01-1033

VOCs (ug/kg)
Methyene chloride
Toluene

PAHs (ug/kg)
Chrysene

TPH-silica gel cleanup (mg/kg)
Diesel
Motor Oil

Total Metals (mg/kg)
Arsenic
Barium
T.Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Selenium
Vanadium
Zinc

Sample #YWV-TP01-1034

VOCs (ug/kg)
Acetone
Methyl ethyl ketone
Toluene

TPH-silica gel cleanup (mg/kg)
Diesel
Motor Oil

Total Metals (mg/kg)
Arsenic
Barium
T.Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Vanadium
Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110		PROJECT NAME: NPS Yosemite - Vogelsang WAA	
TEST PIT NUMBER: YWV-TP02	COORDINATES:		DATE: 8/22/01
ELEVATION, ft amsl:	GWL Depth	Date/Time	TIME STARTED: 1158
ENGINEER/GEOLOGIST: D. Bero	Depth	Date/Time	TIME COMPLETE 1300
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTIO	REMARKS
		na	na	Waste debris with minor tan colored sandy soil from surface tobedrock at approx. 2.5 ft. bgs. Waste debris composed of broken glass, rusted metal, broken ceramic dinnerware, and bottles.	SW	na	na	
1	X							Sample #YWV-TP02-1031
2								
	X							Sample #YWV-TP02-1032
3				Granitic Bedrock				

Detections:

Sample #YWV-TP02-1031

VOCs (ug/kg)
4-Methyl-2-pentanone
Acetone
Methyl ethyl ketone
Methyene chloride

TPH-silica gel cleanup (mg/kg)
Diesel
Motor Oil

PCBs (ug/kg)
Anoclor-1260

Dioxins/Furans (pg/g)
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
1,2,3,4,6,7,8-heptachlorodibenzofuran
2,3,7,8-tetrachlorodibenzofuran
Heptachlorinated dibenzo-p-dioxins (T)
Heptachlorinated dibenzofurans (T)
Hexachlorinated dibenzo-p-dioxins (T)
Hexachlorinated dibenzofurans (T)
Octachlorodibenzo-p-Dioxin
Octachlorodibenzofuran
Tetrachlorinated dibenzo-p-dioxins (T)
Tetrachlorinated dibenzofurans (T)

Total Metals (mg/kg)
Arsenic
Barium
Cadmium
T.Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Vanadium
Zinc

SVOCs (ug/kg)
bis(2-Ethylhexy)phthalate

Pesticides (ug/kg)
4,4'-DDD
4,4'-DDE
Dieldrin
Heptachlor epoxide

Sample #YWV-TP02-1032

VOCs (ug/kg)
Methyene chloride

Pestocides (ug/kg)
4,4'-DDE

PCBs (ug/kg)
Anoclor-1260

TPH-silica gel cleanup (mg/kg)
Diesel
Motor Oil

Total Metals (mg/kg)

Arsenic	Lead
Barium	Mercury
Cadmium	Molybdenum
T.Chromium	Nickel
Cobalt	Vanadium
Copper	Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110	PROJECT NAME: NPS Yosemite - Vogelsang WAA		
TEST PIT NUMBER YWV-TP03	COORDINATES:	DATE: 8/21/01	
ELEVATION, ft amsl	GWL Depth Date/Time	TIME STARTED: 1535	
ENGINEER/GEOLOGIST: D. Bero	Depth Date/Time	TIME COMPLETE 1715	
METHOD: Hand Ex.		PAG 1 OF 1	

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTION	REMARKS
		na	na	Medium red-brown silty sandy soil; loose; dry. Scattered waste debris (broken glass, cemanic).	SW	na	na	
	X			Gray ash layer (analyzed for dioxins and furans)				Sample #YWV-TP03-1025
1	X			Tan to yellow silty sandy soil; loose; dry. Scattered waste debris (broken glass, cemanic).	SW			Sample #YWV-TP03-1026
2	X			Waste debris with minor tan sandy soil to bedrock at approx. 2.5 ft bgs. Waste debris composed of rusted metal (including wood stove parts), bottles, broken glass, etc.	SW			Sample #YWV-TP03-1027
3				Granitic Bedrock				

Detections:

Sample #YWV-TP03-1025

Dioxins/Furans (pg/g)

1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
Heptachlorinated dibenzo-p-dioxins (T)
Octachlorodibenzo-p-Dioxin

Sample #YWV-TP03-1026

VOCs (ug/kg)

Acetone
Methyene chloride

PAHs (ug/kg)

Chrysene

TPH-silica gel cleanup (mg/kg)

Diesel
Motor Oil

Total Metals (mg/kg)

Arsenic
Barium
Cadmium
T.Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Vanadium
Zinc

Sample #YWV-TP03-1027

VOCs (ug/kg)

Acetone
Methyene chloride

PAHs (ug/kg)

Chrysene

Pestocides (ug/kg)

4,4'-DDT

PCBs (ug/kg)

Anoclor-1260

TPH-silica gel cleanup (mg/kg)

Diesel
Motor Oil

Total Metals (mg/kg)

Arsenic
Barium
Cadmium
T.Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Vanadium
Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110		PROJECT NAME: NPS Yosemite - Vogelsang WAA	
TEST PIT NUMBER YWV-TP04	COORDINATES:		DATE: 8/21/01
ELEVATION, ft amsl	GWL Depth	Date/Time	TIME STARTED: 1004
ENGINEER/GEOLOGIST: D. Bero	Depth	Date/Time	TIME COMPLETE 1140
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTION	REMARKS
		na	na	Waste debris with minor sandy soil. Soil is medium brown silty sand; well sorted; dry. Waste debris composed of broken glass, cemanic, cans, metal.	SW	na	na	
	X			Gray ash layer (analyzed for dioxins and furans)				Sample #YWV-TP04-1029
1				Waste debris with minor sandy soil. Soil is tan to yellow silty sand; loose; dry. Waste debris composed of broken glass, cemanic, cans, metal. Soil contains roots and organic matter to approx. 1 ft. bgs	SW			
	X							Sample #YWV-TP04-1030 (MS/MSD)
2								
3								
	X							Sample #YWV-TP04-1028
				Granitic Bedrock				

Detections:

Sample #YWV-TP04-1028

VOCs (ug/kg)
Acetone
Methyl ethyl ketone
Methyene chloride
Toluene

PAHs (ug/kg)
Chrysene

PCBs (ug/kg)
Anoclor-1260

TPH-silica gel cleanup (mg/kg)
Diesel
Motor Oil

Total Metals (mg/kg)

Arsenic	Cobalt	Molybdenum
Barium	Copper	Nickel
Cadmium	Lead	Vanadium
T.Chromium	Mercury	Zinc

Sample #YWV-TP04-1029

Dioxins/Furans (pg/g)
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
1,2,3,4,6,7,8-heptachlorodibenzofuran
1,2,3,4,7,8-hexachlorodibenzofuran
1,2,3,4,7,8-hexachlorodibenzo-p-dioxin
1,2,3,4,6,7,8-hexachlorodibenzofuran
1,2,3,7,8,9-hexachlorodibenzo-p-dioxin
1,2,3,7,8-pentachlorodibenzofuran
2,3,4,6,7,8-hexachlorodibenzofuran
2,3,4,7,8-pentachlorodibenzofuran
2,3,7,8-tetrachlorodibenzo-p-dioxin
2,3,7,8-tetrachlorodibenzofuran
Heptachlorinated dibenzo-p-dioxins (T)
Heptachlorinated dibenzofurans (T)
Hexachlorinated dibenzo-p-dioxins (T)
Hexachlorinated dibenzofurans (T)
Octachlorodibenzo-p-Dioxin
Pentachlorinated dibenzo-p-dioxins (T)
Pentachlorinated dibenzofurans (T)
Tetrachlorinated dibenzo-p-dioxins (T)
Tetrachlorinated dibenzofurans (T)

Sample #YWV-TP04-1030

VOCs (ug/kg)
1,2-Dichlorobenzene
Methyene chloride

PAHs (ug/kg)
Chrysene

Pestocides (ug/kg)
4,4'-DDE

TPH-silica gel cleanup (mg/kg)
Diesel
Motor Oil

Total Metals (mg/kg)

Arsenic	Lead
Barium	Mercury
Cadmium	Molybdenum
T.Chromium	Nickel
Cobalt	Vanadium
Copper	Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110		PROJECT NAME: NPS Yosemite - Vogelsang WAA	
TEST PIT NUMBER YWV-UG01	COORDINATES:		DATE: 8/21/01
ELEVATION, ft amsl	GWL Depth	Date/Time	TIME STARTED: 1003
ENGINEER/GEOLOGIST: D. Bero	Depth	Date/Time	TIME COMPLETE 1050
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTIO	REMARKS
		na	na	Dark brown sandy soil containing minor pebbles; loose; dry. Roots and organic debris present.	SW	na	na	
1	X			Dark brown sandy soil containing minor clay; dry.	SP-SM			Sample #YWV-UG01-1019
2								

Detections:

Sample #YWV-UG01-1019

VOCs (ug/kg)
- Methyene chloride
- Toluene

TPH-silica gel cleanup (mg/kg)
- Diesel
- Motor Oil

Total Metals (mg/kg)
- Arsenic
- Barium
- Cadmium
- T.Chromium
- Cobalt
- Copper
- Lead
- Mercury
- Molybdenum
- Nickel
- Vanadium
- Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110		PROJECT NAME: NPS Yosemite - Vogelsang WAA	
TEST PIT NUMBER YWV-UG02	COORDINATES:		DATE: 8/21/01
ELEVATION, ft amsl	GWL Depth	Date/Time	TIME STARTED: 1100
ENGINEER/GEOLOGIST: D. Bero	Depth	Date/Time	TIME COMPLETE 1130
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTIO	REMARKS
		na	na	Dark brown sandy soil containing minor pebbles; loose; dry. Roots and organic debris present.	SW	na	na	
1	X			Pale brown sandy, clayey soil containing minor clay; very dry.	SP-SM			Sample #YWV-UG02-1020

Detections:

Sample #YWV-UG02-1020

VOCs (ug/kg)
Methyene chloride

TPH-silica gel cleanup (mg/kg)
Diesel
Motor Oil

Total Metals (mg/kg)
Arsenic
Barium
T.Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Vanadium
Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110		PROJECT NAME: NPS Yosemite - Vogelsang WAA	
TEST PIT NUMBER YWV-UG03	COORDINATES:		DATE: 8/21/01
ELEVATION, ft amsl	GWL Depth	Date/Time	TIME STARTED: 1138
ENGINEER/GEOLOGIST: D. Bero	Depth	Date/Time	TIME COMPLETE 1210
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTIO	REMARKS
		na	na	Dark brown sandy soil containing minor pebbles; loose; dry. Roots and organic debris present.	SW	na	na	
1	X			Dark brown sandy, silty soil containing pebbles; dry.	SP-SM			Sample #YWV-UG03-1021

Detections:

Sample #YWV-UG03-1021

VOCs (ug/kg)

Methyene chloride

PAHs (ug/kg)

Chrysene

TPH-silica gel cleanup (mg/kg)

Diesel

Motor Oil

Total Metals (mg/kg)

Arsenic

Barium

Beryllium

Cadmium

T.Chromium

Cobalt

Copper

Lead

Mercury

Molybdenum

Nickel

Vanadium

Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110	PROJECT NAME: NPS Yosemite - Vogelsang WAA		
TEST PIT NUMBER YWV-DG01	COORDINATES:		DATE: 8/21/01
ELEVATION, ft amsl	GWL Depth	Date/Time	TIME STARTED: 1342
ENGINEER/GEOLOGIST: D. Bero	Depth	Date/Time	TIME COMPLETE 1404
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTIO	REMARKS
		na	na	Dark brown sandy soil containing minor pebbles; loose; dry. Roots and organic debris present.	SW	na	na	
1	X			Dark red-brown sandy, silty soil containing pebbles; moist.	SP-SM			Sample #YWV-DG01-1022

Detections:

Sample #YWV-DG01-1022

VOCs (ug/kg)

Methyene chloride

SVOCs (mg/kg)

bis(2-Ethylhexyl)phthalate

PAHs (ug/kg)

Chrysene

TPH-silica gel cleanup (mg/kg)

Diesel

Motor Oil

Total Metals (mg/kg)

Arsenic

Barium

T.Chromium

Cobalt

Copper

Lead

Mercury

Molybdenum

Nickel

Vanadium

Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110		PROJECT NAME: NPS Yosemite - Vogelsang WAA	
TEST PIT NUMBER YWV-DG02	COORDINATES:		DATE: 8/21/01
ELEVATION, ft amsl	GWL Depth	Date/Time	TIME STARTED: 1414
ENGINEER/GEOLOGIST: D. Bero	Depth	Date/Time	TIME COMPLETE 1440
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTIO	REMARKS
		na	na	Dark red-brown sandy soil containing minor pebbles; loose; dry. Roots and organic debris present.	SW	na	na	
1	X			Dark red-brown sandy soil containing pebbles; moist.	SP-SM			Sample #YWV-DG02-1023

Detections;

Sample #YWV-DG02-1023

VOCs (ug/kg)
Acetone
Methyene chloride

PAHs (ug/kg)
Chrysene

TPH-silica gel cleanup (mg/kg)
Diesel
Motor Oil

Total Metals (mg/kg)
Arsenic
Barium
T.Chromium
Cobalt
Copper
Lead
Mercury
Molybdenum
Nickel
Vanadium
Zinc

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VISUAL CLASSIFICATION OF SOILS IN TEST PIT EXCAVATIONS

PROJECT NUMBER: 870508.02120110		PROJECT NAME: NPS Yosemite - Vogelsang WAA	
TEST PIT NUMBER YWV-DG03	COORDINATES:		DATE: 8/21/01
ELEVATION, ft amsl	GWL Depth	Date/Time	TIME STARTED: 1445
ENGINEER/GEOLOGIST: D. Bero	Depth	Date/Time	TIME COMPLETE 1525
METHOD: Hand Ex.			PAG 1 OF 1

DEPTH (ft)	SAMPLE DEPTH.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTIO	REMARKS
		na	na	Red-brown sandy soil containing pebbles; loose; dry. Roots and organic debris present.	SW	na	na	
1	X			Medium red-brown sandy soil containing pebbles; moist.	SP-SM			Sample #YWV-DG03-1124

Detections:

Sample #YWV-DG03-1124

VOCs (ug/kg)

Methyene chloride

PAHs (ug/kg)

Chrysene

TPH-silica gel cleanup (mg/kg)

Diesel

Motor Oil

Total Metals (mg/kg)

Arsenic

Barium

Beryllium

T.Chromium

Cobalt

Copper

Lead

Mercury

Molybdenum

Nickel

Vanadium

Zinc

APPENDIX C

LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORMS

TABLE C-1
SAMPLE IDENTIFICATION CROSS REFERENCE AND DATA REVIEW LEVEL
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Date Collected	*Lab ID*	*Field ID*	*Lab*	*Sample Type*	*Analytical Method*	*Prep Method*	*Date Prepared*	*Date Analyzed*	*Review Level*
8/16/01	01-5321-1	YWV-TB-WT-1017	APHC	TB	M8015V	SW5030	8/21/01	8/21/01	III
8/16/01	01-5321-1	YWV-TB-WT-1017	APHC	TB	SW8260B	SW5030	8/19/01	8/19/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	SW8082	SW3510	8/20/01	8/24/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	SW8310	SW3510	8/20/01	8/24/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	SW8260B	SW5030	8/19/01	8/19/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	SW8081A	SW3510	8/20/01	8/22/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	SW7470A	METHOD	8/21/01	8/21/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	SW7196A	NONE	NA	8/17/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	SW6010B	SW3010	8/21/01	8/21/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	M8015V	SW5030	8/21/01	8/21/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	M8015D	SW3630	8/21/01	8/22/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	M8015D	SW3510	8/21/01	8/23/01	III
8/16/01	01-5321-2	YWV-MB-WH-1018	APHC	SB	SW8270C	SW3510	8/20/01	8/28/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	SW8310	SW3510	8/28/01	8/30/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	M8015D	SW3510	8/27/01	8/29/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	SW8270C	SW3510	8/24/01	9/5/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	SW8260B	SW5030	8/30/01	8/30/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	SW8082	SW3510	8/24/01	8/28/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	SW8081A	SW3510	8/27/01	8/29/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	SW7470A	SW3010	8/29/01	8/29/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	SW7196A	NONE	NA	8/24/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	SW6010B	SW3010	8/27/01	8/27/01	III
8/23/01	01-5474-1	YWV-EB-WH-1035	APHC	EB	M8015D	SW3510	8/29/01	9/4/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW8082	SW3550	8/28/01	8/30/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW8081A	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	D2216	NONE	NA	8/28/01	III
8/21/01	01-5474-11	YWV-TP03-SO-1026	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW8082	SW3550	8/28/01	8/30/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III

TABLE C-1
SAMPLE IDENTIFICATION CROSS REFERENCE AND DATA REVIEW LEVEL
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Date Collected	*Lab ID*	*Field ID*	*Lab*	*Sample Type*	*Analytical Method*	*Prep Method*	*Date Prepared*	*Date Analyzed*	*Review Level*
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	D2216	NONE	NA	8/28/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-12	YWV-TP03-SO-1027	APHC	NS	SW8081A	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW8082	SW3550	8/28/01	8/30/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW8081A	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	M8015D	SW3550	8/30/01	8/31/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	D2216	NONE	NA	8/28/01	III
8/21/01	01-5474-13	YWV-TP04-SO-1028	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	D2216	NONE	NA	8/28/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW8082	SW3550	8/28/01	8/30/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/22/01	01-5474-14	YWV-TP04-SO-1030	APHC	NS	SW8081A	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW8081A	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW8082	SW3550	8/28/01	8/30/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	M8015D	SW3550	8/30/01	8/31/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	D2216	NONE	NA	8/28/01	III

TABLE C-1
SAMPLE IDENTIFICATION CROSS REFERENCE AND DATA REVIEW LEVEL
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Date Collected	*Lab ID*	*Field ID*	*Lab*	*Sample Type*	*Analytical Method*	*Prep Method*	*Date Prepared*	*Date Analyzed*	*Review Level*
8/21/01	01-5474-15	YWV-UG01-SO-1019	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW8082	SW3550	8/28/01	8/30/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW8081A	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	D2216	NONE	NA	8/28/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	M8015D	SW3550	8/30/01	8/31/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	M8015D	SW3550	8/27/01	8/30/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/21/01	01-5474-16	YWV-UG02-SO-1020	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW8082	SW3550	8/28/01	8/30/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW8081A	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	M8015D	SW3550	8/27/01	8/30/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	D2216	NONE	NA	8/28/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	M8015D	SW3550	8/30/01	8/31/01	III
8/21/01	01-5474-17	YWV-UG03-SO-1021	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/23/01	01-5474-2	YWV-TB-WT-1036	APHC	TB	SW8260B	SW5030	8/30/01	8/30/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	D2216	NONE	NA	8/28/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW8081A	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW8082	SW3550	8/28/01	8/29/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW8270C	SW3550	8/27/01	9/5/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW8310	SW3550	8/28/01	8/31/01	III
8/21/01	01-5474-3	YWV-DG01-SO-1022	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	D2216	NONE	NA	8/28/01	III

TABLE C-1
SAMPLE IDENTIFICATION CROSS REFERENCE AND DATA REVIEW LEVEL
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Date Collected	*Lab ID*	*Field ID*	*Lab*	*Sample Type*	*Analytical Method*	*Prep Method*	*Date Prepared*	*Date Analyzed*	*Review Level*
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW8270C	SW3550	8/27/01	9/5/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW8082	SW3550	8/28/01	8/29/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW8081A	SW3550	8/27/01	8/28/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/21/01	01-5474-4	YWV-DG02-SO-1023	APHC	NS	SW8310	SW3550	8/28/01	8/31/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW8270C	SW3550	8/27/01	9/5/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW8081A	SW3550	8/27/01	8/28/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW8310	SW3550	8/28/01	8/31/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW8082	SW3550	8/28/01	8/29/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	D2216	NONE	NA	8/28/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/21/01	01-5474-5	YWV-DG03-SO-1024	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW8082	SW3550	8/28/01	8/29/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	D2216	NONE	NA	8/28/01	III
8/22/01	01-5474-6	YWV-TP01-SO-1033	APHC	NS	SW8081A	SW3550	8/27/01	8/28/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW8310	SW3550	8/28/01	9/1/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW9040B	NONE	NA	8/27/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW8081A	SW3550	8/27/01	8/28/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW8270C	SW3550	8/27/01	9/6/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	D2216	NONE	NA	8/28/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW8260B	SW5030	8/27/01	8/27/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW8082	SW3550	8/28/01	8/29/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW7196A	NONE	NA	8/28/01	III

TABLE C-1
SAMPLE IDENTIFICATION CROSS REFERENCE AND DATA REVIEW LEVEL
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Date Collected	*Lab ID*	*Field ID*	*Lab*	*Sample Type*	*Analytical Method*	*Prep Method*	*Date Prepared*	*Date Analyzed*	*Review Level*
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW6010B	SW3050	8/27/01	8/27/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	M8015D	SW3550	8/27/01	8/29/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	M8015D	SW3550	8/30/01	8/30/01	III
8/22/01	01-5474-7	YWV-TP01-SO-1034	APHC	FD	SW7471A	SW3050	8/28/01	8/28/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW8082	SW3550	8/28/01	8/29/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW8081A	SW3550	8/27/01	8/28/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	D2216	NONE	NA	8/28/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/22/01	01-5474-8	YWV-TP02-SO-1031	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW6010B	SW3050	8/27/01	8/27/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW9040B	NONE	NA	8/27/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW8310	SW3550	8/28/01	9/1/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW8270C	SW3550	8/27/01	9/6/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW8260B	SW5030	8/27/01	8/27/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW8082	SW3550	8/28/01	8/29/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW8081A	SW3550	8/27/01	8/28/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW7196A	NONE	NA	8/28/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	M8015D	SW3550	8/30/01	8/30/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	M8015D	SW3550	8/27/01	8/29/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	D2216	NONE	NA	8/28/01	III
8/22/01	01-5474-9	YWV-TP02-SO-1032	APHC	NS	SW7471A	SW3050	8/28/01	8/28/01	III
8/21/01	G1H28015100	YWV-TP03-SO-1025	SVLS	NS	SW8290	METHOD	8/28/01	8/29/01	III
8/22/01	G1H28015100	YWV-TP04-SO-1029	SVLS	NS	SW8290	METHOD	8/28/01	8/31/01	III
8/21/01	G1I19024400	YWV-UG03-SO-1021	SVLS	NS	SW8290	METHOD	9/21/01	9/25/01	III
8/22/01	G1I19024400	YWV-TP02-SO-1031	SVLS	NS	SW8290	METHOD	9/21/01	9/25/01	III

Notes

III = EPA Level III - Data Review *NS = Normal Sample* *AB = Ambient Blank* *TB = Trip Blank* *NA = Not Applicable*
IV = EPA Level IV - Data Validation *FD = Field Duplicate* *EB = Equipment Blank* *SB = Source Blank*

APCL

Applied Physics & Chemistry Laboratory

13760 Magnolia Ave. Chino CA 91710

Tel. (909) 590-1828 Fax (909) 590-1498

received 9/11/01

September 6, 2001

The IT Group
Attention : Susan Huang
4005 Port Chicago Highway
Concord, CA 94520-1120

Dear Susan,

This package contains samples in our Service ID 01-5321 and your project: 870508 National Park Service. Enclosed please find:

(1) Original report.
(2) Original Chain of Custody.
(3) One original and one copy of Standard Data Package Deliverable.

If anything is missing or you have any questions, please feel free to contact me.

Respectfully submitted,

Kevin Xie, Ph.D.,
QA/QC Director
Applied P & Ch Laboratory

Applied P & Ch Laboratory

13760 Magnolia Ave. Chino CA 91710

Tel: (909) 590-1828 Fax: (909) 590-1498

Case Narrative

Project: National Park Service/870508

For The IT Group

APCL Service No: 01-5321

1. Sample Identification

The sample identifications are listed in the following table:

The IT Group Sample ID	APCL Sample ID
YWM-MB-WH-1018	01-05321-2
YWB-TB-WT-1017	01-05321-1

2. Analytical Methodology

Samples are analyzed by EPA methods

- SW8260B (Volatile organics),
- M8015V (Gasoline),
- M8015D (TPH: Diesel),
- M8015D (TPH: Motor Oil),
- SW8310 (Polynuclear Aromatic HC (PAH)),
- SW8081A (Organochlorine pesticides),
- SW8082 (PCBs),
- 7196A (Chromium (VI)),
- SW6010B (TTLC 17 Metals),
- SW8270C (Semi-VOC, 64 Compounds),

3. Holding Time

All samples were extracted, digested and analyzed within the holding times defined by the appropriate EPA methods of the analyses.

4. Preservation

All samples were preserved and stored according to the appropriate EPA methods.

5. Tele-log

None.

6. Anomaly

None.

See amended case narrative H2OB/35 Env.

"I certify that these data are technically accurate, complete, and in compliance with the terms and conditions of the contract, for other than the conditions detailed above. Release of the data contained in the hardcopy data package and its electronic data deliverable submitted on diskette had been authorized by the Laboratory Manager or her/his designee, as verified by the following signature."

Respectfully submitted,

Kevin Xie, Ph.D.,
QA/QC Director
Applied P & Ch Laboratory

Applied P & Ch Laboratory
13760 Magnolia Ave., Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

Sample Receiving Checklist

APCL ServiceID: **5321** Client Name/Project: IT@NPS Yosemite

1. Sample Arrival

Date/Time Received 8/17/01 930 Date/Time Opened 8/17/01 1000 By (name): MK

Custody Transfer: ☐ Client ☐ Golden State ☐ UPS ☐ US Mail ☒ FedEx ☐ APCL Empl: ____

2. Chain-of-Custody (CoC)

☒ With Samples? ☐ Faxed? ☒ Client has Copy? ☒ Signed, dated? By: ____

☒ Project ID? ☒ Analyses Clear? ☐ Hold Samples? #on Hold ____ # Received ____

☒ CoC/Docs Zip-Locked under lid? ☐ Compos.#: __ ☒ #Samples OK?

☐ Discrepancies? ☐ Client notified? ☐ Response (attach docs): ____

3. Shipping Container/Cooler

☒ Cooler Used? # of 2 Cooled by: ☒ Ice ☐ Blue Ice ☐ Dry Ice ☐ None

Temp °C ____

(Cooler temperature measured from temp blank if present, otherwise measured from the cooler).

Cooler Custody Seal? ☐ Absent ☐ Intact ☐ Tampered?

4. Sample Preservation

This portion can be removed for Recipient's records.

Date 8-16-01 FedEx Tracking Number 829195995145

☐ pH <2 ☐ pH >12

If Not, pH = ____ Preserved by: ☐

Sender's Name Mike Brown Phone 925 288-9898

5321

5. Holding-time Requirements

Company IT CORPORATION/CRC

☐ pH 24hr ☐ BACT 6/24hr ☐ C

☐ Cl_2 ASAP ☐ Turbidity 48hr ☐ DO

Address 4005 PORT CHICAGO HWY Dept/Floor/Suite/Room

☐ HT Expired? ☐ Client notified?

CONCORD State CA ZIP 94520

6. Sample Container Condition

Your Internal Billing Reference 870508.02120300

☒ Intact? ☐ Broken? ☐ Documented? Number: ____

Type: ☒ plastic ☒ glass ☐ Tube: brass/SS ☐ Tedlar Bag

☒ Quantity OK? ☐ Leaking? ☐ Anomaly?

☒ Caps tight? ☐ Air Bubbles? ☐ Anomaly?

Labels: ☒ Unique ID? ☒ Date/Time ☐ Preserved?

7. Turn Around Time

☒ RUSH TAT: 5day ☐ Std (7-10 days) ☐ Not Marked

8. Sample Matrix

☐ Drinking H_2O ☒ Other Liq ☐ Soil ☐ Wipe ☐ Polymer ☐ Air ☐ Other: ____

☐ Ground H_2O ☐ Sludge ☐ Filter ☐ Oil/Petro ☐ Paint ☐ W. Water ☐ Extract ☐ Unknown

9. Pre-Login Check List Completed & OK?

☒ ALL OK? (if not, attach docs) ☐ Client Contact? (Name: ____)Date/Time: ____

Received/Checked by: MK Date: 17 Aug 2001 Time: 7:32a.m.

*HT: Samples must be analyzed for results to reflect total concentrations. Results generated outside required of holding times are considered minimal values and may be used to define waste as hazardous but not as non-hazardous.

DocumentFile: [acal.texfiles]smprcl.tex.

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

Sample Login: Check List

01-05321 (1194_ 467) (4196000_ 467)

08/17/01

Part 1: General Information

☐	Company Information	Name:	*The IT Group*
		Address:	*4005 Port Chicago Highway ,Concord ,CA 94520-1120*
☐	Project Information	Project Description:	*National Park Service*
		Project #:	*870508*
☐	Billing Information	P.O. #:	*0802-SC-0131*
		Bill Address:	*4005 Port Chicago Highway ,Concord ,CA 94520-1120*
		Lab Project ID:	*1999_0968*
		Client Database #:	*04*
☐	Receiving Information	Who Received Sample?	*Mark*
		Receiving Date/Time:	*08/17/01 1020*
		COC No.	
☐	Shipping Information	Shipping Company	*Express*
		Packing Information:	*Cooler/Ice Chester*
		Cooler Temperature:	*4.0 4.0 °C*
☐	Container Information	Container Provider:	*Client*
☐	Sampling Information	Sampling Person:	
		Sampling Company:	*Client*
☐	Turn-Around-Time Option:		*Rush 5 working day(s)*
☐	QC Option:		*NEESA C*
☐	Disposal Option:		*Not specify*

Part 2: Sample Information

Seq. #	Sample ID (on COC)	Sample Sub-ID	APCL Sample ID	Matrix	Container	Preservative	Vol, ml Am. g	# of Replica	Condition G, L, B	Collected mmddyy	Hold ?	Composite Group	TAT Days	
1	YWM-MB-WH-1018	VOA	01-05321-2-α	W	V	C	40	6	G	081601	N	0	7	☐
	YWM-MB-WH-1018	8270	01-05321-2-β	W	G		1000	2	G	081601	N	0	7	☐
	YWM-MB-WH-1018	8310	01-05321-2-γ	W	G		1000	2	G	081601	N	0	7	☐
	YWM-MB-WH-1018	8015	01-05321-2-δ	W	G		1000	2	G	081601	N	0	7	☐
	YWM-MB-WH-1018	8081	01-05321-2-ζ	W	G		1000	2	G	081601	N	0	7	☐
	YWM-MB-WH-1018	8082	01-05321-2-η	W	G		1000	2	G	081601	N	0	7	☐
	YWM-MB-WH-1018	Metal	01-05321-2-θ	W	P	N	500	1	G	081601	N	0	7	☐
	YWM-MB-WH-1018	CR VI	01-05321-2-ι	W	P		500	1	G	081601	N	0	7	☐
2	YWB-TB-WT-1017	VOA	01-05321-1	W	V	C	40	6	G	081601	N	0	7	☐

Part 3: Analysis Information

Test Items:

- ☑ *8260* Volatile organics
- ☑ *M8015V/M8015G* Gasoline
- ☑ *M8015E/M8015D* TPH: Diesel
- ☑ *M8015E/M8015M* TPH: Motor Oil
- ☑ *8310* Polynuclear Aromatic HC (PAH)
- ☑ *8081* Organochlorine pesticides
- ☐ *8141* Organo-phosphorus
- ☑ *8082* PCBs
- ☐ *9040/150.1* pH
- ☐ *ASTM-D2216* Moisture, percent in soil
- ☐ *M8015E/M8015D* TPH: Diesel, Motor Oil, JP-5
- ☑ *7196* Chromium (VI)
- ☑ *6010/various* TTLC 17 Metals
- ☑ *200.7/6010* Iron, Fe, by ICP
- ☐ *8021B* BTXE + MTBE
- ☐ *SW§7.3.3* Reactivity: Cyanide
- ☐ *SW§7.3.4* Reactivity: Sulfide
- ☐ *1010* Ignitability (Flashpoint)
- ☐ *9040B/150.1* Corrosivity (pH)
- ☑ *8270C* Semi-VOC, 64 Compounds

Seq. #	Client"s Sample ID (as given on COC)	Sample Sub-ID	APCL Sample ID	Matrix	8260	TPH	TPH	TPH	8310	8081	8141	8082

uploaded 11/01/01

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Submitted to:
The IT Group
Attention: Susan Huang
4005 Port Chicago Highway
Concord CA 94520-1120
Tel: (925)288-9898 Fax: (925)288-0888

Service ID #: 801-015321 Received: 08/17/01
Collected by: M. Brown/J. Strach Extracted: 08/20-21/01
Collected on: 08/16/01 Tested: 08/17-28/01
Reported: 08/29/01
Sample Description: Water from Waste Arc. Area
Project Description: 870508 National Park Service

Analysis of Water Samples

Component Analyzed	Method	Unit	PQL	Analysis Result YW~~M~~-MB-WH-1018 01-05321-2
CHROMIUM (VI)	7196A	μg/L	10	<10
METALS				
Dilution Factor				1
ANTIMONY	SW6010B	μg/L	5	<5
ARSENIC	SW6010B	μg/L	5	<5
BARIUM	SW6010B	μg/L	10	<10
BERYLLIUM	SW6010B	μg/L	3	<3
CADMIUM	SW6010B	μg/L	1	<1
CHROMIUM	SW6010B	μg/L	5	0.95J
COBALT	SW6010B	μg/L	4	<4
COPPER	SW6010B	μg/L	10	<10
IRON	SW6010B	μg/L	50	18.4J
LEAD	SW6010B	μg/L	10	1.9J
MERCURY	SW7470A	μg/L	0.2	0.52
MOLYBDENUM	SW6010B	μg/L	5	<5
NICKEL	SW6010B	μg/L	5	1.2J
SELENIUM	SW6010B	μg/L	5	2.1J
SILVER	SW6010B	μg/L	5	<5
THALLIUM	SW6010B	μg/L	2	<2
VANADIUM	SW6010B	μg/L	4	<4
ZINC	SW6010B	μg/L	20	9.8J
WITH SILICA GEL CLEAN UP				
Dilution Factor				1
DIESEL	SW8015B	mg/L	0.05	<0.05
Dilution Factor				1
MOTOR OILS	SW8015B	mg/L	0.5	<0.5
WITHOUT SILICA GEL CLEAN UP				
Dilution Factor				1
DIESEL	SW8015B	mg/L	0.05	0.03J
Dilution Factor				1
MOTOR OILS	SW8015B	mg/L	0.5	<0.5

~~MW~~/35 ENV 10/25/01

Applied P & Ch Laboratory
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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWM-MB-WH-1018 01-05321-2
SEMI-VOC, 64 COMPOUNDS				
Dilution Factor				1
ACENAPHTHENE	SW8270C	μg/L	10	<10
ACENAPHTHYLENE	SW8270C	μg/L	10	<10
ANTHRACENE	SW8270C	μg/L	10	<10
BENZOIC ACID	SW8270C	μg/L	10	<10
BENZYL ALCOHOL	SW8270C	μg/L	10	<10
BENZO(A)ANTHRACENE	SW8270C	μg/L	10	<10
BENZO(A)PYRENE	SW8270C	μg/L	10	<10
BENZO(B)FLUORANTHENE	SW8270C	μg/L	10	<10
BENZO(G,H,I)PERYLENE	SW8270C	μg/L	10	<10
BENZO(K)FLUORANTHENE	SW8270C	μg/L	10	<10
BIS(2-CHLOROETHOXY) METHANE	SW8270C	μg/L	10	<10
BIS(2-CHLOROETHYL) ETHER	SW8270C	μg/L	10	<10
2,2'-OXYBIS(1-CHLOROPROPANE)	SW8270C	μg/L	10	<10
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	μg/L	10	<10
4-BROMOPHENYL PHENYL ETHER	SW8270C	μg/L	10	<10
BENZYL BUTYL PHTHALATE	SW8270C	μg/L	10	<10
4-CHLORO-3-METHYLPHENOL	SW8270C	μg/L	10	<10
4-CHLOROANILINE	SW8270C	μg/L	17 [a]	<17
2-CHLORONAPHTHALENE	SW8270C	μg/L	10	<10
2-CHLOROPHENOL	SW8270C	μg/L	10	<10
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/L	10	<10
CHRYSENE	SW8270C	μg/L	10	<10
DI-N-BUTYL PHTHALATE	SW8270C	μg/L	10	<10
DI-N-OCTYLPHTHALATE	SW8270C	μg/L	10	<10
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/L	10	<10
DIBENZOFURAN	SW8270C	μg/L	10	<10
1,2-DICHLOROBENZENE	SW8270C	μg/L	10	<10
1,3-DICHLOROBENZENE	SW8270C	μg/L	10	<10
1,4-DICHLOROBENZENE	SW8270C	μg/L	10	<10
3,3'-DICHLOROBENZIDINE	SW8270C	μg/L	20	<20
2,4-DICHLOROPHENOL	SW8270C	μg/L	10	<10
DIETHYL PHTHALATE	SW8270C	μg/L	10	<10
DIMETHYL PHTHALATE	SW8270C	μg/L	10	<10
2,4-DIMETHYLPHENOL	SW8270C	μg/L	10	<10
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/L	50	<50
2,4-DINITROPHENOL	SW8270C	μg/L	50	<50
2,4-DINITROTOLUENE	SW8270C	μg/L	10	<10
2,6-DINITROTOLUENE	SW8270C	μg/L	10	<10
FLUORANTHENE	SW8270C	μg/L	10	<10
FLUORENE	SW8270C	μg/L	10	<10
HEXACHLOROBENZENE	SW8270C	μg/L	10	<10
HEXACHLOROBUTADIENE	SW8270C	μg/L	10	<10
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/L	50	<50

HDB/3J Env 10/25/01

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWM-MB-WH-1018 01-05321-2
HEXACHLOROETHANE	SW8270C	μg/L	10	<10
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/L	10	<10
ISOPHORONE	SW8270C	μg/L	10	<10
2-METHYLNAPHTHALENE	SW8270C	μg/L	10	<10
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/L	10	<10
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/L	10	<10
NAPHTHALENE	SW8270C	μg/L	10	<10
2-NITROANILINE	SW8270C	μg/L	50	<50
3-NITROANILINE	SW8270C	μg/L	50	<50
4-NITROANILINE	SW8270C	μg/L	50	<50
NITROBENZENE	SW8270C	μg/L	10	<10
2-NITROPHENOL	SW8270C	μg/L	10	<10
4-NITROPHENOL	SW8270C	μg/L	50	<50
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/L	10	<10
N-NITROSODIPHENYLAMINE	SW8270C	μg/L	10	<10
PENTACHLOROPHENOL	SW8270C	μg/L	50	<50
PHENANTHRENE	SW8270C	μg/L	10	<10
PHENOL	SW8270C	μg/L	10	<10
PYRENE	SW8270C	μg/L	10	<10
1,2,4-TRICHLOROBENZENE	SW8270C	μg/L	10	<10
2,4,5-TRICHLOROPHENOL	SW8270C	μg/L	10	<10
2,4,6-TRICHLOROPHENOL	SW8270C	μg/L	10	<10
ORGANOCHLORINE PESTICIDES				
Dilution Factor				1
ALDRIN	SW8081A	μg/L	0.05	<0.05
BETA BHC	SW8081A	μg/L	0.05	<0.05
ALPHA BHC	SW8081A	μg/L	0.05	<0.05
DELTA BHC	SW8081A	μg/L	0.05	<0.05
GAMMA BHC (LINDANE)	SW8081A	μg/L	0.05	<0.05
ALPHA-CHLORDANE	SW8081A	μg/L	0.05	<0.05
GAMMA-CHLORDANE	SW8081A	μg/L	0.05	<0.05
P,P'-DDD	SW8081A	μg/L	0.1	<0.1
P,P'-DDE	SW8081A	μg/L	0.1	<0.1
P,P'-DDT	SW8081A	μg/L	0.1	<0.1
DIELDRIN	SW8081A	μg/L	0.1	<0.1
ALPHA ENDOSULFAN	SW8081A	μg/L	0.05	<0.05
BETA ENDOSULFAN	SW8081A	μg/L	0.1	<0.1
ENDOSULFAN SULFATE	SW8081A	μg/L	0.1	<0.1
ENDRIN	SW8081A	μg/L	0.1	<0.1
ENDRIN ALDEHYDE	SW8081A	μg/L	0.1	<0.1
ENDRIN KETONE	SW8081A	μg/L	0.1	<0.1
HEPTACHLOR	SW8081A	μg/L	0.05	<0.05
HEPTACHLOR EPOXIDE	SW8081A	μg/L	0.05	<0.05
METHOXYCHLOR	SW8081A	μg/L	2	<2
TOXAPHENE	SW8081A	μg/L	5	<5

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWM-MB-WH-1018 01-05321-2
PCBS				
Dilution Factor				1
PCB-1016 (AROCHLOR 1016)	SW8082	μg/L	1	<1
PCB-1221 (AROCHLOR 1221)	SW8082	μg/L	1	<1
PCB-1232 (AROCHLOR 1232)	SW8082	μg/L	1	<1
PCB-1242 (AROCHLOR 1242)	SW8082	μg/L	1	<1
PCB-1248 (AROCHLOR 1248)	SW8082	μg/L	1	<1
PCB-1254 (AROCHLOR 1254)	SW8082	μg/L	1	<1
PCB-1260 (AROCHLOR 1260)	SW8082	μg/L	1	<1
POLYNUCLEAR AROMATIC HC (PAH)				
Dilution Factor				1
ACENAPHTHENE	SW8310	μg/L	5	<5
ACENAPHTHYLENE	SW8310	μg/L	2	<2
ANTHRACENE	SW8310	μg/L	0.2	<0.2
BENZO(A)ANTHRACENE	SW8310	μg/L	0.2	<0.2
BENZO(A)PYRENE	SW8310	μg/L	0.2	<0.2
BENZO(B)FLUORANTHENE	SW8310	μg/L	0.2	<0.2
BENZO(G,H,I)PERYLENE	SW8310	μg/L	0.2	<0.2
BENZO(K)FLUORANTHENE	SW8310	μg/L	0.2	<0.2
CHRYSENE	SW8310	μg/L	0.2	<0.2
DIBENZ(A,H)ANTHRACENE	SW8310	μg/L	0.5	<0.5
FLUORANTHENE	SW8310	μg/L	0.2	<0.2
FLUORENE	SW8310	μg/L	1	<1
INDENO(1,2,3-C,D)PYRENE	SW8310	μg/L	0.2	<0.2
2-METHYLNAPHTHALENE	SW8310	μg/L	5	<5
NAPHTHALENE	SW8310	μg/L	5	<5
PHENANTHRENE	SW8310	μg/L	1	<1
PYRENE	SW8310	μg/L	0.2	<0.2

Component Analyzed	Method	Unit	PQL	Analysis Result YWB-TB-WT-1017 01-05321-1	Analysis Result YWM-MB-WH-1018 01-05321-2
Dilution Factor				1	1
GASOLINE	SW8015B	mg/L	0.05	0.009J	0.02J

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWB-TB-WT-1017 01-05321-1	YWM-MB-WH-1018 01-05321-2
VOLATILE ORGANICS					
Dilution Factor				1	1
ACETONE	SW8260B	μg/L	10	<10	<10
BENZENE	SW8260B	μg/L	0.5	<0.5	<0.5
BROMODICHLOROMETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
BROMOFORM	SW8260B	μg/L	0.5	<0.5	<0.5
BROMOMETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
2-BUTANONE	SW8260B	μg/L	10	<10	<10
CARBON DISULFIDE	SW8260B	μg/L	1	<1	<1
CARBON TETRACHLORIDE	SW8260B	μg/L	0.5	<0.5	<0.5
CHLOROBENZENE	SW8260B	μg/L	0.5	<0.5	<0.5
DIBROMOCHLOROMETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
CHLOROETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
CHLOROFORM	SW8260B	μg/L	0.5	<0.5	<0.5
CHLOROMETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
1,2-DICHLOROBENZENE	SW8260B	μg/L	0.5	<0.5	<0.5
1,3-DICHLOROBENZENE	SW8260B	μg/L	0.5	<0.5	<0.5
1,4-DICHLOROBENZENE	SW8260B	μg/L	0.5	<0.5	<0.5
DICHLORODIFLUOROMETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
1,1-DICHLOROETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
1,2-DICHLOROETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
1,1-DICHLOROETHENE	SW8260B	μg/L	0.5	<0.5	<0.5
CIS-1,2-DICHLOROETHENE	SW8260B	μg/L	1	<1	<1
TRANS-1,2-DICHLOROETHENE	SW8260B	μg/L	1	<1	<1
1,2-DICHLOROPROPANE	SW8260B	μg/L	0.5	<0.5	<0.5
CIS-1,3-DICHLOROPROPENE	SW8260B	μg/L	0.5	<0.5	<0.5
TRANS-1,3-DICHLOROPROPENE	SW8260B	μg/L	0.5	<0.5	<0.5
ETHYLBENZENE	SW8260B	μg/L	0.5	<0.5	<0.5
2-HEXANONE	SW8260B	μg/L	1	<1	<1
METHYLENE CHLORIDE	SW8260B	μg/L	5	<5	0.7J
4-METHYL-2-PENTANONE	SW8260B	μg/L	1	<1	<1
METHYL-TERTIARY-BUTYL ETHER	SW8260B	μg/L	1	<1	<1
STYRENE	SW8260B	μg/L	1	<1	<1
1,1,2,2-TETRACHLOROETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
TETRACHLOROETHENE(PCE)	SW8260B	μg/L	0.5	<0.5	<0.5
TOLUENE	SW8260B	μg/L	0.5	<0.5	0.5
1,1,1-TRICHLOROETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
1,1,2-TRICHLOROETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
TRICHLOROETHENE	SW8260B	μg/L	0.5	<0.5	<0.5
1,1,2-TRICHLOROTRIFLUOROETHANE	SW8260B	μg/L	1	<1	<1
VINYL ACETATE	SW8260B	μg/L	10	<10	<10

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWB-TB-WT-1017 01-05321-1	YWM-MB-WH-1018 01-05321-2
VINYL CHLORIDE	SW8260B	$\mu g/L$	0.5	<0.5	<0.5
O-XYLENE	SW8260B	$\mu g/L$	0.5	<0.5	<0.5
M,P-XYLENE	SW8260B	$\mu g/L$	0.5	<0.5	<0.5

PQL: Practical Quantitation Limit. MDL: Method Detection Limit. CRDL: Contract Required Detection Limit

N.D.: Not Detected or less than the practical quantitation limit. "-": Analysis is not required.

J: Reported between PQL and MDL.

Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0

[a] MDL reported.

Respectfully submitted,

Dominic Lau
Laboratory Director
Applied P & Ch Laboratory

IT CORPORATION

Chain Of Custody

PROJ NO.	PROJECT NAME
870508	NATIONAL PARK SERVICE = Waste Accumulation Area

IT Corp Contact (Name and Phone Number) Susan Huang - (925) 288-2099

NAME OF SAMPLER: M. Brown / J Strack

Cooler Temperature: 4 °C

NPS 10:
- ✓ Vogelsang ... 870508.01120120
- __ Baseline ... 870508.02122120
- __ Mather ... 870508.02103120
- __ Camp Six ... TBD
- __ El Capitan ... TBD
- __ Cascade ... TBD

COC #: 186
Cooler: 2 of 2
Lab: APCL
Ship Date: 8-16-01
FedEx No:

Location ID	Sample DATE (mmddyy)	Sample TIME	VOCs (SW8260B)	SVOCs (SW8270C)	PAHs (SW8310)	TPH -D/MO (SW8015B) w/wo silica gel cleanup	OCP (Pesticides) (SW8081A)	PCBs (SW8082)	Metals (SW5010B/SW7470A/SW7471A)	Hexavalent Chromium (SW7196A)	Dioxins/Furans (SW8290)	Other TPH-gasoline	MATRIX	Comments
		Aqueous Sample	3 x 40mL V	2x1L A	2x1L A	2x1L A	2x1L A	2x1L A	1x500mL PE	1x500mL PE	2x1L A	3x40mlV	A=Aqueous	
		Aqueous Preservative	HCl	ice	ice	ice	ice	ice	HNO3	ice	ice	HCl		
		Solid Sample	3 x EnCore	1 x [2"x6"] stainless steel sleeve							1 x [2"x6"]		S=Solid	
		Soil Preservative	ice	ice	ice	ice	ice	ice	ice	ice	ice			
Temperature Blank													A	One 40 mL in each cooler
YWA-MB-WH-1018	081601	1700	✓	✓	✓	✓	✓	✓	✓	✓		✓	A	
YWB-TB-WT-1017	081601	1710	✓									✓	A	
last line MB 8/16														
ADB/SS ENV 10/25/01														

5321

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
M Brown / IT to FedEx	8-16-01/1800	FEDEX	FEDEX	8/17/01 1020	Mark [illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

IT CORPORATION — Chain Of Custody

PROJ NO. 870508

PROJECT NAME: NATIONAL PARK SERVICE = Waste Accumulation Area

IT Corp Contact (Name and Phone Number): Susan Huang - (925) 288-2099

NAME OF SAMPLER: M. Brown / J. Strack

Cooler Temperature: 4 °C

NPS 10:
- ✓ Vogelsang ... 870508.01120120
- __ Baseline ... 870508.02122120
- __ Mather ... 870508.02103120
- __ Camp Six ... TBD
- __ El Capitan ... TBD
- __ Cascade ... TBD

COC #: 186
Cooler: 1 of 2
Lab: APCL
Ship Date: 8-16-01
FedEx No: 8291 9599 5145

Location ID	Sample DATE (mmddyy)	Sample TIME	VOCs (SW8260B)	SVOCs (SW8270C)	PAHs (SW8310)	TPH -D/MO (SW8015B) w/wo silica gel cleanup	OCP (Pesticides) (SW8081A)	PCBs (SW8082)	Metals (SW5010B/SW7470A/SW7471A)	Hexavalent Chromium (SW7196A)	Dioxins/Furans (SW8290)	Other TPH-gasoline	MATRIX	Comments
		Aqueous Sample	3 x 40mL V	2x1L A	2x1L A	2x1L A	2x1L A	2x1L A	1x500mL PE	1x500mL PE	2x1L A	3x40mL V	A=Aqueous	
		Aqueous Preservative	HCl	ice	ice	ice	ice	ice	HNO3	ice	ice	HCl		
		Solid Sample	3 x EnCore	1 x [2"x6"] stainless steel sleeve							1 x [2"x6"]		S=Solid	
		Soil Preservative	ice	ice	ice	ice	ice	ice	ice	ice	ice			
Temperature Blank													A	One 40 mL in each cooler
YWM-MB-WH-1018	081601	1700	✓	✓	✓	✓	✓	✓	✓	✓		✓	A	
YWB-TB-WT-1017	081601	1710	✓									✓	A	
last line MB 8/16														

5321

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
M Brown / IT to FedEx	8-16-01/1800	FEDEX	FEDEX	8/17/01/1020	[signature]

rec'd 11/1/01
HAB/ESJ Env.

AMENDED

01-5321

10/30/2001

(1 Reanalysis)

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

Case Narrative (Reanalysis)

Project: National Park Service/870508

For The IT Group

APCL Service No: 01-5321

1. Sample Identification

The sample identifications are listed in the following table:

The IT Group Sample ID	APCL Sample ID
YWM-MB-WH-1018	01-05321-2
YWB-TB-WT-1017	01-05321-1

2. Analytical Methodology

Samples are analyzed by EPA methods

SW8260B (Volatile organics),
M8015V (Gasoline),
M8015D (TPH: Diesel),
M8015D (TPH: Motor Oil),
SW8310 (Polynuclear Aromatic HC (PAH)),
SW8081A (Organochlorine pesticides),
SW8082 (PCBs),
7196A (Chromium (VI)),
SW6010B/7470A (TTLC 17 Metals),
SW8270C (Semi-VOC, 64 Compounds),

3. Holding Time

All samples were extracted, digested and analyzed within the holding times defined by the appropriate EPA methods of the analyses.

Holding time was exceeded for Mercury re-analysis.

4. Preservation

All samples were preserved and stored according to the appropriate EPA methods.

5. Tele-log

The e-mail from Vicky Taylor requesting confirmation of Mercury result.

6. Anomaly

(1) SW7470A:

The result of 0.52 μg/L for Mercury in the sample YWM-MB-WH-1018 was obtained from the old CV analyzer. APCL replaced the old instrument with a new one from Perkin Elmer in early September. The sample was re-analyzed per Client's request on 01/30/01 with Mercury found to be < 0.2 μg/L. However, the re-analysis was performed 47 days outside of holding time. Result from re-analysis has been reported in this data package.

"I certify that these data are technically accurate, complete, and in compliance with the terms and conditions of the contract, for other than the conditions detailed above. Release of the data contained in the hardcopy data package and its electronic data deliverable submitted on diskette had been authorized by the Laboratory Manager or her/his designee, as verified by the following signature."

Respectfully submitted,

Kevin Xie, Ph.D.,
QA/QC Director
Applied P & Ch Laboratory

Necd 11/01/01 inserted

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Submitted to:
The IT Group
Attention: Susan Huang
4005 Port Chicago Highway
Concord CA 94520-1120
Tel: (925)288-9898 Fax: (925)288-0888

Service ID #: 801-015321 Received: 08/17/01
Collected by: M. Brown/J. Strach Extracted: 08/20-21/01
Collected on: 08/16/01 Tested: 08/17-10/30/01
Revised: 10/30/01
Sample Description: Water from Waste Arc. Area
Project Description: 870508 National Park Service

Analysis of Water Samples

Component Analyzed	Method	Unit	PQL	Analysis Result YWM-MB-WH-1018 01-05321-2
CHROMIUM (VI)	7196A	μg/L	10	<10
METALS				
Dilution Factor				1
ANTIMONY	SW6010B	μg/L	5	<5
ARSENIC	SW6010B	μg/L	5	<5
BARIUM	SW6010B	μg/L	10	<10
BERYLLIUM	SW6010B	μg/L	3	<3
CADMIUM	SW6010B	μg/L	1	<1
CHROMIUM	SW6010B	μg/L	5	0.95J
COBALT	SW6010B	μg/L	4	<4
COPPER	SW6010B	μg/L	10	<10
IRON	SW6010B	μg/L	50	18.4J
LEAD	SW6010B	μg/L	10	1.9J
MERCURY	SW7470A	μg/L	0.2	<0.2 (b)
MOLYBDENUM	SW6010B	μg/L	5	<5
NICKEL	SW6010B	μg/L	5	1.2J
SELENIUM	SW6010B	μg/L	5	2.1J
SILVER	SW6010B	μg/L	5	<5
THALLIUM	SW6010B	μg/L	2	<2
VANADIUM	SW6010B	μg/L	4	<4
ZINC	SW6010B	μg/L	20	9.8J
WITH SILICA GEL CLEAN UP				
Dilution Factor				1
DIESEL	SW8015B	mg/L	0.05	<0.05
Dilution Factor				1
MOTOR OILS	SW8015B	mg/L	0.5	<0.5
WITHOUT SILICA GEL CLEAN UP				
Dilution Factor				1
DIESEL	SW8015B	mg/L	0.05	0.03J
Dilution Factor				1
MOTOR OILS	SW8015B	mg/L	0.5	<0.5

APCL

Applied Physics & Chemistry Laboratory

13760 Magnolia Ave. Chino CA 91710
Tel. (909) 590-1828 Fax (909) 590-1498

October 4, 2001

Received
10/9/01

The IT Group
Attention: Suman Sharma
4005 Port Chicago Highway
Concord, CA 94520-1120

Dear Suman,

This package contains samples in our Service ID 01-5474 and your project 870508 National Park Service. Enclosed please find:

(1) Original report.
(2) Copy of Chain of Custody.
(3) One Diskette containing EDD Deliverable.
(4) One original and one copy of Level C Data Package Deliverable.

If anything is missing or you have any questions, please feel free to contact me.

Respectfully submitted,

Kevin Xie, Ph.D.,
QA/QC Director
Applied P & Ch Laboratory

Level C Data Package Deliverables

General Information

Project : 870508 National Park Service

APCL Service ID: 01-5474

Applied P & Ch Laboratory
[illegible]
Telephone: [illegible]
[illegible]

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

Case Narrative

Project: National Park Service Waste Accumulation Area/870508

For The IT Group

APCL Service No: 01-5474

1. Sample Identification

The sample identifications are listed in the following table:

The IT Group Sample ID	APCL Sample ID
YWB-EB-WH-1035	01-05474-1
YWB-TB-WT-1036	01-05474-2
YWV-UG01-SO-1019	01-05474-15
YWV-UG02-SO-1020	01-05474-16
YWV-UG03-SO-1021	01-05474-17
YWV-DG01-SO-1022	01-05474-3
YWV-DG02-SO-1023	01-05474-4
YWV-DG03-SO-1024	01-05474-5
YWV-TP03-SO-1025	01-05474-10
YWV-TP03-SO-1026	01-05474-11
YWV-TP03-SO-1027	01-05474-12
YWV-TP04-SO-1028	01-05474-13
YWV-TP04-SO-1030	01-05474-14
YWV-TP02-SO-1031	01-05474-8
YWV-TP02-SO-1032	01-05474-9
YWV-TP01-SO-1033	01-05474-6
YWV-TP01-SO-1034	01-05474-7

2. Analytical Methodology

Samples are analyzed by EPA methods

8260B (Volatile organics),
M8015E/M8015D (TPH: Diesel),
M8015E/M8015M (TPH: Motor Oil),
8310 (Polynuclear Aromatic HC (PAH)),
8081 (Organochlorine pesticides),
8082 (PCBs),
9040/150.1 (pH),
ASTM-D2216 (Moisture, percent in soil),
7196 (Chromium (VI)),
6010B (TTLC 17 Metals),
8270C (Semi-VOC, 64 Compounds),

3. Holding Time

All samples were extracted, digested and analyzed within the holding times defined by the appropriate EPA methods of the analyses.

4. Preservation

All samples were preserved and stored according to the appropriate EPA methods.

5. Tele-log

None

6. Anomaly

(1) SW8082:

Surrogate recoveries in the water method blank were 62% and 54% respectively, within APCL's control limits but lower than 65-135% control limits.

The percent RPDs of the LCS/LCSD for YWB-EB-WH-1035 were 22-23%, slightly higher than 20% control limit. No PCBs were detected in sample YWB-EB-WH-1035.

"I certify that these data are technically accurate, complete, and in compliance with the terms and conditions of the contract, for other than the conditions detailed above. Release of the data contained in the hardcopy data package and its electronic data deliverable submitted on diskette had been authorized by the Laboratory Manager or her/his designee, as verified by the following signature."

Respectfully submitted,

~~Kevin~~ Xie, Ph.D.,
QA/QC Director
Applied P & Ch Laboratory

Applied P & Ch Laboratory
13760 Magnolia Ave., Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

Sample Receiving Checklist

APCL ServiceID: 5474 Client Name/Project: IT @ YOSEMITE VOGELSANG

1. Sample Arrival

Date/Time Received 8/24/01 930 Date/Time Opened 8/24/01 1045 By (name): M

Custody Transfer: ☐ Client ☐ Golden State ☐ UPS ☐ US Mail ☒ FedEx ☐ APCL Empl: ____

2. Chain-of-Custody (CoC)

☒ With Samples? ☐ Faxed? ☒ Client has Copy? ☒ Signed, dated? By: ____
☒ Project ID? ☒ Analyses Clear? ☐ Hold Samples? #on Hold ____ # Received ____
☒ CoC/Docs Zip-Locked under lid? ☐ Compos.#: _ ☒ #Samples OK? ____
☐ Discrepancies? ☐ Client notified? ☐ Response (attach docs): ____

3. Shipping Container/Cooler

☒ Cooler Used? # of 4 Cooled by: ☒ Ice ☐ Blue Ice ☐ Dry Ice ☐ None
Temp °C 2.0°C 1.9° 1.8°C 2.0°

(Cooler temperature measured from temp blank if present, otherwise measured from the cooler).

Cooler Custody Seal? ☐ Absent ☒ Intact ☐ Tampered?

4. Sample Preservation

☐ pH <2 ☐ pH >12
If Not, pH = ____ Preserved by: ☐ Client ☐ APCL ☐ Third Party ____

5. Holding-time Requirements

☐ pH 24hr ☐ BACT 6/24hr ☐ Cr^{VI} 24hr ☐ NO_3^- 48hr ☐ BOD 48hr
☐ Cl_2 ASAP ☐ Turbidity 48hr ☐ DO ASAP ☐ Fe(II) ASAP
☐ HT Expired? ☐ Client notified?

6. Sample Container Condition

☐ Intact? ☐ Broken? ☐ Documented? Number: ____
Type: ☒ plastic ☒ glass ☐ Tube: brass/SS ☐ Tedlar Bag
☒ Quantity OK? ☐ Leaking? ☐ Anomaly?
☒ Caps tight? ☐ Air Bubbles? ☐ Anomaly?
Labels: ☒ Unique ID? ☒ Date/Time ☐ Preserved?

7. Turn Around Time

☒ RUSH TAT: 5 day ☐ Std (7-10 days) ☐ Not Marked

8. Sample Matrix

☐ Drinking H_2O ☒ Other Liq ☒ Soil ☐ Wipe ☐ Polymer ☐ Air ☐ Other: ____
☐ Ground H_2O ☐ Sludge ☐ Filter ☐ Oil/Petro ☐ Paint ☐ W. Water ☐ Extract ☐ Unknown

9. Pre-Login Check List Completed & OK?

☒ ALL OK? (if not, attach docs) ☐ Client Contact? (Name: ____)Date/Time: ____

Received/Checked by: M Date: 24 Aug 2001 Time: 8:15 a.m.

*H Samples must be analyzed for results to reflect total concentrations. Results generated outside required of holding times are considered minimal values and may be used to define waste as hazardous but not as non-hazardous.

DocumentFile: [ocal.texfiles]smpcl.tex.

Applied P & Ch Laboratory
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Tel: (909) 590-1828 Fax: (909) 590-1498

Sample Login: Check List

01-05474 (1194_ 473) (4196000_ 473)

08/24/01

Part 1: General Information

☐ Company Information	Name:	The IT Group
	Address:	4005 Port Chicago Highway ,Concord ,CA 94520-1120
☐ Project Information	Project Description:	National Park Service Waste Accumulation Area
	Project #:	870508
☐ Billing Information	P.O. #:	0802-SC-0131
	Bill Address:	4005 Port Chicago Highway ,Concord ,CA 94520-1120
	Lab Project ID:	1999_0968
	Client Database #:	04
☐ Receiving Information	Who Received Sample?	Mark
	Receiving Date/Time:	08/24/01 0930
	COC No.	
☐ Shipping Information	Shipping Company	Express
	Packing Information:	Cooler/Ice Chester
	Cooler Temperature:	2.0 1.9 1.8 °C
☐ Container Information	Container Provider:	Client
☐ Sampling Information	Sampling Person:	
	Sampling Company:	Client
☐ Turn-Around-Time Option:		Rush 5 working day(s)
☐ QC Option:		NEESA C
☐ Disposal Option:		Not specify

Part 2: Sample Information

Seq. #	Sample ID (on COC)	Sample Sub-ID	APCL Sample ID	Matrix	Container	Preservative	Vol, ml Am, g	# of Replica	Condition G, L, B	Collected mmddyy	Hold ?	Composite Group	TAT Days	
1	YWB-EB-WH-1035	VOA	01-05474-1-α	W	V	C	40	6	G	082301	N	0	5	☐
	YWB-EB-WH-1035	8270	01-05474-1-β	W	G		1000	2	G	082301	N	0	5	☐
	YWB-EB-WH-1035	8310	01-05474-1-γ	W	G		1000	2	G	082301	N	0	5	☐
	YWB-EB-WH-1035	8015	01-05474-1-δ	W	G		1000	2	G	082301	N	0	5	☐
	YWB-EB-WH-1035	8081	01-05474-1-ζ	W	G		1000	2	G	082301	N	0	5	☐
	YWB-EB-WH-1035	8082	01-05474-1-η	W	G		1000	2	G	082301	N	0	5	☐
	YWB-EB-WH-1035	Metal	01-05474-1-θ	W	P	N	500	1	G	082301	N	0	5	☐
	YWB-EB-WH-1035	CR VI	01-05474-1-ι	W	P		500	1	G	082301	N	0	5	☐
2	YWB-TB-WT-1036	VOA	01-05474-2	W	V	C	40	3	G	082301	N	0	5	☐
3	YWV-UG01-SO-1019	Encore	01-05474-15-α	S	P		5	3	G	082101	N	0	5	☐
	YWV-UG01-SO-1019	Sleeve	01-05474-15-β	S	B		250	2	G	082101	N	0	5	☐
4	YWV-UG02-SO-1020	Encore	01-05474-16-α	S	P		5	3	G	082101	N	0	5	☐
	YWV-UG02-SO-1020	Sleeve	01-05474-16-β	S	B		250	2	G	082101	N	0	5	☐
5	YWV-UG03-SO-1021	Encore	01-05474-17-α	S	P		5	3	G	082101	N	0	5	☐
	YWV-UG03-SO-1021	Sleeve	01-05474-17-β	S	B		250	2	G	082101	N	0	5	☐
6	YWV-DG01-SO-1022	Encore	01-05474-3-α	S	P		5	3	G	082101	N	0	5	☐
	YWV-DG01-SO-1022	Sleeve	01-05474-3-β	S	B		250	2	G	082101	N	0	5	☐
7	YWV-DG02-SO-1023	Encore	01-05474-4-α	S	P		5	3	G	082101	N	0	5	☐
	YWV-DG02-SO-1023	Sleeve	01-05474-4-β	S	B		250	2	G	082101	N	0	5	
	YWV-DG03-SO-1024	Encore	01-05474-5-α	S	P		5	3	G	082101	N	0	5	
	YWV-DG03-SO-1024	Sleeve	01-05474-5-β	S	B		250	2	G	082101	N	0	5	☐
9	YWV-TP03-SO-1025	Encore	01-05474-10-α	S	P		5	3	G	082101	N	0	5	☐
	YWV-TP03-SO-1025	Sleeve	01-05474-10-β	S	B		250	2	G	082101	N	0	5	☐
10	YWV-TP03-SO-1026	Encore	01-05474-11-α	S	P		5	3	G	082101	N	0	5	☐
	YWV-TP03-SO-1026	Sleeve	01-05474-11-β	S	B		250	2	G	082101	N	0	5	☐
11	YWV-TP03-SO-1027	Encore	01-05474-12-α	S	P		5	3	G	082101	N	0	5	☐
	YWV-TP03-SO-1027	Sleeve	01-05474-12-β	S	B		250	2	G	082101	N	0	5	☐
12	YWV-TP04-SO-1028	Encore	01-05474-13-α	S	P		5	3	G	082201	N	0	5	☐
	YWV-TP04-SO-1028	Sleeve	01-05474-13-β	S	B		250	2	G	082201	N	0	5	☐
13	YWV-TP04-SO-1030	Encore	01-05474-14-α	S	P		5	9	G	082201	N	0	5	☐
	YWV-TP04-SO-1030	Sleeve	01-05474-14-β	S	B		250	6	G	082201	N	0	5	☐
14	YWV-TP02-SO-1031	Encore	01-05474-8-α	S	P		5	3	G	082201	N	0	5	☐
	YWV-TP02-SO-1031	Sleeve	01-05474-8-β	S	B		250	2	G	082201	N	0	5	☐
15	YWV-TP02-SO-1032	Encore	01-05474-9-α	S	P		5	3	G	082201	N	0	5	☐
	YWV-TP02-SO-1032	Sleeve	01-05474-9-β	S	B		250	2	G	082201	N	0	5	☐
16	YWV-TP01-SO-1033	Encore	01-05474-6-α	S	P		5	3	G	082201	N	0	5	☐
	YWV-TP01-SO-1033	Sleeve	01-05474-6-β	S	B		250	2	G	082201	N	0	5	☐
17	YWV-TP01-SO-1034	Encore	01-05474-7-α	S	P		5	3	G	082201	N	0	5	☐
	YWV-TP01-SO-1034	Sleeve	01-05474-7-β	S	B		250	2	G	082201	N	0	5	☐

Part 3: Analysis Information

Applied P & Ch Laboratory
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APCL Analytical Report

Submitted to:
The IT Group
Attention: Susan Huang
4005 Port Chicago Highway
Concord CA 94520-1120
Tel: (925)288-9898 Fax: (925)288-0888

Service ID #: 801-015474
Collected by: MB/JS
Collected on: 08/21-23/01
Received: 08/24/01
Extracted: 08/24-30/01
Tested: 08/24-09/06/01
Reported: 09/10/01
Sample Description: Water and Soil
Project Description: 870508 National Park Service

Analysis of Water and Soil Samples

I. Analysis of Water Samples

Component Analyzed	Method	Unit	PQL	Analysis Result YWP-EB-WH-1035 01-05474-1
CHROMIUM (VI)	7196A	μg/L	10	<10
METALS				
Dilution Factor				1
ANTIMONY	SW6010B	μg/L	5	4.7J
ARSENIC	SW6010B	μg/L	5	<5
BARIUM	SW6010B	μg/L	10	1.8J
BERYLLIUM	SW6010B	μg/L	3	<3
CADMIUM	SW6010B	μg/L	1	<1
CHROMIUM	SW6010B	μg/L	5	1.3J
COBALT	SW6010B	μg/L	4	<4
COPPER	SW6010B	μg/L	10	2.3J
LEAD	SW6010B	μg/L	10	3.1J
MERCURY	SW7470A	μg/L	0.2	0.15J
MOLYBDENUM	SW6010B	μg/L	5	<5
NICKEL	SW6010B	μg/L	5	<5
SELENIUM	SW6010B	μg/L	5	<5
SILVER	SW6010B	μg/L	5	<5
THALLIUM	SW6010B	μg/L	2	<2
VANADIUM	SW6010B	μg/L	4	<4
ZINC	SW6010B	μg/L	20	22.2
SILICA GEL CLEAN UP.				
Dilution Factor				1
DIESEL	SW8015B	mg/L	0.05	0.1
Dilution Factor				1
MOTOR OILS	SW8015B	mg/L	0.5	0.1J
WITHOUT SILICA GEL CLEAN UP.				
Dilution Factor				1
DIESEL	SW8015B	mg/L	0.05	0.12
Dilution Factor				1
MOTOR OILS	SW8015B	mg/L	0.5	0.1J

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YW~~B~~Y-EB-WH-1035 01-05474-1
SEMI-VOC, 64 COMPOUNDS				
Dilution Factor				1
ACENAPHTHENE	SW8270C	$\mu g/L$	10	<10
ACENAPHTHYLENE	SW8270C	$\mu g/L$	10	<10
ANTHRACENE	SW8270C	$\mu g/L$	10	<10
BENZOIC ACID	SW8270C	$\mu g/L$	36 (a)	<36
BENZYL ALCOHOL	SW8270C	$\mu g/L$	10	<10
BENZO(A)ANTHRACENE	SW8270C	$\mu g/L$	10	<10
BENZO(A)PYRENE	SW8270C	$\mu g/L$	10	<10
BENZO(B)FLUORANTHENE	SW8270C	$\mu g/L$	10	<10
BENZO(G,H,I)PERYLENE	SW8270C	$\mu g/L$	10	<10
BENZO(K)FLUORANTHENE	SW8270C	$\mu g/L$	10	<10
BIS(2-CHLOROETHOXY) METHANE	SW8270C	$\mu g/L$	10	<10
BIS(2-CHLOROETHYL) ETHER	SW8270C	$\mu g/L$	10	<10
2,2'-OXYBIS(1-CHLOROPROPANE)	SW8270C	$\mu g/L$	10	<10
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	$\mu g/L$	10	<10
4-BROMOPHENYL PHENYL ETHER	SW8270C	$\mu g/L$	10	<10
BENZYL BUTYL PHTHALATE	SW8270C	$\mu g/L$	10	<10
4-CHLORO-3-METHYLPHENOL	SW8270C	$\mu g/L$	10	<10
4-CHLOROANILINE	SW8270C	$\mu g/L$	17 (a)	<17
2-CHLORONAPHTHALENE	SW8270C	$\mu g/L$	10	<10
2-CHLOROPHENOL	SW8270C	$\mu g/L$	10	<10
4-CHLOROPHENYL PHENYL ETHER	SW8270C	$\mu g/L$	10	<10
CHRYSENE	SW8270C	$\mu g/L$	10	<10
DI-N-BUTYL PHTHALATE	SW8270C	$\mu g/L$	10	<10
DI-N-OCTYLPHTHALATE	SW8270C	$\mu g/L$	10	<10
DIBENZ(A,H)ANTHRACENE	SW8270C	$\mu g/L$	10	<10
DIBENZOFURAN	SW8270C	$\mu g/L$	10	<10
1,2-DICHLOROBENZENE	SW8270C	$\mu g/L$	10	<10
1,3-DICHLOROBENZENE	SW8270C	$\mu g/L$	10	<10
1,4-DICHLOROBENZENE	SW8270C	$\mu g/L$	10	<10
3,3'-DICHLOROBENZIDINE	SW8270C	$\mu g/L$	20	<20
2,4-DICHLOROPHENOL	SW8270C	$\mu g/L$	10	<10
DIETHYL PHTHALATE	SW8270C	$\mu g/L$	10	<10
DIMETHYL PHTHALATE	SW8270C	$\mu g/L$	10	<10
2,4-DIMETHYLPHENOL	SW8270C	$\mu g/L$	10	<10
4,6-DINITRO-2-METHYLPHENOL	SW8270C	$\mu g/L$	50	<50
2,4-DINITROPHENOL	SW8270C	$\mu g/L$	50	<50
2,4-DINITROTOLUENE	SW8270C	$\mu g/L$	10	<10
2,6-DINITROTOLUENE	SW8270C	$\mu g/L$	10	<10
FLUORANTHENE	SW8270C	$\mu g/L$	10	<10
FLUORENE	SW8270C	$\mu g/L$	10	<10
HEXACHLOROBENZENE	SW8270C	$\mu g/L$	10	<10
HEXACHLOROBUTADIENE	SW8270C	$\mu g/L$	10	<10
HEXACHLOROCYCLOPENTADIENE	SW8270C	$\mu g/L$	50	<50

Applied P & Ch Laboratory

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWB-EB-WH-1035 01-05474-1
HEXACHLOROETHANE	SW8270C	μg/L	10	<10
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/L	10	<10
ISOPHORONE	SW8270C	μg/L	10	<10
2-METHYLNAPHTHALENE	SW8270C	μg/L	10	<10
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/L	10	<10
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/L	10	<10
NAPHTHALENE	SW8270C	μg/L	10	<10
2-NITROANILINE	SW8270C	μg/L	50	<50
3-NITROANILINE	SW8270C	μg/L	50	<50
4-NITROANILINE	SW8270C	μg/L	50	<50
NITROBENZENE	SW8270C	μg/L	10	<10
2-NITROPHENOL	SW8270C	μg/L	10	<10
4-NITROPHENOL	SW8270C	μg/L	50	<50
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/L	10	<10
N-NITROSODIPHENYLAMINE	SW8270C	μg/L	10	<10
PENTACHLOROPHENOL	SW8270C	μg/L	50	<50
PHENANTHRENE	SW8270C	μg/L	10	<10
PHENOL	SW8270C	μg/L	10	<10
PYRENE	SW8270C	μg/L	10	<10
1,2,4-TRICHLOROBENZENE	SW8270C	μg/L	10	<10
2,4,5-TRICHLOROPHENOL	SW8270C	μg/L	10	<10
2,4,6-TRICHLOROPHENOL	SW8270C	μg/L	10	<10
ORGANOCHLORINE PESTICIDES				
Dilution Factor				1
ALDRIN	SW8081A	μg/L	0.05	<0.05
BETA BHC	SW8081A	μg/L	0.05	<0.05
ALPHA BHC	SW8081A	μg/L	0.05	<0.05
DELTA BHC	SW8081A	μg/L	0.05	<0.05
GAMMA BHC (LINDANE)	SW8081A	μg/L	0.05	<0.05
ALPHA-CHLORDANE	SW8081A	μg/L	0.05	<0.05
GAMMA-CHLORDANE	SW8081A	μg/L	0.05	<0.05
P,P'-DDD	SW8081A	μg/L	0.1	<0.1
P,P'-DDE	SW8081A	μg/L	0.1	<0.1
P,P'-DDT	SW8081A	μg/L	0.1	<0.1
DIELDRIN	SW8081A	μg/L	0.1	<0.1
ALPHA ENDOSULFAN	SW8081A	μg/L	0.05	<0.05
BETA ENDOSULFAN	SW8081A	μg/L	0.1	<0.1
ENDOSULFAN SULFATE	SW8081A	μg/L	0.1	<0.1
ENDRIN	SW8081A	μg/L	0.1	<0.1
ENDRIN ALDEHYDE	SW8081A	μg/L	0.1	<0.1
ENDRIN KETONE	SW8081A	μg/L	0.1	<0.1
HEPTACHLOR	SW8081A	μg/L	0.05	<0.05
HEPTACHLOR EPOXIDE	SW8081A	μg/L	0.05	<0.05
METHOXYCHLOR	SW8081A	μg/L	2	<2
TOXAPHENE	SW8081A	μg/L	5	<5

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWB-EB-WH-1035 01-05474-1
PCBS				
Dilution Factor				1
PCB-1016 (AROCLOR 1016)	SW8082	μg/L	1	<1
PCB-1221 (AROCLOR 1221)	SW8082	μg/L	1	<1
PCB-1232 (AROCLOR 1232)	SW8082	μg/L	1	<1
PCB-1242 (AROCLOR 1242)	SW8082	μg/L	1	<1
PCB-1248 (AROCLOR 1248)	SW8082	μg/L	1	<1
PCB-1254 (AROCLOR 1254)	SW8082	μg/L	1	<1
PCB-1260 (AROCLOR 1260)	SW8082	μg/L	1	<1
POLYNUCLEAR AROMATIC HC (PAH)				
Dilution Factor				1
ACENAPHTHENE	SW8310	μg/L	5	<5
ACENAPHTHYLENE	SW8310	μg/L	2	<2
ANTHRACENE	SW8310	μg/L	0.2	<0.2
BENZO(A)ANTHRACENE	SW8310	μg/L	0.2	<0.2
BENZO(A)PYRENE	SW8310	μg/L	0.2	<0.2
BENZO(B)FLUORANTHENE	SW8310	μg/L	0.2	<0.2
BENZO(G,H,I)PERYLENE	SW8310	μg/L	0.2	<0.2
BENZO(K)FLUORANTHENE	SW8310	μg/L	0.2	<0.2
CHRYSENE	SW8310	μg/L	0.2	<0.2
DIBENZ(A,H)ANTHRACENE	SW8310	μg/L	0.5	<0.5
FLUORANTHENE	SW8310	μg/L	0.2	<0.2
FLUORENE	SW8310	μg/L	1	<1
INDENO(1,2,3-C,D)PYRENE	SW8310	μg/L	0.2	<0.2
NAPHTHALENE	SW8310	μg/L	5	<5
2-METHYLNAPHTHALENE	SW8310	μg/L	5	<5
PHENANTHRENE	SW8310	μg/L	1	<1
PYRENE	SW8310	μg/L	0.2	<0.2

Component Analyzed	Method	Unit	PQL	Analysis Result YWB-EB-WH-1035 01-05474-1	YWB-TB-WT-1036 01-05474-2
VOLATILE ORGANICS					
Dilution Factor				1	1
ACETONE	SW8260B	μg/L	10	<10	<10
BENZENE	SW8260B	μg/L	0.5	<0.5	<0.5
BROMODICHLOROMETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
BROMOFORM	SW8260B	μg/L	0.5	<0.5	<0.5
BROMOMETHANE	SW8260B	μg/L	0.5	<0.5	<0.5
2-BUTANONE	SW8260B	μg/L	10	<10	<10
CARBON DISULFIDE	SW8260B	μg/L	1	<1	<1
CARBON TETRACHLORIDE	SW8260B	μg/L	0.5	<0.5	<0.5

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWB-EB-WH-1035 01-05474-1	YWB-TB-WT-1036 01-05474-2
CHLOROBENZENE	SW8260B	µg/L	0.5	<0.5	<0.5
DIBROMOCHLOROMETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
CHLOROETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
CHLOROFORM	SW8260B	µg/L	0.5	<0.5	<0.5
CHLOROMETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
1,2-DICHLOROBENZENE	SW8260B	µg/L	0.5	<0.5	<0.5
1,3-DICHLOROBENZENE	SW8260B	µg/L	0.5	<0.5	<0.5
1,4-DICHLOROBENZENE	SW8260B	µg/L	0.5	<0.5	<0.5
DICHLORODIFLUOROMETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
1,1-DICHLOROETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
1,2-DICHLOROETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
1,1-DICHLOROETHENE	SW8260B	µg/L	0.5	<0.5	<0.5
CIS-1,2-DICHLOROETHENE	SW8260B	µg/L	1	<1	<1
TRANS-1,2-DICHLOROETHENE	SW8260B	µg/L	1	<1	<1
1,2-DICHLOROPROPANE	SW8260B	µg/L	0.5	<0.5	<0.5
CIS-1,3-DICHLOROPROPENE	SW8260B	µg/L	0.5	<0.5	<0.5
TRANS-1,3-DICHLOROPROPENE	SW8260B	µg/L	0.5	<0.5	<0.5
ETHYLBENZENE	SW8260B	µg/L	0.5	<0.5	<0.5
2-HEXANONE	SW8260B	µg/L	1.6 (a)	<1.6	<1.6
METHYLENE CHLORIDE	SW8260B	µg/L	5	<5	<5
4-METHYL-2-PENTANONE	SW8260B	µg/L	1	<1	<1
METHYL-TERTIARY-BUTYL ETHER	SW8260B	µg/L	1	<1	<1
STYRENE	SW8260B	µg/L	1	<1	<1
1,1,2,2-TETRACHLOROETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
1,1,2-TRICHLOROTRIFLUOROETHANE	SW8260B	µg/L	1	<1	<1
TETRACHLOROETHENE(PCE)	SW8260B	µg/L	0.5	<0.5	<0.5
TOLUENE	SW8260B	µg/L	0.5	<0.5	<0.5
1,1,1-TRICHLOROETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
1,1,2-TRICHLOROETHANE	SW8260B	µg/L	0.5	<0.5	<0.5
TRICHLOROETHENE	SW8260B	µg/L	0.5	<0.5	<0.5
VINYL ACETATE	SW8260B	µg/L	10	<10	<10
VINYL CHLORIDE	SW8260B	µg/L	0.5	<0.5	<0.5
O-XYLENE	SW8260B	µg/L	0.5	<0.5	<0.5
M,P-XYLENE	SW8260B	µg/L	0.5	<0.5	<0.5

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II . Analysis of Soil Samples

Component Analyzed	Method	Unit	PQL	Analysis Result		
				YWV-DG01-SO-1022	YWV-DG02-SO-1023	YWV-DG03-SO-1024
				01-05474-3	01-05474-4	01-05474-5
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	18.0	14.0	6.3
PH	9040B	pH unit	0.01	7.38	7.08	6.74
CHROMIUM (VI)	7196A	mg/kg	0.5	<0.61	<0.58	<0.53
METALS						
Dilution Factor				4	4	4
ANTIMONY	SW6010B	mg/kg	5	<24	<23	<21
ARSENIC	SW6010B	mg/kg	0.3	2.7	2.3	2.9
BARIUM	SW6010B	mg/kg	1	17.2	15.2	18.2
BERYLLIUM	SW6010B	mg/kg	0.2	<0.98	<0.93	0.026J
CADMIUM	SW6010B	mg/kg	0.1	<0.49	<0.46	<0.43
CHROMIUM	SW6010B	mg/kg	0.5	3.2	3.4	4.3
COBALT	SW6010B	mg/kg	0.5	3.5	3.3	3.1
COPPER	SW6010B	mg/kg	0.5	23.9	18.3	15.5
LEAD	SW6010B	mg/kg	0.3	5.3	5.0	5.2
Dilution Factor				1	1	1
MERCURY	SW7471A	mg/kg	0.2	0.25	0.11J	0.24
Dilution Factor				4	4	4
MOLYBDENUM	SW6010B	mg/kg	0.2	88.6	32.5	22.7
NICKEL	SW6010B	mg/kg	0.3	4.5	2.5	2.8
SELENIUM	SW6010B	mg/kg	0.5	<2.4	<2.3	<2.1
SILVER	SW6010B	mg/kg	0.5	<2.4	<2.3	<2.1
THALLIUM	SW6010B	mg/kg	0.5	<2.4	<2.3	<2.1
VANADIUM	SW6010B	mg/kg	0.5	34.6	27.9	28.1
ZINC	SW6010B	mg/kg	1	61.5	29.2	24.5
WITH SILICA GEL CLEAN UP						
Dilution Factor				1	1	1
DIESEL	SW8015B	mg/kg	10	8J	6J	6J
Dilution Factor				1	1	1
MOTOR OILS	SW8015B	mg/kg	10	37	42	37
WITHOUT SILICA GEL CLEAN UP						
Dilution Factor				1	1	1
DIESEL	SW8015B	mg/kg	10	14	18	12
Dilution Factor				1	1	1
MOTOR OILS	SW8015B	mg/kg	10	62	83	74

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-DG01-SO-1022 01-05474-3	YWV-DG02-SO-1023 01-05474-4	YWV-DG03-SO-1024 01-05474-5
VOLATILE ORGANICS						
Dilution Factor				1.17	1.39	1.64
ACETONE	SW8260B	μg/kg	50	<71	31J	<88
BENZENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
BROMODICHLOROMETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
BROMOFORM	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
BROMOMETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
2-BUTANONE	SW8260B	μg/kg	50	<71	<81	<88
CARBON DISULFIDE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
CARBON TETRACHLORIDE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
CHLOROBENZENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
DIBROMOCHLOROMETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
CHLOROETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
CHLOROFORM	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
CHLOROMETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,2-DICHLOROBENZENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,3-DICHLOROBENZENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,4-DICHLOROBENZENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
DICHLORODIFLUOROMETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,1-DICHLOROETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,2-DICHLOROETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,1-DICHLOROETHENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
CIS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
TRANS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,2-DICHLOROPROPANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
CIS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
TRANS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
ETHYLBENZENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
2-HEXANONE	SW8260B	μg/kg	10	<14	<16	<18
METHYLENE CHLORIDE	SW8260B	μg/kg	10	5J	10J	10J
4-METHYL-2-PENTANONE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
METHYL-TERTIARY-BUTYL ETHER	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
STYRENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,1,2,2-TETRACHLOROETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,1,2-TRICHLOROTRIFLUOROETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
TETRACHLOROETHENE(PCE)	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
TOLUENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,1,1-TRICHLOROETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
1,1,2-TRICHLOROETHANE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
TRICHLOROETHENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
VINYL ACETATE	SW8260B	μg/kg	10	<14	<16	<18
VINYL CHLORIDE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
O-XYLENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8
M,P-XYLENE	SW8260B	μg/kg	5	<7.1	<8.1	<8.8

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-DG01-SO-1022 01-05474-3	YWV-DG02-SO-1023 01-05474-4	YWV-DG03-SO-1024 01-05474-5
SEMI-VOC. 64 COMPOUNDS						
Dilution Factor				1	1	1
ACENAPHTHENE	SW8270C	μg/kg	330	<400	<380	<350
ACENAPHTHYLENE	SW8270C	μg/kg	330	<400	<380	<350
ANTHRACENE	SW8270C	μg/kg	330	<400	<380	<350
BENZOIC ACID	SW8270C	μg/kg	1700	<2000	<1900	<1800
BENZYL ALCOHOL	SW8270C	μg/kg	330	<400	<380	<350
BENZO(A)ANTHRACENE	SW8270C	μg/kg	330	<400	<380	<350
BENZO(A)PYRENE	SW8270C	μg/kg	330	<400	<380	<350
BENZO(B)FLUORANTHENE	SW8270C	μg/kg	330	<400	<380	<350
BENZO(G,H,I)PERYLENE	SW8270C	μg/kg	330	<400	<380	<350
BENZO(K)FLUORANTHENE	SW8270C	μg/kg	330	<400	<380	<350
BIS(2-CHLOROETHOXY) METHANE	SW8270C	μg/kg	330	<400	<380	<350
BIS(2-CHLOROETHYL) ETHER	SW8270C	μg/kg	330	<400	<380	<350
2,2'-OXYBIS(1-CHLOROPROPANE)	SW8270C	μg/kg	330	<400	<380	<350
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	μg/kg	330	240J	<380	<350
4-BROMOPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<400	<380	<350
BENZYL BUTYL PHTHALATE	SW8270C	μg/kg	330	<400	<380	<350
4-CHLORO-3-METHYLPHENOL	SW8270C	μg/kg	330	<400	<380	<350
4-CHLOROANILINE	SW8270C	μg/kg	740 [a]	<900	<860	<790
2-CHLORONAPHTHALENE	SW8270C	μg/kg	330	<400	<380	<350
2-CHLOROPHENOL	SW8270C	μg/kg	330	<400	<380	<350
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<400	<380	<350
CHRYSENE	SW8270C	μg/kg	330	<400	<380	<350
DI-N-BUTYL PHTHALATE	SW8270C	μg/kg	330	<400	<380	<350
DI-N-OCTYLPHTHALATE	SW8270C	μg/kg	330	<400	<380	<350
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/kg	330	<400	<380	<350
DIBENZOFURAN	SW8270C	μg/kg	330	<400	<380	<350
1,2-DICHLOROBENZENE	SW8270C	μg/kg	330	<400	<380	<350
1,3-DICHLOROBENZENE	SW8270C	μg/kg	330	<400	<380	<350
1,4-DICHLOROBENZENE	SW8270C	μg/kg	330	<400	<380	<350
3,3'-DICHLOROBENZIDINE	SW8270C	μg/kg	660	<800	<770	<700
2,4-DICHLOROPHENOL	SW8270C	μg/kg	330	<400	<380	<350
DIETHYL PHTHALATE	SW8270C	μg/kg	330	<400	<380	<350
DIMETHYL PHTHALATE	SW8270C	μg/kg	330	<400	<380	<350
2,4-DIMETHYLPHENOL	SW8270C	μg/kg	330	<400	<380	<350
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/kg	1700	<2000	<1900	<1800
2,4-DINITROPHENOL	SW8270C	μg/kg	1700	<2000	<1900	<1800
2,4-DINITROTOLUENE	SW8270C	μg/kg	330	<400	<380	<350
2,6-DINITROTOLUENE	SW8270C	μg/kg	330	<400	<380	<350
FLUORANTHENE	SW8270C	μg/kg	330	<400	<380	<350
FLUORENE	SW8270C	μg/kg	330	<400	<380	<350
HEXACHLOROBENZENE	SW8270C	μg/kg	330	<400	<380	<350
HEXACHLOROBUTADIENE	SW8270C	μg/kg	330	<400	<380	<350
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/kg	1700	<2000	<1900	<1800

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-DG01-SO-1022 01-05474-3	YWV-DG02-SO-1023 01-05474-4	YWV-DG03-SO-1024 01-05474-5
HEXACHLOROETHANE	SW8270C	μg/kg	330	<400	<380	<350
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/kg	330	<400	<380	<350
ISOPHORONE	SW8270C	μg/kg	330	<400	<380	<350
2-METHYLNAPHTHALENE	SW8270C	μg/kg	330	<400	<380	<350
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/kg	330	<400	<380	<350
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/kg	330	<400	<380	<350
NAPHTHALENE	SW8270C	μg/kg	330	<400	<380	<350
2-NITROANILINE	SW8270C	μg/kg	1700	<2000	<1900	<1800
3-NITROANILINE	SW8270C	μg/kg	1700	<2000	<1900	<1800
4-NITROANILINE	SW8270C	μg/kg	1700	<2000	<1900	<1800
NITROBENZENE	SW8270C	μg/kg	330	<400	<380	<350
2-NITROPHENOL	SW8270C	μg/kg	330	<400	<380	<350
4-NITROPHENOL	SW8270C	μg/kg	1700	<2000	<1900	<1800
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/kg	330	<400	<380	<350
N-NITROSODIPHENYLAMINE	SW8270C	μg/kg	330	<400	<380	<350
PENTACHLOROPHENOL	SW8270C	μg/kg	1700	<2000	<1900	<1800
PHENANTHRENE	SW8270C	μg/kg	330	<400	<380	<350
PHENOL	SW8270C	μg/kg	330	<400	<380	<350
PYRENE	SW8270C	μg/kg	330	<400	<380	<350
1,2,4-TRICHLOROBENZENE	SW8270C	μg/kg	330	<400	<380	<350
2,4,5-TRICHLOROPHENOL	SW8270C	μg/kg	330	<400	<380	<350
2,4,6-TRICHLOROPHENOL	SW8270C	μg/kg	330	<400	<380	<350
ORGANOCHLORINE PESTICIDES						
Dilution Factor				1	1	1
ALDRIN	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
BETA BHC	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
ALPHA BHC	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
DELTA BHC	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
GAMMA BHC (LINDANE)	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
ALPHA-CHLORDANE	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
GAMMA-CHLORDANE	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
P,P'-DDD	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
P,P'-DDE	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
P,P'-DDT	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
DIELDRIN	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
ALPHA ENDOSULFAN	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
BETA ENDOSULFAN	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
ENDOSULFAN SULFATE	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
ENDRIN	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
ENDRIN ALDEHYDE	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
ENDRIN KETONE	SW8081A	μg/kg	2	<2.4	<2.3	<2.1
HEPTACHLOR	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
HEPTACHLOR EPOXIDE	SW8081A	μg/kg	1	<1.2	<1.2	<1.1
METHOXYCHLOR	SW8081A	μg/kg	10	<12	<12	<11
TOXAPHENE	SW8081A	μg/kg	100	<120	<120	<110

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-DG01-SO-1022 01-05474-3	YWV-DG02-SO-1023 01-05474-4	YWV-DG03-SO-1024 01-05474-5
PCBS						
Dilution Factor				1	1	1
PCB-1016 (AROCLOR 1016)	SW8082	µg/kg	50	<61	<58	<53
PCB-1221 (AROCLOR 1221)	SW8082	µg/kg	50	<61	<58	<53
PCB-1232 (AROCLOR 1232)	SW8082	µg/kg	50	<61	<58	<53
PCB-1242 (AROCLOR 1242)	SW8082	µg/kg	50	<61	<58	<53
PCB-1248 (AROCLOR 1248)	SW8082	µg/kg	50	<61	<58	<53
PCB-1254 (AROCLOR 1254)	SW8082	µg/kg	25	<30	<29	<27
PCB-1260 (AROCLOR 1260)	SW8082	µg/kg	25	<30	<29	<27
POLYNUCLEAR AROMATIC HC (PAH)						
Dilution Factor				1	1	1
ACENAPHTHENE	SW8310	µg/kg	50	<61	<58	<53
ACENAPHTHYLENE	SW8310	µg/kg	20	<24	<23	<21
ANTHRACENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
BENZO(A)ANTHRACENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
BENZO(A)PYRENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
BENZO(B)FLUORANTHENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
BENZO(G,H,I)PERYLENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
BENZO(K)FLUORANTHENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
CHRYSENE	SW8310	µg/kg	2	52	25	16
DIBENZ(A,H)ANTHRACENE	SW8310	µg/kg	5	<6.1	<5.8	<5.3
FLUORANTHENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
FLUORENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
INDENO(1,2,3-C,D)PYRENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
2-METHYLNAPHTHALENE	SW8310	µg/kg	50	<61	<58	<53
NAPHTHALENE	SW8310	µg/kg	50	<61	<58	<53
PHENANTHRENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1
PYRENE	SW8310	µg/kg	2	<2.4	<2.3	<2.1

Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP01-SO-1033 01-05474-6	YWV-TP01-SO-1034 01-05474-7	YWV-TP02-SO-1031 01-05474-8
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	6.8	7.0	12.2
PH	9040B	pH unit	0.01	6.36	6.15	5.97
CHROMIUM (VI)	7196A	mg/kg	0.5	<0.54	<0.54	<0.57

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP01-SO-1033 01-05474-6	YWV-TP01-SO-1034 01-05474-7	YWV-TP02-SO-1031 01-05474-8
METALS						
Dilution Factor				4	4	4
ANTIMONY	SW6010B	mg/kg	5	<21	<21	<23
ARSENIC	SW6010B	mg/kg	0.3	2.9	3.2	6.4
BARIUM	SW6010B	mg/kg	1	13.5	13.0	28.1
BERYLLIUM	SW6010B	mg/kg	0.2	<0.86	<0.86	<0.91
CADMIUM	SW6010B	mg/kg	0.1	<0.43	<0.43	0.30J
CHROMIUM	SW6010B	mg/kg	0.5	3.1	2.9	7.8
COBALT	SW6010B	mg/kg	0.5	2.9	2.8	8.8
COPPER	SW6010B	mg/kg	0.5	16.0	16.1	163
LEAD	SW6010B	mg/kg	0.3	4.3	4.2	64.6
Dilution Factor				1	1	1
MERCURY	SW7471A	mg/kg	0.2	0.13J	0.23	0.25
Dilution Factor				4	4	4
MOLYBDENUM	SW6010B	mg/kg	0.2	19.6	21.3	5.5
NICKEL	SW6010B	mg/kg	0.3	1.9	1.6	26.0
SELENIUM	SW6010B	mg/kg	0.5	<2.1	<2.1	<2.3
SILVER	SW6010B	mg/kg	0.5	<2.1	<2.1	<2.3
THALLIUM	SW6010B	mg/kg	0.5	<2.1	<2.1	<2.3
VANADIUM	SW6010B	mg/kg	0.5	31.9	35.0	23.5
ZINC	SW6010B	mg/kg	1	24.0	21.9	233
WITH SILICA GEL CLEAN UP						
Dilution Factor				1	1	1
DIESEL	SW8015B	mg/kg	10	9J	5J	38
Dilution Factor				1	1	1
MOTOR OILS	SW8015B	mg/kg	10	87	48	110
WITHOUT SILICA GEL CLEAN UP						
Dilution Factor				1	1	1
DIESEL	SW8015B	mg/kg	10	24	8J	57
Dilution Factor				1	1	1
MOTOR OILS	SW8015B	mg/kg	10	160	69	160

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP01-SO-1033 01-05474-6	YWV-TP01-SO-1034 01-05474-7	YWV-TP02-SO-1031 01-05474-8
VOLATILE ORGANICS						
Dilution Factor				2.11	1.42	1.39
ACETONE	SW8260B	μg/kg	50	<110	51J	370
BENZENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
BROMODICHLOROMETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
BROMOFORM	SW8260B	μg/kg	5	<11	<7.6	<7.9
BROMOMETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
2-BUTANONE	SW8260B	μg/kg	50	<110	9J	18J
CARBON DISULFIDE	SW8260B	μg/kg	5	<11	<7.6	<7.9
CARBON TETRACHLORIDE	SW8260B	μg/kg	5	<11	<7.6	<7.9
CHLOROBENZENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
DIBROMOCHLOROMETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
CHLOROETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
CHLOROFORM	SW8260B	μg/kg	5	<11	<7.6	<7.9
CHLOROMETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,2-DICHLOROBENZENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,3-DICHLOROBENZENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,4-DICHLOROBENZENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
DICHLORODIFLUOROMETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,1-DICHLOROETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,2-DICHLOROETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,1-DICHLOROETHENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
CIS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
TRANS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,2-DICHLOROPROPANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
CIS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
TRANS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
ETHYLBENZENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
2-HEXANONE	SW8260B	μg/kg	10	<23	<15	<16
METHYLENE CHLORIDE	SW8260B	μg/kg	10	13J	9J	12J
4-METHYL-2-PENTANONE	SW8260B	μg/kg	5	<11	<7.6	1J
METHYL-TERTIARY-BUTYL ETHER	SW8260B	μg/kg	5	<11	<7.6	<7.9
STYRENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,1,2,2-TETRACHLOROETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
TETRACHLOROETHENE(PCE)	SW8260B	μg/kg	5	<11	<7.6	<7.9
TOLUENE	SW8260B	μg/kg	5	4J	0.9J	<7.9
1,1,1-TRICHLOROETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,1,2-TRICHLOROETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
TRICHLOROETHENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
1,1,2-TRICHLOROTRIFLUOROETHANE	SW8260B	μg/kg	5	<11	<7.6	<7.9
VINYL ACETATE	SW8260B	μg/kg	10	<23	<15	<16
VINYL CHLORIDE	SW8260B	μg/kg	5	<11	<7.6	<7.9
O-XYLENE	SW8260B	μg/kg	5	<11	<7.6	<7.9
M,P-XYLENE	SW8260B	μg/kg	5	<11	<7.6	<7.9

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP01-SO-1033 01-05474-6	YWV-TP01-SO-1034 01-05474-7	YWV-TP02-SO-1031 01-05474-8
SEMI-VOC, 64 COMPOUNDS						
Dilution Factor				1	1	1
ACENAPHTHENE	SW8270C	μg/kg	330	<350	<350	<380
ACENAPHTHYLENE	SW8270C	μg/kg	330	<350	<350	<380
ANTHRACENE	SW8270C	μg/kg	330	<350	<350	<380
BENZOIC ACID	SW8270C	μg/kg	1700	<1800	<1800	<1900
BENZYL ALCOHOL	SW8270C	μg/kg	330	<350	<350	<380
BENZO(A)ANTHRACENE	SW8270C	μg/kg	330	<350	<350	<380
BENZO(A)PYRENE	SW8270C	μg/kg	330	<350	<350	<380
BENZO(B)FLUORANTHENE	SW8270C	μg/kg	330	<350	<350	<380
BENZO(G,H,I)PERYLENE	SW8270C	μg/kg	330	<350	<350	<380
BENZO(K)FLUORANTHENE	SW8270C	μg/kg	330	<350	<350	<380
BIS(2-CHLOROETHOXY) METHANE	SW8270C	μg/kg	330	<350	<350	<380
BIS(2-CHLOROETHYL) ETHER	SW8270C	μg/kg	330	<350	<350	<380
2,2'-OXYBIS(1-CHLOROPROPANE)	SW8270C	μg/kg	330	<350	<350	<380
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	μg/kg	330	<350	<350	85J
4-BROMOPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<350	<350	<380
BENZYL BUTYL PHTHALATE	SW8270C	μg/kg	330	<350	<350	<380
4-CHLORO-3-METHYLPHENOL	SW8270C	μg/kg	330	<350	<350	<380
4-CHLOROANILINE	SW8270C	μg/kg	740 (a)	<800	<800	<840
2-CHLORONAPHTHALENE	SW8270C	μg/kg	330	<350	<350	<380
2-CHLOROPHENOL	SW8270C	μg/kg	330	<350	<350	<380
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<350	<350	<380
CHRYSENE	SW8270C	μg/kg	330	<350	<350	<380
DI-N-BUTYL PHTHALATE	SW8270C	μg/kg	330	<350	<350	<380
DI-N-OCTYLPHTHALATE	SW8270C	μg/kg	330	<350	<350	<380
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/kg	330	<350	<350	<380
DIBENZOFURAN	SW8270C	μg/kg	330	<350	<350	<380
1,2-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<350	<380
1,3-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<350	<380
1,4-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<350	<380
3,3'-DICHLOROBENZIDINE	SW8270C	μg/kg	660	<710	<710	<750
2,4-DICHLOROPHENOL	SW8270C	μg/kg	330	<350	<350	<380
DIETHYL PHTHALATE	SW8270C	μg/kg	330	<350	<350	<380
DIMETHYL PHTHALATE	SW8270C	μg/kg	330	<350	<350	<380
2,4-DIMETHYLPHENOL	SW8270C	μg/kg	330	<350	<350	<380
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/kg	1700	<1800	<1800	<1900
2,4-DINITROPHENOL	SW8270C	μg/kg	1700	<1800	<1800	<1900
2,4-DINITROTOLUENE	SW8270C	μg/kg	330	<350	<350	<380
2,6-DINITROTOLUENE	SW8270C	μg/kg	330	<350	<350	<380
FLUORANTHENE	SW8270C	μg/kg	330	<350	<350	<380
FLUORENE	SW8270C	μg/kg	330	<350	<350	<380
HEXACHLOROBENZENE	SW8270C	μg/kg	330	<350	<350	<380
HEXACHLOROBUTADIENE	SW8270C	μg/kg	330	<350	<350	<380
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/kg	1700	<1800	<1800	<1900

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP01-SO-1033 01-05474-6	YWV-TP01-SO-1034 01-05474-7	YWV-TP02-SO-1031 01-05474-8
HEXACHLOROETHANE	SW8270C	µg/kg	330	<350	<350	<380
INDENO(1,2,3-C,D)PYRENE	SW8270C	µg/kg	330	<350	<350	<380
ISOPHORONE	SW8270C	µg/kg	330	<350	<350	<380
2-METHYLNAPHTHALENE	SW8270C	µg/kg	330	<350	<350	<380
4-METHYLPHENOL (P-CRESOL)	SW8270C	µg/kg	330	<350	<350	<380
2-METHYLPHENOL (O-CRESOL)	SW8270C	µg/kg	330	<350	<350	<380
NAPHTHALENE	SW8270C	µg/kg	330	<350	<350	<380
2-NITROANILINE	SW8270C	µg/kg	1700	<1800	<1800	<1900
3-NITROANILINE	SW8270C	µg/kg	1700	<1800	<1800	<1900
4-NITROANILINE	SW8270C	µg/kg	1700	<1800	<1800	<1900
NITROBENZENE	SW8270C	µg/kg	330	<350	<350	<380
2-NITROPHENOL	SW8270C	µg/kg	330	<350	<350	<380
4-NITROPHENOL	SW8270C	µg/kg	1700	<1800	<1800	<1900
N-NITROSODI-N-PROPYLAMINE	SW8270C	µg/kg	330	<350	<350	<380
N-NITROSODIPHENYLAMINE	SW8270C	µg/kg	330	<350	<350	<380
PENTACHLOROPHENOL	SW8270C	µg/kg	1700	<1800	<1800	<1900
PHENANTHRENE	SW8270C	µg/kg	330	<350	<350	<380
PHENOL	SW8270C	µg/kg	330	<350	<350	<380
PYRENE	SW8270C	µg/kg	330	<350	<350	<380
1,2,4-TRICHLOROBENZENE	SW8270C	µg/kg	330	<350	<350	<380
2,4,5-TRICHLOROPHENOL	SW8270C	µg/kg	330	<350	<350	<380
2,4,6-TRICHLOROPHENOL	SW8270C	µg/kg	330	<350	<350	<380
ORGANOCHLORINE PESTICIDES						
Dilution Factor				1	1	1
ALDRIN	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
BETA BHC	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
ALPHA BHC	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
DELTA BHC	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
GAMMA BHC (LINDANE)	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
ALPHA-CHLORDANE	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
GAMMA-CHLORDANE	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
P,P'-DDD	SW8081A	µg/kg	2	<2.1	<2.1	31
P,P'-DDE	SW8081A	µg/kg	2	<2.1	<2.1	22
P,P'-DDT	SW8081A	µg/kg	2	<2.1	<2.1	<2.3
DIELDRIN	SW8081A	µg/kg	2	<2.1	<2.1	2J
ALPHA ENDOSULFAN	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
BETA ENDOSULFAN	SW8081A	µg/kg	2	<2.1	<2.1	<2.3
ENDOSULFAN SULFATE	SW8081A	µg/kg	2	<2.1	<2.1	<2.3
ENDRIN	SW8081A	µg/kg	2	<2.1	<2.1	<2.3
ENDRIN ALDEHYDE	SW8081A	µg/kg	2	<2.1	<2.1	<2.3
ENDRIN KETONE	SW8081A	µg/kg	2	<2.1	<2.1	<2.3
HEPTACHLOR	SW8081A	µg/kg	1	<1.1	<1.1	<1.1
HEPTACHLOR EPOXIDE	SW8081A	µg/kg	1	<1.1	<1.1	0.7J
METHOXYCHLOR	SW8081A	µg/kg	10	<11	<11	<11
TOXAPHENE	SW8081A	µg/kg	100	<110	<110	<110

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PCBS						
Dilution Factor				1	1	1
PCB-1016 (AROCLOR 1016)	SW8082	μg/kg	50	<54	<54	<57
PCB-1221 (AROCLOR 1221)	SW8082	μg/kg	50	<54	<54	<57
PCB-1232 (AROCLOR 1232)	SW8082	μg/kg	50	<54	<54	<57
PCB-1242 (AROCLOR 1242)	SW8082	μg/kg	50	<54	<54	<57
PCB-1248 (AROCLOR 1248)	SW8082	μg/kg	50	<54	<54	<57
PCB-1254 (AROCLOR 1254)	SW8082	μg/kg	25	<27	<27	<28
PCB-1260 (AROCLOR 1260)	SW8082	μg/kg	25	<27	<27	45
POLYNUCLEAR AROMATIC HC (PAH)						
Dilution Factor				1	1	1
ACENAPHTHENE	SW8310	μg/kg	50	<54	<54	<57
ACENAPHTHYLENE	SW8310	μg/kg	20	<21	<21	<23
ANTHRACENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
BENZO(A)ANTHRACENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
BENZO(A)PYRENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
BENZO(B)FLUORANTHENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
BENZO(G,H,I)PERYLENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
BENZO(K)FLUORANTHENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
CHRYSENE	SW8310	μg/kg	2	6.2	<2.1	4
DIBENZ(A,H)ANTHRACENE	SW8310	μg/kg	5	<5.4	<5.4	<5.7
FLUORANTHENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
FLUORENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
INDENO(1,2,3-C,D)PYRENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
NAPHTHALENE	SW8310	μg/kg	50	<54	<54	<57
2-METHYLNAPHTHALENE	SW8310	μg/kg	50	<54	<54	<57
PHENANTHRENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3
PYRENE	SW8310	μg/kg	2	<2.1	<2.1	<2.3

Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP02-SO-1032 01-05474-9	YWV-TP03-SO-1026 01-05474-11	YWV-TP03-SO-1027 01-05474-12
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	5.5	7.4	7.9
PH	9040B	pH unit	0.01	6.36	6.20	6.13
CHROMIUM (VI)	7196A	mg/kg	0.5	<0.53	<0.54	<0.54

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP02-SO-1032 01-05474-9	YWV-TP03-SO-1026 01-05474-11	YWV-TP03-SO-1027 01-05474-12
METALS						
Dilution Factor				4	4	4
ANTIMONY	SW6010B	mg/kg	5	<21	<22	<22
ARSENIC	SW6010B	mg/kg	0.3	3.6	2.3	3.1
BARIUM	SW6010B	mg/kg	1	11.1	32.6	26.3
BERYLLIUM	SW6010B	mg/kg	0.2	<0.85	<0.86	<0.87
CADMIUM	SW6010B	mg/kg	0.1	0.13J	14.8	1.0
CHROMIUM	SW6010B	mg/kg	0.5	4.7	3.6	3.5
COBALT	SW6010B	mg/kg	0.5	3.4	8.4	5.9
COPPER	SW6010B	mg/kg	0.5	152	31.4	46.1
LEAD	SW6010B	mg/kg	0.3	13.4	9.7	91.5
Dilution Factor				1	1	1
MERCURY	SW7471A	mg/kg	0.2	0.16J	0.13J	0.66
Dilution Factor				4	4	4
MOLYBDENUM	SW6010B	mg/kg	0.2	25.8	20.0	24.3
NICKEL	SW6010B	mg/kg	0.3	3.5	10.1	8.2
SELENIUM	SW6010B	mg/kg	0.5	<2.1	<2.2	<2.2
SILVER	SW6010B	mg/kg	0.5	<2.1	<2.2	<2.2
THALLIUM	SW6010B	mg/kg	0.5	<2.1	<2.2	<2.2
VANADIUM	SW6010B	mg/kg	0.5	25.3	26.2	28.9
ZINC	SW6010B	mg/kg	1	80.0	128	456
WITH SILICA GEL CLEAN UP						
Dilution Factor				1	1	1
DIESEL	SW8015B	mg/kg	10	<11	9J	29
Dilution Factor				1	1	1
MOTOR OILS	SW8015B	mg/kg	10	13	73	50
WITHOUT SILICA GEL CLEAN UP						
Dilution Factor				1	1	1
DIESEL	SW8015B	mg/kg	10	<11	16	43
Dilution Factor				1	1	1
MOTOR OILS	SW8015B	mg/kg	10	17	110	73

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP02-SO-1032 01-05474-9	YWV-TP03-SO-1026 01-05474-11	YWV-TP03-SO-1027 01-05474-12
VOLATILE ORGANICS						
Dilution Factor				1.14	1.3	1.25
ACETONE	SW8260B	μg/kg	50	<60	110	79
BENZENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
BROMODICHLOROMETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
BROMOFORM	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
BROMOMETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
2-BUTANONE	SW8260B	μg/kg	50	<60	<70	<68
CARBON DISULFIDE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
CARBON TETRACHLORIDE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
CHLOROBENZENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
DIBROMOCHLOROMETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
CHLOROETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
CHLOROFORM	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
CHLOROMETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,2-DICHLOROBENZENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,3-DICHLOROBENZENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,4-DICHLOROBENZENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
DICHLORODIFLUOROMETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,1-DICHLOROETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,2-DICHLOROETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,1-DICHLOROETHENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
CIS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
TRANS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,2-DICHLOROPROPANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
CIS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
TRANS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
ETHYLBENZENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
2-HEXANONE	SW8260B	μg/kg	10	<12	<14	<14
METHYLENE CHLORIDE	SW8260B	μg/kg	10	9J	9J	8J
4-METHYL-2-PENTANONE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
METHYL-TERTIARY-BUTYL ETHER	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
STYRENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,1,2,2-TETRACHLOROETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
TETRACHLOROETHENE(PCE)	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
TOLUENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,1,1-TRICHLOROETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,1,2-TRICHLOROETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
1,1,2-TRICHLOROTRIFLUOROETHANE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
TRICHLOROETHENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
VINYL ACETATE	SW8260B	μg/kg	10	<12	<14	<14
VINYL CHLORIDE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
O-XYLENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8
M,P-XYLENE	SW8260B	μg/kg	5	<6.0	<7.0	<6.8

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP02-SO-1032 01-05474-9	YWV-TP03-SO-1026 01-05474-11	YWV-TP03-SO-1027 01-05474-12
SEMI-VOC, 64 COMPOUNDS						
Dilution Factor				1	1	1
ACENAPHTHENE	SW8270C	μg/kg	330	<350	<360	<360
ACENAPHTHYLENE	SW8270C	μg/kg	330	<350	<360	<360
ANTHRACENE	SW8270C	μg/kg	330	<350	<360	<360
BENZOIC ACID	SW8270C	μg/kg	1700	<1800	<1800	<1800
BENZYL ALCOHOL	SW8270C	μg/kg	330	<350	<360	<360
BENZO(A)ANTHRACENE	SW8270C	μg/kg	330	<350	<360	<360
BENZO(A)PYRENE	SW8270C	μg/kg	330	<350	<360	<360
BENZO(B)FLUORANTHENE	SW8270C	μg/kg	330	<350	<360	<360
BENZO(G,H,I)PERYLENE	SW8270C	μg/kg	330	<350	<360	<360
BENZO(K)FLUORANTHENE	SW8270C	μg/kg	330	<350	<360	<360
BIS(2-CHLOROETHOXY) METHANE	SW8270C	μg/kg	330	<350	<360	<360
BIS(2-CHLOROETHYL) ETHER	SW8270C	μg/kg	330	<350	<360	<360
2,2'-OXYBIS(1-CHLOROPROPANE)	SW8270C	μg/kg	330	<350	<360	<360
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	μg/kg	330	<350	<360	<360
4-BROMOPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<350	<360	<360
BENZYL BUTYL PHTHALATE	SW8270C	μg/kg	330	<350	<360	<360
4-CHLORO-3-METHYLPHENOL	SW8270C	μg/kg	330	<350	<360	<360
4-CHLOROANILINE	SW8270C	μg/kg	740 [a]	<780	<800	<810
2-CHLORONAPHTHALENE	SW8270C	μg/kg	330	<350	<360	<360
2-CHLOROPHENOL	SW8270C	μg/kg	330	<350	<360	<360
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<350	<360	<360
CHRYSENE	SW8270C	μg/kg	330	<350	<360	<360
DI-N-BUTYL PHTHALATE	SW8270C	μg/kg	330	<350	<360	<360
DI-N-OCTYLPHTHALATE	SW8270C	μg/kg	330	<350	<360	<360
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/kg	330	<350	<360	<360
DIBENZOFURAN	SW8270C	μg/kg	330	<350	<360	<360
1,2-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<360	<360
1,3-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<360	<360
1,4-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<360	<360
3,3'-DICHLOROBENZIDINE	SW8270C	μg/kg	660	<700	<710	<720
2,4-DICHLOROPHENOL	SW8270C	μg/kg	330	<350	<360	<360
DIETHYL PHTHALATE	SW8270C	μg/kg	330	<350	<360	<360
DIMETHYL PHTHALATE	SW8270C	μg/kg	330	<350	<360	<360
2,4-DIMETHYLPHENOL	SW8270C	μg/kg	330	<350	<360	<360
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/kg	1700	<1800	<1800	<1800
2,4-DINITROPHENOL	SW8270C	μg/kg	1700	<1800	<1800	<1800
2,4-DINITROTOLUENE	SW8270C	μg/kg	330	<350	<360	<360
2,6-DINITROTOLUENE	SW8270C	μg/kg	330	<350	<360	<360
FLUORANTHENE	SW8270C	μg/kg	330	<350	<360	<360
FLUORENE	SW8270C	μg/kg	330	<350	<360	<360
HEXACHLOROBENZENE	SW8270C	μg/kg	330	<350	<360	<360
HEXACHLOROBUTADIENE	SW8270C	μg/kg	330	<350	<360	<360
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/kg	1700	<1800	<1800	<1800

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP02-SO-1032 01-05474-9	YWV-TP03-SO-1026 01-05474-11	YWV-TP03-SO-1027 01-05474-12
HEXACHLOROETHANE	SW8270C	μg/kg	330	<350	<360	<360
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/kg	330	<350	<360	<360
ISOPHORONE	SW8270C	μg/kg	330	<350	<360	<360
2-METHYLNAPHTHALENE	SW8270C	μg/kg	330	<350	<360	<360
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/kg	330	<350	<360	<360
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/kg	330	<350	<360	<360
NAPHTHALENE	SW8270C	μg/kg	330	<350	<360	<360
2-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1800	<1800
3-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1800	<1800
4-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1800	<1800
NITROBENZENE	SW8270C	μg/kg	330	<350	<360	<360
2-NITROPHENOL	SW8270C	μg/kg	330	<350	<360	<360
4-NITROPHENOL	SW8270C	μg/kg	1700	<1800	<1800	<1800
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/kg	330	<350	<360	<360
N-NITROSODIPHENYLAMINE	SW8270C	μg/kg	330	<350	<360	<360
PENTACHLOROPHENOL	SW8270C	μg/kg	1700	<1800	<1800	<1800
PHENANTHRENE	SW8270C	μg/kg	330	<350	<360	<360
PHENOL	SW8270C	μg/kg	330	<350	<360	<360
PYRENE	SW8270C	μg/kg	330	<350	<360	<360
1,2,4-TRICHLOROBENZENE	SW8270C	μg/kg	330	<350	<360	<360
2,4,5-TRICHLOROPHENOL	SW8270C	μg/kg	330	<350	<360	<360
2,4,6-TRICHLOROPHENOL	SW8270C	μg/kg	330	<350	<360	<360
ORGANOCHLORINE PESTICIDES						
Dilution Factor				1	1	1
ALDRIN	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
BETA BHC	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
ALPHA BHC	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
DELTA BHC	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
GAMMA BHC (LINDANE)	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
ALPHA-CHLORDANE	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
GAMMA-CHLORDANE	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
P,P'-DDD	SW8081A	μg/kg	2	<2.1	<2.2	<2.2
P,P'-DDE	SW8081A	μg/kg	2	0.4J	<2.2	<2.2
P,P'-DDT	SW8081A	μg/kg	2	<2.1	<2.2	2J
DIELDRIN	SW8081A	μg/kg	2	<2.1	<2.2	<2.2
ALPHA ENDOSULFAN	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
BETA ENDOSULFAN	SW8081A	μg/kg	2	<2.1	<2.2	<2.2
ENDOSULFAN SULFATE	SW8081A	μg/kg	2	<2.1	<2.2	<2.2
ENDRIN	SW8081A	μg/kg	2	<2.1	<2.2	<2.2
ENDRIN ALDEHYDE	SW8081A	μg/kg	2	<2.1	<2.2	<2.2
ENDRIN KETONE	SW8081A	μg/kg	2	<2.1	<2.2	<2.2
HEPTACHLOR	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
HEPTACHLOR EPOXIDE	SW8081A	μg/kg	1	<1.1	<1.1	<1.1
METHOXYCHLOR	SW8081A	μg/kg	10	<11	<11	<11
TOXAPHENE	SW8081A	μg/kg	100	<110	<110	<110

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PCBS						
Dilution Factor				1	1	1
PCB-1016 (AROCLOR 1016)	SW8082	μg/kg	50	< 53	< 54	< 54
PCB-1221 (AROCLOR 1221)	SW8082	μg/kg	50	< 53	< 54	< 54
PCB-1232 (AROCLOR 1232)	SW8082	μg/kg	50	< 53	< 54	< 54
PCB-1242 (AROCLOR 1242)	SW8082	μg/kg	50	< 53	< 54	< 54
PCB-1248 (AROCLOR 1248)	SW8082	μg/kg	50	< 53	< 54	< 54
PCB-1254 (AROCLOR 1254)	SW8082	μg/kg	25	< 26	< 27	< 27
PCB-1260 (AROCLOR 1260)	SW8082	μg/kg	25	11J	< 27	13J
POLYNUCLEAR AROMATIC HC (PAH)						
Dilution Factor				1	1	1
ACENAPHTHENE	SW8310	μg/kg	50	< 53	< 54	< 54
ACENAPHTHYLENE	SW8310	μg/kg	20	< 21	< 22	< 22
ANTHRACENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
BENZO(A)ANTHRACENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
BENZO(A)PYRENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
BENZO(B)FLUORANTHENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
BENZO(G,H,I)PERYLENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
BENZO(K)FLUORANTHENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
CHRYSENE	SW8310	μg/kg	2	< 2.1	12	5.3
DIBENZ(A,H)ANTHRACENE	SW8310	μg/kg	5	< 5.3	< 5.4	< 5.4
FLUORANTHENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
FLUORENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
INDENO(1,2,3-C,D)PYRENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
2-METHYLNAPHTHALENE	SW8310	μg/kg	50	< 53	< 54	< 54
NAPHTHALENE	SW8310	μg/kg	50	< 53	< 54	< 54
PHENANTHRENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2
PYRENE	SW8310	μg/kg	2	< 2.1	< 2.2	< 2.2

Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP04-SO-1028 01-05474-13	YWV-TP04-SO-1030 01-05474-14	YWV-UG01-SO-1019 01-05474-15
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	10.1	11.7	3.1
PH	9040B	pH unit	0.01	6.07	6.03	5.88
CHROMIUM (VI)	7196A	mg/kg	0.5	< 0.56	< 0.57	< 0.52

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP04-SO-1028 01-05474-13	YWV-TP04-SO-1030 01-05474-14	YWV-UG01-SO-1019 01-05474-15
METALS						
Dilution Factor				4	1	1
ANTIMONY	SW6010B	mg/kg	5	< 22	< 5.7	< 5.2
ARSENIC	SW6010B	mg/kg	0.3	1.9	2.9	2.2
BARIUM	SW6010B	mg/kg	1	32.9	27.2	21.4
BERYLLIUM	SW6010B	mg/kg	0.2	<0.89	<0.23	<0.21
CADMIUM	SW6010B	mg/kg	0.1	0.45	0.28	0.0096J
CHROMIUM	SW6010B	mg/kg	0.5	2.7	4.2	1.6
COBALT	SW6010B	mg/kg	0.5	3.1	3.8	3.3
COPPER	SW6010B	mg/kg	0.5	262	373	11.8
LEAD	SW6010B	mg/kg	0.3	29.4	8.9	3.5
Dilution Factor				1	1	1
MERCURY	SW7471A	mg/kg	0.2	0.15J	0.14J	0.075J
Dilution Factor				4	1	1
MOLYBDENUM	SW6010B	mg/kg	0.2	4.0	10.6	0.61
NICKEL	SW6010B	mg/kg	0.3	5.2	5.4	1.8
SELENIUM	SW6010B	mg/kg	0.5	< 2.2	<0.57	<0.52
SILVER	SW6010B	mg/kg	0.5	< 2.2	<0.57	<0.52
THALLIUM	SW6010B	mg/kg	0.5	< 2.2	<0.57	<0.52
VANADIUM	SW6010B	mg/kg	0.5	16.0	25.9	15.5
ZINC	SW6010B	mg/kg	1	131	102	21.8
WITH SILICA GEL CLEAN UP						
Dilution Factor				1	1	1
DIESEL	SW8015B	mg/kg	10	8J	7J	5J
Dilution Factor				1	1	1
MOTOR OILS	SW8015B	mg/kg	10	39	34	21
WITHOUT SILICA GEL CLEAN UP						
Dilution Factor				1	1	1
DIESEL	SW8015B	mg/kg	10	12	11J	3J
Dilution Factor				1	1	1
MOTOR OILS	SW8015B	mg/kg	10	56	55	24

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP04-SO-1028 01-05474-13	YWV-TP04-SO-1030 01-05474-14	YWV-UG01-SO-1019 01-05474-15
VOLATILE ORGANICS						
Dilution Factor				1.25	1.26	1.12
ACETONE	SW8260B	μg/kg	50	61J	<71	<58
BENZENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
BROMODICHLOROMETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
BROMOFORM	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
BROMOMETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
2-BUTANONE	SW8260B	μg/kg	50	8J	<71	<58
CARBON DISULFIDE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
CARBON TETRACHLORIDE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
CHLOROBENZENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
DIBROMOCHLOROMETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
CHLOROETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
CHLOROFORM	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
CHLOROMETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,2-DICHLOROBENZENE	SW8260B	μg/kg	5	<7.0	1J	<5.8
1,3-DICHLOROBENZENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,4-DICHLOROBENZENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
DICHLORODIFLUOROMETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,1-DICHLOROETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,2-DICHLOROETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,1-DICHLOROETHENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
CIS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
TRANS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,2-DICHLOROPROPANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
CIS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
TRANS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
ETHYLBENZENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
2-HEXANONE	SW8260B	μg/kg	10	<14	<14	<12
METHYLENE CHLORIDE	SW8260B	μg/kg	10	8J	8J	6J
4-METHYL-2-PENTANONE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
METHYL-TERTIARY-BUTYL ETHER	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
STYRENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,1,2,2-TETRACHLOROETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
TETRACHLOROETHENE(PCE)	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
TOLUENE	SW8260B	μg/kg	5	1J	<7.1	0.8J
1,1,1-TRICHLOROETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,1,2-TRICHLOROETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
TRICHLOROETHENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
1,1,2-TRICHLOROTRIFLUOROETHANE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
VINYL ACETATE	SW8260B	μg/kg	10	<14	<14	<12
VINYL CHLORIDE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
O-XYLENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8
M,P-XYLENE	SW8260B	μg/kg	5	<7.0	<7.1	<5.8

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP04-SO-1028 01-05474-13	YWV-TP04-SO-1030 01-05474-14	YWV-UG01-SO-1019 01-05474-15
SEMI-VOC, 64 COMPOUNDS						
Dilution Factor				1	1	1
ACENAPHTHENE	SW8270C	μg/kg	330	<370	<370	<340
ACENAPHTHYLENE	SW8270C	μg/kg	330	<370	<370	<340
ANTHRACENE	SW8270C	μg/kg	330	<370	<370	<340
BENZOIC ACID	SW8270C	μg/kg	1700	<1800	<1900	<1700
BENZYL ALCOHOL	SW8270C	μg/kg	330	<370	<370	<340
BENZO(A)ANTHRACENE	SW8270C	μg/kg	330	<370	<370	<340
BENZO(A)PYRENE	SW8270C	μg/kg	330	<370	<370	<340
BENZO(B)FLUORANTHENE	SW8270C	μg/kg	330	<370	<370	<340
BENZO(G,H,I)PERYLENE	SW8270C	μg/kg	330	<370	<370	<340
BENZO(K)FLUORANTHENE	SW8270C	μg/kg	330	<370	<370	<340
BIS(2-CHLOROETHOXY) METHANE	SW8270C	μg/kg	330	<370	<370	<340
BIS(2-CHLOROETHYL) ETHER	SW8270C	μg/kg	330	<370	<370	<340
2,2'-OXYBIS(1-CHLOROPROPANE)	SW8270C	μg/kg	330	<370	<370	<340
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	μg/kg	330	<370	<370	<340
4-BROMOPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<370	<370	<340
BENZYL BUTYL PHTHALATE	SW8270C	μg/kg	330	<370	<370	<340
4-CHLORO-3-METHYLPHENOL	SW8270C	μg/kg	330	<370	<370	<340
4-CHLOROANILINE	SW8270C	μg/kg	740 (a)	<830	<840	<770
2-CHLORONAPHTHALENE	SW8270C	μg/kg	330	<370	<370	<340
2-CHLOROPHENOL	SW8270C	μg/kg	330	<370	<370	<340
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<370	<370	<340
CHRYSENE	SW8270C	μg/kg	330	<370	<370	<340
DI-N-BUTYL PHTHALATE	SW8270C	μg/kg	330	<370	<370	<340
DI-N-OCTYLPHTHALATE	SW8270C	μg/kg	330	<370	<370	<340
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/kg	330	<370	<370	<340
DIBENZOFURAN	SW8270C	μg/kg	330	<370	<370	<340
1,2-DICHLOROBENZENE	SW8270C	μg/kg	330	<370	<370	<340
1,3-DICHLOROBENZENE	SW8270C	μg/kg	330	<370	<370	<340
1,4-DICHLOROBENZENE	SW8270C	μg/kg	330	<370	<370	<340
3,3'-DICHLOROBENZIDINE	SW8270C	μg/kg	660	<730	<750	<680
2,4-DICHLOROPHENOL	SW8270C	μg/kg	330	<370	<370	<340
DIETHYL PHTHALATE	SW8270C	μg/kg	330	<370	<370	<340
DIMETHYL PHTHALATE	SW8270C	μg/kg	330	<370	<370	<340
2,4-DIMETHYLPHENOL	SW8270C	μg/kg	330	<370	<370	<340
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/kg	1700	<1800	<1900	<1700
2,4-DINITROPHENOL	SW8270C	μg/kg	1700	<1800	<1900	<1700
2,4-DINITROTOLUENE	SW8270C	μg/kg	330	<370	<370	<340
2,6-DINITROTOLUENE	SW8270C	μg/kg	330	<370	<370	<340
FLUORANTHENE	SW8270C	μg/kg	330	<370	<370	<340
FLUORENE	SW8270C	μg/kg	330	<370	<370	<340
HEXACHLOROBENZENE	SW8270C	μg/kg	330	<370	<370	<340
HEXACHLOROBUTADIENE	SW8270C	μg/kg	330	<370	<370	<340
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/kg	1700	<1800	<1900	<1700

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP04-SO-1028 01-05474-13	YWV-TP04-SO-1030 01-05474-14	YWV-UG01-SO-1019 01-05474-15
HEXACHLOROETHANE	SW8270C	μg/kg	330	<370	<370	<340
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/kg	330	<370	<370	<340
ISOPHORONE	SW8270C	μg/kg	330	<370	<370	<340
2-METHYLNAPHTHALENE	SW8270C	μg/kg	330	<370	<370	<340
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/kg	330	<370	<370	<340
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/kg	330	<370	<370	<340
NAPHTHALENE	SW8270C	μg/kg	330	<370	<370	<340
2-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1900	<1700
3-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1900	<1700
4-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1900	<1700
NITROBENZENE	SW8270C	μg/kg	330	<370	<370	<340
2-NITROPHENOL	SW8270C	μg/kg	330	<370	<370	<340
4-NITROPHENOL	SW8270C	μg/kg	1700	<1800	<1900	<1700
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/kg	330	<370	<370	<340
N-NITROSODIPHENYLAMINE	SW8270C	μg/kg	330	<370	<370	<340
PENTACHLOROPHENOL	SW8270C	μg/kg	1700	<1800	<1900	<1700
PHENANTHRENE	SW8270C	μg/kg	330	<370	<370	<340
PHENOL	SW8270C	μg/kg	330	<370	<370	<340
PYRENE	SW8270C	μg/kg	330	<370	<370	<340
1,2,4-TRICHLOROBENZENE	SW8270C	μg/kg	330	<370	<370	<340
2,4,5-TRICHLOROPHENOL	SW8270C	μg/kg	330	<370	<370	<340
2,4,6-TRICHLOROPHENOL	SW8270C	μg/kg	330	<370	<370	<340
ORGANOCHLORINE PESTICIDES						
Dilution Factor				1	1	1
ALDRIN	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
BETA BHC	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
ALPHA BHC	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
DELTA BHC	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
GAMMA BHC (LINDANE)	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
ALPHA-CHLORDANE	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
GAMMA-CHLORDANE	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
P,P'-DDD	SW8081A	μg/kg	2	<2.2	<2.3	<2.1
P,P'-DDE	SW8081A	μg/kg	2	<2.2	0.5J	<2.1
P,P'-DDT	SW8081A	μg/kg	2	<2.2	<2.3	<2.1
DIELDRIN	SW8081A	μg/kg	2	<2.2	0.5J	<2.1
ALPHA ENDOSULFAN	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
BETA ENDOSULFAN	SW8081A	μg/kg	2	<2.2	<2.3	<2.1
ENDOSULFAN SULFATE	SW8081A	μg/kg	2	<2.2	<2.3	<2.1
ENDRIN	SW8081A	μg/kg	2	<2.2	<2.3	<2.1
ENDRIN ALDEHYDE	SW8081A	μg/kg	2	<2.2	<2.3	<2.1
ENDRIN KETONE	SW8081A	μg/kg	2	<2.2	<2.3	<2.1
HEPTACHLOR	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
HEPTACHLOR EPOXIDE	SW8081A	μg/kg	1	<1.1	<1.1	<1.0
METHOXYCHLOR	SW8081A	μg/kg	10	<11	<11	<10
TOXAPHENE	SW8081A	μg/kg	100	<110	<110	<100

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APCL Analytical Report

Component Analyzed	Method	Unit	PQL	Analysis Result YWV-TP04-SO-1028 01-05474-13	YWV-TP04-SO-1030 01-05474-14	YWV-UG01-SO-1019 01-05474-15
PCBS						
Dilution Factor				1	1	1
PCB-1016 (AROCLOR 1016)	SW8082	µg/kg	50	<56	<57	<52
PCB-1221 (AROCLOR 1221)	SW8082	µg/kg	50	<56	<57	<52
PCB-1232 (AROCLOR 1232)	SW8082	µg/kg	50	<56	<57	<52
PCB-1242 (AROCLOR 1242)	SW8082	µg/kg	50	<56	<57	<52
PCB-1248 (AROCLOR 1248)	SW8082	µg/kg	50	<56	<57	<52
PCB-1254 (AROCLOR 1254)	SW8082	µg/kg	25	<28	<28	<26
PCB-1260 (AROCLOR 1260)	SW8082	µg/kg	25	17J	<28	<26
POLYNUCLEAR AROMATIC HC (PAH)						
Dilution Factor				1	1	1
ACENAPHTHENE	SW8310	µg/kg	50	<56	<57	<52
ACENAPHTHYLENE	SW8310	µg/kg	20	<22	<23	<21
ANTHRACENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
BENZO(A)ANTHRACENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
BENZO(A)PYRENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
BENZO(B)FLUORANTHENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
BENZO(G,H,I)PERYLENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
BENZO(K)FLUORANTHENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
CHRYSENE	SW8310	µg/kg	2	4	5.2	<2.1
DIBENZ(A,H)ANTHRACENE	SW8310	µg/kg	5	<5.6	<5.7	<5.2
FLUORANTHENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
FLUORENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
INDENO(1,2,3-C,D)PYRENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
2-METHYLNAPHTHALENE	SW8310	µg/kg	50	<56	<57	<52
NAPHTHALENE	SW8310	µg/kg	50	<56	<57	<52
PHENANTHRENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1
PYRENE	SW8310	µg/kg	2	<2.2	<2.3	<2.1

Component Analyzed	Method	Unit	PQL	Analysis Result YWV-UG02-SO-1020 01-05474-16	YWV-UG03-SO-1021 01-05474-17
MOISTURE, PERCENT IN SOIL	ASTM-D2216	%Moisture	0.5	5.4	7.0
PH	9040B	pH unit	0.01	5.44	5.48
CHROMIUM (VI)	7196A	mg/kg	0.5	<0.53	<0.54

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-UG02-SO-1020 01-05474-16	YWV-UG03-SO-1021 01-05474-17
METALS					
Dilution Factor				1	4
ANTIMONY	SW6010B	mg/kg	5	<5.3	<22
ARSENIC	SW6010B	mg/kg	0.3	0.92	2.5
BARIUM	SW6010B	mg/kg	1	4.2	43.6
BERYLLIUM	SW6010B	mg/kg	0.2	<0.21	0.59J
CADMIUM	SW6010B	mg/kg	0.1	<0.11	0.25J
CHROMIUM	SW6010B	mg/kg	0.5	1.2	6.5
COBALT	SW6010B	mg/kg	0.5	1.0	4.6
COPPER	SW6010B	mg/kg	0.5	4.0	27.7
LEAD	SW6010B	mg/kg	0.3	1.4	8.7
Dilution Factor				1	1
MERCURY	SW7471A	mg/kg	0.2	0.13J	0.13J
Dilution Factor				1	4
MOLYBDENUM	SW6010B	mg/kg	0.2	0.34	1.3
NICKEL	SW6010B	mg/kg	0.3	0.59	5.3
SELENIUM	SW6010B	mg/kg	0.5	<0.53	<2.2
SILVER	SW6010B	mg/kg	0.5	<0.53	<2.2
THALLIUM	SW6010B	mg/kg	0.5	<0.53	<2.2
VANADIUM	SW6010B	mg/kg	0.5	10.3	20.7
ZINC	SW6010B	mg/kg	1	11.4	31.6
WITH SILICA GEL CLEAN UP					
Dilution Factor				1	1
DIESEL	SW8015B	mg/kg	10	6J	5J
Dilution Factor				1	1
MOTOR OILS	SW8015B	mg/kg	10	56	41
WITHOUT SILICA GEL CLEAN UP					
Dilution Factor				1	1
DIESEL	SW8015B	mg/kg	10	7J	6J
Dilution Factor				1	1
MOTOR OILS	SW8015B	mg/kg	10	81	51

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-UG02-SO-1020 01-05474-16	YWV-UG03-SO-1021 01-05474-17
VOLATILE ORGANICS					
Dilution Factor				1.23	1.41
ACETONE	SW8260B	μg/kg	50	<65	<76
BENZENE	SW8260B	μg/kg	5	<6.5	<7.6
BROMODICHLOROMETHANE	SW8260B	μg/kg	5	<6.5	<7.6
BROMOFORM	SW8260B	μg/kg	5	<6.5	<7.6
BROMOMETHANE	SW8260B	μg/kg	5	<6.5	<7.6
2-BUTANONE	SW8260B	μg/kg	50	<65	<76
CARBON DISULFIDE	SW8260B	μg/kg	5	<6.5	<7.6
CARBON TETRACHLORIDE	SW8260B	μg/kg	5	<6.5	<7.6
CHLOROBENZENE	SW8260B	μg/kg	5	<6.5	<7.6
DIBROMOCHLOROMETHANE	SW8260B	μg/kg	5	<6.5	<7.6
CHLOROETHANE	SW8260B	μg/kg	5	<6.5	<7.6
CHLOROFORM	SW8260B	μg/kg	5	<6.5	<7.6
CHLOROMETHANE	SW8260B	μg/kg	5	<6.5	<7.6
1,2-DICHLOROBENZENE	SW8260B	μg/kg	5	<6.5	<7.6
1,3-DICHLOROBENZENE	SW8260B	μg/kg	5	<6.5	<7.6
1,4-DICHLOROBENZENE	SW8260B	μg/kg	5	<6.5	<7.6
DICHLORODIFLUOROMETHANE	SW8260B	μg/kg	5	<6.5	<7.6
1,1-DICHLOROETHANE	SW8260B	μg/kg	5	<6.5	<7.6
1,2-DICHLOROETHANE	SW8260B	μg/kg	5	<6.5	<7.6
1,1-DICHLOROETHENE	SW8260B	μg/kg	5	<6.5	<7.6
CIS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<6.5	<7.6
TRANS-1,2-DICHLOROETHENE	SW8260B	μg/kg	5	<6.5	<7.6
1,2-DICHLOROPROPANE	SW8260B	μg/kg	5	<6.5	<7.6
CIS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<6.5	<7.6
TRANS-1,3-DICHLOROPROPENE	SW8260B	μg/kg	5	<6.5	<7.6
ETHYLBENZENE	SW8260B	μg/kg	5	<6.5	<7.6
2-HEXANONE	SW8260B	μg/kg	10	<13	<15
METHYLENE CHLORIDE	SW8260B	μg/kg	10	6J	9J
4-METHYL-2-PENTANONE	SW8260B	μg/kg	5	<6.5	<7.6
METHYL-TERTIARY-BUTYL ETHER	SW8260B	μg/kg	5	<6.5	<7.6
STYRENE	SW8260B	μg/kg	5	<6.5	<7.6
1,1,2,2-TETRACHLOROETHANE	SW8260B	μg/kg	5	<6.5	<7.6
TETRACHLOROETHENE(PCE)	SW8260B	μg/kg	5	<6.5	<7.6
TOLUENE	SW8260B	μg/kg	5	<6.5	<7.6
1,1,1-TRICHLOROETHANE	SW8260B	μg/kg	5	<6.5	<7.6
1,1,2-TRICHLOROETHANE	SW8260B	μg/kg	5	<6.5	<7.6
TRICHLOROETHENE	SW8260B	μg/kg	5	<6.5	<7.6
1,1,2-TRICHLOROTRIFLUOROETHANE	SW8260B	μg/kg	5	<6.5	<7.6
VINYL ACETATE	SW8260B	μg/kg	10	<13	<15
VINYL CHLORIDE	SW8260B	μg/kg	5	<6.5	<7.6
O-XYLENE	SW8260B	μg/kg	5	<6.5	<7.6
M,P-XYLENE	SW8260B	μg/kg	5	<6.5	<7.6

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-UG02-SO-1020 01-05474-16	YWV-UG03-SO-1021 01-05474-17
SEMI-VOC, 64 COMPOUNDS					
Dilution Factor				1	1
ACENAPHTHENE	SW8270C	μg/kg	330	<350	<350
ACENAPHTHYLENE	SW8270C	μg/kg	330	<350	<350
ANTHRACENE	SW8270C	μg/kg	330	<350	<350
BENZOIC ACID	SW8270C	μg/kg	1700	<1800	<1800
BENZYL ALCOHOL	SW8270C	μg/kg	330	<350	<350
BENZO(A)ANTHRACENE	SW8270C	μg/kg	330	<350	<350
BENZO(A)PYRENE	SW8270C	μg/kg	330	<350	<350
BENZO(B)FLUORANTHENE	SW8270C	μg/kg	330	<350	<350
BENZO(G,H,I)PERYLENE	SW8270C	μg/kg	330	<350	<350
BENZO(K)FLUORANTHENE	SW8270C	μg/kg	330	<350	<350
BIS(2-CHLOROETHOXY) METHANE	SW8270C	μg/kg	330	<350	<350
BIS(2-CHLOROETHYL) ETHER	SW8270C	μg/kg	330	<350	<350
2,2'-OXYBIS(1-CHLOROPROPANE)	SW8270C	μg/kg	330	<350	<350
BIS(2-ETHYLHEXYL) PHTHALATE	SW8270C	μg/kg	330	<350	48J
4-BROMOPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<350	<350
BENZYL BUTYL PHTHALATE	SW8270C	μg/kg	330	<350	<350
4-CHLORO-3-METHYLPHENOL	SW8270C	μg/kg	330	<350	<350
4-CHLOROANILINE	SW8270C	μg/kg	740 [(a)]	<780	<800
2-CHLORONAPHTHALENE	SW8270C	μg/kg	330	<350	<350
2-CHLOROPHENOL	SW8270C	μg/kg	330	<350	<350
4-CHLOROPHENYL PHENYL ETHER	SW8270C	μg/kg	330	<350	<350
CHRYSENE	SW8270C	μg/kg	330	<350	<350
DI-N-BUTYL PHTHALATE	SW8270C	μg/kg	330	<350	<350
DI-N-OCTYLPHTHALATE	SW8270C	μg/kg	330	<350	<350
DIBENZ(A,H)ANTHRACENE	SW8270C	μg/kg	330	<350	<350
DIBENZOFURAN	SW8270C	μg/kg	330	<350	<350
1,2-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<350
1,3-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<350
1,4-DICHLOROBENZENE	SW8270C	μg/kg	330	<350	<350
3,3'-DICHLOROBENZIDINE	SW8270C	μg/kg	660	<700	<710
2,4-DICHLOROPHENOL	SW8270C	μg/kg	330	<350	<350
DIETHYL PHTHALATE	SW8270C	μg/kg	330	<350	<350
DIMETHYL PHTHALATE	SW8270C	μg/kg	330	<350	<350
2,4-DIMETHYLPHENOL	SW8270C	μg/kg	330	<350	<350
4,6-DINITRO-2-METHYLPHENOL	SW8270C	μg/kg	1700	<1800	<1800
2,4-DINITROPHENOL	SW8270C	μg/kg	1700	<1800	<1800
2,4-DINITROTOLUENE	SW8270C	μg/kg	330	<350	<350
2,6-DINITROTOLUENE	SW8270C	μg/kg	330	<350	<350
FLUORANTHENE	SW8270C	μg/kg	330	<350	<350
FLUORENE	SW8270C	μg/kg	330	<350	<350
HEXACHLOROBENZENE	SW8270C	μg/kg	330	<350	<350
HEXACHLOROBUTADIENE	SW8270C	μg/kg	330	<350	<350
HEXACHLOROCYCLOPENTADIENE	SW8270C	μg/kg	1700	<1800	<1800

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Component Analyzed	Method	Unit	PQL	Analysis Result YWV-UG02-SO-1020 01-05474-16	YWV-UG03-SO-1021 01-05474-17
HEXACHLOROETHANE	SW8270C	μg/kg	330	<350	<350
INDENO(1,2,3-C,D)PYRENE	SW8270C	μg/kg	330	<350	<350
ISOPHORONE	SW8270C	μg/kg	330	<350	<350
2-METHYLNAPHTHALENE	SW8270C	μg/kg	330	<350	<350
4-METHYLPHENOL (P-CRESOL)	SW8270C	μg/kg	330	<350	<350
2-METHYLPHENOL (O-CRESOL)	SW8270C	μg/kg	330	<350	<350
NAPHTHALENE	SW8270C	μg/kg	330	<350	<350
2-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1800
3-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1800
4-NITROANILINE	SW8270C	μg/kg	1700	<1800	<1800
NITROBENZENE	SW8270C	μg/kg	330	<350	<350
2-NITROPHENOL	SW8270C	μg/kg	330	<350	<350
4-NITROPHENOL	SW8270C	μg/kg	1700	<1800	<1800
N-NITROSODI-N-PROPYLAMINE	SW8270C	μg/kg	330	<350	<350
N-NITROSODIPHENYLAMINE	SW8270C	μg/kg	330	<350	<350
PENTACHLOROPHENOL	SW8270C	μg/kg	1700	<1800	<1800
PHENANTHRENE	SW8270C	μg/kg	330	<350	<350
PHENOL	SW8270C	μg/kg	330	<350	<350
PYRENE	SW8270C	μg/kg	330	<350	<350
1,2,4-TRICHLOROBENZENE	SW8270C	μg/kg	330	<350	<350
2,4,5-TRICHLOROPHENOL	SW8270C	μg/kg	330	<350	<350
2,4,6-TRICHLOROPHENOL	SW8270C	μg/kg	330	<350	<350
ORGANOCHLORINE PESTICIDES					
Dilution Factor				1	1
ALDRIN	SW8081A	μg/kg	1	<1.1	<1.1
BETA BHC	SW8081A	μg/kg	1	<1.1	<1.1
ALPHA BHC	SW8081A	μg/kg	1	<1.1	<1.1
DELTA BHC	SW8081A	μg/kg	1	<1.1	<1.1
GAMMA BHC (LINDANE)	SW8081A	μg/kg	1	<1.1	<1.1
ALPHA-CHLORDANE	SW8081A	μg/kg	1	<1.1	<1.1
GAMMA-CHLORDANE	SW8081A	μg/kg	1	<1.1	<1.1
P,P'-DDD	SW8081A	μg/kg	2	<2.1	<2.2
P,P'-DDE	SW8081A	μg/kg	2	<2.1	<2.2
P,P'-DDT	SW8081A	μg/kg	2	<2.1	<2.2
DIELDRIN	SW8081A	μg/kg	2	<2.1	<2.2
ALPHA ENDOSULFAN	SW8081A	μg/kg	1	<1.1	<1.1
BETA ENDOSULFAN	SW8081A	μg/kg	2	<2.1	<2.2
ENDOSULFAN SULFATE	SW8081A	μg/kg	2	<2.1	<2.2
ENDRIN	SW8081A	μg/kg	2	<2.1	<2.2
ENDRIN ALDEHYDE	SW8081A	μg/kg	2	<2.1	<2.2
ENDRIN KETONE	SW8081A	μg/kg	2	<2.1	<2.2
HEPTACHLOR	SW8081A	μg/kg	1	<1.1	<1.1
HEPTACHLOR EPOXIDE	SW8081A	μg/kg	1	<1.1	<1.1
METHOXYCHLOR	SW8081A	μg/kg	10	<11	<11
TOXAPHENE	SW8081A	μg/kg	100	<110	<110

Component Analyzed	Method	Unit	PQL	Analysis Result YWV-UG02-SO-1020 01-05474-16	YWV-UG03-SO-1021 01-05474-17
PCBS					
Dilution Factor				1	1
PCB-1016 (AROCLOR 1016)	SW8082	μg/kg	50	<53	<54
PCB-1221 (AROCLOR 1221)	SW8082	μg/kg	50	<53	<54
PCB-1232 (AROCLOR 1232)	SW8082	μg/kg	50	<53	<54
PCB-1242 (AROCLOR 1242)	SW8082	μg/kg	50	<53	<54
PCB-1248 (AROCLOR 1248)	SW8082	μg/kg	50	<53	<54
PCB-1254 (AROCLOR 1254)	SW8082	μg/kg	25	<26	<27
PCB-1260 (AROCLOR 1260)	SW8082	μg/kg	25	<26	<27
POLYNUCLEAR AROMATIC HC (PAH)					
Dilution Factor				1	1
ACENAPHTHENE	SW8310	μg/kg	50	<53	<54
ACENAPHTHYLENE	SW8310	μg/kg	20	<21	<22
ANTHRACENE	SW8310	μg/kg	2	<2.1	<2.2
BENZO(A)ANTHRACENE	SW8310	μg/kg	2	<2.1	<2.2
BENZO(A)PYRENE	SW8310	μg/kg	2	<2.1	<2.2
BENZO(B)FLUORANTHENE	SW8310	μg/kg	2	<2.1	<2.2
BENZO(G,H,I)PERYLENE	SW8310	μg/kg	2	<2.1	<2.2
BENZO(K)FLUORANTHENE	SW8310	μg/kg	2	<2.1	<2.2
CHRYSENE	SW8310	μg/kg	2	<2.1	6.7
DIBENZ(A,H)ANTHRACENE	SW8310	μg/kg	5	<5.3	<5.4
FLUORANTHENE	SW8310	μg/kg	2	<2.1	<2.2
FLUORENE	SW8310	μg/kg	2	<2.1	<2.2
INDENO(1,2,3-C.D)PYRENE	SW8310	μg/kg	2	<2.1	<2.2
2-METHYLNAPHTHALENE	SW8310	μg/kg	50	<53	<54
NAPHTHALENE	SW8310	μg/kg	50	<53	<54
PHENANTHRENE	SW8310	μg/kg	2	<2.1	<2.2
PYRENE	SW8310	μg/kg	2	<2.1	<2.2

PQL: Practical Quantitation Limit. MDL: Method Detection Limit. CRDL: Contract Required Detection Limit

N.D.: Not Detected or less than the practical quantitation limit. "-": Analysis is not required.

J: Reported between PQL and MDL.

† All results are reported on dry basis for soil samples.

Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0

(a) MDL reported.

Respectfully submitted,

Dominic Lau
Laboratory Director
Applied P & Ch Laboratory

IT CORPORATION

Chain Of Custody

PROJ NO. 870508 | PROJECT NAME: NATIONAL PARK SERVICE = Waste Accumulation Area

IT Corp Contact (Name and Phone Number): Susan Huang - (925) 288-2099

NAME OF SAMPLER: M. Brown, J. Strack

Cooler Temperature: 4°C

NPS 10:
✓ Vogelsang ... 870508.01120120
_ Baseline ... 870508.02122120
_ Mather ... 870508.02103120
_ Camp Six ... TBD
_ El Capitan ... TBD
_ Cascade ... TBD

COC #: 187 Page 1 of 2
Cooler: 1 of 4
Lab: APCL
Ship Date: 8-23-01
FedEx No: 8291 9599 5156

Location ID	Sample DATE (mmddyy)	Sample TIME	VOCs (SW8260B)	SVOCs (SW8270C)	PAHs (SW8310)	TPH -D/MO (SW8015B) w/wo silica gel cleanup	OCP (Pesticides) (SW8081A)	PCBs (SW8082)	Metals (SW5010B/SW7470A/SW7471A)	Hexavalent Chromium (SW7196A)	Dioxins/Furans (SW8290)	Other	MATRIX	Comments
		Aqueous Sample	3 x 40mL V	2x1L A	2x1L A	2x1L A	2x1L A	2x1L A	1x500mL PE	1x500mL PE	2x1L A		A=Aqueous	
		Aqueous Preservative	HCl	ice	ice	ice	ice	ice	HNO3	ice	ice			
		Solid Sample	3 x EnCore	1 x [2"x6"] stainless steel sleeve							1 x [2"x6"]		S=Solid	
		Soil Preservative	ice	ice	ice	ice	ice	ice	ice	ice	ice			
Temperature Blank													A	One 40 mL in each cooler
YWV-UG01-SO-1019	082101	1030	X	X	X	X	X	X	X	X	X		S	
YWV-UG02-SO-1020		1115	X	X	X	X	X	X	X	X	X		S	SAMPLES
YWV-UG03-SO-1021		1155	X	X	X	X	X	X	X	X	X		S	FROZEN UPON
YWV-DG01-SO-1022		1355	X	X	X	X	X	X	X	X	X		S	RECEIPT
YWV-DG02-SO-1023		1430	X	X	X	X	X	X	X	X	X		S	
YWV-DG03-SO-1024		1505	X	X	X	X	X	X	X	X	X		S	
YWV-TP03-SO-1025		1630									X		S	5474
YWV-TP03-SO-1026		1640	X	X	X	X	X	X	X	X	X		S	
YWV-TP03-SO-1027		1650	X	X	X	X	X	X	X	X	X		S	
YWV-TP04-SO-1028	082201	1110	X	X	X	X	X	X	X	X	X		S	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
M. Brown / IT Corp to Fed Ex	8-23-01 / 1430	FEDEX	FEDEX	8/24/01 1045	[signature]

IT CORPORATION — Chain Of Custody

PROJ NO. 870508 | PROJECT NAME: NATIONAL PARK SERVICE = Waste Accumulation Area

IT Corp Contact (Name and Phone Number): Susan Huang - (925) 288-2099

NAME OF SAMPLER: M. Brown, J. Strack

Cooler Temperature: 4°C

NPS 10:
- ✓ Vogelsang ... 870508.01120120
- __ Baseline ... 870508.02122120
- __ Mather ... 870508.02103120
- __ Camp Six ... TBD
- __ El Capitan ... TBD
- __ Cascade ... TBD

COC #: ~~188~~ 187 MB 8/22
Page 2 of 2
Cooler: 1 of 4
Lab: APCL
Ship Date: 8-23-01
FedEx No: 8291 9599 5156

Location ID	Sample DATE (mmddyy)	Sample TIME	VOCs (SW8260B)	SVOCs (SW8270C)	PAHs (SW8310)	TPH-D/MO (SW8015B) w/wo silica gel cleanup	OCP (Pesticides) (SW8081A)	PCBs (SW8082)	Metals (SW5010B/SW7470A/SW7471A)	Hexavalent Chromium (SW7196A)	Dioxins/Furans (SW8290)	Other	MATRIX	Comments
		Aqueous Sample	3 x 40mL V	2x1L A	2x1L A	2x1L A	2x1L A	2x1L A	1x500mL PE	1x500mL PE	2x1L A		A=Aqueous	
		Aqueous Preservative	HCl	ice	ice	ice	ice	ice	HNO3	ice	ice			
		Solid Sample	3 x EnCore	1 x [2"x6"] stainless steel sleeve							1 x [2"x6"]		S=Solid	
		Soil Preservative	ice	ice	ice	ice	ice	ice	ice	ice	ice			
Temperature Blank													A	One 40 mL in each cooler
YWV-TP04-SO-1029	082201	1120									X		S	
YWV-TP04-SO-1030		1130	X	X	X	X	X	X	X	X	X		S	double volume for MS/MSD
YWV-TP04-SO-1031		1225	X	X	X	X	X	X	X	X	X		S	
YWV-TP02-SO-1032		1240	X	X	X	X	X	X	X	X	X		S	SAMPLES FROZEN
YWV-TP01-SO-1033		1405	X	X	X	X	X	X	X	X	X		S	UPON RECEIPT
YWV-TP01-SO-1034		1405	X	X	X	X	X	X	X	X	X		S	
last line MB 8/23														

5474

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
M. Brown / IT Corp to FedEx	8-23-01 1430	FEDEX	FEDEX	8/24/01 1045	[signature]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

APCL Applied Physics and Chemistry Laboratory

13760 Magnolia Avenue. Chino, CA 91710 TEL: (909)590-1828 FAX: (909)590-1498

September 25, 2001

Received
9/26/01

APCL
01-05475

Ms. Vicky Taylor
International Technology Corp.
4005 Port Chicago Highway
Concord, California 94520

Dear Ms. Taylor,

This box contains the Dioxin/Furans analysis for the Yosemite Project at both Vogelsang and Mather. However, the cover sheet indicates that it has more results than what is included here. The remainders of the results were requested by you and Susan days before we received these results, so there will be more results to come and they will come under the same SDG's as the ones included in this shipment. The sample results that are still missing are from SDG #5475: YWV-UG03-SO-1021, YWV-TP02-SO-1031; From SDG #5586: YWM-UG02-SO-1044, YWM-TP02-SO-1047.

Hope that this helps.

If there are any questions please call me at (909) 590-1828 Extension #113.

Sincerely yours,

Mark A. Heckman

Mark A. Heckman
Project Manager

APPLIED P & CH LABORATORY

#0B/3J Env.
10/23/01

Client Sample ID: YWV-~~DG02~~ IP03-SO-1025

Trace Level Organic Compounds

Lot-Sample #...: G1H280151-001
Date Sampled...: 08/21/01
Prep Date......: 08/28/01
Prep Batch #...: 1240515
% Moisture.....: 4.7

Work Order #...: EJM7G1AC
Date Received..: 08/28/01
Analysis Date..: 08/29/01

Matrix.........: SOLID

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.24	pg/g	SW846 8290
Total TCDD	ND	0.24	pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	0.40	pg/g	SW846 8290
Total PeCDD	ND	0.68	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	ND	0.29	pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	ND	0.34	pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	ND	0.35	pg/g	SW846 8290
Total HxCDD	ND	0.76	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	6.3	5.2	pg/g	SW846 8290
Total HpCDD	12	5.2	pg/g	SW846 8290
OCDD	31	10	pg/g	SW846 8290
2,3,7,8-TCDF	ND	0.20	pg/g	SW846 8290
Total TCDF	ND	0.48	pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	0.28	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND	0.27	pg/g	SW846 8290
Total PeCDF	ND	0.44	pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	ND	0.25	pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	ND	0.24	pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	ND	0.26	pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND	0.27	pg/g	SW846 8290
Total HxCDF	ND	0.62	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	ND	1.9	pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	ND	0.22	pg/g	SW846 8290
Total HpCDF	ND	1.9	pg/g	SW846 8290
OCDF	ND	2.2	pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	92	(40 - 135)
13C-1,2,3,7,8-PeCDD	83	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	99	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	102	(40 - 135)
13C-OCDD	90	(40 - 135)
13C-2,3,7,8-TCDF	95	(40 - 135)
13C-1,2,3,7,8-PeCDF	87	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	90	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	103	(40 - 135)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

APPLIED P & CH LABORATORY

Client Sample ID = YWV-TP04-SO-1029

Trace Level Organic Compounds

Lot-Sample #...: G1H280151-002 Work Order #...: EJM7P1AC Matrix.........: SOLID
Date Sampled...: 08/22/01 Date Received..: 08/28/01
Prep Date......: 08/28/01 Analysis Date..: 08/31/01
Prep Batch #...: 1240515
% Moisture.....: 18

PARAMETER	RESULT		DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	6.5		1.2	pg/g	SW846 8290
Total TCDD	50		1.2	pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND		2.4	pg/g	SW846 8290
Total PeCDD	25		6.1	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	ND		1.7	pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	3.5 F	J, Tr ✓	6.1	pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	3.3 F	J, Tr ✓	6.1	pg/g	SW846 8290
Total HxCDD	34		6.1	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	26		6.1	pg/g	SW846 8290
Total HpCDD	48		6.1	pg/g	SW846 8290
OCDD	69		12	pg/g	SW846 8290
2,3,7,8-TCDF	5.6 CON		1.2	pg/g	SW846 8290
Total TCDF	110		1.2	pg/g	SW846 8290
1,2,3,7,8-PeCDF	3.1 F	J, Tr ✓	6.1	pg/g	SW846 8290
2,3,4,7,8-PeCDF	6.1		6.1	pg/g	SW846 8290
Total PeCDF	51		6.1	pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	3.8 F	J, Tr ✓	6.1	pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	3.2 F	✓	6.1	pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	4.4 F	✓	6.1	pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND		0.27	pg/g	SW846 8290
Total HxCDF	23		6.1	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	9.9		6.1	pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	ND		0.44	pg/g	SW846 8290
Total HpCDF	9.9		6.1	pg/g	SW846 8290
OCDF	ND		3.3	pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	93	(40 - 135)
13C-1,2,3,7,8-PeCDD	83	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	96	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	97	(40 - 135)
13C-OCDD	94	(40 - 135)
13C-2,3,7,8-TCDF	104	(40 - 135)
13C-1,2,3,7,8-PeCDF	96	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	107	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	102	(40 - 135)

HAB | SJ Env
10/22/01

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

F Analyte was positively identified but the associated result is below the RL.

CON Confirmation analysis.

APCL Applied P & Ch Laborat – Subcontract Chain of Cust dy

13760 E. Magnolia Ave., Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

Please Print in pen

Page ____ of ____

TO: STL

Contact T. Temperty

Tel: (916) 374-4408 Fax: (916) 372-7168

Address 880 Riverside Parkway

City Sacramento

State CA

Zip code 95605

APCL Project Title/Code National Park Service

Sampler MB/JS

Sample disposition: Date ☒ client; ☐ APCL

Bill to (if different from above) APCL

Quotation # ACP070101

P.O.#

Due date ☒ regular ☐ rush

Client signature Mark A. Heckman

Date 8/27/01

Sample Description	Date Collected	Time Collected	Matrix	Pres. Y/N	Filtered Y/N	Analysis items	Unit Price*	APCL Lab-ID
YWV-~~DG02~~ B02-SO-1025	082101	1630	S	N		DIOXIN (8290) *@		5475-8
YWV-TP04-SO-1029	082201	1120	S	N		DIOXIN (8290) *@		5475-12
HOB/JJ Cal 10/23/01								

*High Resolution Full List

@ Data Requirements: Level 3 W/ EDD

RECEIVED IN GOOD CONDITION UNDER COC
AUG 28 2001
IM: LB

Sample Conditions: Seal ☒ Intact ☐ Broken ☐ None; Temperature ☒ Cold ☐ Room; Other

Relinquished by [signature]	Date/Time 8/27/01 1600	Received by [signature]	Date/Time 08
Relinquished by	Date/Time	Received by	Date/Time
Relinquished by	Date/Time	Received by	Date/Time
Relinquished by	Date/Time	Received by	Date/Time

* APCL must be notified if unit price is incorrect.

APPLIED P & CH LABORATORY

Client Sample ID : YWV-UG03-SO-1021

Trace Level Organic Compounds

Lot-Sample #...: G1I190244-001 Work Order #...: EKP1H1AC Matrix.........: SO
Date Sampled...: 08/21/01 Date Received..: 09/19/01
Prep Date......: 09/21/01 Analysis Date..: 09/25/01
Prep Batch #...: 1264132
% Moisture.....: 7.1

✓ entire page

PARAMETER	RESULT		DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	UJ-, H	0.48	pg/g	SW846 8290
Total TCDD	ND		0.48	pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND		0.70	pg/g	SW846 8290
Total PeCDD	ND		0.70	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	ND		0.79	pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	ND		0.86	pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	ND		0.76	pg/g	SW846 8290
Total HxCDD	ND		0.86	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	ND		0.65	pg/g	SW846 8290
Total HpCDD	ND		0.65	pg/g	SW846 8290
OCDD	ND		1.1	pg/g	SW846 8290
2,3,7,8-TCDF	ND		0.44	pg/g	SW846 8290
Total TCDF	37	J-, H	1.1	pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	UJ, H	0.60	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND		0.60	pg/g	SW846 8290
Total PeCDF	ND		0.60	pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	ND		0.76	pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	ND		0.76	pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	ND		0.82	pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND		0.89	pg/g	SW846 8290
Total HxCDF	ND		0.89	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	ND		0.36	pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	ND		0.44	pg/g	SW846 8290
Total HpCDF	ND		0.44	pg/g	SW846 8290
OCDF	ND		0.82	pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	86	(40 - 135)
13C-1,2,3,7,8-PeCDD	81	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	90	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	92	(40 - 135)
13C-OCDD	98	(40 - 135)
13C-2,3,7,8-TCDF	78	(40 - 135)
13C-1,2,3,7,8-PeCDF	74	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	94	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	91	(40 - 135)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

H29B/35 ENV
10/25/01

APPLIED P & CH LABORATORY

Client Sample ID = YWV-TP02-SO-1031

Trace Level Organic Compounds

Lot-Sample #...:	G1I190244-002	Work Order #...:	EKP1M1AC	Matrix.........:	SO
Date Sampled...:	08/21/01	Date Received..:	09/19/01		
Prep Date......:	09/21/01	Analysis Date..:	09/25/01		
Prep Batch #...:	1264132				
% Moisture.....:	5.2				

✓ entire page

PARAMETER	RESULT		DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	UJ-, H	0.52	pg/g	SW846 8290
Total TCDD	1.8	J-, H	1.1	pg/g	SW846 8290
1,2,3,7,8-PeCDD	ND	UJ-, H	1.0	pg/g	SW846 8290
Total PeCDD	ND		1.0	pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	ND		0.98	pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	ND		2.4	pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	ND		1.6	pg/g	SW846 8290
Total HxCDD	4.9	J-, H	5.3	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	42		5.3	pg/g	SW846 8290
Total HpCDD	71		5.3	pg/g	SW846 8290
OCDD	320		11	pg/g	SW846 8290
2,3,7,8-TCDF	1.8 CON		1.1	pg/g	SW846 8290
Total TCDF	5.0		1.1	pg/g	SW846 8290
1,2,3,7,8-PeCDF	ND	UJ-, H	0.73	pg/g	SW846 8290
2,3,4,7,8-PeCDF	ND		0.73	pg/g	SW846 8290
Total PeCDF	ND		1.6	pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	ND		0.75	pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	ND		0.75	pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	ND		0.80	pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	ND		0.88	pg/g	SW846 8290
Total HxCDF	4.4	J-, H	5.3	pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	5.3	J-, H	5.3	pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	ND	UJ-, H	0.66	pg/g	SW846 8290
Total HpCDF	19	J-, H	5.3	pg/g	SW846 8290
OCDF	11	J-, H	11	pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	88	(40 - 135)
13C-1,2,3,7,8-PeCDD	80	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	81	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	87	(40 - 135)
13C-OCDD	89	(40 - 135)
13C-2,3,7,8-TCDF	78	(40 - 135)
13C-1,2,3,7,8-PeCDF	71	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	89	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	87	(40 - 135)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

CON Confirmation analysis.

HAB/3J Env.
10/25/01

APCL

Applied P & Ch Laborat-y
13760 E. Magnolia Ave., Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

Subcontract Chain of Cus dy

Please Print in pen
Page 1 of 1

TO: STL
Address 880 RIVERSIDE
Contact T. Temperly
Tel: (916) 374-4408 Fax: (916) 372-7768
APCL Project Title/Code YOSEMITE #5475
City SACRAMENTO
State CA
Zip code 95605
Bill to (if different from above) APCL
Sampler M. BROWN
Sample disposition: Date 8/27/01 ☒ client; ☐ APCL
Due date ☒ regular ☐ rush
Quotation # apc 070101
P.O.#
Client signature MARK A. HECKMAN
Date 9/18/01

Sample Description	Date Collected	Time Collected	Matrix	Pres. Y/N	Filtered Y/N	Analysis items	Unit Price*	APCL Lab-ID
YWV-UG03-SO-1021	8/21/01	1155	S	N	N	DIOXIN/FURANS		5475-16
YWV-TP08-SO-1031	8/21/01	1225	S	N	N	BY 8290		
						HIGH RESOLUTION		5475-6
						FULL LIST		
						LEVEL 3 DATA PACKAGE		
						EDD-ENHANCED		
						ERPIMS		

Sample Conditions: Seal ☐ Intact ☐ Broken ☐ None; Temperature ☐ Cold ☐ Room; Other

Relinquished by [signature]	Date/Time 9/18/01 1600	Received by G.S.	Date/Time 9/18/01
Relinquished by G.S.	Date/Time 9/19/01	Received by [signature]	Date/Time 1010 9.19.01
Relinquished by	Date/Time	Received by	Date/Time
Relinquished by	Date/Time	Received by	Date/Time

* APCL must be notified if unit price is incorrect.

APPENDIX D

BACKGROUND ASSESSMENT USING UPPER TOLERANCE LIMIT APPROACH

APPENDIX D
BACKGROUND ASSESSMENT USING UPPER TOLERANCE LIMIT APPROACH

A background assessment has been performed for the waste accumulation areas (WAAs) using a statistical technique referred to as the upper tolerance limit (UTL) approach. This approach for evaluating WAA data and background data compares the WAA maximum detected concentrations (MDC) with the background UTL. The UTL is the concentration, with a probability of 0.95 (or a confidence of 95 percent), that will capture (or cover) 95 percent of background samples if a large number of samples were taken. For this risk evaluation, 20 background soil samples were collected upgradient from ten WAAs at Yosemite, as follows:

- Curry, Taft Toe, South Pit, Pohono, and Gaylor -- 1 background sample each
- Vogelsang, Mather, Baseline, El Capitan, and Camp Six -- 3 background samples each

Assuming that these site data truly reflect background, there is a 5 percent probability that any site sample concentration will exceed the UTL. Chemicals with MDCs less than the background UTL have been eliminated from further consideration. If the MDC exceeds the UTL, the chemical was retained as a constituent of potential concern (COPC). It should be noted that a more rigorous statistical analysis may be performed, on a case-by-case basis. This statistical analysis consists of comparing the site and background data sets to determine if both are drawn from the same population. The Mann Whitney U Test (also called the Wilcoxon Rank Sum test) is used for this purpose, because it is applicable to all data distributions.

The UTL was calculated as follows, for a data set with a normal data distribution (Gilbert, 1987). Data sets were tested for normality and lognormality with the Shapiro-Wilk test (EPA, 1992).

$$UTL_{0.95} = \bar{x} + sK_{0.95,0.95}$$

where:	$UTL_{0.95}$	=	upper tolerance limit
	$\bar{x}$	=	arithmetic mean of the background data
	s	=	arithmetic standard deviation
	$K_{0.95,0.95}$	=	tolerance factor for estimating the 95 percent confidence limit for the 95th quantile (Gilbert, 1987; Table A-3)

The UTL was calculated as follows, for a data set with a lognormal data distribution (Gilbert, 1987). Data sets were tested for normality and lognormality with the Shapiro-Wilk test (USEPA, 1992).

$$UTL_{0.95} = \exp\left[\bar{y} + s_y K_{0.95,0.95}\right]$$

where:	$UTL_{0.95}$	=	upper tolerance limit
	$\bar{y}$	=	arithmetic mean of the log-transformed background data, $y = \ln(x)$
	s_y	=	standard deviation of the log-transformed data
	$K_{0.95,0.95}$	=	tolerance factor for estimating the 95 percent confidence limit for the 95th quantile (Gilbert, 1987; Table A-3)

If a chemical was found to have neither a normal nor a lognormal data distribution, the lower of the normal UTL and lognormal UTL was used, as a conservative approach.

Based on the results of the statistical analysis, UTLs for background inorganic constituents at the Yosemite WAAs are presented in Appendix Table D-1.

REFERENCES:

Gilbert, R.O., 1987. *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, New York, 320 pp.

U.S. Environmental Protection Agency, 1992. *Supplemental Guidance to RAGS: Calculating the Concentration Term*, Intermittent Bulletin Volume 1 Number 1, OS-230, Publication 9285.7-081, Office of Emergency and Remedial Response, Hazardous Site Evaluation Division, Washington DC.

TABLE D-1: BACKGROUND UPPER TOLERANCE LEVEL STATISTICS FOR WASTE ACCUMULATION AREA SOILS, YOSEMITE NATIONAL PARK, CALIFORNIA

(All data in mg/kg)

Constituent	Total Sample Number	Detects	Frequency of Detection	Minimum Detection	Maximum Detection	Arithmetic Mean	Data Distribution [a]	95% UTL (normal) [b]	95% UTL (lognormal) [b]	Background Statistic [c]
Antimony	20	20	100%	5.1	22	10.63	U	28.849735	42.658414	28.8
Arsenic	20	20	100%	0.31	28.6	3.401	L	17.863088	19.384774	19.4
Barium	20	20	100%	4.2	191	94.355	N	211.083953	600.249177	211
Beryllium	20	17	85%	0.2	0.84	0.3965	U	1.121787	1.894981	1.12
Cadmium	20	17	85%	0.0096	0.42	0.16778	U	0.458719	0.986268	0.46
Chromium, total	20	17	85%	1.2	16.2	5.335	U	13.775418	28.844811	13.8
Cobalt	20	20	100%	1	19.5	8.26	N	18.467605	32.211603	18.5
Copper	20	20	100%	3.5	28.6	12.16	L	32.470721	50.852886	50.9
Iron	1	1	100%		18300	18300				NA [d]
Lead	20	20	100%	1.4	29.6	7.29	L	25.32971	33.946092	33.9
Mercury	20	20	100%	0.022	1	0.18035	L	0.722335	1.195662	1.20
Molybdenum	20	19	95%	0.087	1.3	0.54635	N	1.323793	2.441042	1.32
Nickel	20	20	100%	0.59	7.2	4.5445	N	8.484157	15.604501	8.48
Selenium	20	20	100%	0.43	2.2	1.1505	U	2.925711	4.630208	2.93
Silver	20	20	100%	0.033	2.2	1.018	U	2.948897	9.126064	2.95
Thallium	20	17	85%	0.51	2.2	0.9105	U	2.435631	3.007936	2.44
Vanadium	20	20	100%	10.3	76.2	39.565	N	76.0896	111.108313	76.1
Zinc	20	20	100%	11.4	70.8	45.135	N	84.088535	121.568339	84.1
Chromium, hexavalent	20	6	30%	0.51	0.53	0.29225	U	0.696769	1.140246	0.70

NOTES:

[a] N = normal data distribution; L = lognormal data distribution; U = undefined data distribution.

[b] UTL = Upper Tolerance Limit; presented for both normal and lognormal data distributions.

[c] Background Statistic is UTL for identified data distribution. If distribution is undefined (U), then lower 95% UTL is conservatively used.

[d] NA = not available, as only one sample analyzed for iron.

APPENDIX E

REFINED BACKGROUND ASSESSMENT USING MANN WHITNEY U TEST APPROACH

Mann-Whitney U for Cadmium (mg/kg)
Grouping Variable: Sample Type

Vogelsang WAA vs.
Yosemite Backgrouind

U	11.500
U Prime	188.500
Z-Value	-3.893
P-Value	<.0001
Tied Z-Value	-3.936
Tied P-Value	<.0001
# Ties	5

Mann-Whitney Rank Info for Cadmium (mg/kg)
Grouping Variable: Sample Type

	Count	Sum Ranks	Mean Rank
Background	20	221.500	11.075
Vogelsang sample	10	243.500	24.350

Mann-Whitney U for Copper (mg/kg)
Grouping Variable: Sample Type

U	18.000
U Prime	182.000
Z-Value	-3.608
P-Value	.0003
Tied Z-Value	-3.608
Tied P-Value	.0003
# Ties	1

Mann-Whitney Rank Info for Copper (mg/kg)
Grouping Variable: Sample Type

	Count	Sum Ranks	Mean Rank
Background	20	228.000	11.400
Vogelsang sample	10	237.000	23.700

Mann-Whitney U for Lead (mg/kg)
Grouping Variable: Sample Type

U	42.000
U Prime	158.000
Z-Value	-2.552
P-Value	.0107
Tied Z-Value	-2.552
Tied P-Value	.0107
# Ties	1

Mann-Whitney Rank Info for Lead (mg/kg)
Grouping Variable: Sample Type

	Count	Sum Ranks	Mean Rank
Background	20	252.000	12.600
Vogelsang sample	10	213.000	21.300

Mann-Whitney U for Molybdenum (mg/kg)
Grouping Variable: Sample Type

U	0.000
U Prime	200.000
Z-Value	-4.399
P-Value	<.0001
Tied Z-Value	-4.403
Tied P-Value	<.0001
# Ties	5

Mann-Whitney Rank Info for Molybdenum (mg/kg)
Grouping Variable: Sample Type

	Count	Sum Ranks	Mean Rank
Background	20	210.000	10.500
Vogelsang sample	10	255.000	25.500

Mann-Whitney U for Zinc (mg/kg)
Grouping Variable: Sample Type

U	56.000
U Prime	144.000
Z-Value	-1.936
P-Value	.0529
Tied Z-Value	-1.936
Tied P-Value	.0529
# Ties	0

Mann-Whitney Rank Info for Zinc (mg/kg)
Grouping Variable: Sample Type

	Count	Sum Ranks	Mean Rank
Background	20	266.000	13.300
Vogelsang sample	10	199.000	19.900

	Sample ID	Depth (ft)	Sample Type	Cadmium (mg/kg)
1	YWV-TP01-SO-1033/10...	1.000	Vogelsang sample	.220
2	YWV-TP02-SO-1031	1.200	Vogelsang sample	.300
3	YWV-TP02-SO-1032	2.500	Vogelsang sample	.130
4	YWV-TP03-SO-1026	1.200	Vogelsang sample	14.800
5	YWV-TP03-SO-1027	2.500	Vogelsang sample	1.000
6	YWV-TP04-SO-1030	1.600	Vogelsang sample	.280
7	YWV-TP04-SO-1028	3.300	Vogelsang sample	.450
8	YWV-DG01-SO-1022	1.000	Vogelsang sample	.250
9	YWV-DG02-SO-1023	1.000	Vogelsang sample	.230
10	YWV-DG03-SO-1024	1.000	Vogelsang sample	.220
11	YWB-UG01-SO-1059	1.000	Background	.210
12	YWB-UG02-SO-1060	1.000	Background	.210
13	YWB-UG03-SO-1063	1.000	Background	.210
14	YWM-UG01-SO-1043	1.000	Background	.210
15	YWM-UG02-SO-1044	1.000	Background	.210
16	YWM-UG03-SO-1045	1.000	Background	.210
17	YWC00-741	1.500	Background	.041
18	YWT00-771	1.200	Background	.055
19	YWS00-786	.500	Background	.050
20	YWCX-UG01-1147	1.000	Background	.050
21	YWCX-UG02-1148	1.000	Background	.050
22	YWCX-UG03-1149	1.000	Background	.050
23	YWEC-UG01-SO-1102	1.000	Background	.050
24	YWEC-UG02-SO-1103	1.000	Background	.050
25	YWEC-UG03-SO-1104	1.000	Background	.050
26	YWP00-822	1.000	Background	.055
27	YWV-UG01-SO-1019	1.000	Background	.010
28	YWV-UG02-SO-1020	1.000	Background	.055
29	YWV-UG03-SO-1021	1.000	Background	.250
30	YWG00-705	1.500	Background	.160

	Copper (mg/kg)	Lead (mg/kg)	Molybdenum (mg/kg)	Zinc (mg/kg)	Bkgrd Si
1	16.100	4.250	20.500	23.000	
2	163.000	64.600	5.500	233.000	
3	152.000	13.400	25.800	80.000	
4	31.400	9.700	20.000	128.000	
5	46.100	91.500	24.300	456.000	
6	373.000	8.900	10.600	102.000	
7	262.000	29.400	4.000	131.000	
8	23.900	5.300	88.600	61.500	
9	18.300	5.000	32.500	29.200	
10	15.500	5.200	22.700	24.500	
11	4.900	8.200	.420	64.800	Baseline
12	4.600	4.800	.420	59.800	Baseline
13	5.900	6.800	.410	67.400	Baseline
14	3.500	3.500	.410	27.100	Mather
15	10.000	5.100	.390	40.100	Mather
16	3.900	3.700	.600	52.800	Mather
17	28.600	2.700	.087	60.600	Curry
18	9.000	4.600	.900	39.900	Taft Toe
19	8.900	4.700	.100	43.700	South Pit
20	21.900	4.100	.110	45.900	Camp Six
21	25.700	29.600	.110	60.100	Camp Six
22	23.200	26.000	.100	70.800	Camp Six
23	7.500	3.100	.960	44.400	El Capitan
24	9.000	6.600	.620	55.600	El Capitan
25	6.300	4.200	.620	41.900	El Capitan
26	13.200	1.500	.110	29.900	Pohono
27	11.800	3.500	.610	21.800	Vogelsang
28	4.000	1.400	.340	11.400	Vogelsang
29	27.700	8.700	1.300	31.600	Vogelsan
30	13.600	13.000	.570	33.100	Gaylor

TABLE E-1: BACKGROUND STATISTICAL ANALYSIS SUMMARY
VOGELSANG WASTE ACCUMULATION AREA, YOSEMITE NATIONAL PARK, CALIFORNIA

Inorganic Constituents of Potential Concern [a]	Maximum Detected Soil Concentration (mg/kg)	Background Soil UTL (mg/kg) [b]	Maximum Concentration Greater Than UTL?	If Yes, Mann-Whitney U Test Results, expressed as P-value [c]	WAA Concentrations Significantly Different Than Background? [d]
Arsenic	6.4	19.4	No	-	No
Cadmium	14.8	0.46	Yes	< 0.0001	Yes
Copper	373	50.9	Yes	0.0003	Yes
Chromium (total)	7.8	13.8	No	-	No
Lead	91.5	33.9	Yes	0.011	Yes
Mercury (total)	0.66	1.20	No	-	No
Molybdenum	88.6	1.32	Yes	< 0.0001	Yes
Vanadium	35	76.1	No	-	No
Zinc	456	84.1	Yes	0.053	No

NOTES:
[a] COPCs presented are those with maximum detected concentration above either human health residential preliminary remediation goals (PRGs) or ecological PRGs.
[b] UTL = upper tolerance limit, see Appendix D for details.
[c] The Mann-Whitney U Test (MWUT), a nonparametric statistical test commonly used to compare site data with background data, was run if the maximum site constituent concentration was greater than the background UTL. MWUT results are probabilities (P-values), and details are presented in Appendix E.
[d] Concentrations of a constituent are significantly different from background if the P-value from the MWUT is less than or equal to 0.05. If the P-value is greater than 0.05, it is concluded that the constituent concentrations between the WAA and background data sets are not statistically different. Soil data were checked to make sure that if a significant difference was found, that it was related to WAA concentrations being greater than background, not less than background. If this latter situation was found, it has been indicated as such on the table.

APPENDIX F

DERIVATION OF SITE-SPECIFIC RISK-BASED ECOLOGICAL PRGS

APPENDIX F
DERIVATION OF SITE-SPECIFIC RISK-BASED ECOLOGICAL PRELIMINARY REMEDIATION GOALS

Site-specific ecological preliminary remediation goals (PRGs) for Vogelsang WAA were estimated for cadmium, copper, lead, molybdenum, and 2,3,7,8-TCDD as follows, using the selected sensitive wildlife receptors: the Short-tailed Shrew and the American Robin (Section 5.2); COPEC- and WAA-specific information (Section 5.3), and toxicity benchmarks for these five COPECs (from Sample et. al., [1996]) (Section 5.4).

SHORT-TAILED SHREW

Cadmium
PRG_{Cd} = (Short-tailed shrew $Benchmark_{Cd}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]
where:

- Short-tailed shrew benchmarks (NOAEL and LOAEL for cadmium in food) = 3.533 and 35.33 mg/kg
- Soil-to-Earthworm BAF/BCF = 5.0.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the short-tailed shrew (1.0 acre) = 0.5.

thus:

short-tailed shrew NOAEL-PRG_{Cd} = (3.533)/[(5.0)(0.5)] = 1.4 mg/kg
short-tailed shrew LOAEL-PRG_{Cd} = (35.33)/[(5.0)(0.5)] = 14 mg/kg.

Copper
PRG_{Cu} = (Short-tailed shrew $Benchmark_{Cu}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]
where:

- Short-tailed shrew benchmarks (NOAEL and LOAEL for copper in food) = 55.7 and 73.3 mg/kg
- Soil-to-Earthworm BAF/BCF =0.067.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the short-tailed shrew (1.0 acre) = 0.5.

thus:

short-tailed shrew NOAEL-PRG_{Cu} = (55.7)/[(0.067)(0.5)] = 1,663 mg/kg
short-tailed shrew LOAEL-PRG_{Cu} = (73.3)/[(0.067)(0.5)] = 2,188 mg/kg.

Lead
PRG_{Pb} = (Short-tailed shrew $Benchmark_{Pb}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]
where:

- Short-tailed shrew benchmarks (NOAEL and LOAEL for lead in food) = 29.3 and 293 mg/kg
- Soil-to-Earthworm BAF/BCF = 0.36.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the short-tailed shrew (1.0 acre) = 0.5.

thus:

short-tailed shrew NOAEL-PRG_{Pb} = (29.3)/[(0.36)(0.5)] = 163 mg/kg
short-tailed shrew LOAEL-PRG_{Pb} = (293)/[(0.36)(0.5)] = 1,628 mg/kg.

Molybdenum
PRG_{Mo} = (Short-tailed shrew $Benchmark_{Mo}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]
where:

- Short-tailed shrew benchmarks (NOAEL and LOAEL for molybdenum in food) = 0.52 and 5.15 mg/kg
- Soil-to-Earthworm BAF/BCF = 1.3.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the short-tailed shrew (1.0 acre) = 0.5.

thus:

short-tailed shrew NOAEL-PRG_{Mo} = (0.52)/[(1.3)(0.5)] = 0.8 mg/kg
short-tailed shrew LOAEL-PRG_{Mo} = (5.15)/[(1.3)(0.5)] = 7.9 mg/kg.

2,3,7,8-TCDD

$PRG_{2378\text{-}TCDD}$ = (Short-tailed shrew $Benchmark_{2378\text{-}TCDD}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]

where:

- Short-tailed shrew benchmarks (NOAEL and LOAEL for 2,3,7,8-TCDD in food) = 0.0000037 and 0.0000366 mg/kg
- Soil-to-Earthworm BAF/BCF = 4.5.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the short-tailed shrew (1.0 acre) = 0.5.

thus:

short-tailed shrew NOAEL-$PRG_{2378\text{-}TCDD}$ = (0.0000037)/[(4.5)(0.5)] = 1.6E-6 mg/kg
short-tailed shrew LOAEL-$PRG_{2378\text{-}TCDD}$ = (0.0000366)/[(4.5)(0.5)] = 1.6E-5 mg/kg.

AMERICAN ROBIN

Cadmium

PRG_{Cd} = (American robin $Benchmark_{Cd}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]

where:

- American robin benchmarks (NOAEL and LOAEL for cadmium in food) = 1.2 and 16.56 mg/kg
- Soil-to-Earthworm BAF/BCF = 5.0.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the American robin (1.2 acres) = 0.42.

thus:

American robin NOAEL-PRG_{Cd} = (1.2)/[(5.0)(0.42)] = 0.6 mg/kg
American robin LOAEL-PRG_{Cd} = (16.56)/[(5.0)(0.42)] = 7.9 mg/kg.

Copper

PRG_{Cu} = (American robin $Benchmark_{Cu}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]

where:

- American robin benchmarks (NOAEL and LOAEL for copper in food) = 38.9 and 51.1 mg/kg
- Soil-to-Earthworm BAF/BCF = 0.067
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the American robin (1.2 acres) = 0.42.

thus:

American robin NOAEL-PRG_{Cu} = (38.9)/[(0.067)(0.42)] = 1,382 mg/kg
American robin LOAEL-PRG_{Cu} = (51.1)/[(0.067)(0.42)] = 1,816 mg/kg.

Lead

PRG_{Pb} = (American robin $Benchmark_{Pb}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]

where:

- American robin benchmarks (NOAEL and LOAEL for lead in food) = 0.94 and 9.36 mg/kg

- Soil-to-Earthworm BAF/BCF = 0.36.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the American robin (1.2 acres) = 0.42.

thus:

American robin NOAEL-PRG_{Pb} = (0.94)/[(0.36)(0.42)] = 6.2 mg/kg
American robin LOAEL-PRG_{Pb} = (9.36)/[(0.36)(0.42)] = 62 mg/kg.

Molybdenum

PRG_{Mo} = (American robin $Benchmark_{Mo}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]
where:

- American robin benchmarks (NOAEL and LOAEL for molybdenum in food) = 2.9 and 29.23 mg/kg
- Soil-to-Earthworm BAF/BCF = 1.3.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the American robin (1.2 acres) = 0.42.

thus:

American robin NOAEL-PRG_{Mo} = (2.9)/[(1.3)(0.42)] = 5.3 mg/kg
American robin LOAEL-PRG_{Mo} = (29.23)/[(1.3)(0.42)] = 54 mg/kg.

2,3,7,8-TCDD

$PRG_{2378\text{-}TCDD}$ = (American robin $Benchmark_{2378\text{-}TCDD}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]
where:

- American robin benchmarks (NOAEL and LOAEL for 2,3,7,8-TCDD in food) = 0.0000116 and 0.0001159 mg/kg
- Soil-to-Earthworm BAF/BCF = 4.5.
- Area Use Factor is calculated by dividing the WAA area (approximately 0.5 acre) by the home range of the American robin (1.2 acres) = 0.42.

thus:

American robin NOAEL-$PRG_{2378\text{-}TCDD}$ = (0.0000116)/[(4.5)(0.42)] = 6.1E-6 mg/kg
American robin LOAEL-$PRG_{2378\text{-}TCDD}$ = (0.0001159)/[(4.5)(0.42)] = 6.1E-5 mg/kg.

Attachment 2

NPS SAP for Vogelsang FWDA (CDM Smith 2018)

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Contaminated Sites Program
Environmental Compliance and Response Branch

National Park Service
U.S. Department of the Interior

NPS Sampling and Analysis Plan

Yosemite National Park

Vogelsang Former Waste Disposal Area
EDL #: 5PWR169

Prepared by

CDM Smith

8/22/2018

Revision Log:

Revision #	**Revision Date**	**Revision Description**
0	8/22/2018	---

NPS Federal Government Lead Name

NPS Regional Environmental Coordinator Name

NPS Federal Government Lead Signature

NPS Regional Environmental Coordinator Signature

Date

Date

By signing above, the signatories verify that they understand and concur with the information, procedures, and recommendations presented herein

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List of Abbreviations and Acronyms

95UCL	95% upper confidence level
°F	degree Fahrenheit
bgs	below ground surface
APPL	Agriculture & Priority Pollutants Laboratories, Inc.
BMP	best management practice
CAM	California Assessment Manual
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	chain-of-custody
COPC	contaminant of potential concern
COR	contracting officer representative
CSM	conceptual site model
DOI	U.S. Department of the Interior
DQI	data quality indicator
DQO	data quality objective
DTSC	Department of Toxic Substances Control
DU	decision unit
EcoNOTE	DTSC Guidance for Ecological Risk Assessment
EDD	electronic data deliverable
EDL	Environmental and Disposal Liabilities
EE/CA	engineering evaluation/cost analysis
EO	Executive Order
ESI	expanded site inspection
FSDS	field sample data sheet
FSI	focused site inspection
FSP	field sampling plan
FWDA	former waste disposal area
GPS	global positioning system
HASP	health and safety plan
HERO	Office of Human and Ecological Risk

HI	hazard index
HPLC	high performance liquid chromatography
HQ	hazard quotient
HSC	High Sierra Camp
IDW	investigation-derived waste
IDQTF	Intergovernmental Data Quality Task Force
ISM	incremental sampling methodology
ITRC	Interstate Technology & Regulatory Council
MCL	maximum contaminant level
mg/kg	milligram per kilogram
mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
NCP	National Oil and Hazardous Substances Pollution Contingency Plan (aka National Contingency Plan)
NPS	National Park Service
PAH	polycyclic aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PQL	practical quantitation limit
PPE	personal protective equipment
QAPP	quality assurance project plan
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
RSD	relative standard deviation
RSL	Regional Screening Level
SAP	sampling and analysis plan
SF	square feet
SHPO	State Historic Preservation Officer
SL	screening level
SOP	standard operating procedure

SU	sampling unit
SVOC	semi-volatile organic compound
TPH	total petroleum hydrocarbon
TSDF	treatment, storage, and disposal facility
U.S.C.	U.S. Code
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1 Introduction

This document serves as the sampling and analysis plan (SAP) for the Vogelsang Former Waste Disposal Area (FWDA) (Site). The purpose of this SAP is to define:

- The purpose of this investigation
- The use for the data generated
- The quality of data needed to accomplish the goals of this investigation
- The data collection method

1.1 CERCLA and National Park Service Authority

Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S. Code (U.S.C.) § 9604, authorizes the president to respond to releases of hazardous substances to protect the public health or welfare or the environment consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. Pursuant to Executive Order (EO) 12580, as amended by EO 13016, the president has delegated his Section 104 authority to the Secretary of the Interior to respond to releases of hazardous substances on or from land under U.S. Department of the Interior's (DOI's) jurisdiction, custody or control. The Secretary of the Interior has re-delegated CERCLA Section 104 authorities to the Director of the National Park Service (NPS) with respect to releases on or from NPS-managed lands. Pursuant to its delegated authority, NPS is the CERCLA "lead agency" as defined by NCP 40 CFR Part 300 for response actions where the release or threatened release of hazardous substances is on any facility under the jurisdiction, custody, or control of NPS. Based on this authority, NPS has contracted CDM Smith to prepare this SAP for the Site located within Yosemite National Park (Yosemite). This SAP is part of the expanded site inspection (ESI) being conducted at the Site by NPS and is in compliance with the requirements of CERCLA and the NCP.

This document has been prepared in accordance with the Yosemite National Park Agreement (Docket HWCA: P1-99/00-006), effective date March 6, 2001, between the California Department of Toxic Substances Control (DTSC) and NPS (Agreement). Pursuant to the terms of the Agreement, this document is intended to comply with the requirements of both CERCLA Sections 104 and 120 and the State of California, Hazardous Waste Management Program, which is codified in Chapter 6.5 of Division 20 of the California Health and Safety Code. DTSC is authorized to administer the State Hazardous Waste Management Program in lieu of the federal hazardous waste management requirements of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901, et. seq.

This SAP was generated in accordance with the United States Environmental Protection Agency's (USEPA) *Guidance on Systematic Planning Using the Data Quality Objectives Process* (USEPA 2006a), *Guidance for Quality Assurance Project Plans* (USEPA 2002b), *EPA Requirements for Quality Assurance Project Plans* (USEPA 2001), and the Intergovernmental Data Quality Task Force's (IDQTF) *Uniform Federal Policy for Quality Assurance Project Plans* (IDQTF 2005).

CERCLA's implementing regulations, codified in the NCP and 40 CFR Part 300, establishes the framework for CERCLA response actions. If environmental samples are to be collected, a SAP is required (See NCP Sections 300.415 and 300.430). The SAP is comprised of two parts: the field sampling plan (FSP) and the quality assurance project plan (QAPP). The FSP describes the number, types, and locations of samples and the types of analyses that will be conducted on the samples. The QAPP describes the project's policy, organization, and functional activities and the data quality objectives (DQOs) and measures necessary to achieve the goals of the investigation.

In addition, NPS has a number of regulations that apply to the release of hazardous substances on property under the jurisdiction of NPS (see NPS 2014a), including the NPS Organic Act of 1916 (16 U.S.C. § 1, et seq. 36 CFR Part 1), which requires that NPS manage parks in order "*to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations*." Therefore, determining whether debris buried at the Site poses risks to current and future human and ecological receptors is especially relevant to NPS responsibility to protect park resources.

To the extent practicable, all work will be conducted in accordance with USEPA guidance, *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites* (USEPA 2008b).

1.2 Purpose of Field Sampling

In 2001, NPS entered into a consent agreement with DTSC. NPS agreed to determine the nature and extent of contamination at various sites within Yosemite, including the Site. Under the agreement, NPS is exercising its CERCLA lead agency authority, and DTSC is exercising its RCRA Corrective Action authority.

The purpose of this sampling program is to conduct data collection activities that will adequately characterize the nature and extent of contamination.

This SAP proposes specific activities to supplement existing data and fill gaps in current understanding of contamination at the Site:

- Soil sampling to characterize the nature and extent of soil contamination and,
- Soil sampling to establish local background concentrations to identify Site-related contaminants in soil.

NPS will use the data obtained from these investigations in accordance with the provisions outlined in the DQOs detailed in Section 4.

1.3 Site Location

The Site is located in wilderness within the Cathedral Range south of Tuolumne Meadows at an elevation of approximately 10,300 feet above mean sea level. The Site is located within a sparsely vegetated subalpine pine forest and is accessed from Tuolumne Meadows via a 6.9-mile hiking trail along Rafferty Creek. The Site is located about 100 feet southwest of the Vogelsang High Sierra Camp (HSC) in a grassy ephemeral drainage between two low granite outcrops. It is bordered by Fletcher Creek to the south, a meadow and leach field to the west, and a corral for pack animals to the north. The Site covers approximately 19,500 square feet (0.45 acre), with most of the subsurface debris concentrated in several depressions. **Figure 1** shows the location of the Site (IT Corporation 2002).

2 Site Description, Previous Investigations, and Conceptual Site Model

This section summarizes all the known environmental information and historical activities that have occurred at the Site and presents this information in the form of a conceptual site model (CSM). The development of a clear and thorough CSM is a critical component for ensuring that key site elements are considered before any samples are collected, gaining stakeholder approval, assisting the planning team in developing the DQOs (Section 4), and assisting the field team in making decisions in the field.

2.1 Key Site Features

Site Description

As previously described, the Site is located in wilderness at an elevation of approximately 10,300 feet above mean sea level. The Site is located within a sparsely vegetated subalpine pine forest. The Site covers approximately 19,500 square feet (0.45 acre), with most of the subsurface debris concentrated in several depressions.

Operational History

NPS' archeological report entitled "*Victory Culture*" (Burton et al. 2003) contains a section on the Vogelsang FWDA. The following discussion of the Site operational history is taken from this report.

In an effort to relieve the overcrowding of the Yosemite Valley and to encourage people to visit other parts of the Park, the Park Service authorized the Desmond Company to construct "mountain chalets" in the Yosemite backcountry in 1916. The original lodges were built at Merced Lake, Tenaya Lake, and Tuolumne Meadows. Two additional camps, at Little Yosemite Valley and Boothe Lake, were opened in 1924. The Boothe Lake camp was subject to drainage and mosquito problems, and was moved in the 1930s to the junction of the Vogelsang, Rafferty Creek, and Lyell Fork Trails and the name was changed to Vogelsang, after the adjacent peak and pass. In 1940, the Vogelsang HSC was moved once again, this time to its current location on Fletcher Creek. Today the Vogelsang camp is open from approximately July to September. Facilities include a stone kitchen with an attached tent dining area and store, 12 tent cabins to accommodate up to 42 guests, a shower tent, a restroom, a few storage buildings, a barn, and a corral. A leach field for sewage disposal was constructed in 1965, and a sewer mound was constructed about 1987. All solid waste generated at the camp is now hauled out by pack stock. Water is available at the camp and there is a dispersed backpackers' campground nearby with a composting toilet.

The Site was formerly used as a waste disposal area; however, disposal records were not kept to verify exact dates and uses of the site. Although NPS archeologists' investigations (Burton et al. 2003) did not yield any 1940s era trash, it is likely that the era of disposal spanned from 1940-1965, and that other waste from this earlier period may be found in other "untested" portions of the site.

Waste Characteristics

Waste debris at the Site includes crushed and rusted metal cans, metal household objects, broken glass, and broken china. This debris was observed during the focused site inspection (FSI) performed by IT Corporation in 2001 (IT Corporation 2002). Other than what can be deduced from field observations, documentation of waste disposal activities is not available.

Site Geology and Hydrogeology

The following description of Site geology is from the 2002 FSI (IT Corporation 2002):

The Vogelsang FWDA is located within the Sierra Nevada granitic batholith. The native soil at the site consists mostly of sand and silt with minor clay and gravel. The soil materials are primarily granitic in origin with lesser amounts derived from local metamorphic rocks. The depth to bedrock within the main portion of the FWDA varied between 2.5 and 3.5 feet below ground surface (bgs).

No evidence of surface drainage or ponding was observed on the Vogelsang FWDA during the FSI. The nearest down-slope surface water occurrence is Fletcher Creek, approximately 350 feet southwest of the FWDA (see **Figure 1**). Fletcher Creek flows southwest into the Merced River drainage.

Site Hydrology

No groundwater monitoring wells exist within or near the boundary of the FWDA, and groundwater was not encountered in any of the test pits that were excavated during the FSI; therefore, depth to groundwater is unknown at the site. The nearest drinking water well is located at the Tuolumne Meadows Ranger Station, 7.5 miles north of Vogelsang in the Tuolumne River drainage system. The nearest drinking water wells in the Merced River drainage are at Yosemite Lodge, approximately 16 miles from the FWDA.

Local Climate

Average total annual precipitation at Yosemite National Park is 36 inches, with the wet season spanning November to April. The 25-year 24-hour maximum rainfall is 6.51 inches. Average total annual snowfall at the park is 65 inches, with the heaviest snowfall occurring from December through March. Monthly maximum temperature ranges from 47 to 89 degrees Fahrenheit (°F), whereas monthly minimum temperature ranges from 25 to 53°F.

2.2 Summary of Previous Investigations

The NPS conducted a preliminary assessment site visit in 1998 (Yosemite National Park Landfill Inventory Report Form, NPS, 1998). Soil core samples from depths of two feet or less at four locations were combined into a single composite soils sample that was analyzed for extractable petroleum hydrocarbons, volatile organic compounds (VOCs), organochlorine pesticides, polychlorinated biphenyls (PCBs), and metals. All detections were less than default human health screening levels (SLs) except arsenic, which exceeded the residential soil SL but was less than the industrial soil SL.

The Site is discussed within DTSC's 1999 *RCRA Facility Assessment* (DTSC 1999). However, due to its remote location, the site was not inspected during the Visual Site Inspections conducted by DTSC.

In August 2001, IT Corporation conducted an FSI at the Site. Due to the site being within the confines of wilderness, IT Corporation field personnel hand-excavated four test pits within the main debris area at the Site (see **Appendix A**, FSI Figure 2-2). Supplies were carried in by mules and no heavy equipment or mechanized tools were used. As each test pit was excavated, the site geologist described the soil exposed in the test pit sidewall on a test pit log. The native soil was composed mainly of medium to dark red-brown sand with varying amounts of silt and/or clay and scattered pebbles. Subsurface debris was noted in test pits TP02, TP03, and TP04; these test pits were terminated on bedrock at 2.6 feet, 2.6 feet and 3.6 feet, respectively. Bedrock was not encountered in TP01, nor any of the three up-slope test pits or three down-slope test pits (see **Appendix A**, FSI Figure 2-2), all of which were terminated at one foot bgs because they contained no debris. The three test pits containing subsurface debris (TP02, TP03, TP04) define a roughly triangular area. Assuming the subsurface debris is continuous between these three test pits and extends several feet beyond their localized area, the estimated lateral extent of the subsurface debris in this occurrence is approximately 1,800 square feet. The FSI noted waste was observed on the surface over lateral extent of about 19,500 square feet (see dotted line in **Appendix A**, FSI Figure 2-2) (IT Corporation, 2002). Unfortunately, no land survey was performed and no global positioning system (GPS) coordinates were collected during the FSI.

In September 2011, NPS personnel visited the Site and collected information about the extent of surface debris, the nature of the debris, the condition of vegetation at the Site, and the proximity of the Site to surface water and developments associated with the High Sierra Camp. These findings were documented in a letter to DTSC (NPS, 2011). The conclusion of the letter was that the nature and extent of the debris at the Site is consistent with that reported in the 2002 FSI report.

On August 17, 2018, NPS personnel performed a site reconnaissance to collect additional information on the location and extent of the waste piles in preparation for this sampling event. During this reconnaissance, a magnetic utility locator was used to locate eight areas with concentrated metal that align with depressions or flat areas without much vegetation. Field sketches from this field reconnaissance are presented in **Figure 2**. As shown by the red dashed line in **Figure 2**, the area encompassed by these eight potential waste areas is estimated to be less than about 0.25 acres in size. Field personnel also noted the ground often sounded hollow underneath when placing stakes to mark these eight areas and it was observed the waste areas appeared to be small discrete pits (approximately 10 feet in diameter) (C. Fehrman, personal communication 2018). This observation on the discrete pattern of waste areas is similar what was noted in the *Victory Culture* report (Burton et al. 2003).

2.2.1 Data Quality/Usability

This section evaluates all previously collected data relative to the USEPA General Assessment Factors (as defined in USEPA 2003b) used for evaluating the quality of scientific and technical information presented in **Exhibit A**.

Exhibit A: EPA General Assessment Factors

Assessment Factor	Description
Soundness	The extent to which the scientific and technical procedures, measures, methods, or models employed to generate the information is reasonable for, and consistent with, the intended application
Applicability and Utility	The extent to which the information is relevant for the project's intended use
Clarity and Completeness	The degree of clarity and completeness with which the data, assumptions, methods, quality assurance, sponsoring organizations, and analyses employed to generate the information are documented
Uncertainty and Variability	The extent to which the variability and uncertainty (quantitative and qualitative) in the information or the procedures, measures, methods, or models are evaluated and characterized
Evaluation and Review	The extent of independent verification, validation, and peer review of the information or of the procedures, measures, methods, or models

Source: USEPA (2003b)

Evaluation of previously collected data relative to the USEPA General Assessment Factors yielded the following conclusions:

- The FSI sampling was governed by an investigation-specific work plan. The sampling and analysis methods for the subsurface soils that were collected are consistent with current methodology. Appropriate field and laboratory quality control (QC) samples were collected and evaluated. A Level III data review was performed in accordance with standard USEPA data review guidance, and data were found to meet acceptance criteria.
- Information on visual extent of debris (both at the surface and in the subsurface) is usable and useful for delineating the extent of waste. However, it is possible that chemical contamination may extend beyond the area of debris.
- Location coordinates of the lateral extent of the FWDA, the test pits, and other investigation locations are unknown.
- With the exception of the test pit locations, the presence or depth of debris across the rest of the Site are unknown.
- Subsurface soil samples at three test pits are not sufficient to characterize the Site. No surface soil sampling was performed.
- It is not clear if the downgradient soil samples were collected along the preferential flow path for surface water. Additional soil should be collected downslope of the Site.
- Background sampling locations exhibited impacts from historical activities. Another background sampling location free of historical activities should be used.

Overall, additional investigation is needed to adequately determine the nature and extent of chemical contamination and evaluate if contamination is a consequence of Site-related activities.

2.2.2 Preliminary Identification of Data Gaps

Preliminary data gaps identified are as follows:

- A localized background data set for baseline comparison of contaminant detections in Site soil
- Lateral and vertical extent of debris and contamination
- Exposure point concentrations of areas with debris and of areas immediately outside the debris-containing area
- Coordinates of extents and of investigation locations

2.2.3 Contaminants of Potential Concern

The 2002 FSI performed a comparison of measured concentrations to residential soil screening levels. With the exception of cadmium and 2,3,7,8-TCDD, chemical concentrations in soil were below the residential screening levels. The 2002 FSI also included a preliminary screening level ecological risk assessment that concluded localized populations of insectivorous wildlife (e.g., shrew, robin) that feed exclusively at the Site may be adversely impacted cadmium, lead, molybdenum, and 2,3,7,8-TCDD if these contaminants are bioaccumulating in dietary items (e.g., earthworms).

The contaminants of potential concern (COPCs) for the Site have not been established. Based on Site knowledge of potential contaminants and the results of the 2002 FSI, the following classes of contaminants cover the range of COPCs:

- California Assessment Manual (CAM) 17 Metals (including mercury)
- Polychlorinated biphenyls (PCBs)
- Organochlorine pesticides
- Semi-volatile organic compounds (SVOCs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Total petroleum hydrocarbons (TPH) for diesel and motor oil
- Dioxin/Furan

It is noted that hexavalent chromium was not included as a COPC because it was not detected in any of the soil samples collected as part of the 2002 FSI. Due to the age of the Site, it is not anticipated that VOCs would continue to be present in soil. VOCs may be a COPC if groundwater has in the past come in contact with impacted waste materials. However, given the depth to bedrock is only within 4 feet of the surface, contact with groundwater is not likely. As a result, VOCs were not included as a COPC.

2.2.4 Media of Potential Concern

The primary medium of potential concern is soil, which will be sampled under this SAP. According to the 2002 FSI, debris was scattered in the surface across the Site (0.45 acres), with a portion of debris extending to the subsurface. The maximum known depth of subsurface debris is 3.5 feet bgs (IT Corporation 2002).

Given the elevation of the Site, the presence of bedrock at a shallow depth (less than 4 feet bgs), the relatively shallow extent of debris (less than 3.5 feet bgs), and the absence of groundwater at these shallow depths, groundwater is assumed to be not of concern at this Site.

2.3 Current and Future Property Use Scenarios

The Site is considered natural wilderness and will not be developed in the future per the Wilderness Act. There is no direct access road into the Site.

2.4 Conceptual Site Model

The Site is located 100 feet southwest of the Vogelsang HSC, which is one of five HSCs in the Park and features 12 cabins with a total capacity of 42 guest beds. The Vogelsang HSC was established in 1940 and is used as a basecamp for hikes to the surrounding alpine lakes, including Evelyn Lake, Ireland Lakes, Booth Lake, Emeric Lake, and Vogelsang Lake. More than 13,000 visitors stay at the HSCs every year—and several thousand backpackers stop at the Site for meals. NPS personnel visit the Vogelsang HSC periodically, especially during the peak tourist season (July to September).

Montane or Trowbridge shrew and the American robin are found in the Park, and may be present at the Site. Both the shrew and the robin have small home ranges, relatively high metabolisms and elevated food intake per unit body weight. These species also prey on soil invertebrates, which could bioaccumulate some of the chemicals previously detected in Site soils. Therefore, these species were selected as sensitive representative wildlife receptors for the purposes of the screening level ecological risk assessment performed in the FSI (IT Corporation 2002).

The Site is bounded to the south by Fletcher Creek. Other nearby surface water bodies include Fletcher Lake, Vogelsang Lake, and Boothe Lake; of which only Boothe Lake is downslope from the Site.

Figure 3 illustrates the conceptual site model and presents the human and ecological exposure scenarios of potential concern. As seen, human receptors include NPS personnel and recreational visitors. Complete exposure pathways for these human receptors include inhalation of ambient air and ingestion and dermal contact with surface soil. Due to the age of the Site, any volatile organics would likely have volatilized. Therefore, exposure through inhalation of volatile contaminants is likely to be low or negligible. The complete pathway to human receptors with the highest potential to be an important contributor to total risk is ingestion and dermal contact of surface soil.

Ecological receptors of interest include birds, mammals, soil invertebrates, and terrestrial plants. Complete exposure pathways for birds and mammals include ingestion of surface, subsurface soils, and dietary items. Complete exposure pathways for terrestrial plants and soil invertebrates include direct contact with surface and subsurface soils.

3 DQO Planning Team and Stakeholders

As noted previously, NPS and DTSC entered into a consent agreement for the purposes of conducting CERCLA response action and RCRA corrective action, at eleven sites, including the Vogelsang FWDA. Consequently, data will be collected at the Site in order to conduct an ESI. CDM Smith is contracted to NPS to provide technical support for the Site, including the development of a SAP (this document) to address data gaps identified in the FSI.

3.1 DQO Planning Team

The DQO planning team develops the project DQOs according to the DQO process. The DQO process is iterative, and team members may be added or changed in order to address technical issues that were not initially identified. The project team organization chart is presented in **Figure 4**. The key members of the DQO planning team for this investigation include the following:

- NPS, Christopher Fehrman (federal government lead)**
- DTSC, Roman Racca (state site lead)**
- DTSC, Dan Gallagher (senior engineering geologist)
- CDM Smith, Scott Felton (cleanup lead/project manager)
- CDM Smith, Lynn Woodbury (technical team leader/risk assessor)

** Principal data user and decision-maker for activities within the Site.

3.2 Decision Makers

The Contaminated Site Team (CST) have the ultimate authority for making final decisions based on the recommendations of the DQO planning team. The CST for this project consists of the following individuals:

- Chris Fehrman, P.E., NPS contracting officer representative (COR) and project manager – primary decision maker
- Steve Mitchell, P.E., NPS regional environmental coordinator – CSTeam resource
- DOI solicitor/project attorney – CST member – to be identified
- Greg Stock, PhD, P.G., park geologist – CST member
- Roman Racca, DTSC – support agency decision maker

3.3 Stakeholders

Stakeholders are parties who may be affected by the results of the investigation and/or persons who may later use the data resulting from the DQO process. Stakeholders for the Site include NPS, DTSC, and the public who uses the park. In addition, the following list of stakeholders have been identified for the Site:

- Mariposa County Environmental Health Department

- American Indian Council of Mariposa, Inc. (Southern Sierra Miwuk Nation)
- Tuolumne Band of Me-Wuk Indians
- North Fork Rancheria of Mono Indians of Carlifornia
- Bridgeport Indian Colony
- Bishop Paiute Tribe
- Mono Lake Kutzadika Tribe
- Picayune Rancheria of the Chukchansi Indians
- Sierra Club Yosemite Committee
- Central Sierra Environmental Resource Center
- Upper Merced River Watershed Council
- Yosemite Climber Association
- NatureBridge
- Yosemite Conservancy

If CERCLA response action is determined to be required for the Site, these stakeholders will be contacted and interviewed to gauge their interest in the Site and their preference for involvement regarding future Site activities.

4 Data Quality Objectives

DQOs are statements that define the type, quality, quantity, purpose, and use of data to be collected. The design of an investigation is closely tied to the DQOs, which serve as the basis for important decisions regarding key design features, such as the number and location of samples to be collected and types of analyses to be performed. USEPA has developed a seven-step process for establishing DQOs to help ensure that data collected during a field sampling program will be adequate to support reliable decision-making (USEPA 2001, 2006a). The DQO process consists of the following seven steps, described in detail below:

1. State the Problem
2. Identify the Goal of the Investigation
3. Identify the Information Inputs
4. Define the Boundaries of the Investigation
5. Develop the Analytic Approach
6. Specify Performance or Acceptance Criteria
7. Develop the Plan for Obtaining Data

The following sections detail each step in the DQO process for this investigation.

4.1 State the Problem

An FSI was conducted in August 2001 to determine the impact to Site soil due to waste accumulation during the period of operation at the Site (IT Corporation 2002). The FSI included observations of the type and extent of waste present at the Site and the collection of subsurface soil samples from test pits excavated at the Site.

The FSI concluded that soil within the Site is likely to have a low probability of adverse impacts due to previous waste accumulation activities at the Site; however, several data gaps exist as detailed in Section 2.2. Further investigation is necessary to better define the extent of contamination and perform an ESI. Therefore, based on the background information and the CSM presented in Section 2, CDM Smith recommends the following activities:

- Further investigation to determine the extent of chemical concentrations in soil, including:
  - Delineation of the lateral extent of debris in surface soils (estimated to be 19,500 square feet (SF) in the FSI) and subsurface soils (estimated to be 1,800 SF in the FSI)
  - Delineation of the vertical extent of debris in subsurface soils (estimated to be 3 to 4 feet in the FSI)
  - Collection of surface soil samples from within the surface debris-containing area
  - Collection of subsurface soil samples from within the subsurface debris-containing area in the FWDA

- Collection of surface soil samples to determine if chemicals have migrated outside the FWDA footprint[1]

- Collection of a localized background data set for baseline comparison of chemical detections in Site soil

Note: Although the primary objective of this investigation is to support the ESI, DQOs were developed such that the resulting data would be useful to support human health and ecological risk assessments in the event that the ESI shows further Site characterization and risk assessment may be warranted.

Resources, Constraints, Schedule

Available resources for this project include the planning team entities listed above and the subcontractors that will be employed and equipment used to perform the activities required for this investigation. The schedule for this investigation will depend primarily upon staff/equipment availability and meteorological conditions. The goal is to conduct this investigation in the summer of 2018. The exact sampling dates are not important, provided conditions are appropriate to ensure sampling can be conducted safely and efficiently. The investigation schedule must also consider the time needed to procure any field equipment, train field personnel, establish necessary subcontracting agreements, and develop the SAP (this document) that will govern this investigation (i.e., appropriate subcontracting agreements and an approved SAP must be in place before the investigation can commence).

4.2 Identify the Goal of the Investigation

This section details the key questions this investigation is designed to answer.

4.2.1 Principal Investigation Question(s)

This section defines the principal investigation question(s). The principal investigation question(s) support(s) efficient collection of data needed to resolve the investigation problem identified in Section 4.1.

As noted above, there are several potential data gaps in the FSI that were identified by DTSC. Several principal investigation questions that have been identified to address these data gaps:

Estimation Questions

- **E1 (Lateral and Vertical Extent of Debris).** What is the lateral and vertical extent of debris in surface and subsurface soils around the FWDA footprint?
- **E2 (Lateral Extent of Chemical Contamination in Surface and Subsurface Soil).** What is the lateral extent of chemical contamination in surface and subsurface soil within and around the FWDA footprint?

Decision Questions

[1] The "FWDA footprint" is identified as the surface debris area within the dotted line presented on FSI Figure 2-2 in **Appendix A.**

- **D1 (Soil vs. Background).** Are Site surface and subsurface soil concentrations higher than local background levels?

4.2.2 Estimation and Decision Statements

The following estimation and decision statements were developed based on the investigation questions identified above.

Lateral and Vertical Extent of Debris (E1) – The principal quantity to be estimated is the areal extent and depth of surface and subsurface soils containing debris.

Lateral Extent of Contamination (E2) – The principal quantity to be estimated is the maximum distance that soil contamination has migrated laterally beyond the FWDA footprint in surface soil (defined as 0 to 6 inches bgs) and in subsurface soil (defined as 6 inches to 4 feet).

Soil vs. Background (D1) – Determine whether chemical concentrations in Site soils are statistically higher than levels in background, which would indicate they are Site-related contaminants.

4.3 Identify Information Input

The purpose of this step is to identify the data required to answer the principal investigation question(s) listed in Section 4.2.1 and to determine which inputs require environmental measurements. The quality and usability of existing sources of information and data that could be used to answer the principal investigation question(s) is evaluated. The types of new information and data (e.g., information on specific analytes/contaminants) needed to answer the principal investigation question(s) is then identified.

4.3.1 Previous Data Usability

The FSI collected information on the visual extent of debris and subsurface soil concentrations of Site-related contaminants. However, these data are not adequate to determine the nature and extent of chemical contamination or evaluate if contamination is a consequence of Site-related activities. Therefore, answering the investigation questions posed above will require the collection of new soil concentration data that are representative of both Site and background conditions.

4.3.2 Data to be Collected in the Current Investigation

Environmental Measurements

Lateral and Vertical Extent of Debris (E1) – The following information is needed to document the lateral and vertical extents of debris in surface and subsurface soils:

- Visual inspection of soil borings of surface (0 to 6 inches) and subsurface soils (6 inches to 4 feet)
- Global positioning system (GPS) coordinates for the location of debris and of each soil boring

Lateral Extent of Contamination (E2) – The following information is needed to document the lateral extent of chemical contamination in surface soil:

- Measured concentrations of Site-related contaminants[2] in surface and subsurface soil samples collected within the FWDA footprint and in areas surrounding the footprint
- Global positioning system (GPS) coordinates for the location of the boundaries of each DU and SU.

Soil vs. Background (D1) – The following information is needed to perform a statistical comparison of Site surface and subsurface soil concentrations to background levels:

- Measured concentrations of Site-related contaminants in soil samples collected within human and ecological exposure areas for the Site
- Measured concentrations of naturally occurring chemicals (e.g., metals) and ubiquitous anthropogenic chemicals (e.g., PAHs) in surface soil[3] samples collected from a nearby location that has not been impacted by Site activities

Sampling Methods

There are a variety of sampling designs that could be employed when conducting soil investigations. Discrete sampling is often used when the goal is to delineate spatial variability. Incremental sampling methodology (ISM) is often used when the goal is to provide a robust estimate of the mean. In general, NPS prefers the use of an ISM when collecting data for use in exposure and risk characterization because the mean is the target statistic for exposure assessment and use of ISM will limit analytical cost. Thus, the use of a hybrid approach, in which samples are collected using both ISM and discrete sampling, may be necessary when the results are intended to support multiple objectives with varying statistics of interest.

Because one of the investigation objectives is to make comparisons between background and Site soils, the sampling design and methodology used to collect background soil samples should be similar to that used for the onsite samples. For example, it is not appropriate to compare samples collected using ISM to samples collected as discrete grabs; likewise, it is not appropriate to compare samples collected using a systematic sampling design to samples collected using a judgmental sampling design.

Analytical Methods

Based on Site knowledge of potential contaminants and the results of the FSI, the following classes of contaminants should be analyzed (appropriate analytical methods are also identified below):

- Metals[4] – EPA 6020A
- Mercury – EPA 7471A

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[2] Potentially site-related contaminants include metals, PAHs, TPH, PCBs, dioxins/furans, and SVOCs, and organochlorine pesticides.
[3] Only surface soil is proposed for the background area because it is anticipated that in the absence of a contamination source chemical concentrations generally should be similar for surface and subsurface soil.
[4] Including antimony, arsenic, barium, beryllium, cadmium, chromium (total), cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

- Pesticides – EPA 8081A
- PCBs – EPA 8082
- SVOCs – EPA 8270C
- PAHs – EPA 8270C-SIM
- TPH diesel + motor oil (with and without silica gel cleanup[5]) – EPA 8015B
- Dioxin/Furans – EPA 8290

Table 2 (field measurement and sampling and analysis plan) shows the specific requirements for the sampling event. The FSP is detailed in Section 5.

The selected laboratory should be able to achieve method detection limits for each analyte that are below the screening levels (presented in **Table 1** and defined in Section 4.5.2) to be used for identifying COPCs. If this is not possible, the analytical laboratory should provide the best available detection limits using conventional analytical instruments; any limitations in the best available analytical methods should be discussed as a source of uncertainty in the ESI (and the EE/CA, if required).

4.3.3 Other Data Needs

In addition to the collection of environmental measurements, for the purposes of selecting COPCs in an ESI, the following information will also be needed:

- Human health: USEPA Residential Regional Screening Levels[6] (RSLs); DTSC Office of Human and Ecological Risk (HERO) Note 3 screening levels[7]
- Ecological: *NPS Protocol for the Selection and Use of Ecological Screening Values for Non-Radiological Analytes* (NPS 2016)

4.4 Define the Boundaries of the Investigation

The objective of this step is to define the spatial and temporal bounds of the investigation area and specify the scale of inference for estimation and decision-making.

4.4.1 Spatial Boundaries

The Site is located within a 0.45-acre sparsely vegetated subalpine pine forest. The results of the 2002 FSI provide information on the extent of visual surface debris (see Figure 2-2 of **Appendix A**). The bottom of the debris layer was less than 3.5 feet bgs. The areal extent of debris should be refined in this investigation. For the purposes of this investigation, the lateral bounds for the subsurface soil collection should be within the areas where debris was present. The lateral bounds for the surface soil collection should include the debris footprint and extend around this footprint. If physical transport of debris and

[5] TPH Diesel + Motor Oil analyses should be conducted with and without silica gel cleanup for soil to distinguish between the contributions of petroleum-based hydrocarbons and naturally occurring hydrocarbons.
[6] https://www.epa.gov/risk/regional-screening-levels-rsls; USEPA residential RSLs for soil and tap water based on a target cancer risk of 1 in 1 million, expresses as 1E-06, and a target hazard quotient (HQ) of 0.1.
[7] https://www.dtsc.ca.gov/assessingrisk/humanrisk2.cfm

debris-related chemical contamination has occurred, it is likely to be due to run-off; therefore, it is appropriate to extend the collection of soil samples further in the downgradient (southwest) direction (see **Figure 2**), rather than in the upgradient (northeast) or cross-gradient directions.

The target depth of soil sampling depends upon the interval to which the receptor is exposed. For human health, receptors may include NPS personnel and recreational visitors (hikers, campers) and are likely to be exposed only to surface soils (0 to 6 inches bgs). No construction activities are anticipated in the future. For ecological receptors, most are likely to be exposed to surface soil (0 to 6 inches bgs). Some ecological receptors may be exposed to deeper (subsurface) soil, such as burrowing animals and plants with deeper roots. Because the debris layer in subsurface soil was assumed to be less than 3.5 feet bgs, bedrock is present at a shallow depth (less than 4 feet bgs), and to be consistent with other contaminated Site investigations conducted within the Park, the depth interval of interest for receptors exposed to subsurface soil is 0 to 4 feet bgs. Although the default recommended by DTSC for burrowing animals is 6 feet (EcoNOTE1) (DTSC 1998), a depth of 4 feet was selected to avoid biasing measured soil concentrations due to the inclusion of deeper, less-contaminated soils.

When selecting an appropriate background soil location, the goal is to identify an area that is not influenced by Site activities but is representative of naturally occurring levels and anthropogenic (but not Site-related) influences in the local area. To the extent possible, the soil characteristics (i.e., geology, particle size) of the background area should be similar to the Site. Since the surface and subsurface soils in a background area aren't expected to have wide variability in soil concentrations (i.e. concentrations as a function of depth in unimpacted areas are expected to be similar), only surface soils (0 to 6 inches bgs) in the background area are of interest in this study.

4.4.2 Temporal Boundaries

For soil, it is not expected that chemical concentrations are likely to vary substantially over time (i.e., seasonal variation is not expected). More than 50 years have elapsed since the FWDA was used; any chemical degradation and/or volatilization is likely to have already occurred. Thus, the timing of sample collection is dependent primarily upon ease of sample collection. Because it is easier to access the Site and collect samples in the summer (when the ground is not covered by snow), the target collection time is between July and September.

4.4.3 Scale of Inference (Decision/Sampling Units)

A decision unit (DU) is the smallest user-defined area for which a decision will be made (e.g., to clean up or not clean up) based on sampling. A DU may consist of one or more sampling units (SUs). SUs are user-defined areas from which samples are collected to determine a representative concentration for that area.

For the purposes of making comparisons to background, decisions should be made on a Site-wide basis (i.e., the DU for background comparisons should be the entire area where debris is present). Typically, NPS prefers that DUs are no larger than about 0.25 acres in size. This DU size ensures the resulting data will accommodate exposure characterization for receptors with both small and large home range sizes.

For the purposes of delineating the lateral extent of chemical contamination within a DU, smaller SUs are needed to allow for the determination of spatial patterns. Based on the 2018 site reconnaissance, the waste areas appeared to be small discrete pits (approximately 10 feet in diameter); thus, the SU size should not be larger than about 200 square feet (approximately 0.005 acres) for locations within the debris area. Outside the debris area, where chemical contamination (if present) would be due to bulk transport and expected to be more contiguous in nature, the SU sizes can be larger, but should not be larger than about 0.1 acre in size.

4.5 Develop the Analytic Approach

The purpose of this section is to define the analytic or evaluation approach that will be used to answer the principal investigation question(s) and what screening values or standards will be used. Analytical methods for soil were selected to provide sufficient information for decision making related to decision or estimation parameters in Section 4.5.1 and decision threshold in Section 4.5.2 below. These analytical methods are presented in **Tables 1** and **2**.

4.5.1 Decision or Estimation Parameters

Lateral and Vertical Extent of Debris (E1) – Information on the lateral and vertical extents of debris in surface and subsurface soil will be used to estimate the areal extent of the source materials. This areal extent estimate does not need to be highly precise and can utilize visual data from soil borings.

Lateral Extent of Chemical Contamination (E2) – Information on the lateral extent of chemical contamination in surface and subsurface soil will be used to estimate the areal extent and depth of impacted soils that may need to be addressed. The areal extent and depth of chemical contamination does not need to be highly precise and can utilize chemical contaminant data to be collected from the debris-containing area and the areas surrounding the debris-containing area.

Background (D1) – When making statistical comparisons between site and background, these comparisons will focus on the average. Therefore, the statistical parameter of interest for the decision investigation question is the average – i.e., average concentration of chemical ‘x’ in soil (expressed as mass of chemical per kilogram of soil).

4.5.2 Decision Thresholds and Rules

In the ESI, a simple comparison of maximum concentrations to conservative human health and ecological screening levels (see below) is performed to determine if exposures have the potential to be unacceptable and require further evaluation as part of an EE/CA.

Table 1 provides the screening levels for soil and the laboratory project quantitation limits (PQLs). The screening levels include the following:

- Human health screening levels and criteria:
  - USEPA Residential RSLs (May 2018; https://www.epa.gov/risk/regional-screening-levels-rsls) for soil, with target cancer risk of $1x10^{-6}$ and target hazard quotient of 0.1
  - DTSC HERO Human Health Risk Assessment Note 3 (February 2018) for soil
- Ecological screening levels and criteria:
  - NPS screening levels and criteria: *NPS Protocol for the Selection and Use of Ecological Screening Values for Non-Radiological Analytes* (February 2016) (NPS 2016).

Soil vs. Background (D1) – If mean Site concentrations are statistically higher than mean background concentrations, then it will be concluded that chemical concentrations are likely to be Site-related, otherwise it will be concluded that chemical concentrations are not Site-related but caused by naturally occurring levels or non-Site-related anthropogenic impacts.

4.6 Performance or Acceptance Criteria

The purpose of this step is to establish the criteria needed to maximize the ability of the investigation to obtain the data needed to answer the principal investigation question(s) accurately and with confidence.

4.6.1 Quality Assurance/Quality Control

This section details the quality assurance (QA)/ QC measures that will be implemented during the investigation to minimize variability, mitigate the potential for false positive and/or false negative error, and increase accuracy and defensibility of the collected data.

The data quality indicators (DQIs) and the associated measurement performance criteria specific to each analytical method are presented in **Table 3** and **Table 4**. The DQIs include precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) and are derived based on results from the QA/QC measures described below.

Laboratory Quality Control Samples

Laboratory quality control samples include laboratory control sample, initial calibration verification, continuing calibration verification, calibration blanks, duplicate samples, matrix spike and its duplicate (MS/MSD), and laboratory fortified blanks. Extra sample volume will be submitted for MS/MSD analyses in the laboratory, as needed. MS/MSD samples will be collected at a rate of 1 per 20 samples.

ISM for soil samples requires specific laboratory handling and processing procedures. Section 6.4 of the Interstate Technology & Regulatory Council (ITRC) *Technical and Regulatory Guidance: Incremental Sampling Methodology* (ITRC 2012) and USEPA document, *Guidance for Obtaining Representative Laboratory Analytical Subsamples from Particulate Laboratory Samples* (USEPA 2003c) will be followed for ISM analysis.

All analytical procedures will be performed following the procedures in the laboratory QA manual and standard operating procedures (SOPs). The laboratory QA manual and SOPs will be provided to NPS upon request.

Field Quality Assurance/Quality Control

SOPs for fieldwork are listed in Section 5 and presented in **Appendix B**. These procedures are further discussed in **Section 5**.

ISM for soil sample collection requires specific field sample handling and processing procedures. Section 6.4 of the ITRC *Technical and Regulatory Guidance: Incremental Sampling Methodology* (ITRC 2012) and USEPA (2003c) will be followed for ISM sampling.

Site-specific field forms, presented in **Appendix C**, will be used to ensure that SOPs and QA/QC procedures specified in this sampling plan are being followed.

Field Quality Control Samples

The following field quality control samples will be collected:

- Field duplicate sample. One field duplicate will be collected during discrete sampling. Precision is determined by relative percent difference (RPD) between the field duplicate and its associated parent sample.
- *Soil ISM replicate samples.* According to ITRC guidance (ITRC 2012), at least three soil ISM replicates for each soil DU are required to provide the minimum number of samples necessary to calculate summary statistics for use in hypothesis testing and exposure assessment. Precision is determined by calculating the relative standard deviation (RSD) across the soil ISM replicates. Lower values of RSD (<30 to 35%) indicate more precise result, and higher RSD (>35%) may indicate a higher level of heterogeneity in the soil (ITRC 2012).
- *Field contamination blanks.* These samples include equipment rinsate blanks, field blanks, trip blanks, and temperature blanks. Each type of field contamination blank sample is described below.

Equipment Rinsate Blanks

Equipment rinsate blanks will be collected to evaluate field sampling and decontamination procedures by pouring high performance liquid chromatography (HPLC) organic-free (for organics) or deionized water (for inorganics) over the decontaminated sampling equipment. One equipment rinsate blank collected at the rate of one equipment blank per week per analysis (with the exception of dioxin/furans) will be required for each media to assess the effectiveness of decontaminating sampling equipment in the field. The equipment blank samples for dioxin/furans analysis will be put on hold[10] and analyzed only if any of the associated soil samples contain dioxin/furan above project screening levels. Equipment rinsate blanks will be obtained by passing water through or over the decontaminated sampling devices used that day. If disposable sampling equipment will be used, no rinsate blanks are required. The rinsate blanks that are collected will be analyzed for the target analytes indicated in **Table 2**.

The equipment rinsate blanks will be preserved, packaged, and sealed in the same manner described for the environmental samples. A separate sample number and station number will be assigned to each

[10] Dioxin/furans have a holding time of 30 days, so any dioxin/furan analyses would have to be conducted with sufficient time left to ensure meeting the holding times of the equipment blanks.

sample, and it will be submitted blind to the laboratory. Its designation as an equipment rinsate blank will be noted in the field logbook and the field sample data sheet (FSDS) (see Appendix C).

Field Blanks

Field blanks are used to evaluate whether contaminants have been introduced into the samples during the sampling due to ambient conditions or from sample preservatives or containers.

Trip Blanks

Trip blanks will be prepared to evaluate if the shipping and handling procedures are introducing contaminants into the sample and if cross-contamination in the form of VOC migration has occurred between the collected samples. Trip blanks are typically not collected for soil samples.

In the *Sampling and Analysis Plan Guidance and Template* (USEPA 2014b), USEPA recommends that only one type of blank (equipment, field, or trip) be collected per event, not all three. Since equipment rinsate is planned, no field blanks or trip blanks will be collected for this investigation.

Temperature Blanks

For each cooler that is shipped or transported to the analytical laboratory, a 40-mL VOC vial will be included that is marked "temperature blank." This blank will be used by the sample custodian to check the temperature of samples upon receipt.

Decontamination Procedures

For soil ISM sampling, decontamination will occur between ISM replicates. No decontamination will be performed between incremental sampling points from the same replicate. For discrete sampling, decontamination will occur between each discrete sample.

Equipment rinsate blanks will be collected at a rate of one sample per day when decontaminated sampling equipment is used.

Decontamination or disposal of sampling equipment will be addressed as described in CDM Smith SOP 4-5, *Field Equipment Decontamination at Non-Radioactive Sites,* presented in **Appendix B**.

Instrument/Equipment Calibration and Frequency

All instruments/equipment to be used during sampling will be calibrated, tested, inspected, and maintained according to the frequency presented in **Table 5** or as stated in the manufacturers' specifications and/or CDM Smith SOPs.

Inspection/Acceptance of Supplies and Consumables

The field team will ensure that the proper supplies critical to the project are available by completing the equipment/supply checklist prior to mobilization to the Site. The equipment/supply checklists are presented in each of the applicable SOPs located in **Appendix B** and a checklist is provided in **Appendix C**.

In addition, group gear, personal gear, boots, etc., will be inspected and cleaned to remove invasive weeds, dirt, and mud prior to the hike up to the Site. Soil borers shall also be cleaned so they are free of dirt and weeds.

Special Training and Certification

All field staff will be Hazardous Waste Operations and Emergency Response 40-hour trained and receive 8 hours of annual training. All field staff involved in the collection of soil samples will be trained on ISM and discrete sample collection methods.

Data Quality Indicators Table

DQIs and associated measurement performance criteria are presented in **Table 3** for each analytical method used for Site media.

4.6.2 Decision Error Limits and Uncertainty Evaluation

Acceptable Limits on Estimation Uncertainty

Lateral and Vertical Extents of Debris (E1) – The estimate of the lateral and vertical extents of debris in surface and subsurface soil will be mapped using information from soil borings as determined through GPS coordinates. GPS coordinate data should be reported as latitude and longitude, and the coordinate point should be accurate within 10 feet.

Lateral Extent of Chemical Contamination (E2) – The estimate of the lateral extent of chemical contamination in surface and subsurface soil will be mapped using information as determined through GPS coordinates. GPS coordinate data should be reported as latitude and longitude, and the coordinate point should be accurate within 10 feet.

Decision Hypotheses and Tolerable Limits for Decision Errors

Soil vs. Background (D1) – The comparison of Site concentrations to background concentrations should be accomplished using a two-sample hypothesis test. The form of this hypothesis test assumes that concentrations are Site-related until proven otherwise (i.e., a Form 2 background test [USEPA 2002a]). Thus, the null and alternative hypotheses are as follows:

> H_0: The mean COPC concentration at the Site for the medium of interest exceeds the mean background concentration; the chemical is Site-related.
>
> H_A: The mean COPC concentration at the Site for the medium of interest does not exceed the mean background concentration; the chemical is not Site-related.

Because a Type I error is the more severe decision error (i.e., DU would be dismissed as being similar to background when it is actually impacted as a consequence of Site activities), the tolerable limit for α is set lower than for β. The decision error limits selected for the background investigation are based on the minimum values recommended in USEPA (2002a) for a Form 2 background test. Therefore, when making comparisons to background, the probability of a Type I error should not exceed 10% ($\alpha = 0.10$), and the probability of a Type II error should not exceed 20% ($\beta = 0.2$).

4.6.3 Data Validation and Usability

Under this investigation, 20% of the analytical data collected from the sampling specified in this SAP will be evaluated by checklist format. Mary Lou Fox, CDM Smith analytical services coordinator, is responsible for resolving issues identified during the verification and validation of the data. Chemical analytical data will be evaluated for precision using field duplicates, laboratory duplicates, and MS/MSDs according to the laboratory-specific limits, methodology, *USEPA Contract Laboratory Program National Functional Guidelines (NFG) for Organic Superfund Methods Data Review* (USEPA 2017b), and *USEPA Contractor Laboratory Program NFG for Inorganic Superfund Methods Data Review* (USEPA 2017c).

The evaluation review will address DQIs, including the PARCCS parameters, and field QC. The measurement performance criteria for these DQIs are listed in **Table 3** and **Table 4**. If the measurement performance criteria for the DQIs are not met, it will either be qualified as estimated or rejected per the NFG guidance (USEPA 2017b and 2017c). Qualified results will be used during the ESI, with caution, while rejected results will not be used.

The following items will be checked:

- Precision:
  - Field duplicates: relative percent difference (RPD) criteria met?
  - ISM replicates: RSD criteria met?
  - Laboratory duplicates: RPD criteria met?
  - Method of standard dilution performed (where applicable) and criteria met?
  - MSDs: RPD criteria met?
- Accuracy:
  - MS/MSDs: Percent recovery criteria met?
  - Laboratory control sample/laboratory control sample duplicates: Percent recovery criteria met?
- Representativeness:
  - Sampling procedures and design: Criteria met?
  - Holding times and preservation: Criteria met?
  - Custody: All chain-of-custody forms complete and provided in data package?
- Completeness:
  - The number of valid analytical results meets the target number stated in the DQOs.
- Comparability:
  - Data compares with similar analysis and data sets?
  - Sample collection methods comparable to similar data sets?
  - Laboratory analytical methods comparable to similar data sets?
- Sensitivity:

– Method reporting limits or method detection limits met project objectives?

The documentation of the data evaluation effort will be in the form of the worksheets prepared during validation. These worksheets will be in the summary report of findings, which will be prepared after the completion of the investigations under this SAP. The summary report of findings will identify problems that may affect data usability or require that the data be qualified. The summary report of findings will discuss all PARCCS parameter results from the data validation and overall usability of the data for project objectives. The summary report of findings will be generated after receipt of laboratory data.

4.7 Plan for Obtaining the Data

The purpose of this step is to describe the most resource-effective data collection design for generating data that will satisfy the DQOs specified in the preceding six steps. A detailed description of the FSP is presented in Section 5. In brief, this sampling investigation will be conducted as follows:

- Fifteen soil borings will be collected along transects radiating in the upgradient (northeast), downgradient (southwest), and cross-gradient (southeast and northwest) directions from the center point of the FWDA. Soil boring placement should include the eight waste areas identified during the 2018 site reconnaissance (that were not previously characterized in the FSI) and be preferentially placed in "step-out" locations where depressions or sparsely vegetated flat areas are noted. The presence of visual debris and lithology for each boring will be logged to help define the extent of DU01 (see below).
- A total of three onsite DUs and one background DU will be delineated. DU01 will encompass the portion of the FWDA where debris (surface and subsurface[11]) is present as determined from the soil borings. DU02 will encircle and extend beyond DU01 for about 15 to 30 feet (see **Figure 5**). DU3 will extend beyond DU02 for about 30 to 50 feet in the downgradient direction only. A tentative background DU04 is proposed. The area ultimately chosen as background area DU04 will have soil lithology closest to those observed at the Site. All DUs are subject to change based on field conditions and findings from soil borings. If the extent of debris (DU01) is larger than 0.3 acres, this DUs will be split into two DUs (e.g., DU01A and DU01B) as needed.
- For DU01 and DU04, surface soil samples will be collected using ISM. A total of three ISM replicates will be collected from each DU; each ISM replicate will be comprised of up to 30 increments collected from 0 to 6 inches bgs.
- For DU01, subsurface soil samples will also be collected using ISM. A total of three ISM replicates will be collected; each ISM replicate will be comprised of up to 30 increments collected from 6 inches to 4 feet bgs.
- For DU02 and DU03, each DU will be split into three SUs. For DU02, one of the SUs will be in the downgradient direction and two SUs will be in the up/cross-gradient direction (see **Figure 5**). For DU03, all three SUs will be in the downgradient direction, with each SU at an increasing distance from DU02 (see **Figure 5**). A single ISM sample, consisting of up to 30 increments, will be collected from each SU. Only surface soil samples will be collected from these two DUs.
- All surface and subsurface soil ISM samples will be analyzed for metals (including mercury), PCBs, SVOCs, PAHs, and TPH diesel and motor oil (with and without silica gel cleanup). All

[11] If the areal extent of the subsurface debris is much smaller than the areal extent of the surface debris, the debris area should be split into two DUs – one based on the extent of the subsurface debris, which is sampled similar to the approach described here for DU01 (i.e., ISM triplicates for surface and subsurface soil), and one based on the extent of the surface debris, which is sampled similar to the approach described here for DU02 (i.e., one ISM surface soil sample from each of three SUs).

discrete surface soil samples (from the soil borings) will be analyzed for metals (including mercury) only.

- To reduce analytic costs, initially, only one ISM sample from each DU will be analyzed for dioxin/furans. For DU01, one of the three surface soil ISM replicates and one of the three subsurface soil ISM replicates will be chosen at random for analysis. For DU02, the ISM sample from the downgradient SU will be analyzed (i.e., SU1). For DU03, the ISM sample from the downgradient SU closest to DU02 will be analyzed (i.e., SU1). For DU04, one of the three surface soil ISM replicates will be chosen at random for analysis. Other soil ISM samples for dioxin/furans analysis will be placed on hold and released only if the analyzed soil samples contain dioxin/furans at concentrations above background and above screening levels.

5 Field Sampling Plan

The FSP guides the collection of data. Within the FSP, the sampling design is essential for ensuring the samples collected are representative of the DU and the media being sampled and characterized.

The summary of work to be performed at the Site includes the following investigation elements:

- Soil investigation:
  - Soil borings for lateral extent delineation
  - Surface and subsurface soil sampling
  - GPS of investigation locations (i.e., boring locations, DU and SU boundaries)

Field staff will maintain logbooks and other internal records throughout the field investigation. All deviations from the guiding documents will be recorded in the logbooks by the investigation team. Significant deviations (i.e., those that impact or have the potential to impact investigation objectives) to field requirements/procedures will be discussed with the NPS COR (or their designee) and CDM Smith's project manager prior to implementation.

All field activities will follow best management practices (BMPs) as described in the *Standard Guide for Greener Cleanups* (American Society for Testing and Materials International [ASTM] 2014) and CDM Smith SOPs. BMPs that are applicable to investigation activities at the Site are presented in **Table 6**. These BMPs were prioritized based on potential positive impact and subsequently either included or de-selected for implementation following further evaluation per the rationale provided.

SOPs for each of the above investigation elements and other relevant fieldwork are included in **Appendix B** (except for USEPA *Contract Laboratory Program [CLP] Guidance for Field Samplers* [USEPA 2014c], ITRC *Technical and Regulatory Guidance: Incremental Sampling Methodology* [ITRC 2012]) and listed below:

- CDM Smith SOP 1-2, Revision 7 – *Sample Custody*
- CDM Smith SOP 1-3, Revision 8 – *Surface Soil Sampling*
- CDM Smith SOP 1-4, Revision 7 – *Subsurface Soil Sampling*
- CDM Smith SOP 2-1, Revision 5 – *Packaging and Shipping of Environmental Samples*
- CDM Smith SOP 2-2, Revision 7 – *Guide to Handling Investigation-Derived Waste*
- CDM Smith SOP 3-5, Revision 8 – *Lithologic Logging*
- CDM Smith SOP 3-6, Revision 1 – *Underground Facility Location*
- CDM Smith SOP 4-1, Revision 7 – *Field Logbook Content and Control*
- CDM Smith SOP 4-2, Revision 8 – *Photographic Documentation of Field Activities*
- CDM Smith SOP 4-5, Revision 9 – *Field Equipment Decontamination at Non-Radioactive Sites*
- CDM Smith SOP 4-8, Revision 2 – *Environmental Data Management*
- CDM Smith SOP 5-1, Revision 9 – *Control of Measurement and Test Equipment*

- USEPA – *CLP Guidance for Field Samplers* (USEPA 2014c)
- ITRC – *Technical and Regulatory Guidance: Incremental Sampling Methodology* (ITRC 2012)

5.1 Soil Sampling

The following are descriptions and rationale for each of the soil investigation elements.

Preliminary DU boundaries shown in **Figure 5** are based on information from NPS and based on the geometry of the surface debris boundaries presented in Figure 2-2 of the FSI (see **Appendix A**) (IT Corporation, 2002). The boundaries of the DUs will be refined through visual inspections of soil borings (soil borings are used in place of trenching with heavy equipment due to the remoteness of the Site). A total of 15 soil borings are proposed within the Site to delineate the boundaries of the Site DUs. Visual inspection results from the soil borings will be used to delineate the lateral and vertical extents of the debris-containing area in both surface and subsurface soils. As noted above, the boundaries of DU01 and DU02 will be based on the visual extent of subsurface and surface debris, respectively.

- Hand-augering, logging, and backfill of soil borings
  - Investigation description: soil borings will be collected in and around the waste areas identified during the 2002 FSI and the 2018 site reconnaissance
    - Soil boring placement should include the eight waste areas identified during the 2018 site reconnaissance (that were not previously characterized in the FSI) and be preferentially placed in "step-out" locations in the downgradient, cross-gradient, and upgradient directions where depressions or sparsely vegetated flat areas are noted. Fifteen borings will be collected.
    - Each of the 15 augered boreholes will be advanced up to 4 feet bgs or to bedrock, whichever comes first, to delineate the lateral and vertical extent of wastes. If debris is present within the borehole, the soil sample will be collected near the middle of the debris depth interval. If no debris is present within the borehole, the soil sample should be collected from 0 to 6 inches bgs.
    - In order to adhere to the Programmatic Agreement with the State Historic Preservation Officer (SHPO), the diameter of the hand auger or push probe shall be 2 inches or less. Consultation with NPS COR would be required if a larger diameter auger or push probe is needed.
    - Each soil boring will be logged for lithology as well as for the presence of any debris.
    - Each soil boring will be backfilled with excavated soil immediately after logging.
    - The boundaries of surface and subsurface debris-containing areas will be marked and GPS coordinates of the marked boundaries will be collected.
    - Archeological monitoring will be performed during field work involving disturbance of soils.
  - Rationale: The purpose of the soil borings is to determine the lateral and vertical extent of the debris-containing area and its associated chemical contamination in surface and subsurface soils. The proposed locations of the soil borings are spread across the known extent of the debris-containing area and, in conjunction with GPS data, will provide refinement and confirmation of the boundary of the debris-containing area. The refined boundary of the debris-containing area will be used to develop/fine tune the boundaries of the DUs (**Figure 5**) from which soil sampling will be performed. If the extent of the debris is

larger than 0.3 acre, DU01 will be split into two DUs (i.e., DU01A/1B) as needed. If the areal extent of the subsurface debris is much smaller than the areal extent of the surface debris, the debris area will be split into two DUs – one based on the extent of the subsurface debris and one based on the extent of the surface debris.

- Locating and sampling of background area
  - Investigation description: For the location of the background DU03, an area containing no surface or subsurface debris and exhibiting similar characteristics and geology as the debris-containing area prior to waste disposal operations will be identified and proposed to NPS. NPS will approve the location based on the background DU being removed from known archeological, cultural, and ethnographic sites. The soil composition of the background surface (0 to 6 inches bgs) will be visually compared to the soil composition noted throughout the Site to confirm its similarity.
    - DU04 will also be sampled using ISM as described in the next major bullet below.
    - Archeological monitoring will be performed during field work involving disturbance of soils.
  - Rationale: The purpose of the visual inspection is to make sure that the composition of the soil in the background is similar to the debris areas being sampled so that differences in chemical concentrations detected in soil are not attributable to differences in soil composition. The collection of ISM replicates will be used to support comparisons of average soil concentrations in site to background using two-sample hypothesis testing.

- ISM soil sampling
  - Investigation description: ISM samples will be collected from each of the four DUs (DU01 through DU04).
    - Three ISM replicate samples of surface soil (0 to 6 inches below surface) will be collected from DU01 and DU04. Each replicate sample will consist of up to 30 incremental sampling points. These surface soil samples will be collected manually using a soil sampling push probe.
    - DU01 will be sampled from both the surface (0 to 6 inches bgs) and subsurface (6 inches to 4 feet bgs) intervals. Three ISM replicate soil samples will be collected from each depth interval. Each replicate sample would consist of up to 30 incremental sampling points. Surface soil samples will be collected manually using a soil sampling push probe. Subsurface soil samples will be collected manually using a hand auger. However, if lithology does not allow soil sampling with a hand auger in an efficient manner, potholing with a hand shovel may be performed, and samples will be collected from the sides of the pothole.
    - Surface soils (0 to 6 inches bgs) from DU02 and DU03 will be sampled using ISM. As shown in **Figure 5**, DU02 and DU03 will each be split into three SUs. For DU02, one of the SUs will be in the downgradient direction and two SUs will be in the up/cross-gradient direction (see **Figure 5**). For DU03, all three SUs will be in the downgradient direction, with each SU at an increasing distance from DU02 (see **Figure 5**). One ISM sample, consisting of up to 30 increments, will be collected from each SU. These surface soil samples will be collected manually using a soil sampling push probe.
    - As noted above, If the areal extent of the subsurface debris is much smaller than the areal extent of the surface debris, the debris area will be split into two DUs – one based on the extent of the subsurface debris and one based on the extent of the surface debris. The

subsurface debris DU will be sampled similar to the approach described above for DU01 (i.e., ISM triplicates for surface and subsurface soil). The surface debris DU will sampled similar to the approach described above for DU02 (i.e., one ISM surface soil sample from each of three SUs).

- The number of increments in each ISM sample may be decreased in order to complete all field activities within the field work time frame of 6 days. Under the ideal scenario, each ISM sample would consist of 30 increments. However, if the number of increments needs to be reduced due to time constraints, the reduction would be such that no less than 10 increments will be collected for each ISM sample. If potholing is required for subsurface sampling due to lithology, each ISM sample may contain even fewer increments. Examples of reasons for decreasing the number of incremental sampling points could include, but are not limited to:
  - The total number of DUs is increased due to a larger than anticipated extent of debris.
  - The lithology of the soil is harder to hand auger than anticipated.
  - Hand augering is not possible or not efficient, resulting in the need of potholing with a hand shovel.
  - Weather condition slowing down progress
- Archeological monitoring will be performed during field work involving disturbance of soils.

– Rationale: ISM soil sampling at each DU will allow the determination of average background concentrations in soil outside the debris-containing area.

5.1.1 Soil Sampling Locations

Soil samples will be collected from each of the soil DUs as described above. The preliminary locations of soil DU01 through DU04 are presented in the **Figure 5**. The area covered by the soil DUs includes the entire currently known debris-containing areas and a background area. The DUs shown on **Figure 5** will be adjusted based on findings from the soil borings as discussed above.

5.1.2 Soil Sampling Protocol

Discrete Sampling

Soils from hand-augered boring will be discretely sampled from 15 locations (B01 through B15). If debris is present within the borehole, the soil sample will be collected near the middle of the debris depth interval. If no debris is present within the borehole, the soil sample should be collected from 0 to 6 inches bgs. Containers, holding times, and preservatives are summarized in **Table 7**.

A photograph will be taken of each borehole adjacent to a white board, which would note the sample ID (see Section 5.3.2 for sample labeling requirements).

ISM Sampling at all DUs

Surface and/or subsurface soil sampling will be performed in the soil DUs using ISM. ISM sampling will be performed according to Section 6.4 of the ITRC *Technical and Regulatory Guidance: Incremental Sampling Methodology* (ITRC 2012) and *Guidance for Obtaining Representative Laboratory Analytical Subsamples from Particulate Laboratory Samples* (USEPA 2003c). Soil sampling shall occur after the preliminary boundaries of the DUs as shown in **Figure 5** are refined. The final boundaries of the DUs will be marked in the field using pin flags and/or flagging tape. The procedure for ISM soil sampling is as follows:

DU01 and DU04: Up to 30 incremental sampling points will be sampled for each ISM replicate in DU01 and DU04. Three replicate samples would be collected using a systematic random method. DU01 and DU04 will be marked out into up to 30 incremental sampling areas. An incremental sampling point will then be sampled from the same relative position in each of the incremental sampling areas and then composited as noted below to produce a single sample. This process will be repeated three times to create three ISM replicate samples.

DU02 and DU03: Each SU within DU02 and DU03 will be sampled from 0 to 6 inches bgs (see **Figure 5** for SU boundaries). Each SU will be marked out into up to 30 incremental sampling areas. An incremental sampling point will then be sampled from the same relative position in each of the incremental sampling areas. Soils from each SU will be composited as noted below to produce a single sample.

For DU01, surface (0 to 6 inches bgs) and subsurface (6 inches to 4 feet bgs) soils will be sampled using a sampling push probe and a hand-auger, respectively. As previously described, if lithology does not allow efficient hand augering, potholing with a hand shovel will be performed instead. For all other DUs, surface soil incremental sampling points will be sampled using a surface soil sampling push probe from the sampling interval between surface and 6 inches bgs. No subsurface soil samples will be collected from DU02 through DU04.

Containers, holding times, and preservatives are summarized in **Table 7**.

The following additional field processing steps will be followed for all ISM samples.

<u>DU01:</u>

- <u>Surface Soil:</u>
  - A soil sampling push probe will be used to collect the surface soil samples in DU01.
  - Ten 5-gram soil plugs will be collected from each soil core by sampling two rows of five 5-gram soil plugs with roughly 0.5 inch of space between the columns (with the terminal columns near the edge on both ends). A total of 1.5 kg of soil will be collected for each ISM replicate sample (5 grams per soil plug x 10 soil plugs per increment x 30 increments per replicate = 1,500 grams per replicate).
  - A photograph will be taken of each core adjacent to a white board, which would note the sample ID (see Section 5.3.2 for sample labeling requirements).
  - If, due to time constraints, less than 30 incremental sampling locations per replicate are sampled, the number of soil plugs per increment may be adjusted to give the full 1,500 grams of samples per SU.
- <u>Subsurface Soil:</u>
  - A hand auger will be used to collect the subsurface soil samples in DU01. If the lithology does not allow efficient hand augering (field team decision), potholing with a hand shovel will be performed instead.

- Sampling with hand auger:
  - Since collection of intact cores is not possible with a hand auger, soils collected from the sampling interval (6 inches to 4 feet bgs for subsurface soil) at each incremental sampling point will be placed in a container (e.g. a bowl or a bucket).
  - A photograph will be taken of the container containing soil at each incremental sampling points adjacent to a white board, which would note the sample ID (see Section 5.3.2 for sample labeling requirements) and depth interval.
  - The collected soils in the container will be homogenized and spread flat on a pan, and the ten soil plugs will then be collected in a grid pattern from the pan (i.e. the 2-dimensional Japanese Slabcake sampling method per Section 6.2.2.7 of the ITRC ISM guidance [ITRC 2012]).
  - A total of 1.5 kilograms (kg) of soil will be collected for each ISM replicate sample (5 grams per soil plug x 10 soil plugs per increment x 30 increments per replicate = 1,500 g per replicate). If, due to time constraints, less than 30 incremental sampling locations per replicate are sampled, the number of soil plugs per increment may be adjusted to give the full 1,500 grams of samples per replicate.
- Sampling from pothole:
  - Soil plugs will be collected directly from the side of the pothole at the corresponding depth intervals instead.
  - A photograph will be taken of the pothole indicating the locations of each incremental sampling points adjacent to a white board, which would note the sample ID (see Section 5.3.2 for sample labeling requirements) and depth interval.
  - A total of 1.5 kilograms (kg) of soil will be collected for each ISM replicate sample (5 grams per soil plug x 10 soil plugs per increment x 30 increments per replicate = 1,500 g per replicate). If, due to time constraints, less than 30 incremental sampling locations per replicate are sampled, the number of soil plugs per increment may be adjusted to give the full 1,500 grams of samples per replicate.

DU02 and DU03:

- A surface soil sampling probe will be used to collect surface soil samples from each SU in DU02 and DU03.
- Ten 5-gram soil plugs will be collected from each soil core by sampling two rows of five 5-gram soil plugs with roughly 0.5 inch of space between the columns (with the terminal columns near the edge on both ends). A total of 1.5 kg of soil will be collected for each SU ISM sample (5 grams per soil plug x 10 soil plugs per increment x 30 increments per SU = 1,500 grams per SU). If, due to time constraints, less than 30 incremental sampling locations per SU are sampled, the number of soil plugs per increment may be adjusted to give the full 1,500 grams of samples per SU.
- A photograph will be taken of each core adjacent to a white board, which would note the sample ID (see Section 5.3.2 for sample labeling requirements).

DU04:

- A surface soil sampling probe will be used to collect soil samples for each replicate from DU04.

- Ten 5-gram soil plugs will be collected from each soil core by sampling two rows of five 5-gram soil plugs with roughly 0.5 inch of space between the columns (with the terminal columns near the edge on both ends). A total of 1.5 kg of soil will be collected for each ISM replicate sample (5 grams per soil plug x 10 soil plugs per increment x 30 increments per replicate = 1,500 grams per replicate). If, due to time constraints, less than 30 incremental sampling locations per replicate are sampled, the number of soil plugs per increment may be adjusted to give the full 1,500 grams of samples per replicate.
- A photograph will be taken of each core adjacent to a white board, which would note the sample ID (see Section 5.3.2 for sample labeling requirements).

Decontamination of equipment will be performed between ISM samples (but not between incremental sampling points within the same ISM sample) and between discrete samples. Samples will be placed in coolers with ice and shipped overnight to the analytical laboratory for processing and analysis.

The Agriculture & Priority Pollutants Laboratories, Inc. (APPL) located in Clovis, California was selected to provide analytical laboratory services for this investigation. APPL is experienced with ISM sample processing. The ISM sample processing approach to be utilized by the analytical laboratory must be consistent with Section 6.2 of the ITRC *Technical and Regulatory Guidance: Incremental Sampling Methodology* (ITRC 2012). Laboratory processing of ISM samples will include sample conditioning (oven/air drying), particle size reduction as needed (using sieving and/or mortar and pestle method, or equivalent), and subsampling (using the 1- or 2-dimentional Japanese Slabcake method or other equivalent or better methods) prior to analytical preparation/extraction and analysis.

Analytical laboratory SOPs from APPLs are not presented in this plan but are available from APPL upon NPS request. Analytical procedures will be performed following the procedures in the laboratory QA manual. The laboratory QA manual will be provided to NPS upon request.

5.1.3 Soil Field Measurements

All field measurements will be performed according to CDM Smith SOPs in **Appendix B**. GPS measurements will be made with a handheld unit. GPS measurements will be made at each of the soil borings (for defining DU), around the boundaries of each DU and SU, and at each discrete boring location.

5.1.4 Soil Analytical Measurements/Methods

Discrete Samples

The 15 discrete surface soil samples will each be analyzed for CAM17 metals (SW6020A and SW 7471A).

ISM Samples

Unless otherwise noted, the ISM soil samples collected from the DUs will each be analyzed for the following parameters:

- SVOCs – USEPA 8270C

- PAHs – USEPA 8270C SIM
- Dioxin/Furan – USEPA 8290 – Only one of three ISM samples from each DU will initially be analyzed for dioxins/furans. Dioxin/furan analyses for other soil ISM samples will be put on hold and only analyzed if dioxin/furan concentrations from the analyzed samples are higher than the background concentrations and the screening levels in **Table 1**.
- TPH-D/MO – USEPA 8015B (M) (with and without silica gel cleanup for all samples)
- CAM 17 metals – SW 6020A and SW 7471A
- Pesticides – EPA 8081A
- PCBs – EPA 8082

Field measurements and sampling analyses are summarized on **Table 2**. Sampling requirements for each analysis (volume, preservation, holding time) are presented in **Table 7**.

5.2 Sample Handling

This section describes the sample handling protocol for environmental samples collected during the investigation.

5.2.1 Sample Designation

Each sample will receive a unique designator. Unique designators will consist of an alpha-numeric combination that signifies the location or DU, matrix, and other identifiers. Sample IDs for soil have been assigned to each sample to be collected and are shown in **Table 2**.

The following format will be used to label samples:

- Location (Decision Unit or Well Location):
  - Decision Unit = DUXX
  - Boring location = BXX
- Matrix:
  - Subsurface Soil = SB
  - Surface Soil = SS
- Sample Method Type and QC:
  - ISM Samples = Replicates or SUs will be labeled 01, 02, and 03
  - Discrete soil samples = field duplicates will be labeled 02.
  - Field QC =
    - Equipment blanks will be labeled 04
- Collection Date:
  - YYYYMMDD

For example, the replicate 1 surface soil sample from Decision Unit 1 on September 10, 2018 would receive the following ID: “DU01-SS-01-20180910.”

5.2.2 Sample Labeling

- At a minimum, sample labels should include the following:
  - Sample ID
  - Collection date (YYMMDD)/Time (24hr time)
  - Preservative (if applicable)

5.2.3 Sample Handling and Chain of Custody

Custody protocol and the packaging/shipping of the samples will be done in accordance with CDM Smith SOP 1-2, *Sample Custody,* and 2-1, *Packaging and Shipping of Environmental Samples*, both of which are provided in **Appendix B**.

Laboratory-provided chain-of-custody (COC) forms will be used to track the possession of each sample from the time it is collected to the time it is accepted by the analytical laboratory (see Appendix C). The COC form will document the sample ID, date of collection, matrix, preservative, and analysis requested.

APPL will provide analytical laboratory services for all samples to be collected under this investigation. The laboratory point of contact is:

Libby Cheeseborough

Telephone number: 559-275-2175

APPL will provide courier services for sample pickup from Yosemite National Park. In the event the pickup is missed, the samples will be shipped in coolers on ice to the following address:

APPL, Inc.

908 N Temperance Ave.,

Clovis, CA 93611

5.2.4 Documentation and Records

The following documentation and recordkeeping protocols will be followed throughout the sampling program:

- CDM Smith SOP 4-1, Revision 7 – *Field Logbook Content and Control*
- CDM Smith SOP 4-2, Revision 8 – *Photographic Documentation of Field Activities*

5.3 Utility Clearance

Before initiating the fieldwork, Underground Service Alert of Northern California will be notified 2 weeks prior to the planned work to obtain clearance of the boring locations for subsurface utilities.

5.4 Investigation-Derived Waste Handling

All investigation-derived waste (IDW) produced during field work will be hauled out of the Site, and will be addressed as indicated in CDM Smith SOP 2-2, Revision 7, *Guide to Handling Investigation-Derived Waste* (provided in **Appendix B**).

IDW to be generated during this fieldwork is anticipated to include personal protective equipment (PPE), and wastes. Used PPE will be placed in a dumpster at the park. Soil cuttings will be returned to the borehole.

Overall, the 'Leave No Trace' standards for campers and backpackers (NPS, 2018) also apply to field efforts. Work areas should not be visible when finished.

5.5 Health and Safety

Project-specific health and safety procedures that must be followed in the field, including PPE and clothing that may be required, potential hazards that may be encountered, location and route to the nearest hospital or medical treatment facility, special training and certifications, and documentation and records are included in the Site health and safety plan (HASP). Additional health and safety measures are noted in CDM Smith SOPs (**Appendix B**) and in the 2012 ITRC ISM sampling technical document (ITRC 2012) for health and safety measures related to ISM sampling.

The Site-specific HASP will be submitted to NPS as a separate stand-alone document.

6 Data Management

Sample results and QC data will be delivered to CDM Smith as an electronic data deliverable (EDD) in addition to a hard-copy data package. Electronic copies of all project deliverables prepared by CDM Smith, including graphics, are maintained by project number. Electronic files and EDDs will be routinely backed up and archived.

CDM Smith's local administrative staff has the responsibility for maintaining the document control system. This system includes a document inventory procedure and a filing system. Project personnel are responsible for project documents in their possession while working on a particular task.

The laboratory will submit analytical data reports via email to CDM Smith. Each data report will contain a case narrative that briefly describes the number of samples, the analyses, and any analytical difficulties or QA/QC issues associated with the submitted samples. The data report will also include signed chain-of-custody forms, cooler receipt forms, analytical data, a QC package, and any necessary raw data. The laboratories will also provide an electronic copy of the data. The laboratory will have a 10-business day turnaround time for submitting data packages.

Due to the limited number of samples anticipated for this sampling effort, a Site-specific database will not be created; instead, data will be managed in Microsoft Excel®, and pivot tables will be used to query the data for report tables.

Other field documentation, such as field logbooks and Site-specific FSDSs, will be electronically scanned and stored in the project folder. Originals will be stored in the project file and maintained in the local CDM Smith office. Hard copies will be stored for 7 years. Electronic copies will be stored indefinitely both at the local CDM Smith office and in the corporate-wide data storage/management system (e.g., ProjectWise).

7 Assessment and Oversight

Performance assessments are quantitative checks on the quality of a measurement system and may be used for analytical work. System assessments are qualitative reviews of different aspects of project work to check on the use of appropriate QC measures and the functioning of the QA system. CDM Smith will not be providing performance evaluation samples to the laboratory. No laboratory audits are planned at this time. The selected laboratory is California-certified and National Environmental Laboratory Accreditation Program certified.

Based on the level of effort and the duration of the activities discussed in this SAP, CDM Smith will not be conducting a formal field audit. Anyone discovering a problem is responsible for reporting it for correction; all field staff are required to perform self-assessments. In addition, the designated field team leader is responsible for reviewing field staff procedures to ensure they are consistent with SAP requirements. During routine activities, the majority of corrective actions can be implemented immediately by the field staff and documented in field logbooks. If the condition is not quickly corrected, the individual initiates a corrective action request form and forwards it to the QA manager who assigns responsibility for the corrective action and the required timing for the response. The QA manager, with the assistance of the QA staff, is responsible for tracking, reviewing, accepting, and verifying corrective action. Section 5.7.3 of the *Technical Support Services to the National Park Service, Environmental Compliance and Response Branch Blanket Purchasing Agreement Quality Control Plan*, Revision 0, December 31, 2014 (NPS 2014b) describes the responsibilities and procedures associated with corrective actions.

7.1 Reconciliation with DQOs and Data Usability

Following the collection and analysis of data, all results will be compared against the project DQOs according to the data quality assessment process discussed in Section 4.6 and the USEPA *Data Quality Assessment: A Reviewer's Guide* (USEPA 2006b). Additionally, the usability of the data will be assessed by comparing all data to DQIs identified in Section 4.6.1. The outcome of this data quality assessment will be discussed in the ESI (see Section 8.0).

8 Investigation Outputs

Information gathered as a part of this investigation will be used to determine if CERCLA actions are needed. An ESI will be compiled and provided to NPS to document the field efforts, the analytical results, data validation, the outcome of the data quality assessment, and any variances from the field planning documents. The ESI will also include comparisons of Site concentrations to background concentrations and risk-based screening levels. If Site concentrations are above background and/or screening levels, an EE/CA may be performed as deemed necessary by NPS. If appropriate, the ESI will identify additional fieldwork that should be considered.

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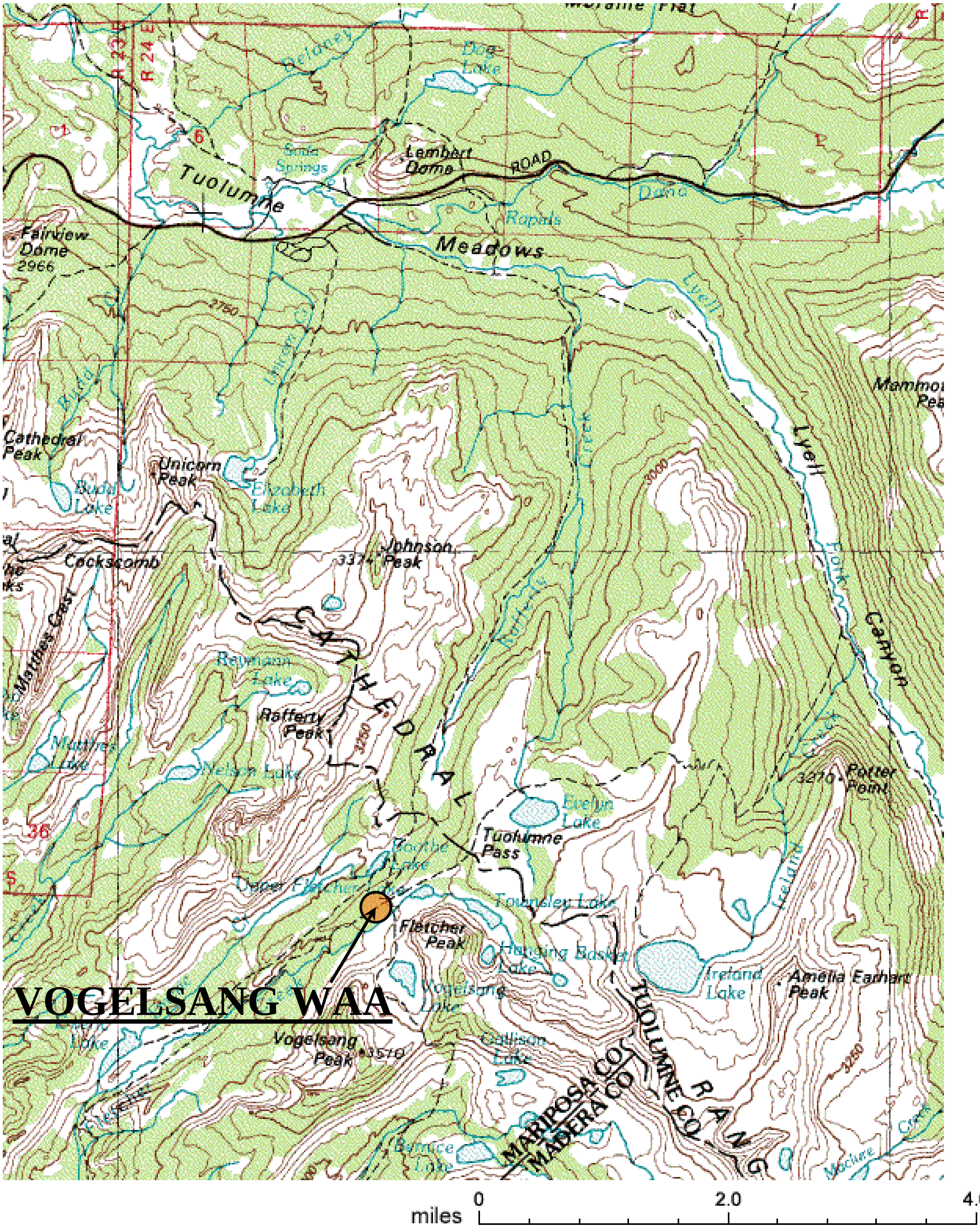
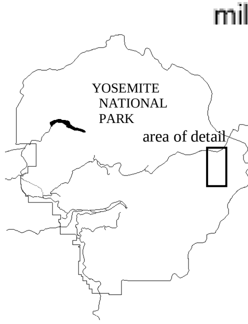
Appendix A – Select Figures from 2002 FSI





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TERC II
U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

FIGURE 2-1
LOCATION OF VOGELSANG
WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK
CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
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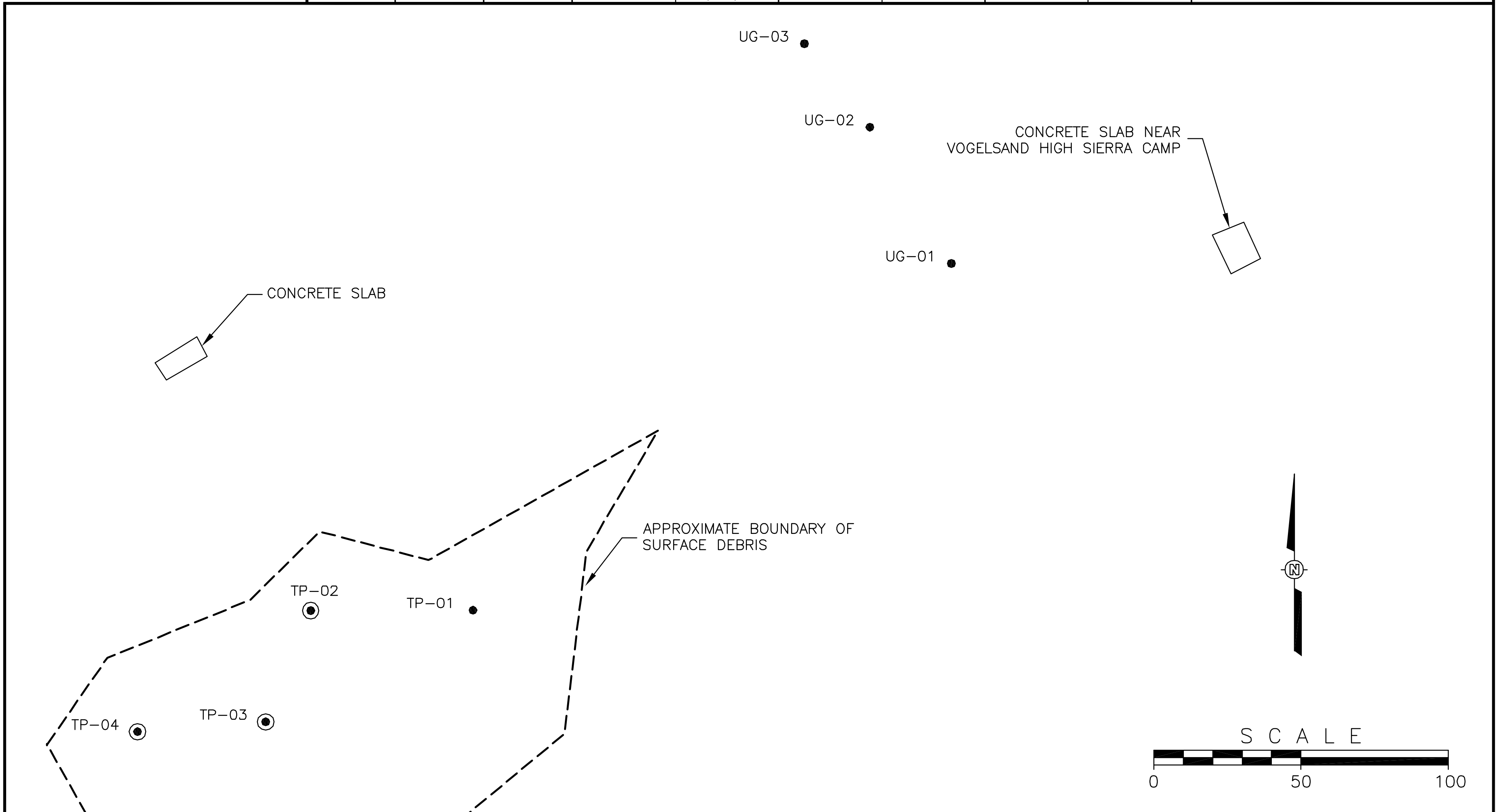


LEGEND:

UG-01	UPGRADIENT SAMPLE LOCATION
DG-02	DOWNGRADIENT SAMPLE LOCATION
TP-01	TEST PIT SAMPLE LOCATION
•	TEST PIT WITH NO DEBRIS
⊙	TEST PIT WITH SUBSURFACE DEBRIS

IT CORPORATION

TERC II
US ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

FIGURE 2-2

SITE MAP OF VOGELSANG WAA
WITH TEST PIT SAMPLE LOCATIONS
YOSEMITE NATIONAL PARK CALIFORNIA

Appendix B – Standard Operating Procedures

Section 1.0

Sampling and Measurement Procedures

Sample Custody	SOP 1-2 Revision: 7 Date: January 2012

Prepared: David O. Johnson **Technical Review:** C. Zakowski

QA Review: Jo Nell Mullins **Approved:** *Signature/Date*

Issued: *Signature/Date*

1.0 Objective

Because of the evidentiary nature of samples collected during environmental investigations, possession must be traceable from the time the samples are collected until their derived data are introduced as evidence in legal proceedings. To maintain and document sample possession, sample custody procedures are followed. All paperwork associated with the sample custody procedures will be retained in CDM Smith files unless the client requests that it be transferred to them for use in legal proceedings or at the completion of the contract.

Note: Sample custody documentation requirements vary with the specific EPA region or client. This technical standard operating procedure (SOP) is intended to present basic sample custody requirements, along with common options. Specific sample custody requirements shall be presented in the project-specific quality assurance (QA) project plan or project-specific modification or clarification form (see Section U-1).

2.0 Background

2.1 Definitions

Sample - A sample is material to be analyzed that is contained in single or multiple containers representing a unique sample identification number.

Sample Custody - A sample is under custody if:
1. It is in your possession
2. It is in your view, after being in your possession
3. It was in your possession and you locked it up
4. It is in a designated secure area

Chain-of-Custody Record - A chain-of-custody record is a form used to document the transfer of custody of samples from one individual to another.

Custody Seal - A custody seal is a tape-like seal that is part of the chain-of-custody process and is used to detect tampering with samples after they have been packed for shipping.

Sample Label - A sample label is an adhesive label placed on sample containers to designate a sample identification number and other sampling information.

Sample Tag - A sample tag is attached with string to a sample container to designate a sample identification number and other sampling information. Tags may be used when it is difficult to physically place adhesive labels on the container (e.g., in the case of small air sampling tubes). Check with your EPA regional Contract Laboratory Program (CLP) coordinator as not all Regions require sample tags.

3.0 General Responsibilities

Sampler - The sampler is personally responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

Field Team Leader - The field team leader (FTL) is responsible for ensuring that strict chain-of-custody procedures are maintained during all sampling events. The FTL is also responsible for coordinating with the subcontractor laboratory to ensure that adequate information is recorded on custody records. The FTL determines whether proper custody procedures were followed during the fieldwork.

Field Sample Custodian - The field sample custodian, when designated by the FTL, is responsible for accepting custody of samples from the sampler(s) and properly packing and shipping the samples to the laboratory assigned to do the analyses. A field sample custodian is typically designated only for large and complex field efforts.

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site/quality assurance project plan (QAPP).

4.0 Required Supplies

- Chain-of-custody records (applicable client or CDM Smith forms)
- Sample labels and/or tags
- EPA Field Operations Records Management System II Lite™ (FORMS II Lite™) software or Scribe software (if required)
- Custody seals
- Clear tape
- Computer
- Printer and paper

5.0 Procedures

5.1 Chain-of-Custody Record

This procedure establishes a method for maintaining custody of samples through use of a chain-of-custody record. This procedure will be followed for all samples collected or split samples accepted.

Field Custody

1. Collect only the number of samples needed to represent the media being sampled. To the extent possible, determine the quantity and types of samples and sample locations before the actual fieldwork. As few people as possible shall handle samples.

2. Complete sample labels or tags for each sample using waterproof ink.

3. Maintain personal custody of the samples (in your possession) at all times until custody is transferred for sample shipment or directly to the analytical laboratory.

Transfer of Custody and Shipment

1. Complete a chain-of-custody record for all samples (see Figure 1 for an example of a chain-of-custody record. Similar forms may be used when requested by the client). When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the sample custodian in the appropriate laboratory.

   - The date/time will be the same for both signatures when custody is transferred directly to another person. When samples are shipped via common carrier (e.g., Federal Express), the date/time will not be the same for both signatures. Common carriers are not required to sign the chain-of-custody record.
   - In all cases, it must be readily apparent that the person who received custody is the same person who relinquished custody to the next custodian.
   - If samples are left unattended or a person refuses to sign, this must be documented and explained on the chain-of-custody record.

   Note: If a field sample custodian has been designated, he/she may initiate the chain-of-custody record, sign, and date as the relinquisher. The individual sampler(s) must sign in the appropriate block, but does (do) not need to sign and date as a relinquisher (refer to Figure 1).

2. Package samples properly for shipment and dispatch to the appropriate laboratory for analysis. Each shipment must be accompanied by a separate chain-of-custody record. If a shipment consists of multiple coolers, a chain-of-custody record shall be filled out for each cooler documenting only samples contained in that particular cooler.

3. The original record will accompany the shipment, and the copies will be retained by the FTL and, if applicable, distributed to the appropriate sample coordinators. Freight bills will also be retained by the FTL as part of the permanent documentation. The shipping number from the freight bill shall be recorded on the applicable chain-of-custody record and field logbook in accordance with SOP 4-1, Field Logbook Content and Control.

Procedure for Completing CDM Smith Example Chain-of-Custody Record
The following procedure is to be used to fill out the CDM Smith chain-of-custody record. The record provided herein (Figure 1) is an example chain-of-custody record. If another type of custody record (i.e., provided by the EPA Contract Laboratory Program (CLP) or a subcontract laboratory or generated by Scribe or FORMS II Lite™) is used to track the custody of samples, the custody record shall be filled out in its entirety.

1. Record project number.
2. Record FTL for the project (if a field sample custodian has been designated, also record this name in the “Remarks” box).
3. Record the name and address of the laboratory to which samples are being shipped.
4. Enter the project name/location or code number.
5. Record overnight courier’s airbill number.
6. Record sample location number.
7. Record sample number.
8. Note preservatives added to the sample.
9. Note media type (matrix) of the sample.
10. Note sample type (grab or composite).
11. Enter date of sample collection.
12. Enter time of sample collection in military time.
13. When required by the client, enter the names or initials of the samplers next to the sample location number of the sample they collected.
14. List parameters for analysis and the number of containers submitted for each analysis.
15. Enter appropriate designation for laboratory quality control (e.g., matrix spike/matrix spike duplicate [MS/MSD], matrix spike/duplicate [MS/D]), or other remarks (e.g., sample depth).
16. Sign the chain-of-custody record(s) in the space provided. All samplers must sign each record.
17. If sample tags are used, record the sample tag number in the “Remarks” column.
18. The originator checks information entered in Items 1 through 16 and then signs the top left “Relinquished by” box, prints his/her name, and enters the current date and time (military).
19. Send the top two copies (usually white and yellow) with the samples to the laboratory; retain the third copy (usually pink) for the project files. Retain additional copies for the project file or distribute as required to the appropriate sample coordinators.
20. The laboratory sample custodian receiving the sample shipment checks the sample label information against the chain-of-custody record. Sample condition is checked and anything unusual is noted under “Remarks” on the chain-of-custody record. The laboratory custodian receiving custody signs in the adjacent “Received by” box and keeps the copy. The white copy is returned to CDM Smith.

5.2 Sample Labels and Tags

Unless the client directs otherwise, sample labels or tags will be used for all samples collected or accepted for CDM Smith projects.

1. Complete one label or tag with the information required by the client for each sample container collected. A typical label or tag would be completed as follows (see Figure 2 for example of sample tag; labels are completed with the equivalent information):

   - Record the project code (i.e., project or task number).
   - Enter the station number (sample number or EPA CLP identification number) if applicable.
   - Record the date to indicate the month, day, and year of sample collection.
   - Enter the time (military) of sample collection.
   - Place a check to indicate composite or grab sample.

- Record the station (sample) location.
- Sign in the space provided.
- Place a check next to “yes” or “no” to indicate if a preservative was added.
- Place a check under “Analyses” next to the parameters for which the sample is to be analyzed. If the desired analysis is not listed, write it in the empty slot. Note: Do not write in the box for “laboratory sample number.”
- Place or write additional relevant information under “Remarks.”

2. Place adhesive labels directly on the sample containers. Place clear tape over the label to protect from moisture.

3. Securely attach sample tags to the sample bottle if required. On 2.27 liter (80 oz.) amber bottles, the tag string may be looped through the ring-style handle and tied. On all other containers, it is recommended that the string be looped around the neck of the bottle, then twisted, and relooped around the neck until the slack in the string is removed.

4. Double-check that the information recorded on the sample label or tag is consistent with the information recorded on the chain-of-custody record.

5.3 Custody Seals
Two custody seals must be placed on opposite corners of all shipping containers (e.g., cooler) before shipment. The seals shall be signed and dated by the shipper.

Custody seals may also be required to be placed on individual sample bottles. Check with the client or refer to EPA regional guidelines for direction.

5.4 Sample Shipping
SOP 2-1, *Packaging and Shipping Environmental Samples* defines the requirements for packaging and shipping environmental samples.

6.0 Restrictions/Limitations
Check with the EPA region or client for specific guidelines. If no specific guidelines are identified, this procedure shall be followed.

For EPA CLP sampling events, combined chain-of-custody/traffic report forms generated with EPA FORMS II Lite™, Scribe or other EPA-specific records may be used. Refer to regional guidelines for completing these forms.

The EPA FORMS II Lite™ or Scribe software may be used to customize sample labels and custody records when directed by the client or the CDM Smith project manager.

7.0 References
U. S. Army Corps of Engineers. 2001 or current revision. *Requirements for the Preparation of Sampling and Analysis Plan*, EM 200-1-3. Appendix F. February.

U. S. Environmental Protection Agency. Revised March 1992 or current revision. *National Enforcement Investigations Center, Multi-Media Investigation Manual*, EPA-330/9-89-003-R. p.85.

__________. Region IV. 1996 or current revision. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Section 3.3. May.

__________. 2002 or current revision. *FORMS II Lite™ User’s Guide, Version 5.1*. http://www.epa.gov/superfund/programs/clp/f2lite.htm

__________. 2006-2011. Scribe Manuals. http://www.ertsupport.org/scribe_home.htm and http://www.epaosc.org/scribe

__________. 2002 or current revision. *EPA Guidance for Quality Assurance Project Plans*, EPA QA/G-5, EPA/240/R-02/009. Section 2.2.3. December.

__________. 2011 or current revision. *Sampler's Guide, Contract Laboratory Program Guidance for Field Samplers*, EPA-540-R-09-03. January.

Figure 1
Example CDM Smith Chain-of-Custody Record

125 Maiden Lane, 5th Floor
New York, NY 10038
(212) 785-9123
Fax: (212) 785-6114

CHAIN OF CUSTODY RECORD

PROJECT ID.	FIELD TEAM LEADER	LABORATORY AND ADDRESS	DATE SHIPPED
PROJECT NAME/LOCATION		LAB CONTRACT:	AIRBILL NO.

MEDIA TYPE
1. Surface Water
2. Groundwater
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil
7. Waste
8. Other ______

PRESERVATIVES
1. HCl, pH <2
2. HNO3, pH <2
3. NaOH, pH >12
4. H2SO4, pH <2
5. Zinc Acetate, pH >9
6. Ice Only
7. Not Preserved
8. Other ______

SAMPLE TYPE
G = Grab
C = Composite

SAMPLE LOCATION NO.	LABORATORY SAMPLE NUMBER	PRESER-VATIVES ADDED	MEDIA TYPE	SAMPLE TYPE	20_ _ DATE	TIME SAMPLED	ANALYSES (List no. of containers submitted)								REMARKS (Note if MS/MSD)
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															

SAMPLER SIGNATURES:

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
(PRINT)		(PRINT)		(PRINT)		(PRINT)	
(SIGN)		(SIGN)		(SIGN)		(SIGN)	
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
(PRINT)		(PRINT)		(PRINT)		(PRINT)	
(SIGN)		(SIGN)		(SIGN)		(SIGN)	

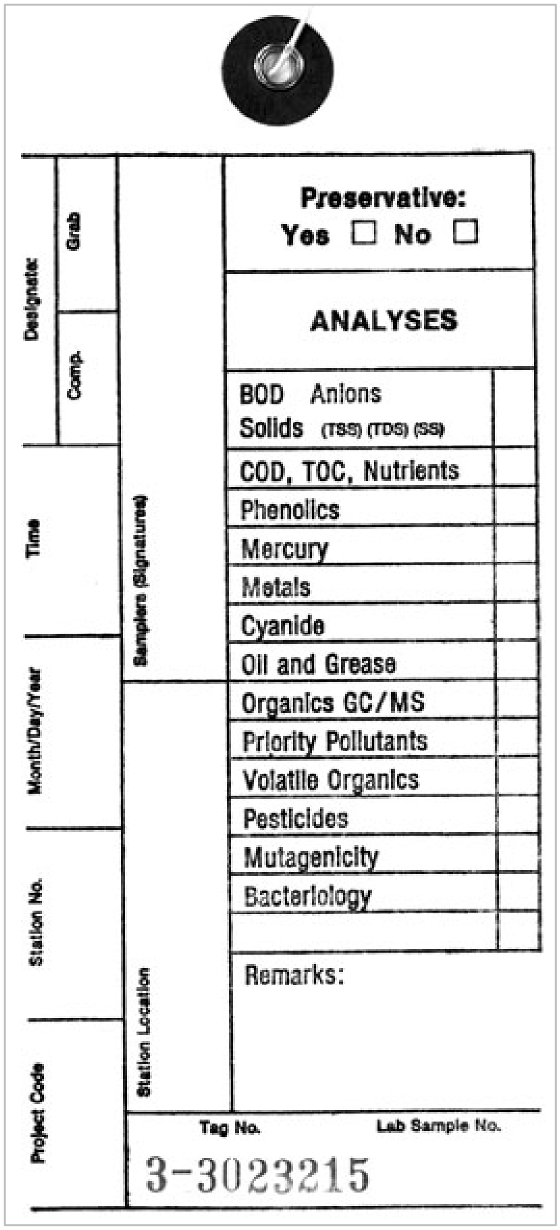
COMMENTS:

DISTRIBUTION: White and yellow copies accompany sample shipment to laboratory; yellow copy retained by laboratory. Pink copy retained by samplers.

1/98

Note: If requested by the client, different chain-of-custody records may be used. Copies of the template for this record may be obtained from the Chantilly Graphics Department.

Figure 2
Example Sample Tag



Note: Equivalent sample labels or tags may be used.

Surface Soil Sampling

SOP 1-3
Revision: 8
Date: January 2012

Prepared:	Del R. Baird	**Technical Review:**	J. Latham
QA Review:	Jo Nell Mullins	**Approved:**	Jackie M Mosher *Signature/Date*
Issued:	Jo Nell Mullins *Signature/Date*		

1.0 Objective

The purpose of this technical standard operating procedure (SOP) is to define the general techniques and requirements for the collection of surface soil samples.

2.0 Background

The techniques and protocols described herein may be used to collect other surface media, including sediment and sludge.

2.1 Definitions

Grab Sample - A discrete portion of sample material or an aliquot taken from a specific sample location at a given point in time.

Spoon/Scoop - A small stainless steel, Teflon®, or Teflon® -lined utensil measuring approximately 15 cm (6 inches) in length with a stem-like handle (for manual operation). Samples are collected using a scooping action.

Surface Soil - Soils generally defined as the soils extending from ground surface to approximately 30 centimeters (cm), or approximately one foot, below ground surface (bgs). Surface soil samples are frequently collected from 0 to 15 cm (0 to 6 inches) bgs. Depending on the soil interval sampled will vary.

Syringe - A hand-held, T-shaped, disposable plastic sampling device used to obtain undisturbed, unconsolidated material samples (e.g., soil or sediment) for laboratory analyses. Samples are collected by pushing the open end of the sampling device into the material to be sampled to retrieve a discrete sample, typically in the amount of 5 or 10 grams.

Trowel - A small stainless steel or Teflon or Teflon® -lined shovel measuring approximately 15 to 20 cm (6 to 8 inches) in length with a slight (approximately 140°) curve across the length. The trowel has a stem-like handle (for manual operation). Samples are collected with a scooping action.

2.2 Associated Procedures

- SOP 1-2, *Sample Custody*
- SOP 2-1, *Packaging and Shipping Environmental Samples*
- SOP 4-1, *Field Logbook Content and Control*
- SOP 4-5, *Field Equipment Decontamination at Nonradioactive Sites*

2.3 Discussion

Surface soil samples are collected to determine the type(s) and level(s) of contamination in soil and often provide information important to the completion of risk assessments for a given site. Surface soil samples may be collected as part of an site investigation or as part of a site-specific sampling plan, and/or as a screen for “hot spots”, which may require more extensive sampling based on the results of the initial surface soil sampling.

Sediment(s) and sludge(s) that have been exposed by evaporation, stream rerouting, or any other means are collected by the same methods as those for surface soil(s). Typically the top 1 to 2 cm of material are carefully removed before collection of the sample. If a thick, matted root zone is encountered at or near the surface, it shall be removed before collecting the representative soil sample. Surface soil, exposed sediment, or sludge is collected using stainless steel and/or Teflon-lined trowels or scoops.

3.0 General Responsibilities

Site Manager - The site manager is responsible for ensuring that sampling efforts are conducted in accordance with this procedure and any other SOPs pertaining to the sampling of specific media. The site manager must also ensure that the quantity and location of surface soil samples collected meet the requirements of the site-specific sampling plan.

Field Team Leader - The field team leader is responsible for ensuring that field personnel collect surface soil samples in accordance with this SOP and other relevant guidance for surface soil sampling.

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site/quality assurance project plan (QAPP).

4.0 Required Equipment

- Insulated cooler and clear waterproof sealing tape
- Securely-sealed bags of ice or “blue ice” packs
- Nitrile or other appropriate protective gloves
- Plastic zip-top bags
- Personal protective clothing and equipment
- Stainless steel and/or Teflon-lined spatulas and pans, trays, or bowls
- Plastic sheeting (disposable, protective ground cover)
- Stainless steel and/or Teflon-lined trowels or spoons/scoops (or other equipment as specified in the site-specific sampling plan)
- Appropriate project documents (including sampling or work plan, and health and safety plan)
- Appropriate sample containers
- Field logbook
- Indelible black ink pen and/or marker
- Sample chain-of-custody forms
- Custody seals
- Decontamination supplies
- Paper towels or Kimwipes

Additional equipment is discussed in Section 5.2.2, VOC Field Sampling/Preservation Methods.

5.0 Procedures

5.1 Preparation

The following steps must be followed when preparing for sample collection:

1. Review site-specific health and safety plan and project plans before initiating sampling activity.

2. Don the appropriate personal protective clothing as specified in the site-specific health and safety plan.

3. Locate sampling location(s) in accordance with project documents (e.g., work plan) and document pertinent information in the field logbook. When possible, reference sampling locations back to known, existing site features such as buildings, roads, intersections, etc.

4. Processes for verifying sample collection depth must be specified in the site-specific sampling or work plans.

5. Place clean plastic sheeting on a flat, level surface near the sampling area, if possible, and place sampling equipment on the plastic; place the insulated cooler(s) on separate plastic sheeting to avoid the potential for any cross-contamination.

6. A clean, new or sufficiently decontaminated trowel, scoop, or spoon will be used to obtain sample material from each specified sample location. Other equipment may be used (e.g., shovels) to collect sample material if constructed of stainless steel and decontaminated appropriately prior to use.

5.2 Sample Collection

The following general steps must be followed when collecting surface soil samples.

1. Wear new, clean gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected, to avoid cross-contamination.

2. Surface soil samples are typically collected from the areas of least contamination to the areas of the greatest contamination, if known.

3. Document the sampling process by recording applicable information in the designated field logbook. Document any and all deviations from SOPs and the sampling plan in the field logbook and include rationale for changes. See SOP 4-1 for guidance on entering information into field log books.

4. Carefully remove stones, vegetation, snow, etc. from the ground surface in the sampling location area. Clear the sample location using a new and/or appropriately decontaminated spoon, scoop, or other tool as described to expose a fresh sampling surface.

5. Collect the required sample aliquot for volatile analyses, as appropriate, as well as any other samples that may be degraded by aeration, followed by the collection of samples for other analyses. Note that samples are typically not collected from ground surface to approximately six (6) to twelve (12) inches below ground surface for volatile organic compound analysis because of the potential for volatile loss. Sample collection and preservation techniques, as appropriate, are discussed in the following subsections of this SOP.

6. Store samples at 4° Celsius (C) (±2°C) until samples are delivered to the designated analytical laboratory. An appropriate amount of ice or number of cold packs should be used according to the number of samples and/or the volume of sample material collected in order to ensure that a temperature of 4°C is achieved and maintained for delivery to the analytical laboratory. Sample holding times shall be determined with the appropriate analytical laboratory.

7. Pack all samples as required by the work plan and/or laboratory requirements. Include properly completed documentation and affix signed and dated custody seals to the cooler lid. See SOPs 1-2 and 2-1 for guidance on sample custody procedures and packaging and shipping environmental samples.

8. Decontaminate sampling equipment between sample locations. See SOP 4-5 for guidance on decontamination of field equipment at non-radioactive sites.

5.2.1 Method for Collecting Samples for Nonvolatile Organic or Inorganic Compound Analysis

The requirements for collecting samples of surface soil for nonvolatile organic or inorganic analyses are as follows:

1. Wear new, clean gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected, to avoid cross-contamination.

2. Clear the area to be sampled of debris as described in Section 5.2 of this SOP. Determine sample depth as described in the sampling plan.

3. Label each sample container with the appropriate sample collection information.

4. Use a decontaminated stainless steel or Teflon-lined trowel or spoon to obtain sufficient sample material from the required interval and subsampling points, if necessary, to fill the specified sample containers.

5. Empty the contents of the sampling device directly into a clean stainless steel or Teflon-lined tray or bowl.

6. Homogenize the sample by mixing with a spoon, spatula, or trowel.

7. Use the spoon, spatula, or trowel to distribute the mixture into the labeled sample containers. Fill organic sample containers first, then inorganic sample containers.

8. Secure the respective cap on each sample container immediately after filling.

9. Wipe the sample containers with a clean paper towel or Kimwipe to remove any residual soil from the sample container surface.

10. Place sample containers in individual zip-top plastic bags and seal the bags.

11. Store samples at 4° C (±2°C) until samples are delivered to the designated analytical laboratory

12. Pack all samples as required by the work plan and/or laboratory requirements. Include properly completed documentation and affix signed and dated custody seals to the cooler lid. See SOPs 1-2 and 2-1 for guidance on sample custody procedures and packaging and shipping environmental samples.

13. Decontaminate all non-disposable sampling equipment in accordance with SOP 4-5.

5.2.2 Method for Collecting Soil Samples for Volatile Organic Compound Analysis

The requirements for collecting grab samples of surface soil for volatile organic compounds (VOCs) or other samples degraded by aeration are as follows:

1. VOC samples shall be collected with the least disturbance to the soil as possible. When grab sampling for VOC analysis or for analysis of any other compound(s) that may be degraded by aeration, it is necessary to minimize sample disturbance and consequently minimize analyte loss. The representativeness of a VOC grab sample is difficult to determine because the collected sample represents a single point, is not homogenized, and has been disturbed.

2. VOC samples shall be collected as grab samples as discussed in section 5.2.2 of this SOP. Although the method of collection may vary from site to site based on data quality objectives and the degree of known or suspected contamination, collection of samples for VOC analysis should follow the sampling and preservation methodology as described below.

3. Complete the sample label by filling in the appropriate information (e.g., sample identification, date and time of sample collection, and requested analyses) and securing the label to the container.

4. Use a clean stainless steel or Teflon-lined trowel or spoon/scoop to collect sufficient material in one grab to fill the sample containers.

5. With the aid of a clean stainless steel spatula, quickly fill the sample containers directly from the sampling device, removing stones, twigs, grass, etc., from the sample material, as needed. Fill the sample containers, compacting the sample material as much as possible to minimize headspace in each of the containers.

6. Immediately secure the Teflon-lined cap(s) on the sample container(s).

7. Wipe the containers with a clean Kimwipe or paper towel to remove any residual soil from the exterior of the container.

8. Place the sample containers in individual zip-top plastic bag(s) and seal the bag(s).

9. Store samples at 4° Celsius (C) (±2°C) until samples are delivered to the designated analytical laboratory. Determine sample holding times with the appropriate analytical laboratory.

10. Pack all samples as required by the work plan and/or laboratory requirements. Include properly completed documentation and affix signed and dated custody seals to the cooler lid. See SOPs 1-2 and 2-1 for guidance on sample custody procedures and packaging and shipping environmental samples.

11. Decontaminate all non-disposable sampling equipment in accordance with SOP 4-5.

Note: A trip blank shall be included with sample coolers containing VOC samples. QC sample requirements vary from project to project. Consult the project-specific sampling plan for requirements.

5.2.3 VOC Field Sampling/Preservation Methods

The following four sections contain SW-846 test methods for sampling and field preservation of soil samples for VOC analysis. These methods include the EnCore™ Sampler Method for low-level VOC analyses, EnCore Sampler Method for high-level VOC analyses, acid preservation for low-level VOC analyses, and methanol preservation for high-level VOC analyses. Equipment requirements in addition to the equipment specified in Section 4.0 of this SOP for each method are indicated at the beginning of each subsection as follows

When collecting soil samples using the EnCore Sampler Method, collection of soil for moisture content analysis is required. Results of the moisture analysis are used to adjust “wet” concentration results to “dry” concentrations to meet analytical method requirements.

Note: Some variation from these methods may be required depending on the contracted analytical laboratory. For example, sample volume requirements are general requirements. Actual sample volumes, sizes, and quantities may vary depending on client or laboratory requirements.

5.2.3.1 EnCore Sampling Equipment and Collection for Low Level VOC Analyses (<200 µg/kg)

The following equipment is required for low-level analysis:

- Three new 5-gram (g) EnCore samplers
- One 110-milliliter (mL) (4-ounce) wide-mouth glass jar or applicable container for moisture analysis
- One EnCore sampler T-handle

The requirements for collecting samples for low level analysis (<200 µg/kg) of VOCs by the EnCore Sampler Method are as follows:

1. Wear new, clean gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected, to avoid cross-contamination.

2. Clear the area to be sampled of debris as described in Section 5.2 of this SOP. Determine sample depth as described in the sampling plan.

3. Remove EnCore sampler and cap from package and attach T-handle to sampler body.

4. Push the sampler into the freshly-exposed sampling surface until the O-ring is visible within the hole on the side of the T-handle. If the O-ring is not visible within this window, then the sampler is not full.

5. Extract the sampler and wipe the sampler head with a clean paper towel or Kimwipe so that the sampler cap can be tightly attached.

6. Push the sampler cap on the head of the sampler with a twisting motion to secure it to the sampler body.

7. Rotate the sampler stem counterclockwise until the stem locks in place to retain the sample within the sampler body.

8. Fill out the sample label with the appropriate sample information (e.g., sample identification, date/time of sample collection, requested analyses) and attach to sampler.

9. Repeat procedure for each of the remaining two samplers.

10. Collect a representative moisture sample in a 110 milliliter (mL) (4-ounce) wide-mouth jar using a new or clean Teflon-lined stainless steel spoon, scoop, or trowel.

11. Store samples at 4° C (±2°C) until samples are delivered to the designated analytical laboratory Samples must be shipped and delivered to the analytical laboratory for extraction within 48 hours.

12. Pack all samples as required by the work plan and/or laboratory requirements. Include properly completed documentation and affix signed and dated custody seals to the cooler lid. See SOPs 1-2 and 2-1 for guidance on sample custody procedures and packaging and shipping environmental samples.

13. Decontaminate all non-disposable sampling equipment in accordance with SOP 4-5.

Note: Verify analytical laboratory requirements for extraction/holding times.

5.2.3.2 Acid Preservation Equipment and Sampling Requirements for Low Level VOC Analyses (<200 µg/kg)

Note: Determine specific field acid preservation procedure based on the requirements specified in the analytical method to be employed. Variations between analytical methods exist with respect to field acid preservation.

The following equipment and supplies are required if field acid preservation is required:

- One 40-mL VOA vial with acid preservation (for field testing of soil pH)
- Two preweighed 40-mL VOA vials with acid preservative and stir bar (for lab analysis)
- Two preweighed 40-mL VOA vials with water and stir bar (in case samples cannot be pre-preserved)
- One pre-weighed jar containing methanol or a pre-weighed empty jar accompanied by a pre-weighed VOA vial containing methanol (for sample screening and/or high level VOC analysis)
- One 110-mL (4-oz) wide-mouth glass jar or other container appropriate for retaining a representative sample for moisture analysis
- One 55-mL (2-oz) jar containing acid preservative (additional acid may be needed because of high soil pH)
- One appropriately sized, non-reactive scoop or measuring spoon capable of delivering 1 g of solid sodium bisulfate
- pH paper
- Weighing scale capable of reading to 0.01 g
- Set of balance weights used in daily balance calibration
- Sodium bisulfate acid solution ($NaHS0_4$)
- A plastic syringe or other sampling device capable of collecting a sufficient sample volume of approximately 5 g

Testing Effervescing Capacity of Soils

Soils must be tested with acid to determine the amount of effervescing that will occur when preserved with acid. Effervescing will drive off VOCs as well as create a high pressure in a sealed VOA vial that could result in the explosion of the sample container. The following steps provide information on the effervescing capacity of the soil.

1. Wear new, clean gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected, to avoid cross-contamination.

2. Clear the area to be sampled of debris as described in Section 5.2 of this SOP. Determine sample depth as described in the sampling plan.

3. Using a new, clean syringe, pace approximately 5 g of soil into a VOA vial that contains acid preservative and no stir bar

4. Do not cap this vial as it may EXPLODE upon interaction with the soil.

5. Observe the sample for gas formation, or effervescence (bubbles that form due to the interaction of carbonates in the soil with the acid preservative).

6. If vigorous or sustained effervescence is observed, then acid is not an acceptable preservative for the sample.
   - In this case the samples need to be collected in the VOA vials containing only water as a preservative and a stir bar. The vials with acid preservative CANNOT be used.

7. If a small amount or no effervescence occurs, then acid is acceptable to preserve the sample. Keep this initial testing VOA vial for use in the buffering test as detailed below.
   - In this case the samples need to be collected in the VOA vials containing acid preservative and a stir bar.

Testing Buffering Capacity of Soils
The soils must be tested to determine the quantity of acid that is required to achieve a pH reading of ≤2 standard units (SUs). The following steps will assist in determining this quantity.

1. If acid preservation is acceptable for sampling soils, then the sample vial that was used to test the effervescing capacity of the soils can be used to test the buffering capacity.

2. Wear new, clean gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected, to avoid cross-contamination.

3. Clear the area to be sampled of debris as described in Section 5.2 of this SOP. Determine sample depth as described in the sampling plan.

4. Cap the VOA vial containing the 5 g of soil, acid preservative, and no stir bar as retained during Step 7 of the effervescing test as described above.

5. Shake the VOA vial gently to homogenize the contents.

6. Open the VOA vial and test the pH of the acid solution with pH paper by dipping one end of a pH paper strip into the soil/acid solution.
   - If the pH paper indicates a pH below 2, then samples can be collected in the two preweighed 40-mL VOA vials with the acid preservative and stir bar. As the pH reading is below 2, it is not necessary to add additional acid to the VOA vials.
   - If the pH paper indicates a pH above 2, then additional acid needs to be added to the VOA vial.

7. To add acid to a sample with a pH above 2, measure out 1 g of the solid sodium bisulfate acid and add to the appropriate VOA vial.

8. Cap the VOA vial and shake thoroughly.

9. After an additional 1 g of solid sodium bisulfate has been added to the VOA vial containing sample material with a pH above 2, repeat Step 4.
   - If the pH paper reads below 2, then the samples can be collected in the two preweighed 40-mL VOA vials containing acid preservative, a stir bar, and 1 g of sodium bisulfate.
   - On the Chain of Custody and in the field log book, note that one additional gram of acid was added such that the laboratory can analyze the samples accordingly.
   - If the pH paper reads above 2, repeat Steps 5 through 7 until the sample pH is less than or equal to 2 SUs.

After the soil chemistry has been determined, samples can be collected. The procedure summarized below assumes the appropriate acid- or water-preserved VOA vials are used based on the guidance discussed.

Sample Preservation Steps
1. Wear new, clean gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected, to avoid cross-contamination.

2. Add more acid to the sample if necessary (based on the buffering capacity testing discussed in the previous section).

3. Collect an approximately 5-g soil sample using a cutoff plastic syringe or other sampling device designed to obtain 5 g of soil from a freshly exposed sampling surface.

4. Carefully wipe exterior of sample collection device with a clean paper towel or Kimwipe.

5. Transfer the sample from the sample collection device to the appropriate VOA vial, using caution when extruding the sample to prevent splashing the acid outside of the vial.

6. Remove any soil from the threads of the VOA vial using a clean paper towel or Kimwipe.

7. Cap the VOA vial and weigh the jar to the nearest 0.01 g.

8. Record the exact weight on the sample label.

9. Repeat this sampling procedure for the duplicate VOA vial.

10. Weigh the VOA vial containing methanol preservative to the nearest 0.01 g. If the weight of the vial with methanol varies by more than 0.01 g from the original weight recorded on the vial, discard the vial. If the weight is within tolerance, it can be used for soil preservation as discussed below.

11. Take a clean, empty sample jar or the jar that contains the methanol preservative and collect a 5-g or 25-g sample using a cutoff plastic syringe or other coring device designed to deliver 5 g or 25 g of soil from a freshly exposed sample surface. The 5-g or 25-g size is dependent on the client or analytical laboratory requirements, or as specified in the sampling plan.

12. Carefully wipe the exterior of the collection device with a clean paper towel or Kimwipe.

13. Transfer the soil to a clean, empty jar or a VOA vial that contains methanol. If extruding into a jar that contains methanol, be careful not to splash the methanol outside of the sample container.

14. If the jar used to collect the soil sample did not contain preservative before the soil was added, immediately preserve with the methanol provided, using only one vial of methanol preservative per sample jar.

15. Remove any soil from the threads of the VOA vial using a clean paper towel or Kimwipe and cap the vial.

16. Weigh the jar with sample to the nearest 0.01 g and record the weight on the sample label.

17. Collect dry weight sample using a clean stainless steel spoon or trowel.

18. Store samples at 4°C (±2°C) until samples are delivered to the designated analytical laboratory

19. Pack all samples as required by the work plan and/or laboratory requirements. Include properly completed documentation and affix signed and dated custody seals to the cooler lid. See SOPs 1-2 and 2-1 for guidance on sample custody procedures and packaging and shipping environmental samples.

20. Decontaminate all non-disposable sampling equipment in accordance with SOP 4-5.

5.2.3.3 EnCore Sampling Equipment and Sampling Requirements for High Level Analysis (≥200 µg/kg)

The following equipment is required for high-level analysis:

- One 5-g sampler or one 25-g sampler

Note: The volume requirements specified are general requirements. Actual sample volumes, container sizes, and quantities may vary depending on client or laboratory requirements.

- One 110-mL (4-oz) wide-mouth glass jar or applicable container specified for moisture analysis
- One T-handle EnCore sampler

The requirements for collecting high level analysis by the EnCore Sampler Method are as follows:

1. Wear new, clean gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected, to avoid cross-contamination.

2. Clear the area to be sampled of debris as described in Section 5.2 of this SOP. Determine sample depth as described in the sampling plan.

2. Remove the EnCore sampler and cap from package and attach the T-handle to sampler body.

3. Push the sampler into freshly exposed soil surface until the O-ring is visible within the hole/window on the side of the T-handle. If the O-ring is not visible within the window/hole, then the sampler is not full.

4. Use a clean paper towel or Kimwipe to wipe the sampler head so that the cap can be tightly attached.

5. Push the sampler cap on the sampler head with a twisting motion to secure it to the sampler body.

6. Fill out the sample label and attach it to sampler.

7. Rotate the sampler stem counterclockwise until the stem locks in place to retain the sample within the sampler body.

8. Collect a representative moisture sample in 110-mL (4-oz) wide-mouth glass jar or designated container using a clean stainless steel spoon or trowel.

9. Store samplers at 4°C (±2°C) until samples are delivered to the designated analytical laboratory. Samples must be shipped and delivered to the analytical laboratory for extraction within 48 hours.

10. Pack all samples as required by the work plan and/or laboratory requirements. Include properly completed documentation and affix signed and dated custody seals to the cooler lid. See SOPs 1-2 and 2-1 for guidance on sample custody procedures and packaging and shipping environmental samples.

11. Decontaminate all non-disposable sampling equipment in accordance with SOP 4-5.

Note: Verify requirements for extraction/holding times.

5.2.3.4 Methanol Preservation Equipment and Sampling Requirements for High Level Analyses (≥200 µg/kg)

The following equipment is required for high-level analysis:

- One pre-weighed jar that contains methanol or a pre-weighed empty jar accompanied by a pre-weighed VOA via that contains methanol (laboratory grade)
- Cutoff plastic syringe or other sampling device to obtain 5 g or 25 g of soil
- Set of balance weights used in daily balance calibration
- One dry weight cup
- Weighing balance that accurately weighs to 0.01 g

The requirements for sampling and preservation are as follows:

1. Wear new, clean gloves during handling of all sample containers and sampling devices. Change out gloves at each sampling location, or each time a new sample is to be collected, to avoid cross-contamination.

2. Clear the area to be sampled of debris as described in Section 5.2 of this SOP. Determine sample depth as described in the sampling plan.

3. Weigh the VOA vial containing methanol preservative to the nearest 0.01 g. If the weight of the VOA vial containing methanol varies by more than 0.01 g from the original weight recorded on the vial, discard the vial. If the weight is within tolerance, it can be used for soil preservation/collection as described below.

4. Quickly collect a 5-g or 25-g sample using a plastic syringe or other sampling device designed to obtain 5 g or 25 g of soil from a freshly exposed sampling surface.

5. Carefully wipe the exterior of the collection device with a clean paper towel or Kimwipe.

6. Quickly transfer the soil to an empty jar or a jar that contains methanol. If extruding into a jar that contains methanol, be careful not to splash the methanol outside of the vial. The type of jar used and the sample volume needed is dependent on the client or laboratory requirements.

7. If the jar used to collect the soil sample was empty before the soil was added, immediately preserve with the methanol provided, using only one vial of methanol preservative per sample jar.

8. Remove any soil from the exterior of the vial using a clean paper towel or Kimwipe and cap the sample container.

9. Weigh the jar containing the soil to the nearest 0.01 g and record the weight on the sample label.

10 Collect a dry weight sample in a clean, unpreserved sample container using a clean stainless steel spoon or trowel.

11. Store samples at 4°C (±2°C) until samples are delivered to the designated analytical laboratory.

12. Pack all samples as required by the work plan and/or laboratory requirements. Include properly completed documentation and affix signed and dated custody seals to the cooler lid. See SOPs 1-2 and 2-1 for guidance on sample custody procedures and packaging and shipping environmental samples.

13. Decontaminate all non-disposable sampling equipment in accordance with SOP 4-5.

14. If dropping the samples off at the analytical laboratory or requesting a sample pick-up is not an option, sample containers may need to be shipped to the analytical laboratory. Samples should be packed with ice packs sufficient to maintain a temperature of 4° C in the cooler, and shall be shipped in accordance with Department of Transportation (DOT) regulations. Consult CDM Smith's Health and Safety website (http://cdmweblegacy/h&s/hazmat_transport.html) for guidance on shipping hazardous materials.

6.0 Restrictions/Limitations

As presented in Section 5.2 of this SOP, when grab sampling for VOC analysis or for analysis of any other compound(s) that may be degraded by aeration, it is necessary to minimize sample disturbance and consequently minimize analyte loss. The representativeness of a VOC grab sample is difficult to determine because the collected sample represents a single point, is not homogenized, and has been disturbed.

7.0 References

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Subsurface Soil Sampling

SOP 1-4
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1.0 Objective

The objective of this technical standard operating procedure (SOP) is to define the techniques and requirements for collecting soil samples for environmental or geotechnical characterization purposes from the unconsolidated subsurface zone. General techniques discussed in this SOP include use of hand augers, split-barrel samplers, Shelby tubes, direct-push rig samplers, and backhoes, as well as field sampling and preservation methods.

2.0 Background

2.1 Definitions

Auger Flight - A steel section length attached to the auger length to extend the augers and remove additional unconsolidated material as drilling depth increases.

Backhoe - An excavator to which a shovel bucket is attached to a hinged boom and is drawn backward to move materials.

Direct Push Rig Sampler - A sampler with a locking tip that keeps the device closed during the sampling push. The tip is released at the desired depth, and the push is continued. During the push, the soil is pushed up into the sampler.

Grab Sample - A discrete portion or aliquot of material taken from a specific location at a given point in time.

Hand Auger - A stainless steel cylinder (bucket) approximately 7 to 10 centimeters (cm), or 3 to 4 inches (in) in diameter and 30 cm, or 1 foot (ft) in length, open at both ends with the bottom edge designed to advance perpendicular to the ground surface with a twisting motion into unconsolidated subsurface material to obtain a soil sample. The auger has a T-shaped handle (used for manual operation) attached to the top of the bucket by extendable stainless steel rods.

Liner - A cylindrical sleeve generally made of brass, stainless steel, or Teflon® that is placed inside a split-barrel sampler, direct-push rig sampler, or hand auger bucket to collect samples for Volatile Organic Compound (VOC) or other analyses or to prevent sample contamination.

Shelby Tube - A cylindrical sampling device which is generally made of steel, and which is driven into the subsurface soil through a hollow-stem auger using a drill rig. The tube, once retrieved, is capped on both ends. The undisturbed soil sample is extruded in the laboratory before soil analysis.

Slide Hammer - A device consisting of a drive weight (hammer) and a drive weight fall guide.

Split-Barrel Sampler - A cylindrical sampling device generally made of carbon steel that fits into a hollow-stem auger. The sampler is opened lengthwise, which allows the sample to be retrieved by “splitting” the barrel sampler. Also referred to as a split-spoon.

Subsurface Soil - The unconsolidated, or non-lithified, material that exists deeper than approximately 30 cm (1 foot) below the ground surface (bgs).

Unconsolidated Zone - A layer of non-lithified earth material (soil or sediment) that has no mineral cement or matrix binding its grains.

2.2 Associated Procedures
- SOP 1-2, *Sample Custody*
- SOP 1-3, Surface Soil Sampling
- SOP 2-1, *Packaging and Shipping Environmental Samples*
- SOP 3-5, *Lithologic Logging*
- SOP 4-1, *Field Logbook Content and Control*
- SOP 4-5, *Field Equipment Decontamination at Nonradioactive Sites*

2.3 Discussion
Shallow subsurface soil samples, or those taken from depths between 0.15 cm to 3 meters (m), or between 6 in and 10 ft bgs, may be collected using hand augers. However, soil samples collected with a hand auger are commonly of poorer quality than those samples collected by split-barrel or Shelby tube samplers because the soil sample is disturbed during the augering process. Split-barrel and Shelby tube samplers are generally used during collection of soil samples using hollow-stem auger drilling methods. Barrel-type samplers may also be used to collect soil samples from hand auger borings using a slide hammer device. For environmental sampling programs, liners are used to minimize the loss of volatile organic compounds (VOCs) and to prevent sample cross-contamination. Collecting samples using a backhoe enables the collector to correlate the precise vertical and horizontal interval of the sample collected relative to adjacent, visible subsurface materials.

The size and material of sampling devices used shall be selected based on project and analytical objectives and as defined in the site-specific sampling and/or work plans. Note that operation and collection of samples via drill rig (split spoon or Shelby tubes), direct-push methods, or backhoe is typically performed by subconsultants to CDM Smith, with field oversight provided by a CDM Smith field representative (engineer, geologist, scientist, or similar) as further discussed in Section 5.2 of this SOP.

3.0 General Responsibilities
Site Manager - The site manager is responsible for ensuring that field personnel are trained in the use of this procedure and the required equipment, and for ensuring that subsurface soil samples are collected in accordance with this procedure and any other SOPs pertaining to specific media sampling. The site manager must also ensure that the quantity and location of subsurface soil samples collected meet the requirements of the site-specific sampling and/or work plans.

Field Team Leader - The field team leader is responsible for ensuring that field personnel collect subsurface soil samples in accordance with this SOP and other relevant procedures.

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific quality assurance project plan (QAPP).

4.0 Required Equipment
4.1 General
- Site-specific plans (e.g., sampling, work, health and safety)
- Field logbook
- Indelible black ink pens and markers
- Clear, waterproof tape
- Appropriate sample containers
- Labels and appropriate forms/documentation for sample shipment
- Insulated cooler(s) and waterproof sealing tape
- Bags of ice or “blue ice” packs
- Nitrile or appropriate gloves
- Plastic zip-top bags
- Personal protective clothing and equipment
- Plastic sheeting
- Stainless steel and/or Teflon-lined spatulas and pans, trays, bowls, trowels, or spoons
- Decontamination supplies
- Sample chain-of-custody forms
- Custody seals
- Kimwipes or paper towels

Additional equipment is discussed in Section 5.2.7, Field Sampling/Preservation Methods.

4.2 Manual (Hand) Augering

- T-handle
- Hand auger: flighted-, bucket-, or tube-type auger as required by the site-specific plans
- Extension rods
- Wrench(es), pliers
- Slide hammer with extension rods

4.3 Split-Barrel and Shelby Tube Sampling

- Drill rig equipped with a 63-kilogram (kg) (140-lb) drop hammer and sufficient hollow-stem auger flights to drill to the depths required by the site-specific work/sampling plans.
- Sufficient numbers of split-barrel samplers so that at least one sampler is always decontaminated and available for sampling. Three split-barrel samplers are generally the minimum necessary (Shelby tubes are used only once).
- Split-barrel liners (as appropriate).
- Wrench(es), hammer.

4.4 Direct Push Rig Sampling

- Direct push rig with sufficient probe rods to extend to sample depths required by the site-specific work/sampling plans
- Sufficient number of samplers (in case of malfunction) and appropriate liners to collect adequate number of samples
- Extension rods
- Wrench(es), pliers, other specific tools

4.5 Backhoe Sampling

- Backhoe with a sufficient length boom to extend to planned depths
- Sufficient number of trowels or scoops
- Extension rods
- Tape, utility knife, other specific tools as needed

5.0 Procedures

5.1 Preparation

1. Review site-specific health and safety plan and project plans before initiating sampling activity.

2. Don the appropriate personal protective clothing as indicated in the site-specific health and safety plan.

3. Locate sampling location(s) in accordance with project documents (e.g., work plan) and document pertinent information in the appropriate field logbook. When possible, reference locations back to existing site features such as buildings, roads, intersections, etc.

4. Processes for verifying depth of sampling must be specified in the site-specific plans.

5. Clear away vegetation and debris from the ground surface at the boring location.

6. If decontamination of equipment and/or personnel is required, set up a decontamination zone in accordance with SOP 4-5.

7. Prepare an area near the sampling location to perform sample collection activities by placing plastic sheeting on the ground, or, if required by the site-specific health and safety plan and or work/sampling plans, place plastic sheeting over the area immediately surrounding the borehole, as applicable.. Sample collection should be performed at a safe distance from all heavy equipment, or as determined by heavy equipment operator(s) and/or the CDM Smith field representative.

5.2 Sample Collection

The following general steps must be followed when collecting all subsurface soil samples. Refer to section 5.3 of this SOP and SOP 1-3 (Surface Soil Sampling) for additional guidance on field sampling and preservation methods.

1. Wear clean gloves during handling of all sample containers and sampling devices.

2. VOC samples or samples that may be degraded by aeration shall be collected first and with the least disturbance possible. When sampling for VOC analysis or for analysis of any other compound(s) that may be degraded by aeration, it is necessary to minimize sample disturbance and consequently minimize analyte loss. The representativeness of a VOC grab sample is difficult to determine because the collected sample represents a single point, is not homogenized, and has been disturbed. Sample containers containing samples for VOC analysis shall be filled completely to minimize headspace (see section 5.3 of this SOP).

3. All sampling information, including environmental and/or geotechnical soil characterization, sample depth, sample volume, and requisite geotechnical or environmental analyses shall be recorded in the field logbook and on any associated forms as specified in the site-specific sampling/work plans. Sample lithology shall be described according to SOP 3-5.

4. Specific sampling devices to be used shall be identified in the site-specific work/sampling plans and shall be recorded in the field logbook.

5. Care must be taken to prevent cross-contamination and misidentification of samples as described in subsequent subsections of this SOP.

5.2.1 Manual (Hand) Augering

The following steps must be followed when collecting environmental soil samples using hand-auger techniques:

1. Advance the auger to the depth specified in the site-specific sampling plan for sample collection Place cuttings on plastic sheeting or as specified in the site-specific work/sampling plans. If possible, lay out the cuttings in stratigraphic order, or from the shallowest cuttings collected to the deepest cuttings collected.

2. During auger advancement and sample collection, record , observations made of the geologic features of the soil or sediments per American Society for Testing and Materials (ASTM) D 2448 (Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) in the field logbook.

3. Stop advancing the auger when the top of the specified sampling depth has been reached. If required by the site-specific sampling plan, remove the auger from the hole and decontaminate the auger or use a separate decontaminated auger, then obtain the sample.

4. Collect a grab sample for VOC analyses (or samples that may be degraded by aeration) immediately and place in sample container. Sample container(s) shall be filled completely to minimize headspace.

5. Remaining sample material for other analyses shall be homogenized before placing samples in the appropriate containers.

6. Wipe container(s)with a clean Kimwipe or paper towel to remove residual soil from the exterior of the container(s).

7. Label the sample container with the appropriate information. Secure the label by covering it with a piece of clear tape.

8. Place the containers in zip-top plastic bags and seal the bags. Pack samples in a cooler with ice or cold packs (to maintain a temperature of 4°C)

9. Proceed with additional sampling as required by the site-specific plans.

10. When sample collection is complete, dispose of cuttings, plastic sheeting, etc., as specified in the site-specific plans.

11. Complete the field logbook entry and other appropriate forms, being sure to record all relevant information before leaving the site.

12. Properly package all samples for shipment and complete all necessary sample shipment documentation. Remand custody of samples to the appropriate personnel. Refer to SOPs 1-2 and 2-1 and site-specific plans.

5.2.2 Manual (Hand) Augering Using a Tube Sampler with Liner or Slide Hammer
The following steps must be followed when collecting environmental soil samples using a hand-auger and a tube sampler with liner or slide hammer:

1. Auger to the depth required for sampling. Place cuttings on the plastic sheeting as specified in the site-specific plans. If possible, lay out the cuttings in stratigraphic order.

2. During auger advancement and sample collection, record observations made of the geologic features of the soil or sediments per ASTM D 2448 (Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) in the field logbook.

3. Stop advancing the auger when the top of the specified sampling depth has been reached. If required by the site-specific sampling plan, remove the auger from the hole and decontaminate the auger per the site-specific work/sampling plan (see line item 11 below).

4. Prepare a clean, new tube sampler by installing a decontaminated liner in the auger tube.

5. Obtain the sample by driving the sample tube through the sample interval with the slide hammer. Remove the liner from the tube and immediately cover the ends with Teflon tape and cap the ends of the tube. Seal the caps with waterproof tape.

6. Wipe sealed liners with a clean Kimwipe or paper towel.

7. Label the sealed liners as required in the site-specific plans. Mark the top and bottom of the sample on the outside of the liner.

8. Place sealed liners in zip-top plastic bags and seal the bags. Pack samples in a cooler with ice or cold packs (to maintain a temperature of 4°C).

9. Proceed with additional sample collection as required by the site-specific sampling plans.

10. When sampling is complete, dispose of cuttings, plastic sheeting, etc., as specified in the site-specific work/sampling plans.

11. Decontaminate all equipment according to SOP 4-5 between each sample.

12. Complete the field logbook entry and other forms, being sure to record all relevant information before leaving the site.

13. Properly package all samples for shipment and complete all necessary sample shipment documentation. Remand custody of samples to the appropriate personnel. See SOPs 1-2 and 2-1 or site-specific plans.

5.2.3 Split-Barrel Sampling
Note: Steps 1 through 12 describe the general activities to be performed by a licensed drilling contractor, not by CDM Smith personnel.

The following steps must be followed when collecting split-barrel samples for environmental and/or geotechnical purposes:

1. Remove any pavement and subbase material from an area of twice the bit diameter, if necessary.

2. The drilling rig will be decontaminated at a separate location before drilling, per SOP 4-5 or the site-specific decontamination procedures.

3. Attach the hollow-stem auger with the cutting head, plug, and center rod(s) to the drill rig.
4. Begin drilling and proceed to the first designated sample depth, adding auger flights as necessary.
5. Upon reaching the designated sample depth, slightly raise the auger(s) to disengage the cutting head, and rotate the auger without advancement to clean cuttings from the bottom of the hole.
6. Remove the plug and center rods, if applicable.
7. If required by the site-specific sampling plan, install decontaminated liners in the split barrel sampler.
8. Install a decontaminated split-barrel on the center rod(s) and insert it into the hollow-stem auger. Connect the hammer assembly and lightly tap the rods to seat the drive shoe at the top of undisturbed soil or sediment.
9. Mark the center rod in 15-cm (6-inch) increments from the top of the auger(s).
10. Drive the split-barrel using the hammer. Use a full 76-cm (30-inch) drop as specified by ASTM D 1586. Record the number of blows required to drive the sampler through each 15-cm (6-inch) increment.
11. Stop driving the split-barrel sampler when the full length of the spoon (24 inches) has been driven or if refusal is encountered. Refusal occurs when little or no progress is made for 50 blows of the hammer. ASTM D1586-99 § 7.2.1 and 7.2.2 defines "refusal" as >50 blows per 6-inches advanced or a total of 100 blows.
12. Pull the sampler free by using upswings of the hammer to loosen the sampler. Pull out the center rod and sampler.
13. Unscrew the sampler assembly from the center rod and place the sampler on the plastic sheeting.
14. Remove the drive shoe and head assembly. If necessary, tap the sampler assembly with a hammer to loosen threaded couplings.
15. With the drive shoe and head assembly off, open (split) the sampler, being careful not to disturb the sample.
16. Label sample containers with appropriate information. Secure the label, covering it with a piece of clear tape. If liners were used, immediately install Teflon tape over the ends of the liners, cap the liners, and seal the caps over the ends of the liner with waterproof tape. Label the samples as required by the site-specific plans. Mark the top and bottom of each sample on the outside of each liner. Indicate boring/well number and depth on the outside of the liner, as required.
17. If samples are to be collected from the soil sample for VOC analyses and liners were not used, place sample material in the appropriate sample container immediately after opening the split-barrel, filling the sample bottle as completely as possible to minimize headspace. Seal the container immediately, then describe the sample material in the field logbook and/or associated forms per ASTM D 2488.
18. Remaining sample material shall be homogenized before placing samples in appropriate containers.
19. Record the sample identification number, depth from which the sample was taken, sample recovery and the analyses to be performed on the samples in the field logbook and on the appropriate forms.
20. Wipe containers with a clean Kimwipe or paper towel. Label sample containers as required when liners are not used.
21. Place containers and/or sealed liners in zip-top plastic bags and seal the bags. Pack samples in a cooler with ice or cold packs (to maintain a temperature of 4°C)
22. In the field logbook and on the boring log, describe sample lithology by observing cuttings and/or the bottom end of the liner.

23. Continue to advance the borehole to the next sampling point. Collect samples as outlined above.

24. When sampling is complete, remove the drilling rig to the heavy equipment decontamination area.

25. Dispose of cuttings, plastic sheeting, etc., as specified in the site-specific plans. Backfill borehole as specified in project- and /or site-specific work/sampling plans.

26. Decontaminate samplers and other small sampling equipment according to SOP 4-5 before proceeding to other sampling locations.

27. Complete the field logbook entry and other forms, being sure to record all relevant information before leaving the site.

28. Properly package all samples for shipment to laboratories and complete all necessary sample shipment documentation. Remand custody of the samples to appropriate personnel. See SOPs 1-2 and 2-1 or site-specific plans.

5.2.4 Shelby Tube Sampling

Note: Steps 1 through 11 describe activities to be performed by a licensed drilling contractor, not by CDM Smith personnel. ASTM D1586-99 provides additional details pertaining to this sampling methodology.

The following steps must be followed when collecting geotechnical samples using Shelby tubes:

1. Remove any pavement and subbase material from an area of twice the bit diameter, if necessary.

2. The drilling rig will be decontaminated at a separate location before drilling.

3. Attach the hollow-stem auger with the cutting head, plug, and center rod(s).

4. Begin drilling and proceed to the first designated sample depth, adding auger(s) as necessary.

5. Upon reaching the designated sample depth, slightly raise the auger(s) to disengage the cutting head, and rotate the auger without advancement to clean cuttings from the bottom of the hole.

6. Remove the plug and center rods, if applicable.

7. Attach a head assembly to a decontaminated Shelby tube sampler assembly. Attach the Shelby tube assembly to the center rods.

8. Lower the Shelby tube and center rods into the hollow-stem augers and seat it at the bottom. Be sure to leave 30 inches or more of center rod above the lowest point to the hydraulic piston’s extension.

9. Use the rig’s hydraulic drive to push the Shelby tube into undisturbed soil. The tube shall be pushed with a slow, steady force. The pressure used by the driller to push the Shelby tube shall be noted in the field logbook.

10. When the Shelby tube has been advanced to its full length or to refusal, back off the hydraulic pistons. Attach a hoisting plug to the upper end of the center rod, slightly twist to break off the sample, and pull the apparatus out of the hole with the rig winch.

11. Retrieve the Shelby tube to ground surface, detach it from the center rod, and remove the head assembly.

12. Since the typical intent of Shelby tube sampling is for engineering purposes and an undisturbed sample is required, the tube ends shall be sealed immediately. Sealing is accomplished by filling any void space in the tube with melted beeswax, then placing caps on the ends of the tube and taping caps into place. The top and bottom ends of the tube shall be marked and the tube transported to the laboratory in an upright position. ***It is extremely important that the Shelby tube samples are not disturbed in any way (dropped, rolled, subjected to extreme temperatures, etc.)***.

13. Wipe sealed tubes with a clean Kimwipe or paper towel.

14. Indicate boring/well number and depth on outside of the tube.

15. Place sealed tubes in zip-top plastic bags, seal bags, and pack samples in a chilled cooler, if applicable.

16. Continue to advance the borehole to the next sampling point. Collect additional samples per the site-specific sampling plan as outlined above.

17. When sampling is complete, remove the drilling rig to the heavy equipment decontamination area, or as specified in the site-specific work/sampling plans.

18. Dispose of cuttings, plastic sheeting, etc., as specified in the site-specific work/sampling plans.

19. Complete the field logbook entry, being sure to record all relevant information before leaving the site. These methods may be used if directed by the EPA region, client, or governing sample plan.

5.2.5 Direct Push Rig Sampling

Note: Steps 1 through 11 describe activities to be performed by a licensed drilling contractor, not CDM Smith personnel.

The following steps must be followed when collecting environmental samples using a direct push rig sampler:

1. Verify that the direct-push rig has been decontaminated at a separate location before drilling.

2. Attach the properly assembled sampler with appropriate liner to the end of the probe rod.

3. Attach drive cap and probe to the first designated sample depth, adding rod(s) as necessary.

4. Upon reaching the designated sample depth, remove the drive cap to access the inside of the probe rods.

5. Insert extension rods into probe rod; turn extension rod to release tip.

6. Retrieve extension rods, replace drive cap, add additional push rod if required, and push probe rod to the planned sample interval.

7. Attach pull cap and retrieve push rods and sampler.

8. Remove the sampler from the probe rod, and then remove the cutting shoe from the sampler.

9. Once the cutting shoe is removed, the liner containing the sample material can be removed from the sampler. Analytical samples can now be collected by CDM Smith personnel per site-specific plans and per Section 5.2.2 of this SOP.

10. When sample collection is complete, remove the push rig to the heavy equipment decontamination area.

11. Dispose of excess sample cuttings, plastic sheeting, etc., as specified in the site-specific plans.

12. Complete the field logbook entry, being sure to record all relevant information before leaving the site. These methods may be used if directed by the EPA region, client, or governing sample plan.

5.2.6 Backhoe Sampling

Note: Steps 1, 2, 7, and 8 describe activities to be performed by a licensed heavy equipment operator, not CDM Smith personnel.

The following steps must be followed when collecting environmental samples using a backhoe:

1. Verify that the parts of the backhoe that will come in contact with the soil to be sampled have been decontaminated before excavation begins.

2. Excavate to the depth required in the site-specific plans.

3. Use a stainless steel trowel or scoop to obtain the sample material

4. Attach the trowel to a steel rod, wooden handle, or other similar device.

5. Remove the surface layer of soil “smeared” on the trench wall.

6. Replace the trowel with a clean trowel to collect a representative sample.

7. Analytical samples shall be collected by CDM Smith personnel per site-specific plans and per Section 5.2.2 of this SOP.

8. When sample collection is complete in the trench, backfill the trench with the excavated material, as appropriate.

9. Once the trench has been backfilled, move the backhoe to the heavy equipment decontamination area, as appropriate.

10. Dispose of excess sample cuttings, plastic sheeting, etc., as specified in the site-specific plans.

11. Complete the field logbook entry, being sure to record all relevant information before leaving the site. These methods may be used if directed by the EPA region, client, or governing sample plan.

5.3 Field Sampling/Preservation Methods

The following three sections contain SW 846 Methods for sampling and field preservation. These methods include EnCore™ Sampler Method for low-level detection limits, EnCore Sampler Method for high-level limits/screening, and methanol preservation. Use of these methods may be required by the governing EPA Region, the client, or if required by the site-specific sampling plan. These methods are very detailed and contain equipment requirements at the beginning of each section.

When collecting soil samples using the EnCore Sampler Method, collection of soil for moisture content analysis is required. Results of this analysis are used to adjust “wet” concentration results to “dry” concentrations to meet analytical method requirements.

Note: Some variations from these methods, (e.g., sample volume) may be required depending on the contracted analytical laboratory.

5.2.7.1 EnCore Sampler Equipment and Collection Requirements for Low-Level Analyses (<200 µg/kg)

The following equipment is required for low-level analysis:

- Three 5 grams (g) samplers

Note: The sample volume requirements specified are general requirements. Actual sample volume and/or container sizes may vary depending on client or laboratory requirements.

- One 110-milliliter (mL) (4-ounce [oz.]) wide-mouth glass jar or applicable container for moisture analysis
- One T-handle
- Paper towels

The requirements for collecting low level analysis by the EnCore Sampler Method are as follows:

1. Wear clean gloves during handling of all sample containers and sampling devices.

2. Remove sampler and cap from package and attach T-handle to sampler body.

3. Quickly push the sampler into a freshly exposed surface of soil until the sampler is full. The O-ring will be visible within the hole on the side of the T-handle. If the O-ring is not visible within this window, then the sampler is not full.

4. Extract sampler and wipe the sampler head with a paper towel so that the cap can be tightly attached.

5. Push cap on with a twisting motion to secure to the sampler body.

6. Rotate the sampler stem counterclockwise until stem locks in place to retain sample within the sampler body.

7. Fill out sample label and attach to sampler.

8. Repeat procedure for the remaining two samplers.

9. Collect moisture sample in 110-mL (4-oz.) wide-mouth jar using a clean stainless steel spoon or trowel.

10. Store samplers at 4 degrees (°) Celsius (C), ±2°C. Samples must be shipped and delivered to the analytical laboratory for extraction within 48 hours.

Note: Verify requirements for extraction/holding times.

5.2.7.2 EnCore Sampler Equipment and Collection Requirements for High-Level Analyses (≥200 µg/kg)

The following equipment is required for high-level analysis:

- One 5-g sampler or one 25-g sampler (the sampler size used will be dependent on client and laboratory requirements
- One 110-mL (4-oz.) wide-mouth glass jar or applicable container specified for moisture analysis
- One T-handle
- Paper towels

The requirements for collecting high-level analysis by the EnCore Sampler Method are as follows:

1. Wear clean gloves during handling of all sample containers and sampling devices.

2. Remove sample and cap from package and attach T-handle to sampler body.

3. Quickly push the sampler into a freshly exposed surface of soil until the sampler is full. The O-ring will be visible within the hole on the side of the T-handle. If the O-ring is not visible within this window, then the sampler is not full.

4. Use clean paper toweling to quickly wipe the sampler head so that the cap can be tightly attached.

5. Push cap on with a twisting motion to attach cap.

6. Fill out a sample label and attach to sampler.

7. Rotate sampler stem counterclockwise until the stem locks in place to retain the sample within the sampler body.

8. Collect moisture sample in 110-mL (4-oz.) wide-mouth jar or designated container using a clean stainless steel spoon or trowel.

9. Store samplers at 4°C, ±2°C. Samples must be shipped and delivered to the analytical laboratory for extraction within 48 hours.

Note: Verify requirements for extraction/holding times.

5.2.7.3 Methanol Preservation Equipment and Sampling Requirements for High-Level Analyses (≥200 µg/kg)

The following equipment is required for methanol preservation sampling:

- One preweighed jar that contains methanol or a preweighed empty jar accompanied with a preweighed vial that contains methanol (laboratory grade)
- One dry weight cup
- Weighing balance that accurately weighs to 0.01 g (with accuracy of ±0.1 g)
- Set of balance weights used in daily balance calibration
- Latex gloves
- Paper towels
- Cutoff plastic syringe or other coring device to deliver 5 g or 25 g of soil

The requirements for sampling and preservation are as follows:

1. Wear clean gloves during all handling of preweighed vials.

2. Weigh the vial containing methanol preservative to the nearest 0.01 g. If the weight of the vial with methanol varies by more than 0.01 g from the original weight recorded on the vial, discard the vial. If the weight is within tolerance, it can be used for soil preservation/collection below.

3. Quickly collect a 5-g or 25-g sample using a cutoff plastic syringe or other coring device designed to deliver 5 g or 25 g of soil from a freshly exposed surface of soil. The 5-g or 25-g size used is dependent on client and laboratory requirements.

4. Carefully wipe the exterior of the collection device with a clean paper towel.

5. Quickly transfer the soil to an empty jar or a jar that contains methanol. If extruding into a jar that contains methanol, be careful not to splash the methanol outside of the vial. Again, the type of jar used is dependent on the client or laboratory requirements.

6. If the jar used to collect the soil plug was empty before the soil was added, immediately preserve with the methanol provided, using only one vial of methanol preservative per sample jar.

7. Using the paper toweling, remove any soil off of the vial threads and cap the jar.

8. Weigh the jar with the soil in it to the nearest 0.01 g and record the weight on the sample label.

9. Collect dry weight sample using a clean stainless steel spoon or trowel.

10. Store samples at 4°, ±2°C.

11. Ship sample containers with plenty of ice in accordance with DOT regulations (CORROSIVE. FLAMMABLE LIQUID. POISON) to the laboratory.

6.0 Restrictions/Limitations

- Basket or spring retainers may be needed for split-barrel sampling in loose, sandy soils.

- A larger-diameter split spoon sampler assembly in addition to the standard split spoon assembly is recommended for all projects on which environmental sample collection from discrete intervals may be required. This enables additional sample material to be recovered in the event the initial split spoon sample does not yield adequate sample material. This method is not recommended for the collection of samples that are to be analyzed for VOCs.

- Shelby tubes are most appropriately used to sample cohesive materials, and may not retain sample material in loose, sandy soils.

- When grab sampling for VOC analysis or for analysis of any other compound(s) that may be degraded by aeration, it is necessary to minimize sample disturbance and consequently minimize analyte loss. The representativeness of a VOC grab sample is difficult to determine because the collected sample represents a single point, is not homogenized, and has been disturbed.

7.0 References

American Society for Testing and Materials. 1999. *Standard Test Method for Penetration Test and Split Barrel Sampling of Soils*. Standard Method D1586-99.

__________. 2000. *Standard Test Method for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes*. Standard Method D1587-00.

U. S. Department of Energy. 1996. Hazardous Waste Remedial Actions Program. *Quality Control Requirements for Field Methods*, DOE/HWP-69/R2. September.

__________. Hazardous Waste Remedial Actions Program. *Standard Operating Procedures for Site Characterizations*, DOE/HWP-100/R1. September 1996 or current revision.

U. S. Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*, Third Edition, November 1986, (as amended by Updates I, II, IIA, IIB, III, and IIIA, June 1997). Method 5035 (***Note***: § 6.2.1.8 of this method says samples stored in EnCore™ samplers shall be analyzed within 48 hours or transferred to soil sample vials in the laboratory within 48 hours): December 1996, Revision O, Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples.

__________. 2001. Region 4. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. November.

Section 2.0

Sample Preparation and Handling Procedures

Packaging and Shipping Environmental Samples	SOP 2-1 Revision: 5 Date: January 2012

Prepared:	Krista Lippoldt	**Technical Review:**	C. Zakowski
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1.0 Objective
The objective of this technical standard operating procedure (SOP) is to outline the requirements for the packaging and shipment of environmental samples. Additionally, Sections 2.0 through 7.0 outline requirements for the packaging and shipping of regulated environmental samples under the Department of Transportation (DOT) Hazardous Materials Regulations, the International Air Transportation Association (IATA), and International Civil Aviation Organization (ICAO) Dangerous Goods Regulations for shipment by air and applies only to domestic shipments. This SOP does not cover the requirements for packaging and shipment of equipment (including data loggers and self-contained breathing apparatus [SCBAs] or bulk chemicals that are regulated under the DOT, IATA, and ICAO.

1.1 Packaging and Shipping of All Samples
This SOP applies to the packaging and shipping of all environmental samples. If the sample is preserved or radioactive, the following sections may also be applicable.

Section 2.0 - Packaging and Shipping Samples Preserved with Methanol
Section 3.0 - Packaging and Shipping Samples Preserved with Sodium Hydroxide
Section 4.0 - Packaging and Shipping Samples Preserved with Hydrochloric Acid
Section 5.0 - Packaging and Shipping Samples Preserved with Nitric Acid
Section 6.0 - Packaging and Shipping Samples Preserved with Sulfuric Acid
Section 7.0 - Packaging and Shipping Limited-Quantity Radioactive Samples

NOTE: This SOP does not address shipment of hazardous materials. Don’t ship a hazardous material unless you have received training that meets the requirements of CDM Smith and the DOT. Check with CDM Smith University for training courses.

1.2 Background
1.2.1 Definitions
Environmental Sample - An aliquot of air, water, plant material, sediment, or soil that represents the contaminant levels on a site. Samples of potential contaminant sources, like tanks, lagoons, or non-aqueous phase liquids are normally not “environmental” for this purpose. This procedure applies only to environmental samples that contain less than reportable quantities for any foreseeable hazardous constituents according to DOT regulations promulgated in 49 CFR - Part 172.101 Appendix A.

Custody Seal - A custody seal is a narrow adhesive-backed seal that is applied to individual sample containers and/or the container (i.e., cooler) before offsite shipment. Custody seals are used to demonstrate that sample integrity has not been compromised during transportation from the field to the analytical laboratory.

Inside Container - The container, normally made of glass or plastic, that actually contacts the shipped material. Its purpose is to keep the sample from mixing with the ambient environment.

Outside Container - The container, normally made of metal or plastic, that the transporter contacts. Its purpose is to protect the inside container.

Secondary Containment - The outside container provides secondary containment if the inside container breaks (i.e., plastic overpackaging if liquid sample is collected in glass).

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Excepted Quantity - Excepted quantities are limits to the mass or volume of a hazardous material in the inside and outside containers below which DOT, IATA, ICAO regulations do not apply. The excepted quantity limits are very low. Most regulated shipments will be made under limited quantity.

Limited Quantity - Limited quantity is the maximum amount of a hazardous material below which there are specific labeling or packaging exceptions.

Performance Testing - Performance testing is the required testing of outer packaging. These tests include drop and stacking tests.

Qualified Shipper - A qualified shipper is a person who has been adequately trained to perform the functions of shipping hazardous materials.

1.2.2 Associated Procedures

- SOP 1-2, *Sample Custody*

1.2.3 Discussion

Proper packaging and shipping is necessary to ensure the protection of the integrity of environmental samples shipped for analysis. These shipments are potentially subject to regulations published by DOT, IATA, or ICAO. Failure to abide by these rules places both CDM Smith and the individual employee at risk of serious fines. The analytical holding times for the samples must not be exceeded. The samples shall be packed in time to be shipped for overnight delivery. Make arrangements with the laboratory before sending samples for weekend delivery.

1.3 Required Equipment

- Coolers with return address of the appropriate CDM Smith office
- Heavy-duty plastic garbage bags
- Plastic zip-type bags, small and large
- Clear tape
- Nylon reinforced strapping tape
- Duct tape
- Kitty litter/pine bedding (or an equivalent nonflammable material that is inert and absorbent)*
- Bubble wrap (optional)
- Ice
- Custody seals
- Completed chain-of-custody record or contract laboratory program (CLP) custody records, if applicable
- Completed bill of lading
- This End Up and directional arrow labels

*Check for any client-specific or laboratory requirements related to the use of absorbent packaging materials.

1.4 Packaging Environmental Samples

The following steps must be followed when packing sample bottles and jars for shipment:

1. Verify the samples undergoing shipment meet the definition of "environmental sample" and are not a hazardous material as defined by DOT. Professional judgment and/or consultation with qualified persons such as the appropriate health and safety coordinator or the health and safety manager shall be observed.

2. Select a sturdy cooler in good repair. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler. Line the cooler with a large heavy-duty plastic garbage bag.

3. Be sure the caps on all bottles are tight (will not leak); check to see that labels and chain-of-custody records are completed properly (SOP 1-2, Sample Custody).

4. Place all bottles in separate and appropriately sized plastic zip-top bags and close the bags. Up to three VOA vials may be packed in one bag. Binding the vials together with a rubber band on the outside of the bag, or separating them so that they do not contact each other, will reduce the risk of breakage. Bottles may be wrapped in bubble wrap. Optionally,

place three to six VOA vials in a quart metal can and then fill the can with kitty litter/pine bedding or equivalent. ***Note***: Trip blanks must be included in coolers containing VOA samples.

5. Place 2 to 4 inches of an absorbent material into a cooler that has been lined with a garbage bag, and then place the bottles and cans in the bag with sufficient space to allow for the addition of packing material between the bottles and cans. It is preferable to place glass sample bottles and jars into the cooler vertically. Glass containers are less likely to break when packed vertically rather than horizontally.

6. While placing sample containers into the cooler, conduct an inventory of the contents of the shipping cooler against the chain-of-custody record. The chain-of-custody with the cooler shall reflect only those samples within the cooler.

7. Put ice in large plastic zip-top bags (double bagging the zip-tops is preferred) and properly seal. Place the ice bags on top of and/or between the samples. Several bags of ice are required (dependant on outdoor temperature, staging time, etc.) to maintain the cooler temperature at approximately 4° Celsius (C) if the analytical method requires cooling. Fill all remaining space between the bottles or cans with packing material. Securely fasten the top of the large garbage bag with fiber or duct tape.

8. Place the completed chain-of-custody record or the CLP traffic report form (if applicable) for the laboratory into a plastic zip-top bag, seal the bag, tape the bag to the inner side of the cooler lid and close the cooler.

9. The cooler lid shall be secured with nylon reinforced strapping tape by wrapping each end of the cooler a minimum of two times. Attach a completed chain-of-custody seal across the opening of the cooler on opposite sides. The custody seals shall be affixed to the cooler with half of the seal on the strapping tape so that the cooler cannot be opened without breaking the seal. Complete two more wraps around with fiber tape and place clear tape over the custody seals.

10. The shipping container lid must be marked **"THIS END UP"** and arrow labels that indicate the proper upward position of the container shall be affixed to the cooler. A label containing the name and address of the shipper (CDM Smith) shall be placed on the outside of the container. Labels used in the shipment of hazardous materials (such as Cargo Only Air Craft, Flammable Solids, etc.) are not permitted on the outside of containers used to transport environmental samples and shall not be used. The name and address of the laboratory shall be placed on the container, or when shipping by common courier, the bill of lading shall be completed and attached to the lid of the shipping container.

2.0 Packaging and Shipping Samples Preserved with Methanol

2.1 Containers

1. The maximum volume of methanol in a sample container is limited to 30 ml.

2. The sample container must not be full of methanol.

2.2 Responsibility

It is the responsibility of the qualified shipper to:

1. Ensure that the samples undergoing shipment contain no other contaminant that meets the definition of "hazardous material" as defined by DOT

2. Determine the amount of preservative in each sample so that accurate determination of quantities can be made

   Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific quality assurance project plan (QAPP).

2.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3:

1. Inner packing may consist of glass or plastic jars
2. Outer packaging (for limited quantities) insulated cooler that has passed the ICAO drop test
3. Survey documentation (if shipping from Department of Energy [DOE] or radiological sites)
4. Class 3 flammable liquid labels
5. Orientation labels
6. Consignor/consignee labels

2.4 Packaging Samples Preserved with Methanol

The following steps are to be followed when packaging limited-quantity sample shipments:

1. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler.
2. All sample containers will be properly labeled and the label protected with waterproof tape before sampling.

   At a minimum the label must contain:

   - Project name
   - Project number
   - Date and time of sample collection
   - Sample location
   - Sample identification number
   - Collector's initials
   - Preservative (note amount of preservative used in miscellaneous section of the chain-of-custody form)
3. Wrap each container (40-ml VOA vials) in bubble wrap (secure with waterproof tape) to prevent breakage.
4. Place the bubble-wrapped container into a 2.7-mil zip-type bag, removing trapped air.
5. Place wrapped containers inside a polyethylene bottle filled with an absorbent; seal the bottle. (Maximum of 4 VOA vials will fit inside a 500-ml wide-mouth polyethylene bottle.)
6. Total volume of methanol per shipping container must not exceed 500 ml.
7. Place sufficient amount of an absorbent in the bottom of the cooler to absorb any leakage that may occur.
8. Place a garbage bag in the cooler.
9. Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
10. Place a sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
11. Seal the garbage bag by tieing or taping.
12. The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
13. Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
14. If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.

15. Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.

16. Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.

17. Mark the outside of the cooler with the proper shipping name of the contents, corresponding UN number, and LTD. QTY. (as shown below).

    Methanol Mixture
    UN1230
    LTD. QTY.

18. Place a label on the front of the cooler with the company name, contact name, phone number, full street address, and state with zip code for both shipper and recipient.

19. Affix a Flammable Liquid label to the outside of the cooler.

20. Affix package orientation labels on two opposite sides of the cooler.

21. Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment. An example of cooler labeling/marking locations is shown in Figure 1.

    Note: No marking or labeling can be obscured by strapping or duct tape.

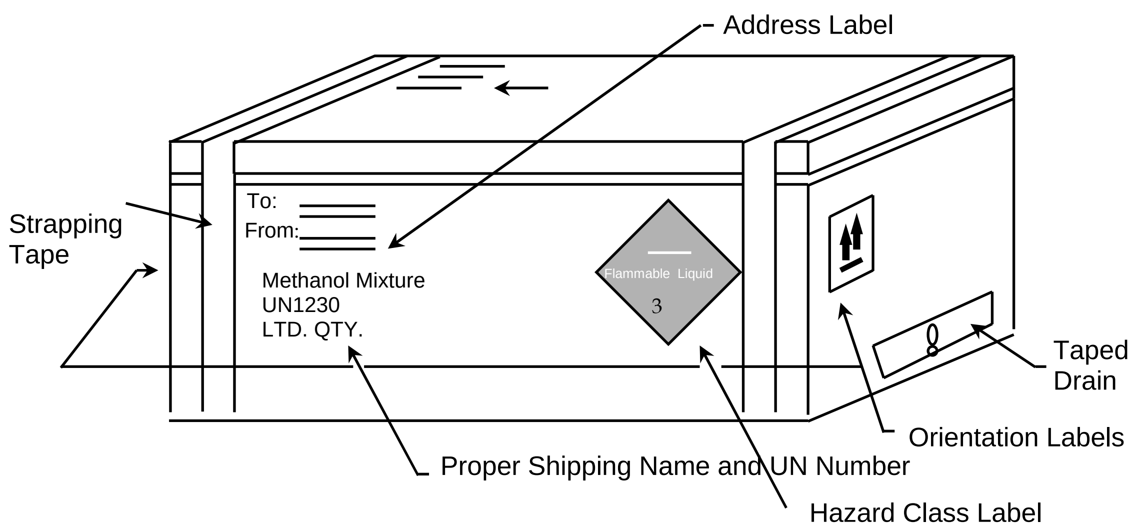
    Note: The inner packaging of dangerous goods must be placed into the designated cooler for shipment. Other nonregulated environmental samples may be added to the cooler for shipment.

22. When shipping from a DOE facility, the cooler will be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.

23. Complete the Dangerous Goods and Hazardous Materials Inspection Checklist for Shipping Limited-Quantity(Appendix A).

24. Complete a Dangerous Goods Airbill.

Figure 1
Example of Cooler Label/Marking Locations



3.0 Packaging and Shipping Samples Preserved with Sodium Hydroxide

3.1 Containers

The inner packaging container (and amount of preservative) that may be used for these shipments includes:

Excepted Quantities of Sodium Hydroxide Preservatives

Preservative		***Desired in Final Sample***		***Quantity of Preservative (ml) for Specified Container***				
		pH	**Conc.**	**40 ml**	**125 ml**	**250 ml**	**500 ml**	**1 L**
NaOH	30%	>12	0.08%		.25	0.5	1	2

5 drops = 1 ml

3.2 Responsibility

It is the responsibility of the qualified shipper to determine the amount of preservative in each sample so that accurate determination of quantities can be made.

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific quality assurance project plan (QAPP).

3.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3:

- Outer packaging (for limited quantities) insulated cooler that has passed the ICAO drop test
- Inner packings may consist of glass or plastic jars no larger than 1 pint
- Survey documentation (if shipping from DOE or radiological sites)
- Class 8 corrosive labels
- Orientation labels
- Consignor/consignee labels

3.4 Packaging Samples Preserved with Sodium Hydroxide

Samples containing NaOH as a preservative that exceed the excepted concentration of 0.08 percent (2 ml of a 30 percent NaOH solution per liter) may be shipped as a limited quantity per packing instruction Y819 of the IATA/ICAO Dangerous Goods Regulations.

The following steps are to be followed when packaging limited-quantity samples shipments:

1. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler.

2. All sample containers will be properly labeled and the label protected with waterproof tape before sampling.

   At a minimum the label must contain:

   - Project name
   - Project number
   - Date and time of sample collection
   - Sample location
   - Sample identification number
   - Collector's initials
   - Preservative (note amount of preservative used in miscellaneous section of the chain-of-custody form)

3. This step is optional; wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.

4. Place the bubble-wrapped container into a 2.7-mil zip-type bag, removing trapped air.

5. Place glass containers inside a polyethylene bottle filled with an absorbent; seal the bottle.

6. The total volume of sample in each cooler must not exceed 1 liter.

7. Place sufficient amount of an absorbent in the bottom of the cooler to absorb any leakage that may occur.

8. Place a garbage bag in the cooler.

9. Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.

10. Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.

11. Seal the garbage bag by tieing or taping.

12. The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.

13. Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.

14. If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.

15. Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.

16. Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.

17. Mark the outside of the cooler with the proper shipping name of the contents, corresponding UN number, and LTD. QTY. (as shown below).

    Sodium Hydroxide Solution
    UN1824
    LTD. QTY.

18. Place a label on the front of the cooler with the company name, contact name, phone number, full street address, and state with zip code for both shipper and recipient.

19. Affix a Corrosive label to the outside of the cooler.

20. Affix package orientation labels on two opposite sides of the cooler.

21. Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment. An example of cooler labeling/marking locations is shown in Figure 1.

    Note: Samples meeting the exception concentration of 0.08 percent NaOH by weight may be shipped as nonregulated or nonhazardous following the procedure in Section 1.4.

    Note: No marking or labeling can be obscured by strapping or duct tape.

    Note: The inner packaging of dangerous goods must be placed into the designated cooler for shipment. Other nonregulated environmental samples may be added to the cooler for shipment.

22. When shipping from a DOE facility, the cooler will be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.

23. Complete the Dangerous Goods and Hazardous Materials Inspection Checklist for Shipping Limited-Quantity (Appendix A).

24. Complete a Dangerous Goods Airbill.

4.0 Packaging and Shipping Samples Preserved with Hydrochloric Acid

4.1 Containers

The inner packaging container (and amount of preservative) that may be used for these shipments includes:

Excepted Quantities of Hydrochloric Acid Preservatives

Preservative		***Desired in Final Sample***		***Quantity of Preservative (ml) for Specified Container***		
		pH	**Conc.**	**40 ml**	**125 ml**	**250 ml**
HCl	2N	<1.96	0.04%	.2	.5	1

5 drops = 1 ml

4.2 Responsibility

It is the responsibility of the qualified shipper to:

- Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT
- Determine the amount of preservative in each sample so that accurate determination of quantities can be made

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific quality assurance project plan (QAPP).

4.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3.

- Inner packing may consist of glass or plastic jars no larger than 1 pint.
- Outer packaging (for limited quantities) insulated cooler that has passed the ICAO drop test.
- Survey documentation (if shipping from DOE or radiological sites)
- Class 8 corrosive labels
- Orientation labels
- Consignor/consignee labels

4.4 Packaging Samples Preserved with Hydrochloric Acid

The following steps are to be followed when packaging limited-quantity sample shipments:

1. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler.

2. All sample containers will be properly labeled and the label protected with waterproof tape before sampling.

   At a minimum the label must contain:

   - Project name
   - Project number
   - Date and time of sample collection
   - Sample location
   - Sample identification number
   - Collector's initials
   - Preservative (note amount of preservative used in miscellaneous section of the chain-of-custody form)

- Wrap each container (40-ml VOA vials) in bubble wrap (secure with waterproof tape) to prevent breakage.
- Place the bubble-wrapped container into a 2.7-mil zip-type bag, removing trapped air.

- Place wrapped containers inside a polyethylene bottle filled with an absorbent; seal the bottle. (No more than 4 VOA vials will fit inside a 500-ml wide-mouth polyethylene bottle.)
- Total volume of sample inside each cooler must not exceed 1 liter.
- Place sufficient amount of an absorbent in the bottom of the cooler to absorb any leakage that may occur.

3. Place a garbage bag in the cooler.
4. Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
5. Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
6. Seal the garbage bag by tieing or taping.
7. The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
8. Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
9. If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
10. Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.
11. Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
12. Mark the outside of the cooler with the proper shipping name of the contents, corresponding UN number, and LTD. QTY. (as shown below).

    Hydrochloric Acid Solution
    UN1789
    LTD. QTY.

13. Place a label on the front of the cooler with the company name, contact name, phone number, full street address, and state with zip code for both shipper and recipient.
14. Affix a Corrosive label to the outside of the cooler.
15. Affix package orientation labels on two opposite sides of the cooler.
16. Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment. An example of cooler labeling/marking locations is shown in Figure 1.

    Note: Samples containing less than the exception concentration of 0.04 percent HCl by weight will be shipped as nonregulated or nonhazardous following the procedure in Section 1.4.

    Note: No marking or labeling can be obscured by strapping or duct tape.

    Note: The inner packaging of dangerous goods must be placed into the designated cooler for shipment. Other nonregulated environmental samples may be added to the cooler for shipment.

17. When shipping from a DOE facility, the cooler will be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.

18. Complete the Dangerous Goods and Hazardous Materials Inspection Checklist for Shipping Limited-Quantity (Appendix A).

19. Complete a Dangerous Goods Airbill.

5.0 Packaging and Shipping Samples Preserved with Nitric Acid

5.1 Containers

The inner packaging container (and amount of preservative) that may be used for these shipments includes:

Excepted Quantities of Nitric Acid Preservatives

Preservative		***Desired in Final Sample***		***Quantity of Preservative (ml) for Specified Container***				
		pH	**Conc.**	**40 ml**	**125 ml**	**250 ml**	**500 ml**	**1 L**
HNO_3	6N	<1.62	0.15%		2	4	5	8

5 drops = 1 mg/L

5.2 Responsibility

It is the responsibility of the qualified shipper to:

1. Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT

2. Determine the amount of preservative in each sample so that accurate determination of quantities can be made

   Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific quality assurance project plan (QAPP).

5.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3:

- Inner packings may consist of glass or plastic jars no larger than 100 ml.
- Outer packaging (for limited quantities) insulated cooler that has passed the ICAO drop test.
- Survey documentation (if shipping from DOE or radiological sites)
- Class 8 corrosive labels
- Orientation labels
- Consignor/consignee labels

5.4 Packaging Samples Preserved with Nitric Acid

Samples containing HNO_3 as a preservative that exceed the excepted concentration of 0.15 percent HNO_3 will be shipped as a limited quantity per packing instruction Y807 of the IATA/ICAO Dangerous Goods Regulations.

The following steps are to be followed when packaging limited-quantity sample shipments:

1. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler.

2. All sample containers will be properly labeled and the label protected with waterproof tape before sampling.

   At a minimum the label must contain:
   - Project name
   - Project number
   - Date and time of sample collection
   - Sample location
   - Sample identification number
   - Collector's initials
   - Preservative (note amount of preservative used in miscellaneous section of the chain-of-custody form)

3. This step is optional; wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.
4. Place the bubble-wrapped container into a 2.7-mil zip-type bag, removing trapped air.
5. Place glass containers inside a polyethylene bottle filled with an absorbent; seal the bottle.
6. Place sufficient amount of an absorbent in the bottom of the cooler to absorb any leakage that may occur.
7. Place a garbage bag in the cooler.
8. Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.
9. Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.
10. Seal the garbage bag by tieing or taping.
11. The maximum volume of preserved solution in the cooler must not exceed 500 ml.
12. The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.
13. Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.
14. If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.
15. Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.
16. Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.
17. Mark the outside of the cooler with the proper shipping name of the contents, corresponding UN number, and LTD. QTY. (as shown below).

    Nitric Acid Solution (with less than 20 percent)
    UN2031
    Ltd. Qty.

18. Place a label on the front of the cooler with the company name, contact name, phone number, full street address, and state with zip code for both shipper and recipient.
19. Affix a Corrosive label to the outside of the cooler.
20. Affix package orientation labels on two opposite sides of the cooler.
21. Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment. An example of cooler labeling/marking locations is shown in Figure 1.

    Note: Samples meeting the exception concentration of 0.15 percent HNO_3 by weight will be shipped as nonregulated or nonhazardous following the procedure in Section 1.4.

    Note: No marking or labeling can be obscured by strapping or duct tape.

    Note: The inner packaging of dangerous goods must be placed into the designated cooler for shipment. Other nonregulated environmental samples may be added to the cooler for shipment.

22. When shipping from a DOE facility, the cooler will be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.

23. Complete the Dangerous Goods and Hazardous Materials Inspection Checklist for Shipping Limited-Quantity (Appendix A).

24. Complete a Dangerous Goods Airbill.

6.0 Packaging and Shipping Samples Preserved with Sulfuric Acid

6.1 Containers

The inner packaging container (and amount of preservative) that may be used for these shipments includes:

Excepted Quantities of Sulfuric Acid Preservatives

Preservative		***Desired in Final Sample***		***Quantity of Preservative (ml) for Specified Container***				
		pH	**Conc.**	**40 ml**	**125 ml**	**250 ml**	**500 ml**	**1 L**
H_2SO_4	37N	<1.15	0.35%	.1	.25	0.5	1	2

5 drops = 1 ml

6.2 Responsibility

It is the responsibility of the qualified shipper to:

1. Determine the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT

2. Determine the amount of preservative in each sample so that accurate determination of quantities can be made

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific quality assurance project plan (QAPP).

6.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3:

- Inner packings may consist of glass or plastic jars no larger than 100 ml.
- Outer packaging (for limited quantities) insulated cooler that has passed the ICAO drop test.
- Survey documentation (if shipping from DOE or radiological sites)
- Class 8 corrosive labels
- Orientation labels
- Consignor/consignee labels

6.4 Packaging of Samples Preserved with Sulfuric Acid

Samples containing H_2SO_4 as a preservative that exceed the excepted concentration of 0.35 percent will be shipped as a limited quantity per packing instruction Y809 of the IATA/ICAO Dangerous Goods Regulations.

The following steps are to be followed when packaging limited-quantity samples shipments:

1. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler.

2. All sample containers will be properly labeled and the label protected with waterproof tape before sampling.

At a minimum the label must contain:

- Project name
- Project number
- Date and time of sample collection
- Sample location
- Sample identification number
- Collector's initials
- Preservative (note amount of preservative used in miscellaneous section of the chain-of-custody form)

3. Wrap each glass container in bubble wrap (secure with waterproof tape) to prevent breakage.

4. Place the bubble-wrapped container into a 2.7-mil zip-type bag, removing trapped air.

5. Place glass containers inside a polyethylene bottle filled with an absorbent; seal the bottle.

6. Place sufficient amount of an absorbent in the bottom of the cooler to absorb any leakage that may occur.

7. Place a garbage bag in the cooler.

8. Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.

9. Place sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.

10. Seal the garbage bag by tieing or taping.

11. The maximum volume of preserved solution in the cooler must not exceed 500 ml.

12. The maximum weight of the cooler shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.

13. Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.

14. If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.

15. Wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.

16. Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.

17. Mark the outside of the cooler with the proper shipping name of the contents, corresponding UN number, and LTD. QTY. (as shown below).

    Sulfuric Acid Solution
    UN2796
    LTD. QTY.

18. Place a label on the front of the cooler with the company name, contact name, phone number, full street address, and state with zip code for both shipper and recipient.

19. Affix a Corrosive label to the outside of the cooler.

20. Affix package orientation labels on two opposite sides of the cooler.

21. Secure the marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment. An example of cooler labeling/marking locations is shown in Figure 1.

Note: Samples containing less than the exception concentration of 0.35 percent H2SO4 by weight will be shipped as nonregulated or nonhazardous in accordance with the procedure described in Section 1.4.

Note: No marking or labeling can be obscured by strapping or duct tape.

Note: The inner packaging of dangerous goods must be placed into the designated cooler for shipment. Other nonregulated environmental samples may be added to the cooler for shipment.

22. When shipping from a DOE facility, the cooler will be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.

23. Complete the Dangerous Goods and Hazardous Materials Inspection Checklist for Shipping Limited-Quantity (Appendix A).

24. Complete a Dangerous Goods Airbill.

7.0 Packaging and Shipping Limited-Quantity Radioactive Samples

7.1 Containers

The inner packaging containers that may be used for these shipments include:

1. Any size sample container

7.2 Description/Responsibilities

The qualified shipper will determine that the samples undergoing shipment contain no other contaminant that meets the definition of hazardous material as defined by DOT.

The qualified shipper will ship all samples that meet the Class 7 definition of radioactive materials and meet the activity requirements specified in Table 7 of 49 CFR 173.425, as Radioactive Materials in Limited Quantity. The qualified shipper will verify that all packages and their contents meet the requirements of 49 CFR 173.421, *Limited Quantities of Radioactive Materials*.

The packaging used for shipping will meet the general requirements for packaging and packages specified in 49 CFR 173.24 and the general design requirements provided in 173.410. These standards state that a package must be capable of withstanding the effects of any acceleration, vibration, or vibration resonance that may arise under normal condition of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole and without loosening or unintentionally releasing the nuts, bolts, or other securing devices even after repeated use.

If the shipment is from a DOE facility, radiological screenings will be completed on all samples taken. The qualified shipper will review the results of each screening (alpha, beta, and gamma speciation). Samples will not be shipped offsite until the radiological screening has been performed.

The total activity for each package will not exceed the relevant limits listed in Table 7 of 49 CFR 173.425. The A_2 value of the material will be calculated based on all radionuclides found during previous investigations (if any) in the area from which the samples are derived. The A_2 values to be used will be the most restrictive of all potential radionuclides as listed in 49 CFR 173.435.

The radiation level at any point on the external surface of the package bearing the sample(s) will not exceed 0.005 mSv/hour (0.5 mrem/hour). These will be verified by dose and activity monitoring before shipment of the package.

The removable radioactive surface contamination on the external surface of the package will not exceed the limits specified in 49 CFR 173.443(a). CDM Smith will apply the DOE-established free release criteria for removable surface contamination of less than 20 dpm/100 cm^2 (alpha) and 1,000 dpm/100 cm^2 (beta/gamma). It shall be noted that these values are more conservative than the DOT requirements for removable surface contamination.

The qualified shipper will verify that the outside of the inner packaging is marked “Radioactive.”

The qualified shipper will verify that the excepted packages prepared for shipment under the provisions of 49 CFR 173.421 have a notice enclosed, or shown on the outside of the package, that reads, **“This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910.”**

> ***Note:*** Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific quality assurance project plan (QAPP).

7.3 Additional Required Equipment

The following equipment is needed in addition to the required equipment listed in Section 1.3:

- Survey documentation/radiation screening results (if shipping from DOE or radiological sites)
- Orientation labels
- Excepted quantities label
- Consignor/consignee labels

7.4 Packaging of Limited-Quantity Radioactive Samples

The following steps are to be followed when packaging limited-quantity sample shipments:

1. The cooler is to be surveyed by a qualified radiation control technician to ensure that radiation flux on exterior surfaces does not exceed 0.5 mrem/h on all sides. This survey will be documented and the results reviewed by the qualified shipper.

2. Tape any interior opening in the cooler (drain plug) from the inside to ensure control of interior contents. Also, tape the drain plug from the outside of the cooler.

3. All sample containers will be properly labeled and the label protected with waterproof tape before sampling. At a minimum the label must contain:

   - Project name
   - Project number
   - Date and time of sample collection
   - Sample location
   - Sample identification number
   - Collector’s initials

4. This step is optional; wrap each container in bubble wrap (secure with waterproof tape) to prevent breakage.

5. Place sufficient amount of an absorbent, or approved packaging material, in the bottom of the cooler to absorb any leakage that may occur.

6. Place a garbage bag in the cooler.

7. Pack the samples appropriately inside the garbage bag (bottles placed upright) to prevent movement during shipment.

8. If required, place a sufficient amount of double-bagged ice around the samples to maintain the required temperature during shipment.

9. Seal the garbage bag by tieing or taping.

10. Place a label marked Radioactive on the outside of the sealed bag.

11. Enclose a notice that includes the name of the consignor or consignee and the following statement: ***"This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910."***

12. Note that both DOT and IATA apply different limits to the quantity in the inside packing and in the outside packing.

13. The maximum weight of the package shall not exceed 30 kg (66 lbs) for any limited-quantity shipment of dangerous goods.

14. Secure the chain-of-custody form (placed inside a zip-type bag) to the interior of the cooler lid.

15. If the shipment is from a DOE or other facility, place the results of the radiation screen and cooler/sample survey with the chain-of-custody.

16. If a cooler is used, wrap strapping tape or duct tape around both ends of the cooler and around the cooler lid.

17. Affix custody seals to opposite sides of the cooler lid. Cover the custody seals with clear waterproof tape.

18. Place a label on the front of the cooler with the company name, contact name, phone number, full street address, and state with zip code for both shipper and recipient.

19. Affix package orientation labels on two opposite sides of the cooler/package.

20. Affix a completed Excepted Quantities label to the side of the cooler/package.

21. Secure any marking and labels to the surface of the cooler with clear waterproof tape to prevent accidental removal during shipment. An example of the cooler labeling/marking is shown in Figure 2.

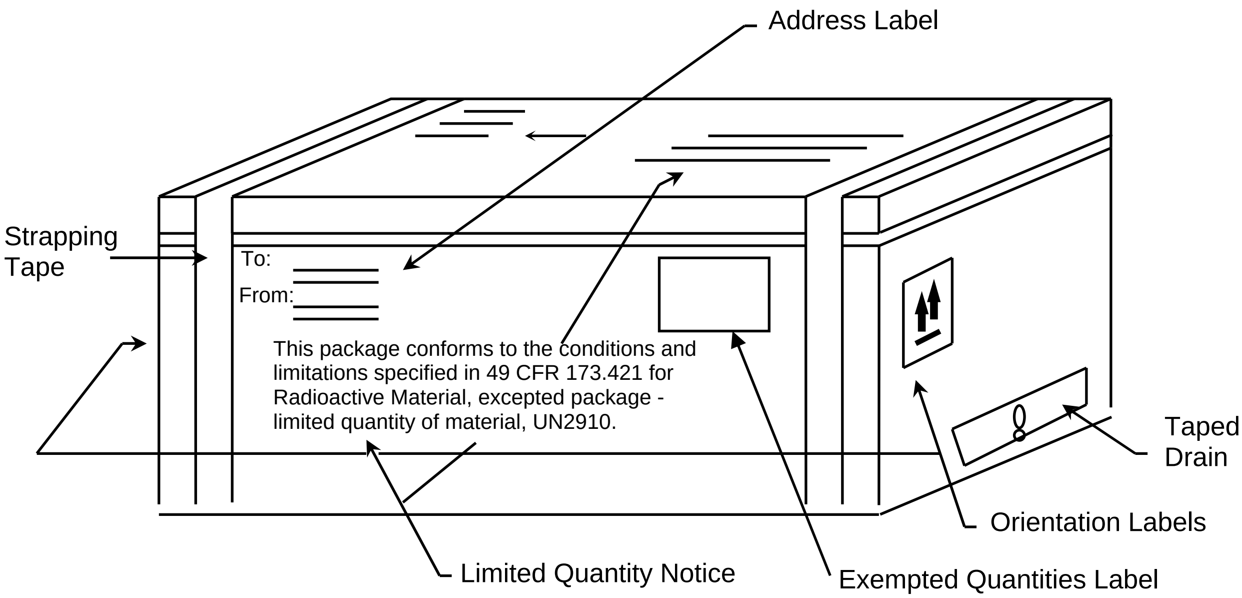
    Note: No marking or labeling can be obscured by strapping or duct tape.

22. Complete the Shipment Quality Assurance Checklist (Appendix B).

    Note: Except as provided in 49 CFR 173.426, the package will not contain more than 15 grams of ^{235}U.

    Note: A declaration of dangerous goods is not required.

Figure 2
Radioactive Material – Limited-Quantity Cooler Marking Example



8.0 References

U. S. Environmental Protection Agency. Region IV. February 1991 or current revision. *Standard Operating Procedures and Quality Assurance Manual*.

__________. 2007 or current revision. *Sampler's Guide, Contract Laboratory Program, Guidance for Field Samplers*, EPA-540-R-07-06.

Title 49 Code of Federal Regulations, Department of Transportation. 2005 or current revision. *Hazardous Materials Table, Special Provisions, Hazardous, Materials Communications, Emergency Response Information, and Training Requirements*, 49 CFR 172.

Title 49 Code of Federal Regulations, Department of Transportation. 2005 or current revision. *Shippers General Requirements for Shipments and Packagings*, 49 CFR 173.

Appendix A

Dangerous Goods and Hazardous Materials Inspection Checklist for Shipping Limited-Quantity

Sample Packaging

Yes	No	N/A	
☐	☐	☐	The VOA vials are wrapped in bubble wrap and placed inside a zip-type bag.
☐	☐	☐	The VOA vials are placed into a polyethylene bottle, filled with an absorbent, and tightly sealed.
☐	☐	☐	The drain plug is taped inside and outside to ensure control of interior contents.
☐	☐	☐	The samples have been placed inside garbage bags with sufficient bags of ice to preserve samples at 4°C.
☐	☐	☐	The cooler weighs less than the 66-pound limit for limited-quantity shipment.
☐	☐	☐	The garbage bag has been sealed with tape (or tied) to prevent movement during shipment.
☐	☐	☐	The chain-of-custody has been secured to the interior of the cooler lid.
☐	☐	☐	The cooler lid and sides have been taped to ensure a seal.
☐	☐	☐	The custody seals have been placed on both the front and back hinges of the cooler, using waterproof tape.

Air Waybill Completion

Yes	No	N/A	
☐	☐	☐	Section 1 has the shipper's name, company, and address; the account number, date, internal billing reference number; and the telephone number where the shipper can be reached.
☐	☐	☐	Section 2 has the recipient's name and company along with a telephone number where they can be reached.
☐	☐	☐	Section 3 has the **Bill Sender** box checked.
☐	☐	☐	Section 4 has the **Standard Overnight** box checked.
☐	☐	☐	Section 5 has the **Deliver Weekday** box checked.
☐	☐	☐	Section 6 has the number of packages and their weights filled out. Was the total of all packages and their weights figured up and added at the bottom of Section 6?
☐	☐	☐	Under the **Transport Details** box, the **Cargo Aircraft Only** box is obliterated, leaving only the **Passenger and Cargo Aircraft** box.
☐	☐	☐	Under the **Shipment Type**, the **Radioactive** box is obliterated, leaving only the **Non-Radioactive** box.
☐	☐	☐	Under the **Nature and Quantity of Dangerous Goods** box, the **Proper Shipping Name, Class or Division, UN or ID No., Packing Group, Subsidiary Risk, Quantity and Type of Packing, Packing Instructions, and Authorization** have been filled out for the type of chemical being sent.
☐	☐	☐	The **Name, Place and Date, Signature, and Emergency Telephone Number** appears at the bottom of the FedEx Airbill.
☐	☐	☐	The statement "In accordance with IATA/ICAO" appears in the **Additional Handling Information** box.
☐	☐	☐	The E**mergency Contact Information** at the bottom of the FedEx Airbill is truly someone who can respond any time of the day or night.

Proper Shipping Name	*Class or Division*	*UN or ID No.*	*Packing Group*	*Sub Risk*	*Quantity*	*Packing Instruction*	*Authorization*
Hydrochloric Acid Solution	8	UN1789	II		1 plastic box × 0.5 L	Y809	Ltd. Qty.
Nitric Acid Solution (with less than 20%)	8	UN2031	II		1 plastic box × 0.5 L	Y807	Ltd. Qty.
Sodium Hydroxide Solution	8	UN1824	II		1 plastic box × 0.5 L	Y809	Ltd. Qty.
Sulfuric Acid Solution	8	UN2796	II		1 plastic box × 0.5 L	Y809	Ltd. Qty.
Methanol	3	UN1230	II		1 plastic box × 1 L	Y305	Ltd. Qty.

Sample Cooler Labeling

Yes	No	N/A	
☐	☐	☐	The proper shipping name, UN number, and Ltd. Qty. appears on the shipping container.
☐	☐	☐	The corresponding hazard labels are affixed on the shipping container; the labels are not obscured by tape.
☐	☐	☐	The name and address of the shipper and receiver appear on the top and side of the shipping container.
☐	☐	☐	The air waybill is attached to the top of the shipping container.
☐	☐	☐	**Up Arrows** have been attached to opposite sides of the shipping container.
☐	☐	☐	Packaging tape does not obscure markings or labeling.

Appendix B

Shipment Quality Assurance Checklist

Date: ____________ Shipper: __________________________ Destination: ________________________

Item(s) Description: ____

Radionuclide(s): ____

Radiological Survey Results: surface _______________mrem/hr 1 meter ______________________

Instrument Used: Mfgr: _________________________________ Model: ____________________________

S/N: ____ Cal Date: __________________________

Limited-Quantity or Instrument and Article

Yes **No**

___ ___ 1. Strong tight package (package that will not leak material during conditions normally incidental to transportation).

___ ___ 2. Radiation levels at any point on the external surface of package less than or equal to 0.5 mrem/hr.

___ ___ 3. Removable surface contamination less than 20 dpm/100 cm^2 (alpha) and 1,000 dpm/100 cm^2 (beta/gamma).

___ ___ 4. Outside inner package bears the marking “Radioactive.”

___ ___ 5. Package contains less than 15 grams of ^{235}U (check yes if ^{235}U not present).

___ ___ 6. Notice enclosed in or on the package that includes the consignor or consignee and the statement, **“This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910.”**

___ ___ 7. Activity less than that specified in 49 CFR 173.425. Permissible package limit: Package Quantity:

___ ___ 8. On all air shipments, the statement **Radioactive Material, excepted package-limited quantity of material** shall be noted on the air waybill.

Qualified Shipper: ________________________ Signature: ______________________________________

Guide to Handling Investigation-Derived Waste

SOP 2-2
Revision: 7
Date: January 2012

Prepared:	Tim Eggert	**Technical Review:**	M. Bloisa
QA Review:	Jo Nell Mullins	**Approved:**	Jackie M Mosher *Signature/Date*
Issued:	Jo Nell Mullins *Signature/Date*		

1.0 Objective

This technical standard operating procedure (SOP) presents guidance for the management of investigation-derived waste (IDW). The primary objectives for managing IDW during field activities include:

- Leaving the site in no worse condition than existed before field activities
- Removing wastes that pose an immediate threat to human health or the environment
- Proper handling of onsite wastes that do not require offsite disposal or extended aboveground containerization
- Complying with federal, state, local, and facility applicable or relevant and appropriate requirements (ARARs)
- Careful planning and coordination of IDW management options
- Minimizing the quantity of IDW

2.0 Background

2.1 Definitions

Hazardous Waste - Discarded material that is regulated listed waste, or waste that exhibits ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261.3 or state regulations.

Investigation-Derived Wastes - Discarded materials resulting from field activities such as sampling, surveying, drilling, excavation, and decontamination processes that, in present form, possess no inherent value or additional usefulness without treatment. Wastes may be solid, sludge, liquid, gaseous, or multiphase materials that may be classified as hazardous or nonhazardous.

Mixed Waste - Any material that has been classified as both hazardous and radioactive.

Radioactive Wastes - Discarded materials that are contaminated with radioactive constituents with specific activities in concentrations greater than the latest regulatory criteria (i.e., 10 CFR 20).

Treatment, Storage, and Disposal Facility (TSDF) - Permitted facilities that accept hazardous waste shipments for further treatment, storage, and/or disposal. These facilities must be permitted by the U. S. Environmental Protection Agency (EPA) and appropriate state and local agencies.

2.2 Discussion

Field investigation activities result in the generation of waste materials that may be characterized as hazardous or radioactive. IDWs may include drilling muds, cuttings, and purge water from test pit and well installation; purge water, soil, and other materials from collection of samples; residues from testing of treatment technologies and pump and treat systems; personal protective equipment (PPE); solutions (aqueous or otherwise) used to decontaminate nondisposable protective clothing and equipment; and other wastes or supplies used in sampling and testing potentially hazardous or radiologically contaminated material.

Note: The client's representatives may not be aware of all potential contaminants. The management of IDW must comply with applicable regulatory requirements.

3.0 General Responsibilities

Site Manager - The site manager is responsible for ensuring that all IDW procedures are conducted in accordance with this SOP. The site manager is also responsible for ensuring that handling of IDW is in accordance with site-specific requirements.

Project Manager - The project manager is responsible for identifying site-specific requirements for the disposal of IDW in accordance with federal, state, and/or facility requirements.

Field Crew Members - Field crew members are responsible for implementing this SOP and communicating any unusual or unplanned condition to the project manager's attention.

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site/project specific quality assurance plan.

4.0 Required Equipment

Equipment required for IDW containment will vary according to site-specific/client requirements. Management decisions concerning the necessary equipment required shall consider: containment method, sampling, labeling, maneuvering, and storage (if applicable). Equipment must be onsite and inspected before commencing work.

4.1 IDW Containment Devices

The appropriate containment device (drums, tanks, etc.) will depend on site- or client-specific requirements and the ultimate disposition of the IDW. Typical IDW containment devices can include:

- Plastic sheeting (polyethylene) with a minimum thickness of 20 micrometers
- Department of Transportation (DOT)-approved steel containers
- Polyethylene or steel bulk storage tanks

Containment of IDW shall be segregated by waste type (i.e., solid or liquid, corrosive or flammable, etc.) and source location. Volume of the appropriate containment device will depend on site-specific requirements.

4.2 IDW Container Labeling

A "Waste Container" or "IDW Container" label or indelible marking shall be applied to each container. Labeling or marking requirements for onsite IDW not expected to be transported offsite are as detailed below.

- Labels and markings must contain the following information: project name, generation date, location of waste origin, container identification number, sample number (if applicable), and contents (drill cuttings, purge water, PPE, etc.).
- Each label or marking will be applied to the upper one-third of the container at least twice, on opposite sides.
- Containers that are 5 gallons or less may only require one label or set of markings.
- Labels or markings will be positioned on a smooth part of the container. The label must not be affixed across container bungs, seams, ridges, or dents.
- Labels must be constructed of a weather-resistive material with markings made with a permanent marker or paint pen and capable of enduring the expected weather conditions. If markings are used, the color must be easily distinguishable from the container color.
- Labels will be secured in a manner to ensure that they remain affixed to the container.

Labeling or marking requirements for IDW expected to be transported offsite must be in accordance with the requirements of 49 CFR 172.

4.3 IDW Container Movement

Staging areas for IDW containers shall be predetermined and in accordance with site-specific and/or client requirements. Arrangements shall be made before field mobilization as to the methods and personnel required to safely transport IDW containers to the staging area. Transportation of IDW containers offsite via a public roadway is prohibited unless 49 CFR 172 requirements are met.

4.4 IDW Container Storage

Containerized IDW awaiting results of pending chemical analysis or further onsite treatment shall be staged on site. Staging areas and bulk storage procedures are to be determined according to site-specific requirements. Containers are to be stored in such a fashion that the labels can be easily read. A secondary/spill container must be provided for liquid IDW storage and as appropriate for solid IDW storage (e.g., steel drums shall not be stored in direct contact with the ground).

5.0 Procedures

The three general options for managing IDW are: (1) collection and onsite disposal, (2) collection for offsite disposal, and (3) collection and interim management. Attachment 1 summarizes media-specific information on generation processes and management options. The option selected shall take into account the following factors:

- Type (soil, sludge, liquid, debris), quantity, and source of IDW
- Risk posed by managing the IDW onsite
- Compliance with regulatory requirements
- IDW minimization and consistency with the IDW remedy and the site remedy

In all cases the client shall approve the plans for IDW. Formal plans for the management of IDW must be prepared as part of a work plan or separate document.

5.1 Collection and Onsite Disposal

5.1.1 Soil/Sludge/Sediment

The options for handling soil/sludge/sediment IDW are:

1. Return IDW to boring, pit, or source immediately after generation as long as returning the media to these areas will not increase site risks (e.g., so that “clean” areas are not contaminated, the IDW material will not be replaced at a greater depth, or in a different area than from where it was originally obtained.

2. Spread IDW around boring, pit, or source within the area of contamination (AOC) as long as returning the media to these areas will not increase site risks (e.g., direct contact with surficial contamination).

3. Consolidate IDW in a pit within the AOC as long as returning the media to these areas will not increase site risks (e.g., the contaminated soil will not be replaced at a greater depth than where it was originally so that it will not contaminate “clean” areas).

4. Send to onsite TSDF. This option may require results of laboratory analysis before treatment/disposal.

Note: These options may require client and/or regulatory approval.

5.1.2 Aqueous Liquids

The options for handling aqueous liquid IDW are:

1. Discharge to surface water, only when IDW is not contaminated.

2. Discharge to ground surface close to the well from which it was extracted, only if soil contaminants will not be mobilized in the process and the action will not contaminate clean areas. If IDW from the sampling of background upgradient wells is not a community concern or associated with soil contamination, this presumably uncontaminated IDW may be released on the ground around the well.

3. Discharge to sanitary sewer, only when IDW is not contaminated.

4. Send to onsite treatment/disposal facility.

Note: These options may require results of laboratory analysis to obtain client and/or regulatory approval.

5. When small amounts (i.e., less than 5 gallons) of used decontamination fluids are generated during site characterization activities (e.g., during soil sampling using direct push technology methods), the fluids may be allowed to evaporate by spreading them on an asphalted surface, or allowing for evaporation from an open bucket.

5.1.3 Disposable PPE
The options for handling disposable PPE are:

1. Double-bag contents in nontransparent trash bags and place in onsite industrial dumpster, only if PPE is not contaminated.

2. Containerize, label, and send to onsite TSDF. This may require results of laboratory analysis before treatment/disposal.

5.2 Collection for Offsite Disposal
Before sending IDW to an offsite TSDF or to a publicly owned treatment works (POTW), laboratory analysis may be required. Manifests are required to accompany any IDW determined to be hazardous. In some instances, a bill of lading can be used for nonhazardous solid IDW (i.e., wooden pallets, large quantities of plastic sheeting). Arrangements must be made with the client responsible for the site to sign as generator on any waste profile and all manifests or bill of ladings; it is CDM Smith’s policy not to sign any waste profile or manifest. The TSDF and transporter must be permitted for the respective wastes. Nonbulk containers (e.g., drums) must have a DOT-approved label adhered to the container and all required associated placard stickers before leaving for an offsite TSDF. These labels must include information as required in 49 CFR 172. Bulk containers (i.e., rolloffs, tanks) do not require container specific labels for transporting offsite, but must include appropriate placards as required in 49 CFR 172.

5.2.1 Soil/Sludge/Sediment
When the final site remedy requires offsite treatment and disposal, the IDW may be stored (e.g., drummed, covered in a waste pile) or returned to its source until final disposal. The management option selected shall take into account the potential for increased risks, applicable regulations, and other relevant site-specific factors (e.g., weather, storage space, and public concern/perceptions).

5.2.2 Aqueous Liquids
When the final site remedy requires offsite treatment and disposal, the IDW may be stored (e.g., mobile tanks or drums with appropriate secondary containment) until final disposal. The management option selected shall take into account the potential for increased risks, applicable regulations, and other relevant site-specific factors (e.g., weather, storage space, and public concern/perceptions).

5.2.3 Disposable PPE
When the final site remedy requires offsite treatment and disposal, the IDW may be containerized and stored. The management option selected shall take into account potential for increased risks, applicable regulations, and other relevant site-specific factors (e.g., weather, storage space, and public concern/perceptions).

5.3 Collection and Interim Management
All interim measures must be approved by the client and regulatory agencies.

1. Storing IDW onsite until the final action may be practical in the following situations:
   - Returning wastes (especially sludges and soils) to their onsite source area would require reexcavation for disposal as determined for the final site remedy.
   - Interim storage in containers may be necessary to provide adequate protection to human health and the environment.
   - Offsite disposal options may trigger land disposal regulations under the Resource Conservation and Recovery Act (RCRA). Storing IDW until the final disposal of all wastes from the site will eliminate the need to address this issue more than once.
   - Interim storage may be necessary to provide time for sampling and analysis.

2. Segregate and containerize all waste for future treatment and/or disposal.
   - Containment options for soil/sludge/sediment may include drums or covered waste piles in AOC.
   - Containment options for aqueous liquids may include mobile tanks or drums.
   - Containment options for PPE may include drums or roll-off boxes.

6.0 Restrictions/Limitations

Site managers shall determine the most appropriate disposal option for aqueous liquids on a site-specific basis. Parameters to consider, especially when determining the level of protection, include the volume of IDW, the contaminants present in the aqueous liquid, the nature of contaminants present in the site soil , and whether groundwater or surface water is a drinking water supply, and if obtained from contaminated groundwater, whether the plume is contained or migrating. Special disposal/handling may be needed for drilling fluids because they may contain significant solid components and therefore may need to be handled, treated, disposed as non-liquid wastes.

Disposable sampling materials, disposable PPE, decontamination fluids, etc. will always be managed on a site-specific basis. Under no circumstances shall these types of materials e stored in a site office or warehouse.

7.0 References

Environmental Resource Center. 1997. *Hazardous Waste Management Compliance Handbook 2nd Edition*. Karnofsky (Editor).

Academy of Certified Hazardous Materials Manager. May 1999. *Hazardous Materials Management Desk Reference*. Cox.

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U. S. Environmental Protection Agency. 1987. *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87/001.1.

__________. August 1990. *Low-Level Mixed Waste: A RCRA Perspective for NRC Licensees*, EPA/530-SW-90-057.

__________. May 1991. *Management of Investigation-Derived Wastes During Site Inspections*, EPA/540/G-91/009.

__________. January 1992. *Guide to Management of Investigation-Derived Wastes*, 9345.3-03FS.

__________. Region IV. November 2001. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*.

Attachment 1
IDW Management Options

Type of IDW	*Generation Processes*	*Management Options*
Soil	▪ Well/Test pit installations ▪ Borehole drilling ▪ Soil sampling	**Onsite Disposal** ▪ Return to boring, pit, or source immediately after generation ▪ Spread around boring, pit, or source within the AOC ▪ Consolidate in a pit (within the AOC) ▪ Send to onsite TSDF **Offsite Disposal** ▪ Client to send to offsite TSDF **Interim Management** ▪ Store for future treatment and/or disposal
Sludge/Sediment	▪ Sludge pit/sediment sampling	**Onsite Disposal** ▪ Return to pit or source immediately after generation ▪ Send to onsite TSDF **Offsite Disposal** ▪ Send to offsite TSDF* **Interim Management** ▪ Store for future treatment and/or disposal
Aqueous Liquids (groundwater, surface water, drilling fluids, wastewater)	▪ Well installation/development ▪ Well purging during sampling ▪ Groundwater discharge during pump tests ▪ Surface water sampling ▪ Wastewater sampling	**Onsite Disposal** ▪ Pour onto ground close to well (nonhazardous waste) ▪ Discharge to sewer ▪ Send to onsite TSDF **Offsite Disposal** ▪ Send to offsite TSDF* ▪ Client to send to publicly owned treatment works (POTW) **Interim Management** ▪ Store for future treatment and/or disposal
Decontamination Fluids	▪ Decontamination of PPE and equipment	**Onsite Disposal** ▪ Send to onsite TSDF ▪ Evaporate (for small amounts of low contamination organic fluids) ▪ Discharge to ground surface **Offsite Disposal** ▪ Send to offsite TSDF* ▪ Discharge to sewer **Interim Management** ▪ Store for future treatment and/or disposal
Disposable PPE and Sampling Equipment	▪ Sampling procedures or other onsite activities	**Onsite Disposal** ▪ Place in onsite industrial dumpster ▪ Send to onsite TSDF **Offsite Disposal** ▪ Send to offsite TSDF* **Interim Management** ▪ Store for future treatment and/or disposal

* Client must sign waste profile, manifest, etc. for any waste sent offsite.
Adapted from U. S. Environmental Protection Agency, *Guide to Management of Investigation-Derived Wastes*, 9345-03FS, January 1992.

Section 3.0

Field Survey/Investigation Procedures

Topographic Survey	SOP 3-2 Revision: 7 Date: January 2012

Prepared:	Demetrios Klerides	**Technical Review:**	Geoffrey McKenzie
QA Review:	Jo Nell Mullins	**Approved:**	Signature/Date
Issued:	Signature/Date		

1.0 Objective

The objective of this technical standard operating procedure (SOP) is to provide guidance for a site topographic survey. The survey will produce a base map of the area under study, showing topographic and site-specific features. Also, the base map will incorporate site-specific grid system coordinates, if appropriate, to show sample and exploration location, monitoring wells, test pits, and any other features required by the scope of work.

2.0 Background

A site-specific grid system may be established at the area under study to coordinate the collection of samples. The topographic survey will establish the coordinates for the grid and facilitate the transposition of the grid and sample locations from the field to the topographic base map. At areas where a grid system is not used, sample and exploration locations will be marked by the field team using appropriate markers such as stakes, nails, flagging, or paint. The base map will also locate site-specific planimetric details such as significant manmade and geographic features via the survey.

The scale for the base maps will vary based on the size of the area under study, but a suitable scale will be selected that clearly shows map features and sample locations. The base maps will be at a scale appropriate for the intended use. Areas with significant detail requirements will be shown in scale that ranges from 1 inch equals 10 feet to 1 inch equals 40 feet. Areas with less detail requirements will be shown in smaller scale such as 1 inch equals 100 feet or 200 feet. Topography will be shown with 1- or 2-foot contour intervals. However, the contour interval shall clearly identify the variation in topography to the degree necessary for the work to be performed. For example, gently sloping areas may require a smaller contour interval (i.e., 1 foot between contour lines) to reveal more subtle topographic variations. Similarly, steeply sloping areas may require larger contour intervals to legibly depict the topography. Index contours shall be indicated at elevations that are multiples of five times the contour interval.

If appropriate, aerial photographs may be used to assist in the development of the topographic base maps. Existing or new photographs can be used for this purpose. In areas with deciduous trees, new photographs shall be taken during late fall or winter when the leaves are off the trees and better ground surface image can be achieved. The scale of the aerial photographs shall provide sufficient detail for developing the topographic base map.

3.0 General Responsibilities

Project Manager - The project manager is responsible for ensuring that the topographic survey is completed in accordance with the project requirements.

Field Team Leader - The field team leader is responsible for developing the survey scope of work and ensuring that the topographic survey is coordinated properly with the grid system (if used) and the sampling points, so that the base map produced is a true representation of the field locations.

Note**:** Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-specific/project-specific quality assurance plan.

4.0 Required Equipment

The required equipment for a topographic survey shall be provided by the selected surveyor. All equipment proposed by the surveyor shall be submitted to CDM Smith for approval before initiating the topographic survey work.

The selected surveyor must be licensed in the state in which the survey is conducted.

For topographic surveys conducted at hazardous waste sites, all surveyor personnel who work onsite will be 40-hour health and safety trained per OSHA requirements for hazardous waste sites (29 CFR 1910.120), unless approved differently by the corporate health and safety manager.

All final drawings and maps must be signed and sealed by the licensed land surveyor.

5.0 Procedures

1. A site visit may be conducted before submitting the bid proposal. A kickoff meeting shall be held between the selected surveyor and CDM Smith's project manager to discuss the specific requirements of the scope of work.

2. The surveyor shall be responsible for executing the work, including deed search if required.

3. The surveyor shall develop and implement a site-specific health and safety plan according to the requirements specified in the subcontract between CDM Smith and the surveyor.

4. To the extent practical, the work shall be performed in the presence of an authorized representative(s) of CDM Smith. CDM Smith will interpret and clarify the specifications and will answer all questions in connection therewith.

5. The CDM Smith field team leader will be responsible for ensuring that appropriate calibration procedures are performed and documented by the surveyor. Calibration procedures shall be consistent with the data quality objectives for the survey and with the equipment manufacturers' requirements.

6. The surveyor shall establish at least one primary horizontal control monument and one vertical benchmark, as established by the United States Coastal and Geodetic Survey (USC&GS) or equivalent authority. Additional monuments may be established by the surveyor.

7. Local benchmarks will be established at least every 500 feet or closer, if warranted by site conditions, to tie the basic control points together. Where required, established horizontal and vertical data, such as state planar coordinate systems and the national geodetic vertical datum of NAVD 88 or subsequent corrections and/or revisions, shall be used to tie the survey data to the national network.

8. Temporary monuments will be set as necessary to perform the surveying. They may be wood, metal, or otherwise marked on facilities such as sidewalks, paved streets, curbs, etc. All monuments shall be described in the field notes and marked on site maps for future reference.

9. If appropriate, the surveyor shall be encouraged to use technologies such as Global Positioning System (GPS) that will meet the accuracy requirements but that may be more flexible and efficient than traditional techniques. All geodetic control work shall conform to either the Standards and Specifications for Geodetic Control networks, Federal Geodetic Control Subcommittee or NAVSTAR Global Positioning System Surveying, U. S. Army Corps of Engineers, for third order Class II control surveys. Short traverses, less than 1 mile, may use generally accepted fourth order techniques (including vertical angles for elevations) that will provide the spatial accuracy required. Angles shall be doubled and redoubled if the mean of the doubled angle differs from the first angle by more than 10 seconds. Length measurements shall be made with a calibrated tape corrected for temperature and tension or with Electronic Distance Measuring (EDM) equipment corrected for variation of the index of refraction.

10. The CDM Smith field team leader will review the draft map to ensure that all sampling and exploration locations, grid coordinates, and other appropriate features are located by the surveyor. The surveyor will record all field survey information in a field logbook; a copy of the logbook shall be provided to CDM Smith with the submittal of the topographic map.

11. A working drawing of the base map will be field checked and corrected by the surveyor as necessary. The completed topographic base map shall be plotted on Mylar® or other suitable drafting film, as directed by the CDM Smith project manager. All survey and topographical data will be in digital format, compatible with the latest version of AutoCAD, ArcView/ArcInfo, DXF, or geographic information system (GIS) export format may also be acceptable. The specific format of the data to be provided to CDM Smith will be specified in the SOW. It is recommended that a review of CDM Smith client requirements be completed to determine the appropriate data format. Sufficient documentation of the digital information shall be provided to explain the data. For clarity, the surveyor will prepare the base map with groups of features on separate layers in the AutoCAD files. The CDM Smith project manager shall designate which features will be placed on the separate layers. Tick marks indicating the latitude and longitude in the state that the work is performed shall be provided on the base map. The project manager will be responsible for ensuring that the topographic base map and digital information is completed according to CDM Smith's drafting standards for the project.

12. In the event that aerial photographs are used, the surveyor shall field edit and statistically test the aerial topographic mapping of the site base map for conformance with the horizontal and vertical components of the National Map Accuracy Standards. The surveyor shall run random baselines throughout the site (minimum of four) to verify that less than 10 percent of horizontal and/or vertical locations exceed the values determined in the National Map Accuracy Standards. If more than 10 percent of the locations exceed the values in the National Map Accuracy Standards, then the surveyor will notify CDM Smith.

13. Stereo map compilation by stereo photogrammetric methods will be accomplished through the use of approved stereophotogrammetric instruments using professionally recognized plotting ratios for each type of instrument. Fully trained and experienced photogrammetrists will be employed to complete stereomap compilation.

14. For broad area high precision topographic mapping, digital elevation/terrain model compilation using light detection and ranging (LiDAR) technologies is becoming more common. This method can be an efficient and effective tool for increasing engineering production at all levels. However, the error budget for a given LiDAR mapping system is dependent on the accuracy of its core subsystems (i.e., the laser rangefinder, the GPS position solution, and the inertial measurement unit [IMU]). System engineers need to balance each subsystem contribution against desired system performance (Shrestha et al. 2000).

15. The surveyor shall establish and maintain a quality control program to ensure that the survey is performed within acceptable limits. At a minimum, the surveyor will:

    - Check all equipment, including compasses, transits, and levels, for accuracy and maintain records of such checks. The surveyor will make records of these checks available to CDM Smith on request.
    - Maintain and submit copies of all survey field notes.
    - Field notes for each surveying activity will be kept in bound books dedicated exclusively to this project. Each book will have a table of contents. Each page of field notes shall be numbered, dated, and show the initials of all crewmembers. Black waterproof ballpoint pens will be used. Erasing is not acceptable. All errors will be crossed out with a single line and the correct data entered adjacent to the error. The crossed out and corrected data will be initialed by the party marking field notes.

16. Permits:
    - The surveyor shall be responsible for obtaining any federal, state, and local permits that may be required and to perform and complete the ground surveys at the site.
    - The surveyor shall not perform any work until permits (if required) are obtained.
    - The surveyor shall provide separate copies of all permits to CDM Smith before performing any onsite activities.

6.0 Restrictions/Limitations

The horizontal positions are to be surveyed within 1/10 of a foot, relative to the datum coordinate system. The vertical elevations of monitoring wells, piezometers, and staff gauges are to be surveyed within 1/100 of a foot (0.01 foot), relative to the local benchmarks. The vertical elevations of all other sampling points are to be surveyed within 1/10 of a foot, relative to the local benchmarks.

7.0 References

U. S. Department of Commerce, National Geodetic Survey (see http://www.ngs.noaa.gov).

Moffitt, F.H. and Bouchard, H. 1982. *SURVEYING* (7th ed.), Harper and Row, Publishers, New York.

Shrestha, R. L. et al. 2000. *Airborne Laser Swath Mapping: Accuracy Assessment for Surveying and Mapping Applications*. University of Florida (see http://www.alsm.ufl.edu/pubs/accuracy/accuracy.htm).

Underground Facility Location*

***Applicable only if CDM Smith, its subcontractor, or lower-tier subcontractor performs the intrusive work. Consult with responsible party for all other situations.**

SOP 3-6
Revision: 1
Date: January 2012

Prepared:	Joe Mayo	**Technical Review:**	Sharon Budney
QA Review:	Doug Updike	**Approved:**	*Signature/Date*
Issued:	*Signature/Date*		

1.0 Objective

The objective of this technical standard operating procedure (SOP) is to provide background information, resources, and guidance for locating underground facilities prior to performing excavations or other intrusive activities such as soil boring or demolition activities.

2.0 Background

To protect the public health and avoid serious and costly accidents that occur each year due to damage to underground utilities from excavation and other intrusive activities, most states have enacted laws and promulgated regulations that require notification and markout of underground utilities prior to performing excavation or other intrusive activities. These laws also require underground facility owners and operators to locate, markout, or otherwise provide the location of underground facilities that they operate so that contractors and others performing intrusive activities can take reasonable care to avoid damaging the facilities.

All states, and in some cases, localities within states, have established "one-call" type systems to facilitate location of underground facilities. These systems typically are operated by independent entities that are funded by the underground facility operators. They provide communication and verification services for locating underground facilities. One-call system operators are responsible for contacting the appropriate underground facility owners, ordering markouts, and tracking markout orders. The one-call system operator maintains records of requests for markouts and also maintains contact information for the field supervisor or other responsible person who requested the markout. This simplifies the process for contractors and allows them to take reasonable care to avoid accidental damage to underground utilities.

Most state laws require contractors to contact the one-call system prior to performing intrusive activities. The contractor (CDM Smith) must provide information including the site location (in some cases, the boundary of the excavation must be marked out), proposed start date, depth of the excavation, and contact information for a representative of the contractor, etc. Most laws provide for civil penalties for violation of the law and some provide for criminal penalties for negligence if an underground facility is damaged and the one-call system was not contacted.

Each state law is different, and it is the responsibility of the contractor to understand the law and activate the state's one-call system. Most states maintain web sites that provide one-call system information and offer downloadable forms for requesting subsurface facility markouts. Many of the one-call web sites also provide state regulations, procedures for using the system, procedures to follow if an underground facility is struck, and other important information. A list of telephone numbers to activate the one-call system in various states and localities is provided in Attachment A.

Often responsibility for contacting the one-call system and confirming the markout is transferred, by contract, to the subcontractor performing the intrusive work (i.e., driller, excavator, etc.). It is important to take reasonable care to ensure that the subcontractor has contacted the one-call system, that the markout has been completed, and that it includes the area where the intrusive activity will occur. No work should occur until the site manager or field manager is confident that the subcontractor has met their responsibility as defined in the subcontract statement of work.

Using a one-call system is not a guarantee that all underground facilities in an area have been identified. Not all facility operators participate in the one-call system or they may be exempt from participation by law. The one-call system operator can provide information on participating operators. Operators of exempted or nonparticipating underground facilities must be contacted directly to determine the location of their facilities. Responsibility for contacting these operators and locating the underground facilities may be transferred to a subcontractor via the subcontract statement of work. If responsibility is not transferred to a subcontractor, then it is the responsibility of the CDM Smith site manager or designee to contact the facility operator and determine the location of the underground facility.

2.1 Definitions

Excavation - State laws often define this term broadly to mean any movement of any earthen materials or rock, especially by means of machinery or explosives. Excavations below minimum depths (e.g., 12 inches) may trigger activation of the one-call system. For example, New Jersey's Underground Facility Protection Act defines excavation as:

> "...any operation in which earth, rock, or other material in the ground is moved, removed, or otherwise displaced by means of any tools, equipment, or explosive, and includes but is not limited to drilling, grading, boring, milling, to a depth greater than six inches, trenching, tunneling, scraping, tree and root removal, cable or pipe plowing, fence post or pile driving, and wrecking, razing, rending, or removing any structure or mass material, but does not include routine residential property or right of way landscaping activities performed with non-mechanized equipment, excavation within the flexible or rigid pavement box within the right-of-way, or the tilling of soil for agricultural purposes to a depth of 18 inches or less."

One-Call Operator - The person identified by the one-call system as the point of contact for location of underground facilities. The one-call operator is responsible for obtaining excavation location information from the excavator, contacting facility operators, ordering the markout, and providing verification that the markout has been completed.

One-Call System - Any of a number of communication systems established by state or local law to provide underground facility markout services to protect underground facilities. There are a number of state and regional one-call systems such as Dig Safe, Call Before You Dig, One Call, Miss Utility, and others.

Underground Facilities - Typically public or private facilities that are buried below ground or submerged on public or private property and used to convey water, sewage, telecommunications, cable television, electricity, oil, petroleum, gas, optical signals, or traffic control. Be aware that some regulations may exclude certain facilities such as storm drains and gravity sewers.

Operator - Person or entity that owns or operates an underground facility as defined above. One-call laws generally require operators to provide the location of their facilities and to perform the markout. Homeowners who operate underground facilities, such as lawn sprinklers, are usually not considered to be operators.

Waiting Period - Most one-call systems establish a minimum time to allow the markout to be completed before excavation activities can proceed. Lead times vary by state but usually are 2 to 3 business days.

Expiration Date - Some states require that the excavation activities must begin within a certain time period after the markout is completed or after the one-call system is contacted. If work is delayed, check with the one-call system to ensure that the markout remains valid.

2.2 Discussion

Excavation Activities on Residential Properties - Underground facility markouts often do not extend onto residential properties. Markouts usually show residential connections at the boundaries of the property, but end there. Excavation activities planned on residential properties require the use of other methods to determine the location of underground utilities such as water lines, electrical lines, septic systems, leach fields, and sewer lines. In addition, homeowners may install other underground facilities such as water sprinkler systems, low voltage lighting lines, well piping, and swimming pool plumbing.

The planning process for conducting work on residential properties must consider the activities that will be performed and their locations relative to the building footprint. Information about the location of underground utilities may be obtained from the residents before performing intrusive activities, but this information is often uncertain. Procurement of a geophysical subcontractor experienced in locating underground utilities is often the best choice to avoid damage to residential underground facilities. The responsibilities of the subcontractor for locating underground facilities should be clearly defined in the subcontract statement of work. Additional methods for avoiding utilities include hand digging and use of a vacuum system to remove soil from the excavation.

Use of an Underground Facility Location Subcontractor - In some situations or in particular areas of the country, it is customary to procure the services of a subcontractor experienced with providing utility markout services. This may be particularly useful for sites that cover large areas and require numerous markouts or in certain areas of the country where these services are used to identify underground facilities. For example, in some western states, the one-call systems are operated at the county or regional level and may require more coordination activities. The subcontractor must comply with all state and local regulations including activation of the one-call system. When this option is selected to identify underground facilities, the procedures described below for subcontractor as the excavator should be followed. The responsibilities of the subcontractor for locating underground facilities should be clearly defined in the subcontract statement of work.

2.3 Associated Procedures

- SOP 1-4, *Subsurface Soil Sampling*
- SOP 3-1, *Geoprobe® Sampling*
- SOP 4-4, *Design and Installation of Monitoring Wells in Aquifers*

3.0 Responsibilities

Project Manager - The project manager is responsible for ensuring that underground facility location responsibilities are clearly stated in subcontractor statements of work, as applicable.

Site Manager - The site manager is responsible for ensuring that the subcontractor has met their facility location responsibility as defined in the subcontract statement of work. If the underground facility location responsibility is not transferred to a subcontractor, it is the responsibility of the site manager to contact one-call and facility operators to determine locations.

Field Manager - The field manager is responsible for ensuring that work is not initiated until they are confident that underground facility location has occurred in the area of the work.

4.0 Procedures

General Procedures to Ensure that Underground Facilities are Identified Before Excavation

Note: The terms ‘excavator’ and ‘excavation’ used in the following procedures are broadly defined to include a variety of intrusive activities including excavation, soil boring, well drilling, test excavations, etc.

Subcontractor as the Excavator - Frequently CDM Smith transfers the responsibility for contacting the appropriate one-call system, via the subcontract statement of work, to a subcontractor such as an excavator or driller. The procedures below apply to the location of underground facilities, when a subcontractor is responsible for contacting the one-call system, and identifying underground facilities.

- Clearly define the subcontractor’s responsibility in locating underground facilities in the subcontract statement of work.

- Obtain and be aware of the state or local regulations concerning excavation activities and underground facilities (contact the one-call system’s website or call the system operator).

- Define areas for excavation. Be as specific as possible with the location and include address, block and lot, milepost markers, cross streets, drawings, etc. (***Note*** - State law may require that the proposed excavation area be physically delineated before the markout. Also be aware that methods for identifying locations vary from state to state).

- Provide the locations of the proposed excavations/borings to the subcontractor.

Underground Facility Location*

***Applicable only if CDM Smith, its subcontractor, or lower-tier subcontractor performs the intrusive work. Consult with responsible party for all other situations.**

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Date: January 2012

- Before beginning work, verify that the subcontractor has contacted the one-call system and that the required markouts have been completed. Obtain confirmation numbers or other documentation to verify that the subcontractor has contacted the one-call system or underground facility operator and that the markout has been completed. Obtain a list of the utilities that were contacted. Record all conversations with the subcontractor related to underground utility location in the field logbook.

- Before beginning the excavation activities, ensure that the appropriate area has been marked out and that the required waiting period has elapsed. Also, ensure that a delay in the start of the excavation activity has not invalidated the markout. If in doubt, contact the one-call system.

- Perform a walkover and visual inspection of the markout area. Verify that the markout area covers the proposed excavation area. If any of the markouts are unclear or do not cover the excavation area, notify the subcontractor that the markout is not adequate. Request an additional markout if necessary.

- During the visual inspection, note the locations of features that may indicate underground facilities (manholes, sewer grates, vent pipes, electrical boxes, etc.). Depending on the state, not all utilities may be marked out (e.g., gravity sewers are excluded from New Jersey's underground facility protection law). Some facility operators may not have the resources to participate in the one-call system. The local municipality or utility must be contacted to determine the location of these underground facilities.

- Begin excavation activities. Be cautious during the initial stages of the intrusive activity. Be alert for signs that an underground facility may be present. Look for changes in the soil characteristics such as the presence of fill materials or non-native materials. Be alert for visual and aural cues that may indicate the presence of underground facilities (metallic sounds, changes in drilling progress, etc.).

- If an underground facility is struck or breeched, cease operations immediately. Remove all personnel from the area, inform the subcontractor, contact the facility operator, inform your supervisor, and follow the emergency procedures in the site-specific health and safety plan. The subcontractor should immediately contact the one-call system and identify the problem.

***Note:* If CDM Smith takes an active role in contacting the one-call system, utility companies, or other operators of underground facilities, it may relieve the subcontractor of responsibility for locating the underground utilities. Before beginning intrusive activities, the site manager and subcontract manager should be consulted if it is believed that the subcontractor has not fulfilled his responsibility under the subcontract.**

CDM Smith as the Excavator - The procedures below define reasonable steps to be taken to avoid damage to underground facilities when CDM Smith is the excavator. In most cases it is advisable to designate a subcontractor (via contract) as the party responsible for location of underground facilities.

- Obtain and be aware of the state or local regulations concerning excavation activities and underground facilities.

- Obtain a copy of the appropriate one-call system underground facility location request form to determine what information is required to submit an underground facility location request.

- Define areas for excavation. Be as specific as possible with the location and include address, lot and block, milepost markers, cross streets, drawings, etc. (***Note*** - State law may require that the proposed excavation area be physically delineated before the markout).

- Contact the appropriate one-call system and provide information on the location of the proposed excavation and field manager or site manager contact information (provide the specific information required by the state's one-call system request form).

- Obtain a confirmation number or other documentation to verify that the markout has been completed. Obtain a list of the utilities that were contacted by the one-call system operator. Record all conversations with the one-call operator of underground utility operator in the field logbook.

- Before beginning the excavation activities, ensure that the appropriate area has been marked out and that the required waiting period has elapsed. Also, ensure that a delay in the start of the excavation activity has not invalidated the markout. If in doubt, contact the one-call system.

- Perform a walkover and visual inspection of the markout area. Note the location of the marked out underground facilities and the proposed excavation location(s). If any of the markouts are unclear or do not cover the excavation area, contact the one-call system. Also during the visual inspection, note the locations of features that may indicate underground facilities (manholes, sewer grates, vent pipes, electrical boxes, etc.). Depending on the state, not all utilities may be marked out (e.g., gravity sewers are excluded from New Jersey's underground facility protection law). Other facility operators may not have the resources to participate in the one-call system. The local municipality or utility must be contacted to determine the location of these underground facilities.

- Determine what clearances are required between the location of the underground facility and the proposed excavation (clearances vary by state).

- Measure distance between proposed excavation and underground facility to ensure that proper clearance distance is maintained.

- Begin excavation activities. Be cautious during the initial stages of the excavation activity. Be alert for signs that an underground facility may be present. Look for changes in the soil characteristics such as the presence of fill materials or non-native materials. Be alert for visual and aural cues that may indicate the presence of an underground facility (metallic sounds, changes in drilling progress, etc.).

- If an underground facility is struck or breeched, cease operations immediately. Remove all personnel from the area, contact the one-call system, inform your supervisor, contact the facility operator, and follow the emergency procedures in the site-specific health and safety plan.

5.0 References

New Jersey Statute, Title 48. 1997. Public Utilities, Chapter 2. Board of Public Utility Commissioners, Article 9. Underground Facility Protection.

New York State Department of Public Service, Safety Section, New York Department of Public Service, Rule 753. *Duties of Excavators*, Sections 753-3.2 - 753-3.17.

Dig Safe, Inc. website, www.digsafe.com.

New Jersey One Call website, www.nj1-call.org.

New York State Electric and Gas (NYSEG) website, safety section, www.nyseg.org.

Dig Safely website, links to state laws and one-call contacts, www.digsafely.com.

Section 4.0

General Technical Operating Procedures

Field Logbook Content and Control	SOP 4-1 Revision: 7 Date: January 2012

Prepared: Del Baird **Technical Review:** Laura Splichal

QA Review: Jo Nell Mullins **Approved:** [signature]

Signature/Date

Issued: [signature]

Signature/Date

1.0 Objective

The objective of this technical standard operating procedure (SOP) is to set criteria for content entry and form of field logbooks. Field logbooks are an essential tool to document field activities for historical and legal purposes.

2.0 Background

2.1 Definitions

Biota - The flora and fauna of a region.

Magnetic Declination Corrections - Compass adjustments to correct for the angle between magnetic north and geographical meridians.

2.2 Discussion

Information recorded in field logbooks includes field team names; observations; data; calculations; date/time; weather; and description of the data collection activity, methods, instruments, and results. Additionally, the logbook may contain deviations from plans and descriptions of wastes, biota, geologic material, and site features including sketches, maps, or drawings as appropriate.

3.0 General Responsibilities

Field Team Leader (FTL) - The FTL is responsible for ensuring that the format and content of data entries are in accordance with this procedure.

Site Personnel - All CDM Smith employees who make entries in field logbooks during onsite activities are required to read this procedure before engaging in this activity. The FTL will assign field logbooks to site personnel who will be responsible for their care and maintenance. Site personnel will return field logbooks to the records file at the end of the assignment.

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities should be defined in the field plan or site-/project-specific quality assurance plan.

4.0 Required Equipment

- Site-specific plans
- Field logbook
- Indelible black or blue ink pen
- Ruler or similar scale

5.0 Procedures

5.1 Preparation

In addition to this SOP, site personnel responsible for maintaining logbooks must be familiar with all procedures applicable to the field activity being performed. These procedures should be consulted as necessary to obtain specific information about equipment and supplies, health and safety, sample collection, packaging, decontamination, and documentation. These procedures should be located at the field office or vehicle for easy reference.

Field logbooks shall be bound with lined, consecutively numbered pages. All pages must be numbered before initial use of the logbook. Before use in the field, each logbook will be marked with a specific document control number issued by the document control administrator, if required by the contract quality implementation plan (QIP). Not all contracts require document control numbers. The following information shall be recorded on the cover of the logbook:

- Field logbook document control number (if applicable).
- Activity (if the logbook is to be activity-specific), site name, and location.
- Name of CDM Smith contact and phone number(s) (typically the project manager).
- Start date of entries.
- End date of entries.
- In specific cases, special logbooks may be required (e.g., waterproof paper for stormwater monitoring).

The first few (approximately five) pages of the logbook will be reserved for a table of contents (TOC). Mark the first page with the heading and enter the following:

Table of Contents

Date/Description	Pages
(Start Date)/Reserved for TOC	1-5

The remaining pages of the table of contents will be designated as such with "TOC" written on the top center of each page. The table of contents should be completed as activities are completed and before placing the logbook in the records file.

5.2 Operation

Requirements that must be followed when using a logbook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the logbook. If data collection forms are specified by an activity-specific plan, this information does not need to be duplicated in the logbook. However, any forms used to record site information must be referenced in the logbook.
- Do not start a new page until the previous one is full or has been marked with a single diagonal line so that additional entries cannot be made. Use both sides of each page.
- Do not erase or blot out any entry at any time. Indicate any deletion by a single line through the material to be deleted. Initial and date each deletion. Take care to not obliterate what was written previously.
- Do not remove any pages from the book.

Specific requirements for field logbook entries include:

- Initial and date each page.
- Sign and date the final page of entries for each day.
- Initial and date all changes.
- Multiple authors must sign out the logbook by inserting the following:
  Above notes authored by:
  - (Sign name)
  - (Print name)
  - (Date)
- A new author must sign and print his/her name before additional entries are made.
- Draw a diagonal line through the remainder of the final page at the end of the day.
- Record the following information on a daily basis:
  - Date and time
  - Name of individual making entry
  - Names of field team and other persons onsite
  - Description of activity being conducted including station or location (i.e., well, boring, sampling location number) if appropriate
  - Weather conditions (i.e., temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data
  - Level of personal protection used
  - Serial numbers of instruments
  - Equipment calibration information
  - Serial/tracking numbers on documentation (e.g., carrier air bills)

Entries into the field logbook shall be preceded with the time (written in military units) of the observation. The time should be recorded frequently and at the point of events or measurements that are critical to the activity being logged. All measurements made and samples collected must be recorded unless they are documented by automatic methods (e.g., data logger) or on a separate form required by an operating procedure. In these cases, the logbook must reference the automatic data record or form.

At each station where a sample is collected or an observation or measurement made, a detailed description of the location of the station is required. Use a compass (include a reference to magnetic declination corrections), scale, or nearby survey markers, as appropriate. A sketch of station location may be warranted. All maps or sketches made in the logbook should have descriptions of the features shown and a direction indicator. It is preferred that maps and sketches be oriented so that north is toward the top of the page. Maps, sketches, figures, or data that will not fit on a logbook page should be referenced and attached to the logbook to prevent separation.

Other events and observations that should be recorded include:

- Changes in weather that impact field activities.
- Deviations from procedures outlined in any governing documents. Also record the reason for any noted deviation.
- Problems, downtime, or delays.
- Upgrade or downgrade of personal protection equipment.
- Visitors to the site.

5.3 Post-Operation

To guard against loss of data as a result of damage or disappearance of logbooks, completed pages shall be periodically photocopied (weekly, at a minimum) and forwarded to the field or project office. Other field records shall be photocopied and submitted regularly and as promptly as possible to the office. When possible, electronic media such as disks and tapes should be copied and forwarded to the project office.

At the conclusion of each activity or phase of site work, the individual responsible for the logbook will ensure that all entries have been appropriately signed and dated and that corrections were made properly (single lines drawn through incorrect information, then initialed and dated). The completed logbook shall be submitted to the records file.

6.0 Restrictions/Limitations

Field logbooks constitute the official record of onsite technical work, investigations, and data collection activities. Their use, control, and ownership are restricted to activities pertaining to specific field operations carried out by CDM Smith personnel and their subcontractors. They are documents that may be used in court to indicate dates, personnel, procedures, and techniques employed during site activities. Entries made in these logbooks should be factual, clear, precise, and nonsubjective. Field logbooks, and entries within, are not to be used for personal use.

7.0 References

Sandia National Laboratories. 1991. *Procedure for Preparing Sampling and Analysis Plan, Site-Specific Sampling Plan, and Field Operating Procedures,* QA-02-03. Albuquerque Environmental Program, Department 3220, Albuquerque, New Mexico.

Sandia National Laboratories. 1992. *Field Operation Procedure for Field Logbook Content and Control*. Environmental Restoration Department, Division 7723, Albuquerque, New Mexico.

Photographic Documentation of Field Activities

SOP 4-2
Revision: 8
Date: January 2012

Prepared: David O. Johnson **Technical Review:** Sharon Budney

QA Review: Jo Nell Mullins **Approved:** [signature]
Signature/Date

Issued: [signature]
Signature/Date

1.0 Objective

The purpose of this technical standard operating procedure (SOP) is to provide standard guidelines and methods for photographic documentation, which include still and digital photography and videotape or DVD recordings of field activities and site features (geologic formations, core sections, lithologic samples, water samples, general site layout, etc.). This document shall provide guidelines designed for use by a professional or amateur photographer. This SOP is intended for circumstances when formal photographic documentation is required. Based on project requirements, it may not be applicable for all photographic activities.

2.0 Background

2.1 Definitions

Photographer - A photographer is the camera operator (professional or amateur) of still photography, including digital photography, or videotape or digital versatile discs (DVD) recording whose primary function with regard to this SOP is to produce documentary or data-oriented visual media.

Identifier Component - Identifier components are visual components used within a photograph such as visual slates, reference markers, and pointers.

Standard Reference Marker - A standard reference marker is a reference marker that is used to indicate a feature size in the photograph and is a standard length of measure, such as a ruler, meter stick, etc. In limited instances, if a ruled marker is not available or its use is not feasible, it can be a common object of known size placed within the visual field and used for scale.

Slates - Slates are blank white index cards or paper used to present information pertaining to the subject/procedure being photographed. Letters and numbers on the slate will be bold and written with black indelible marking pens.

Arrows and Pointers - Arrows and pointers are markers/pointers used to indicate and/or draw attention to a special feature within the photograph.

Contrasting Backgrounds - Contrasting backgrounds are backdrops used to lay soil samples, cores, or other objects on for clearer viewing and to delineate features.

Data Recording Camera Back - A data recording camera back is a camera attachment or built-in feature that will record, at the very least, frame numbers and dates directly on the film.

2.2 Associated Procedures

- SOP 4-1, *Field Logbook Content and Control*

2.3 Discussion

Photographs and videotape or DVD recordings made during field investigations are used as an aid in documenting and describing site features, sample collection activities, equipment used, and possible lithologic interpretation. This SOP is designed to illustrate the format and desired placement of identifier components, such as visual slates, standard reference markers, and pointers. These items shall become an integral part of the “visual media” that, for the purpose of this document, shall encompass still photographs, digital photographs, videotape recordings (or video footage), and recordings on DVDs. The use of a photographic logbook and standardized entry procedures are also outlined. These procedures and guidelines will minimize potential ambiguities that may arise when viewing the visual media and ensure the representative nature of the photographic documentation.

3.0 General Responsibilities

Field Team Leader - The field team leader (FTL) is responsible for ensuring that the format and content of photographic documentation are in accordance with this procedure. The FTL is responsible for directing the photographer to specific situations, site features, or operations that the photographer will be responsible for documenting.

Photographer - The photographer shall seek direction from the FTL and regularly discuss the visual documentation requirements and schedule. The photographer is responsible for maintaining a logbook per Sections 5.1, 5.2.4, and 5.3.1 of this SOP. Responsibilities will be defined in the project sampling plan.

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site/quality assurance project plan (QAPP).

4.0 Required Equipment

A general list of equipment that may be used:

- 35mm camera or disposable single use camera (35mm or panoramic use)
- Digital camera
- Extra batteries for 35mm camera
- Video camera and appropriate storage media (e.g., video tapes, DVDs)
- Logbook
- Indelible black or blue ink pen
- Standard reference markers
- Slates
- Arrows or pointers
- Contrasting backgrounds
- Medium speed, or multi purpose fine-grain, color, 35mm negative film or slide film (project dependent)
- Data recording camera back (if available)
- Storage medium for digital camera

5.0 Procedures

5.1 Documentation

A commercially available, bound logbook will be used to log and document photographic activities. Review SOP 4-1, *Field Logbook Content and Control* and prepare all supplies needed for logbook entries.

Note: A separate photographic logbook is not required. A portion of the field logbook may be designated as the photographic log and documentation section.

Field Health and Safety Considerations

There are no hazards that an individual will be exposed to specific to photographic documentation. However, site-specific hazards may arise depending on location or operation. Personal protective equipment used in this operation will be site-specific and dictated through requirements set by the site safety officer, site health and safety plan, and/or prescribed by the CDM Smith Corporate Health and Safety Program. The photographer should contact the site safety officer for health and safety orientation before commencing field activities. The site health and safety plan must be read before entry to the site, and all individuals must sign the appropriate acknowledgement that this has been done.

The photographer should be aware of any potential physical hazards while photographing the subject (e.g., traffic, low overhead hazard, edge of excavation).

5.2 Operation

5.2.1 General Photographic Activities in the Field

The following sections provide general guidelines that should be followed to visually document field activities and site features using still/digital cameras and video equipment. Listed below are general suggestions that the photographer should consider when performing activities under this SOP:

- The photographer should be prepared to make a variety of shots, from close-up to wide-angle. Many shots will be repetitive in nature or format, especially close-up site feature photographs. Consideration should therefore be given to designing a system or technique that will provide a reliable repetition of performance.

- All still film photographs should be made using a medium speed, or multi purpose fine-grain, color negative film in the 35mm format unless otherwise directed by the FTL.

- It is suggested that Kodak brand “Ektapress Gold Deluxe” film or equivalent be used as the standard film for the still photography requirements of the field activities. This film is stable at room temperature after exposure and will better survive the time lag between exposure and processing. It is suggested that film speed ASA 100 should be used for outdoor photographs in bright sunlight, ASA 200 film should be used in cloudy conditions, and ASA 400 film should be used indoors or for very low-light outdoor photographs.

- No preference of videotape or DVD brand along with digital storage medium is specified and is left to the discretion of the photographer.

- The lighting for sample and feature photography should be oriented toward a flat condition with little or no shadow. If the ambient lighting conditions are inadequate, the photographer should be prepared to augment the light (perhaps with reflectors or electronic flash) to maintain the desired visual effect.

- Digital cameras have multiple photographic quality settings. A camera that obtains a higher resolution (quality) has a higher number of pixels and will store a fewer number of photographs per digital storage medium.

5.2.2 General Guidelines for Still Photography

Slate Information
It is recommended that each new roll of film or digital storage medium shall contain on the first usable frame (for film) a slate with consecutively assigned control numbers (a consecutive, unique number that is assigned by the photographer as in sample numbers).

Caption Information
All still photographs will have a full caption permanently attached to the back or permanently attached to a photo log sheet. The caption should contain the following information (digital photographs should have a caption added after the photographs are downloaded):

- Film roll control number (if required) and photograph sequence number
- Date and time
- Photographer
- Description of activity/item shown (e.g., name of facility/site, specific project name, project number)
- Direction (if applicable)

When directed by the sampling plan, a standard reference marker should be used in all documentary visual media. While the standard reference marker will be predominantly used in close-up feature documentation, inclusion in all scenes should be considered.

Digital media should be downloaded at least once each day to a personal computer; the files should be in either “JPEG” or “TIFF” format. Files should be renamed at the time of download to correspond to the logbook. It is recommended the electronic files be copied to a compact disc for backup.

Close-Up and Feature Photography
When directed by the sampling plan, close-up photographs should include a standard reference marker of appropriate size as an indication of the feature size and contain a slate marked with the site name and any identifying label, such as a well number or core depth, that clearly communicates to the viewer the specific feature being photographed.

Feature samples, core pieces, and other lithologic media should be photographed as soon as possible after they have been removed from their in situ locations. This enables a more accurate record of their initial condition and color. When directed by the sampling plan, include a standard reference color strip (color chart such as Munsell Soil Color Chart or that available from Eastman Kodak Co.) within the scene. This is to be included for the benefit of the viewer of the photographic document and serves as a reference aid to the viewer for formal lithologic observations and interpretations.

Site Photography
Site photography, in general, will consist predominantly of medium- and wide-angle shots. A standard reference marker should be placed adjacent to the feature or, when this is not possible, within the same focal plane.

While it is encouraged that a standard reference marker and caption/slate be included in the scene, it is understood that situations will arise that preclude their inclusion within the scene. This will be especially true of wide-angle shots. In such a case, the film/tape control number shall be entered in the photographic logbook along with the frame number and all other information pertinent to the scene.

Panoramic
In situations where a wide-angle lens does not provide sufficient subject detail, a single-use disposable panoramic camera is recommended. If this type of camera is not available, a panoramic series of two or three photos would be appropriate. Panoramas can provide greater detail while covering a wide subject, such as an overall shot of a site.

To shoot a panoramic series using a standard 35mm or digital camera, the following procedures are recommended:

- Use a stable surface or tripod to support the camera
- Allow a 20- to 30-percent overlap while maintaining a uniform horizon
- Complete two to three photos per series

5.2.3 General Photographic Documentation Using Video Cameras
As a reminder, it is not within the scope of this document to set appropriate guidelines for presentation or “show” videotape or DVD recording. The following guidelines are set for documentary videotape or DVD recordings only and should be implemented at the discretion of the site personnel.

Documentary videotape or DVD recordings of field activities may include an audio slate for all scenes. At the beginning of each video session, an announcer will recite the following information: date, time (in military units), photographer, site ID number, and site location. This oral account may include any additional information clarifying the subject matter being recorded.

A standard reference marker may be used when taking close-up shots of site features with a video camera. The scene may also include a caption/slate. It should be placed adjacent and parallel to the feature being photographed.

It is recommended that a standard reference marker and caption/slate be included in all scenes. The caption information is vital to the value of the documentary visual media and should be included. If it is not included within the scene, it should be placed before the scene.

Original video recordings will not be edited. This will maintain the integrity of the information contained on the videotape or DVD. If editing is desired, a working copy of the original video recording can be made.

A label should be placed on the videotape or DVD with the appropriate identifying information (project name, project number, date, location, etc.).

5.2.4 Photographic Documentation
Photographic activities must be documented in a photographic logbook or in a section of the field logbook. The photographer will be responsible for making proper entries.

In addition to following the technical standards for logbook entry as referenced in SOP 4-1, the following information should be maintained in the appropriate logbook:

- Photographer name.
- If required, an entry shall be made for each new roll/tape/DVD control number assigned.
- Sequential tracking number for each photograph taken (for digital cameras, the camera-generated number may be used).
- Date and time (military time).
- Location.
- A description of the activity/item photographed.
- If needed, a description of the general setup, including approximate distance between the camera and the subject, may be recorded in the logbook.
- Record as much other information as possible to assist in the identification of the photographic document.

5.3 Post Operation

All film will be sent for development and printing to a photographic laboratory (to be determined by the photographer). The photographer will be responsible for arranging transport of the film from the field to the photographic laboratory. The photographer shall also be responsible for arranging delivery of the negatives and photographs, digital storage medium, or videotape or DVD to the project management representative to be placed in the project files.

5.3.1 Documentation

At the end of each day's photographic session, the photographer(s) will ensure that the appropriate logbook has been completely filled out and maintained as outlined in SOP 4-1.

5.3.2 Archive Procedures

- Photographs and the associated set of uncut negatives, digital media, and original unedited documentary video recordings will be submitted to the project files and handled according to contract records requirements. The project manager will ensure their proper distribution.

- Completed pages of the appropriate logbook will be copied weekly and submitted to the project files.

6.0 Restrictions/Limitations

This document is designed to provide a set of guidelines for the field amateur or professional photographer to ensure that an effective and standardized program of visual documentation is maintained.

It is not within the scope of this document to provide instruction in photographic procedures, nor is it within the scope of this document to set guidelines for presentation or "show" photography.

The procedures outlined herein are general by nature. The photographer is responsible for specific operational activity or procedure. Questions concerning specific procedures or requirements should be directed to the project manager or FTL.

Note: Some sites do not permit photographic documentation. Check with the site contact for any restrictions.

7.0 References

U. S. Army Corps of Engineers. 2001. *Requirements for the Preparation of Sampling and Analysis Plans*, EM 200-1-3. Appendix F. February.

U. S. Environmental Protection Agency. 1992. National Enforcement Investigations Center. *Multi-Media Investigation Manual*, EPA-330/9-89-003-R. p. 85. Revised March.

__________. Region IV. 2001. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Athens, Georgia. November.

Field Equipment Decontamination at Nonradioactive Sites		SOP 4-5 Revision: 9 Date: January 2012	
Prepared:	Steven Fundingsland	**Technical Review:**	S. Budney, S. Kirchner, J. Oxford
QA Review:	Jo Nell Mullins	**Approved:**	*Signature/Date*
Issued:	*Signature/Date*		

1.0 Objective

The objective of this technical standard operating procedure (SOP) is to describe the general procedures required for decontamination of field equipment at nonradioactive sites. This SOP serves as a general guide and is applicable at most sites; however, it shall be noted that site-specific conditions (i.e., type of contamination, type of media sampled), the governing agency (e.g., EPA, DOE, USACE), and site-specific work plans, sampling and analysis plans and/or quality assurance (QA) project plans may require modifications to the decontamination procedures provided in this SOP. Decontamination of field equipment is necessary to ensure acceptable quality of samples by preventing cross contamination. Further, decontamination reduces health hazards and prevents the spread of contaminants offsite.

2.0 Background

2.1 Definitions

Acid Rinse - A solution of 10 percent nitric or hydrochloric acid made from reagent grade acid and analyte-free water.

Analyte-Free Water - Tap water that has been treated so that the water contains no detectable heavy metals or other inorganic compounds. Analyte-free water shall be stored only in clean glass, stainless steel, or plastic containers that can be closed when not in use.

Clean - Free of contamination and when decontamination has been completed in accordance with this SOP.

Cross Contamination - The transfer of contaminants through equipment or personnel from the contamination source to less contaminated or noncontaminated samples or areas.

Decontamination - The process of rinsing or otherwise cleaning the surfaces of equipment to rid them of contaminants and to minimize the potential for cross contamination of samples or exposure of personnel.

Material Safety Data Sheets (MSDS) - These documents discuss the proper storage and physical and toxicological characteristics of a particular substance used during decontamination. These documents, generally included in site health and safety plans, shall be kept on site at all times during field operations.

Organic-Free/Analyte-Free Water - Tap water that has been treated so that the water meets the analyte-free water criteria and contains no detectable organic compounds. Organic-free/analyte-free water shall be stored only in clean glass, Teflon™, or stainless steel containers that can be closed when not in use.

Potable Water - Tap water may be obtained from any municipal system. Chemical analysis of the water source may be required before it is used.

Sampling Equipment - Equipment that comes into direct contact with the sample media. Such equipment includes split spoon samplers, well casing and screens, and spatulas or bowls used to homogenize samples.

Soap - Low-sudsing, nonphosphate detergent such as Liquinox™.

Solvent Rinse - Pesticide grade, or better, isopropanol, acetone, or methanol.

2.2 Associated Procedures
- SOP 1-1 – *Surface Water Sampling*
- SOP 1-3 – *Surface Soil Sampling*
- SOP 1-4 – *Subsurface Soil Sampling*
- SOP 1-5 – *Groundwater Sampling Using Bailers*
- SOP 1-7 – *Wipe Sampling*
- SOP 1-9 – *Tap Water Sampling*
- SOP 1-11 – *Sediment/Sludge Sampling*
- SOP 1-12 – *Low Flow (Low-Stress) Groundwater Sampling*
- SOP 1-13 – *Drum Sampling*
- SOP 1-14 – *Lagoon Sampling*
- SOP 2-2 – *Guide to Handling Investigation-Derived Waste*
- SOP 3-1 – *Geoprobe® Sampling*

3.0 Responsibilities
The project manager or designee, generally the field team leader (FTL), ensures that field personnel are trained in the performance of this procedure and that decontamination is conducted in accordance with this SOP and site-specific work plans. The FTL may also be required to collect and document rinsate samples (also known as equipment blanks) to provide quantitative verification that these procedures have been correctly implemented.

Note: Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific QA plan.

4.0 Required Equipment
- Stiff-bristle scrub brushes
- Plastic buckets and troughs
- Soap
- Nalgene or Teflon sprayers or wash bottles or 2- to 5-gallon, manual-pump sprayer (pump sprayer material must be compatible with the solution used)
- Plastic sheeting, plastic bags, and/or aluminum foil to keep decontaminated equipment clean between uses
- Disposable wipes, rags, or paper towels
- Potable water*
- Analyte-free water
- Organic-free/analyte-free water
- Gloves, safety glasses, and other protective clothing as specified in the site-specific health and safety plan
- High-pressure pump with soap dispenser or steam-spray unit (for large equipment only)
- Appropriate decontamination solutions pesticide grade or better and traceable to a source (e.g., 10 percent and/or 1 percent nitric acid [HNO_3], acetone, methanol, isopropanol, hexane)
- Tools for equipment assembly and disassembly (as required)
- 55-gallon drums or tanks for temporary storage of decontamination water (as required)
- Pallets for drums or tanks holding decontamination water (as required)

* Potable water may be required to be tested for contaminants before use. Check field plan for requirements.

5.0 Procedures
All reusable equipment (nondedicated) used to collect, handle, or measure samples shall be decontaminated before coming into contact with any sampled media or personnel using the equipment. Decontamination of equipment shall occur either at a central decontamination station or at portable decontamination stations set up at the sampling location, drill site, or monitoring well location. The centrally located decontamination station shall include an appropriately sized bermed and lined area on which equipment decontamination shall occur and shall be equipped with a collection system and storage

vessels. In certain circumstances, berming is not required when small quantities of water are being generated and for some short duration field activities (i.e., pre-remedial sampling). Equipment shall be transported to and from the decontamination station in a manner to prevent cross contamination of equipment and/or area. Precautions taken may include enclosing augers in plastic wrap while being transported on a flatbed truck.

The decontamination area shall be constructed so that contaminated water is either collected directly into appropriate containers (5-gallon buckets or steel wash tubs) or within the berms of the decontamination area that then drains into a collection system. Water from the collection system shall be transferred into 55-gallon drums or portable tanks for temporary storage. Typically, decontamination water shall be staged until sampling results or waste characterization results are obtained and evaluated and the proper disposition of the waste is determined (SOP 2-2, *Guide to Handling Investigation-Derived Waste*). The exact procedure for decontamination waste disposal shall be discussed in the work plan. Also, solvent and acid rinse fluids may need to be segregated from other investigation-derived wastes.

All items that shall come into contact with potentially contaminated media shall be decontaminated before use and between sampling and/or drilling locations. If decontaminated items are not immediately used, they shall be covered either with clean plastic or aluminum foil depending on the size of the item. All decontamination procedures for the equipment being used are as follows:

General Guidelines

- Potable, analyte-free, and organic-free/analyte-free water shall be free of all contaminants of concern. Following the field QA sampling procedure described in the work plan, analytical data from the water source may be required.
- Sampling equipment that has come into contact with oil and grease shall be cleaned with methanol or other approved alternative to remove the oily material. This may be followed by a hexane rinse and then another methanol rinse. Regulatory or client requirements regarding solvent use shall be stated in the work plan.
- All solvents and acids shall be pesticide grade or better and traceable to a source. The corresponding lot numbers shall be recorded in the appropriate logbook.

Note: Solvents and acids are potentially hazardous materials and must be handled, stored, and transported accordingly. Solvents shall never be used in a closed building. See the site-specific health and safety plan and/or the chemical's MSDS for specific information regarding the safe use of the chemical.

- Decontaminated equipment shall be allowed to air dry before being used.
- Documentation of all equipment type, date, time, and method of decontamination along with associated field QA sampling shall be recorded in the appropriate logbook.
- Gloves, boots, safety glasses, and any other personnel protective clothing and equipment shall be used as specified in the site-specific health and safety plan.

5.1 Heavy Equipment Decontamination

Heavy equipment includes drilling rigs, well development rigs, and backhoes. Follow these steps when decontaminating this equipment:

1. Establish a bermed decontamination area that is large enough to fully contain the equipment to be cleaned. If available, an existing wash pad or appropriate paved and bermed area may be used; otherwise, use one or more layers of heavy plastic sheeting to cover the ground surface and berms. All decontamination pads shall be upwind of the area under investigation.

2. With the rig in place, spray areas (rear of rig or backhoe) exposed to contaminated media using a hot water high-pressure sprayer. Be sure to spray down all surfaces, including the undercarriage.

3. Use brushes, soap, and potable water to remove dirt whenever necessary.

4. Remove equipment from the decontamination pad and allow it to air dry before returning it to the work site.

5. After decontamination activities are completed, collect all contaminated wastewater, plastic sheeting, and disposable gloves, boots, and clothing in separate containers or receptacles. All receptacles containing contaminated items must be properly labeled for disposal as detailed in the field plan. Liquids and solids must be drummed separately.

5.2 Downhole Equipment Decontamination

Downhole equipment includes hollow-stem augers, drill pipes, rods, stems, etc. Follow these steps when decontaminating this equipment:

1. Set up a centralized decontamination area, if possible. This area shall be set up to collect contaminated rinse waters and to minimize the spread of airborne spray.

2. Set up a “clean” area upwind of the decontamination area to receive cleaned equipment for air-drying. At a minimum, clean plastic sheeting must be used to cover the ground, tables, or other surfaces on which decontaminated equipment is to be placed. All decontamination pads shall be upwind of any areas under investigation.

3. Place the object to be cleaned on aluminum foil or plastic-covered wooden sawhorses or other supports. The objects to be cleaned shall be at least 2 feet above the ground to avoid splashback when decontaminating.

4. Using soap and potable water in the hot water high-pressure sprayer (or steam unit), spray the contaminated equipment. Aim downward to avoid spraying outside the decontamination area. Be sure to spray inside corners and gaps especially well. Use a brush, if necessary, to dislodge dirt.

5. If using soapy water, rinse the equipment using clean, potable water. If using hot water, the rinse step is not necessary if the hot water does not contain a detergent. If the hot water contains a detergent, this final clean water rinse is required.

6. Using a suitable sprayer, rinse the equipment thoroughly with analyte-free water.

7. Remove the equipment from the decontamination area and place in a clean area upwind to air dry.

8. After decontamination activities are completed, collect all contaminated wastewaters, plastic sheeting, and disposable gloves, boots, and clothing in separate containers or receptacles. All receptacles containing contaminated items must be properly labeled for disposal. Liquids and solids must be drummed separately.

5.3 Sampling Equipment Decontamination

Follow these steps when decontaminating sampling equipment:

1. Set up a decontamination line on plastic sheeting. The decontamination line shall progress from "dirty" to "clean." A clean area shall be established upwind of the decontamination wash/rinse activities to dry the equipment. At a minimum, clean plastic sheeting must be used to cover the ground, table, or other surfaces that the decontaminated equipment is placed for drying.

2. Disassemble any items that may trap contaminants internally. Do not reassemble the items until decontamination and air drying are complete.

3. Wash the items with potable water and soap using a stiff brush as necessary to remove particulate matter and surface films. The items may be steam cleaned using soap and hot water as an alternative to brushing. Note: Polyvinyl chloride or plastic items shall not be steam cleaned. Items that have come into contact with concentrated and/or oily contaminants may need to be rinsed with a solvent such as hexane and allowed to air dry prior to this washing step.

4. Thoroughly rinse the items with potable water.

5. If sampling for metals, thoroughly rinse the items with an acid solution (e.g., 10 percent nitric acid) followed by a rinse using analyte-free water. If sampling for organic compounds, thoroughly rinse the items with solvent (e.g., isopropanol) followed by a rinse using analyte-free water. The specific chemicals used for the acid rinse and solvent rinse phases shall be specified in the work plan. The acid rinsate and solvent rinsate must each be containerized separately. Acids and solvents are potentially hazardous materials and care must be exercised when using these chemicals to prevent adverse health affects (e.g., skin burns, irritation to the eyes and respiratory system). Appropriate personal protective equipment must be worn when using these chemicals. These chemicals (including spent rinsate) must be managed and stored appropriately. Special measures such as proper labels, paperwork, notification, etc. may be required when transporting or shipping these chemicals.

6. Rinse the items thoroughly using organic-free/analyte-free water.

7. Allow the items to air dry completely.

8. After drying, reassemble the parts as necessary and wrap the items in clean plastic wrap or in aluminum foil.

9. After decontamination activities are completed, collect all contaminated waters, used solvents and acids, plastic sheeting, and disposable personal protective equipment. Place the contaminated items in properly labeled drums for disposal. Liquids and solids must be drummed separately. Refer to site-specific plans for labeling and waste management requirements.

5.4 Pump Decontamination

Follow the manufacturer's recommendation for specified pump decontamination procedures. At a minimum, follow these steps when decontaminating pumps:

1. Set up the decontamination area and separate "clean" storage area using plastic sheeting to cover the ground, tables, and other surfaces. Set up four containers: the first container shall contain dilute (nonfoaming) soapy water, the second container shall contain potable water, the third container shall be empty to receive wastewater, and the fourth container shall contain analyte-free water.

2. The pump shall be set up in the same configuration as for sampling. Submerge the pump intake (or the pump, if submersible) and all downhole-wetted parts (tubing, piping, foot valve) in the soapy water of the first container. Place the discharge outlet in the wastewater container above the level of the wastewater. Pump soapy water through the pump assembly until it discharges to the waste container. Scrub the outside of the pump and other wetted parts with a metal brush.

3. Move the pump assembly to the potable water container while leaving discharge outlet in the waste container. All downhole-wetted parts must be immersed in the potable water rinse. Pump potable water through the pump assembly until it runs clear.

4. Move the pump intake to the analyte-free water container. Pump the water through the pump assembly. Pump the volume of water through the pump specified in the field plan. Usually, three pump-and-line-assembly volumes shall be required.

5. Decontaminate the discharge outlet by hand, following the steps outlined in Section 5.3.

6. Remove the decontaminated pump assembly to the clean area and allow it to air dry upwind of the decontamination area. Intake and outlet orifices shall be covered with aluminum foil to prevent the entry of airborne contaminants and particles.

5.5 Low Stress (Low Flow) Sampling Pump Decontamination

Sampling equipment used for Low Stress (Low Flow) Groundwater Sampling (SOP 1-12) must be decontaminated thoroughly each day before use (daily decontamination) and after each well is sampled (between-well decontamination). All non-disposable equipment, including the pump (support cable and electrical wires which are in contact with the sample) will be decontaminated as described below. Dedicated, in-place pumps and tubing must be thoroughly decontaminated using “daily decontamination” procedures prior to their initial use or installation.

5.5.1 Prior to Sampling Event Decontamination

Please Note: Steps 5 through 13 should only be performed once (for each pump that is to be used) before the commencement of a particular sampling event by a person qualified to disassemble pumps.

1. Pre-rinse: Operate pump in a deep basin containing 8 to 10 gallons of potable water for 5 minutes and thoroughly flush other equipment with potable water.
2. Wash: Operate pump in a deep basin containing 8 to 10 gallons of a non-phosphate detergent solution, such as Liquinox™, for 5 minutes and thoroughly flush other equipment with fresh detergent solution. Use the detergent sparingly.
3. Rinse: Operate pump in a deep basin of potable water for 5 minutes and thoroughly flush other equipment with potable water for five minutes.
4. Analyte-Free Rinse: Operate pump in a deep basin of analyte-free water to pump out 1 to 2 gallons of this final rinse water.
5. Disassemble pump.
6. Wash pump parts (inlet screen, shaft suction interconnector, motor lead assembly, stator house): Place the disassembled parts of the pump into a deep basin containing 8 to 10 gallons of non-phosphate detergent solution. Scrub all pump parts with a test tube brush.
7. Rinse pump parts with potable water for five minutes.
8. Rinse the pump parts with demonstrated analyte-free water.
9. If sampling for metals, place impeller assembly in a large glass beaker and rinse with 1% nitric acid (HNO3).
10. Rinse impeller assembly with potable water for five minutes.
11. If sampling for organics, place impeller assembly in a large glass bleaker and rinse with isopropanol or appropriate organic solvent specified in the site-specific plan.
12. Thoroughly rinse impeller assembly with demonstrated analyte-free water.
13. Reassemble pump.

5.5.2 Daily and Between-Well Decon

1. Pre-rinse: Operate pump in a deep basin containing 8 to 10 gallons of potable water for 5 minutes and thoroughly flush other equipment with potable water for five minutes.
2. Wash: Operate pump in a deep basin containing 8 to 10 gallons of a non-phosphate detergent solution, such as Liquinox™, for 5 minutes and thoroughly flush other equipment with fresh detergent solution. Use the detergent sparingly.
3. Rinse: Operate pump in a deep basin of potable water for 5 minutes and thoroughly flush other equipment with potable water for five minutes.

4. Final Rinse: Operate pump in a deep basin of analyte-free water to pump out 1 to 2 gallons of this final rinse water.

5.6 Instrument Probe Decontamination
Instrument probes used for field measurements such as pH meters, conductivity meters, etc. shall be decontaminated between samples and after use with analyte-free, or better, water.

5.7 Waste Disposal
Refer to site-specific plans and SOP 2-2 for waste disposal requirements. The following are guidelines for disposing of wastes:

- All wash water, rinse water, and decontamination solutions that have come in contact with contaminated equipment are to be handled, packaged, labeled, marked, stored, and disposed of as investigation-derived waste.
- Small quantities of decontamination solutions may be allowed to evaporate to dryness.
- If large quantities of used decontamination solutions shall be generated, each type of waste shall be contained in separate containers.
- Unless otherwise required, plastic sheeting and disposable protective clothing may be treated as solid, nonhazardous waste.
- Waste liquids shall be sampled, analyzed for contaminants of concern in accordance with disposal regulations, and disposed of accordingly.

6.0 Restrictions/Limitations
Nitric acid and polar solvent rinses are necessary only when sampling for metals or organics, respectively. These steps shall not be used, unless required, because of the potential for acid burns and ignitability hazards.

If the field equipment is not thoroughly rinsed and allowed to completely air dry before use, volatile organic residue, which interferes with the analysis, may be detected in the samples. The occurrence of residual organic solvents is often dependent on the time of year sampling is conducted. In the summer, volatilization is rapid, and in the winter, volatilization is slow. Check with your EPA region, state, and client for approved decontamination solvents.

7.0 References
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Environmental Data Management

SOP 4-8
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1.0 Objective

The objective of this technical standard operating procedure (SOP) is to provide instruction to data managers, technical staff, and project managers in preparing an environmental project data management plan. The data management plan identifies and documents a project's requirements and responsibilities for managing and using environmental information. Details determined and provided in the data management plan must clearly define:

- Data types the project will generate and use
- Responsibilities for activities associated with information management
- How the project data will be managed
- When data transfers will occur and who will provide and receive data

Additionally, this SOP defines the technical approach for data management activities associated with the collection and analysis of environmental data.

2.0 Background

The data management plan must be completed at the beginning of the project lifecycle. This ensures that the necessary environmental data management systems and personnel are identified and in place before the initiation of data collection. Reviews and updates of the data management plan must also be completed as necessary.

The data management plan only addresses the management of a project's environmental information. Environmental information includes electronic and hardcopy records that document environmental processes and conditions and are used to support the project objectives related to environmental and remedial decisions. Information generated by the project activities (e.g., chemical, physical) and information obtained from outside sources (e.g., historical data) are managed within the scope of the data management plan. Information such as human resources and financial records are not within the scope of the data management plan.

Project managers, technical staff, and data coordinators have the responsibility for developing the data management plan. Additional staff (e.g., field team leaders, data users) shall also be involved in the data management plan generation as necessary. The minimum project data requirements will depend on the statement of work for individual projects. The project team shall work together to identify project data management requirements, define the environmental data collection and handling process, and define the project data management responsibilities. The process to generate a data management plan is provided in Section 4.0.

2.1 Associated Procedures

All SOPs used to collect environmental data are subject to the procedures and processes presented in this SOP. These include:

- SOP 1-1, *Surface Water Sampling*
- SOP 1-2, *Sample Custody*
- SOP 1-3, *Surface Soil Sampling*
- SOP 1-4, *Subsurface Soil Sampling*
- SOP 1-5, *Groundwater Sampling Using Bailers*
- SOP 1-6, *Water Level Measurement*

- SOP 1-7, *Wipe Sampling*
- SOP 1-8, *Volatile Organic Compound Air Sampling Using USEPA Method TO-15 with SUMMA® Canister*
- SOP 1-9, *Tap Water Sampling*
- SOP 1-10, *Field Measurement of Organic Vapors*
- SOP 1-11, *Sediment/Sludge Sampling*
- SOP 2-1, *Packaging and Shipping Environmental Samples*
- SOP 3-1, *Geoprobe Sampling*
- SOP 3-2, *Topographic Survey*
- SOP 3-4, *Geophysical Logging, Calibration, and Quality Control*
- SOP 3-5, *Lithologic Logging*
- SOP 4-1, *Field Logbook Content and Control*
- SOP 4-3, *Well Development and Purging*
- SOP 4-4, *Design and Installation of Monitoring Wells in Aquifers*
- SOP 4-6, *Hydraulic Conductivity Testing*

3.0 General Roles and Responsibilities

A general description of roles and responsibilities associated with environmental data management is provided below. It shall be understood that not all roles listed below will be required on all projects and that one person may perform multiple roles.

Project Manager - The project manager has the overall responsibility for completing the project. With respect to data management, this involves directing the project team in identifying existing sources of data, identifying the specific project study parameters (e.g., scope of the project), and selecting an effective data collection approach. Additionally, the project manager ensures that data management requirements are effectively communicated in subcontractor statements of work.

Technical Leader - The technical leader serves as the single point of contact for technical issues. This person provides support during the planning, implementation, and reporting of the project.

Project Team - The project team consists of technical and support staff (e.g., data management and administrative staff) who completes various tasks on the project. The project team is responsible for the development of requirement documents (e.g., sampling plans) and ensuring that client contractual requirements are met.

Field Team Leader - The field team leader supervises field teams during planning and implementation of field data collection. The field team leader ensures that field activities are documented according to project-specific requirements, reviewed as required, and that deviations are tracked and justified.

Field Team - The field team consists of individuals who perform activities detailed in the project-specific requirement documents. Field team responsibilities include recording field activities and information as required by the project-specific planning documents. Quality assurance reviews of procedure implementation are completed by a qualified field team member. Quality assurance reviews include ensuring samples are collected as required, calibrations are completed correctly, and that all information is recorded as required.

Data Management Team - The data management team consists of a data manager and data support staff. The data manager is responsible for developing and implementing the project data management plan and ensuring that requirements specified in the data management plan are met. The data manager ensures that existing data and new data generated during the course of the project are incorporated into the project files and applicable databases. The data manager also identifies and obtains appropriate data management training for the project team. The data manager is responsible for overseeing the data support staff.

Data support staff are responsible for entering environmental project data into the project files or database and ensuring that all information is entered accurately. Data support staff also work with the field teams and data users to ensure that data collection is complete and access to the data is appropriate.

Laboratory Coordinator - The laboratory coordinator develops the project-specific analytical statement of work. Analytical methods, detection limits, laboratory quality control requirements, and deliverable requirements must be detailed in the statement of work. The laboratory coordinator also communicates with the data manager to ensure that hardcopy and electronic deliverable formats are specified and meet project requirements.

Data Validation Coordinator - The data validation coordinator is responsible for developing the data validation process specific to the project requirements and is responsible for supervising data validation staff. Included in this process is the approach to verifying that analytical data and field data are complete and accurate, have fulfilled the requested analyses, and are in concurrence with the contract requirements. If discrepancies arise, the data validation coordinator interfaces with the laboratory for resolution. If data validation occurs via a subcontractor, the data validation coordinator is responsible for the development of the subcontractor statement of work and supervision and review of the subcontractor's work.

Data validation staff are responsible for ensuring that analytical data and field data are accurate according to a project-specific set of criteria, including the evaluation of quality control samples to ensure analyses are performed within specified control limits. All validation issues must be identified and corrected. Qualifiers may be assigned to the data to indicate concerns about usability.

Data User - Data users are members of the project team who require access to project information for project decisions and to prepare deliverables. The data user is responsible for documenting information used (e.g., geographic information system [GIS] coverage, database queries, statistical analysis completed) to generate any data deliverables (e.g., data tables, maps). This requirement ensures that deliverables may be reproduced in the future using an identical process. Additionally, the data user is responsible for determining whether or not the data used meet their specific usability requirements.

Note: Responsibilities may vary from site to site. Therefore, all team member responsibilities shall be defined in a work plan or site-/project-specific quality assurance project plan (QAPP).

4.0 Data Management Plan

This section describes the process to complete preparation of a project data management plan. The data management plan must be completed early in the life cycle of a project to ensure that the necessary and appropriate data management systems and personnel are identified and in place before a project begins to generate data. The data management plan identifies and documents the project requirements and responsibilities for managing and using environmental information. The data management plan must provide enough detail to clearly define:

- The types of data the project will generate and use
- Responsibilities for information management activities and procedures to follow
- How the project will manage its data
- When data transfers will occur and who will provide and receive data

4.1 Data Management Plan Outline

The project manager, data manager, and technical leader will evaluate project and client requirements to prepare the data management plan. The following outline shall be customized to meet the project-specific requirements. Additionally, as the project evolves over time, the data management plan must be reviewed and updated periodically to ensure that it suitably meets modifications to the project requirements.

Section 1 - Introduction

- Briefly describe project objectives
- Briefly describe data quality and management objectives
- Briefly describe data management plan objectives and organization
- Summarize the types of data required by the project
- Summarize the data management activities

Section 2 - Data Sources and Needs
- Identify the project data needs (e.g., internal sources, external sources)
- Identify data collection formats (e.g., field forms to be used, GIS coverage)

Section 3 - Data Management Team Organization
- Present roles and responsibilities
- Identify lines of communication

Section 4 - Data Management Activities
- Project planning and setup and data flow process (e.g., sample locations and identification nomenclature, laboratory subcontracting)
- Field data collection (e.g., sample tracking, field data entry, historical data)
- Data validation, evaluation, and qualification
- Database entry and post qualification
- Data analysis and output (e.g., mapping format and specifications, data sharing, figure generation)
- Data quality assurance and quality control
- Data usability

Section 5 - Data Management and Geographic Information System and Process Administration
- Identify project data management and geographic information systems to be used
- Identify any project-specific systems to be used for analysis, modeling, or mapping
- Describe how the project will ensure that data, geographic, and analysis systems and processes are controlled (e.g., configuration change control, security)
- Project documentation and storage (records management)
- Quality control implementation (e.g., quality control of electronic documents, GIS software guidelines, other analytical software guidelines)

4.2 Data Management Plan Preparation

Data management plan development includes a seven-step process. Each of the steps involved in the process are annotated below. Critical issues of the data management plan are the definition of project activities, roles, and responsibilities related to data management.

- **Determine the Data Manager -** Every project must have a project data manager. The data manager is responsible for assisting in identification of data management and data record needs according to project and client requirements. The data manager will work with the project technical leader in the development of the data management plan.

- **Identify the Project Data Needs and Sources -** The data needs and sources will be determined during project scoping meetings and by discussions with the project team. The data types, sources, and uses must be considered when requirements are being defined. Identification of data types includes topics such as:

  - Maps
  - Field measurements
  - Inspection information
  - Sample media
  - Analyses
  - Locations
  - Quantity of samples
  - Quality for intended use
  - Observations

  Data source considerations will include historical, project-generated, and other similar projects. Examples of data uses include modeling (contaminant contouring/transport, geospatial), regulatory compliance, remedial investigation, and risk assessment.

- **Identify Existing Database Requirements** - A requirement may exist that all project information shall be transferred into a pre-existing client database. Close coordination with the client data managers and review of guidance will provide information associated with specific requirements. These requirements will include specific data loading tools, submission file groupings, and data entry guidance.

- **Identify Records Management Requirements -** The project manager, data manager, and technical leader will identify the records management requirements. Additionally, they will identify the types and quantities of records that will be generated and determine what requirements are necessary for their transmittal to the client or central storage location. Records will consist of the guidance and planning documents (sampling plan, quality assurance plan) that detail how samples and data are collected, processed, evaluated, and used by the project.

- **Define Data Management Activities and Responsibilities -** This step details the data flow process for the project. Within this process, responsibilities for data collection, data transfer, updates, and maintenance are defined. A clear understanding of these responsibilities is critical to ensure that the technical activities of the project are completed efficiently and effectively. Section 5.0 of this procedure provides generic activity descriptions and responsibilities common to many environmental projects.

  The data flow process must be reviewed by the project team to ensure completeness and project specificity. Small projects may allow one individual to complete several roles and responsibilities whereas large projects may require multiple personnel to complete one role. Project team understanding and comprehension of the activities and responsibilities are important to the efficient implementation of the overall data management program.

- **Determine Database Needs -** The project manager, data manager, and technical leader will determine the database needs and requirements. Project components to consider during this process are the complexity, types, and volume of data the project will generate; types, frequency, and detail of reports required; and required accessibility of the data. Based on these components and any other project requirements, a database need will be determined. Automation of the database shall also be considered during this step. Database automation consideration shall include factors such as:

  - Volume of data
  - Frequency that data will be received
  - Format of the received data (electronic or hardcopy)
  - Time constraints on data reports
  - Complexity of the data

  After database needs have been determined, the project manager and data manager will identify appropriate personnel to support the data management process. Personnel identification support can include geographical information system specialists, laboratory coordinators, and data support staff. Additionally, the project manager and data manager must identify any training requirement appropriate to the project data management process.

- **Prepare the Data Management Plan -** Based on the decisions made in the preceding steps and the customized outline, the data manager and technical leader will prepare the data management plan.

5.0 Project Data Management Activities

This section identifies typical environmental data management activities in the context of a generic project lifecycle. It is unlikely that all activities presented will be implemented on a single project. Only activities applicable to project-specific data management requirements need to be implemented. The activities presented below have been grouped into three sections. Section 5.1 presents planning activities that will identify the project data needs, identify existing information, plan for project data collection, and identify data management requirements. Section 5.2 presents data collection activities, which include data management support that will provide for efficient field data and field sample collection, data processing, and reporting. Section 5.3 provides review and data use activities that include the evaluation of data quality and project reporting.

5.1 Planning Activities

Environmental projects are most commonly conducted to determine contaminant characterization, remedial design parameters, remedial action requirements, or to complete environmental monitoring of some type. Data generated from these activities are used as the basis for decisionmaking.

5.1.1 Project Scoping

Before making decisions on data management requirements, a complete understanding of the project is required. Completing a scoping exercise based on client requirements and available information is the first step in planning for development of data management requirements. The following activities are included in the project scoping exercise:

- **Project Definition** - The effort to define projects is highly variable and completely dependent on the complexity of the project. For example, the project may be defined specifically in the client statement of work (e.g., sample wells 1, 2, and 3 and analyze water for volatile organics) or may be iterative where a specific condition may require investigation with further refinement of the project scope based on the results and findings (e.g., delineate nature and extent of contamination). Some projects may also be defined by first determining what questions need to be answered to meet the project objective. Therefore, project scoping can be conducted in multiple phases. First, the project scope is initially determined based on limited information and data (such as the information provided in the client statement of work). Next, after the review of more detailed and specific information, the project may be defined more accurately. Some projects may go through a systematic planning process such as implementing the data quality objective (DQO) steps where contractor, client, and regulators are involved. Project definition serves as the method of focusing and developing a conceptual model of the project so that appropriate management tools can be identified. For example, for a project where characterizing the nature and extent of contamination is the objective, the conceptual site model will include determining the environmental setting, the area of contamination, the contaminants of concern, fate and transport of contaminants of concern, and potential human health and ecological risks associated with contaminants of concern.

- **Identify Historical Information** - Information may exist from previous investigations and similar projects within the project boundaries. This information can prove to be valuable in providing insight into operational processes, contaminants of concern, and environmental compliance issues as well as geographical information.

- **Project Scoping Meeting** - A project scoping meeting must be held to finalize the project objectives, project decisions, and project tasks necessary to meet the project objectives. The scoping meeting may include the project team members only or may also include clients, regulators, and other technical team members such as project engineers/geologists and risk assessors.

- **Implement DQOs** - During the scoping meeting, DQOs shall be discussed and resolved. The following seven step DQO process shall be implemented:

  1. State the problem
  2. Identify the goal of the study
  3. Identify information inputs
  4. Define the boundaries of the study
  5. Develop the analytic approach
  6. Specify performance or acceptance criteria
  7. Develop the plan for obtaining data

- **Project Data Requirements** - During the scoping meeting, project data collection needs shall be clearly identified in terms of data use, quantity, and quality. Additionally, decision criteria, acceptable levels of uncertainty, and acceptable levels of false positive and false negative decisions need to be established in accordance with applicable data quality objective guidance.

5.1.2 Acquiring Existing Data

Environmental data collected during previous investigations and studies can prove to be valuable with respect to descriptive information and contaminants. Historical information may contain details in areas such as environmental compliance, geographical data, and characterization investigations. Existing data shall undergo the same review and evaluation as any recently collected information. This review assists in ensuring the quality of data collected during the initial stages of the project. While a quality review of this data is advisable, obtaining the necessary quality control data is not always possible. Included in the process of acquiring existing data are the following activities:

- **Locate the Existing Data** - The project manager will define the criteria by which existing data will be considered relevant (e.g., time period). Based on these criteria and additional information potentially provided by the client, a file search will be completed. These data can include physical, chemical, and geographic information.

- **Document Existing Data** - Once existing data have been located and acquired, documentation of these data must be completed. These data will be transferred into the project data management files.

- **Evaluate Existing Data -** Data users will evaluate the existing data for relevance to the current project objectives and data requirements. An essential part of this step is to determine the quality and suitability of the existing data to the current project objectives and requirements. Existing data may have been collected for very different intended uses. After evaluation, the project team will determine which existing data are useful and applicable to the current project. Documenting and inventorying the evaluation and data selected for inclusion to the project files must then be completed.

- **Process Existing Data -** The data manager will incorporate the appropriate existing data into the project database. Processing the data includes converting information into common systems to be used for the project (e.g., common coordinate systems). All data processing steps completed during conversion and incorporation must be documented.

5.1.3 Project Data Collection Planning

Before starting this step, the project goals and data requirements must be defined to allow for the development of more detailed project plans. Included in the process of planning project data collection are the following activities:

- **Data Requirements -** Project data requirements need to have been developed during the previous project scoping activities. Types of data that will be required include site operations with respect to:

  - Hazardous substances
  - Disposal practices
  - Quantities of hazardous substances
  - Potential migration of contaminants
  - Site conditions
  - Historical and aerial photographs and base map data
  - GIS coverage of soils, geology, hydrogeology, and delineated contaminated plumes

- **Develop Project Work Plans -** All projects require that guidance documents be developed to describe in detail how the project objectives will be met. These guidance documents will range in complexity dependent on the project type, project complexity, and the project regulatory requirements. The guidance document must be developed using the level of detail required to enable any entity to implement it. Examples of projects requiring guidance documents include:

  - Remedial investigation/feasibility studies
  - Remedial design/remedial action
  - Engineering evaluation/cost analysis

  Additionally, supporting plans and procedures may need to be developed to supplement the work plan. Examples of supplemental plans are:

  - Sampling and analysis plans
  - Quality assurance plans
  - Health and safety plans
  - Waste management plans

- **Develop the Laboratory Statement of Work -** The laboratory coordinator will prepare the laboratory statement of work specific to the project requirements determined in the project work plans. The laboratory statement of work must detail:

  - The number of samples to be sent for analysis
  - The analytical methods
  - Reporting limits
  - Laboratory quality assurance/quality control requirements
  - Data deliverable requirements

  The statement of work must define the electronic data deliverable format and requirements and request an example from the laboratory to confirm requirements will be met. Additionally, the laboratory statement of work must define the data deliverable requirements necessary to ensure that validation and evaluation may be completed.

- **Develop Data Validation and Evaluation Criteria -** The data validation coordinator is responsible for developing the data validation and evaluation process. The data validation and evaluation process will document the approach to verify that project DQOs are achieved. The range of effort required to meet the project validation and evaluation needs may range from none to very exhaustive, dependent on the client and project objectives. Validation and evaluation criteria may be modeled after national guidelines (e.g., National Functional Guidelines), client requirements (e.g., specific client work instructions or procedures), or a combination of both. Variables that are usually considered include:

- Sample preservation and holding times
- Calibration of instruments
- Blanks
- Laboratory quality control samples
- Field quality control analysis

The data validation and evaluation process will be included as a section in the project work plan or equivalent. If data validation and evaluation are completed by a subcontractor, the statement of work (detailing the project required process) will be developed.

5.2 Data Collection

The following data collection activities identify the data management team support and project team interactions that will ensure efficient field data and field sample collection, event documentation, data processing, and reporting.

5.2.1 Field Activity Preparation

After completing the work plan and detailed project plans, preparing for field activities is the next step. Preparing for field activities ensures that data and sampling processes for the project are complete and appropriate. Field preparation activities may include obtaining permits, surveying and marking sample locations, installing wells, and testing any required equipment. Data management team preparation activities include ensuring all data users have been trained and have access to the data management system, laboratory data deliverables can be transferred into the project database (laboratory test electronic data deliverables have been received and checked), project field forms have been created, and the records management requirements identified in the data management plan are established. Additional field preparation activities are detailed below.

- **Data Management Plan and Data File Management -** The data manager will ensure that the data management plan is implemented. Implementation of the plan must begin before collecting field data to ensure that the system developed is appropriate and functional. The data manager will also ensure that the data file management system is established before collecting field samples or measurements.

- **Site Survey -** The field team leader inspects the project site area for placement of sampling locations and equipment. These locations shall be documented on site maps and stored in the project files (hardcopy, GIS etc.). These identified locations shall be physically marked at the site with flagging, paints, stakes, etc.

- **Identification of Sampling Locations -** The sampling stations identified are differentiated by assigning a unique identifier to each location. Historical location identifiers must be confirmed and consistently used throughout the project. Geographic coordinates must then be obtained for each sampling location. The method of determining the geographic location shall be selected based on project accuracy requirements. Information used to select and document accuracy must be maintained. Examples of this information include the type of equipment, processing software, and accuracy reports.

- **Installation of Sampling Locations -** Sampling location installation will include the placement of:
  - Monitoring wells
  - Boreholes
  - Direct push locations
  - Cone penetrometer locations

  Record and maintain the following information:
  - Drilling and monitoring well construction information (e.g., borelogs, construction logs)
  - Development logs
  - Purging logs
  - Associated measurements (e.g., air monitoring, water quality monitoring)

- **Instrumentation and Equipment** - After placement of the sampling locations, any required instrumentation and equipment must be installed. An inventory of the instrumentation and equipment must be maintained. Included in the inventory will be:

  - The type and manufacturer of the instrument and equipment
  - Calibration requirements
  - Identification numbers
  - Type of data the instrument will collect

- **Project Database Update** - All information and data collected during the preparation activities shall be captured in the project database. After these preparatory steps have been completed, the collection of environmental data will begin. The project data manager shall be kept current on sampling and data collection schedules and activities.

5.2.2 Field Data Collection

Depending on the type of project, field data may consist of several different types. Field data may consist of observations, checklists, photographs, or preliminary field screening analytical data. Any time field data collection activities are conducted, they must be planned and scheduled. Data entry items such as checklists, field logbooks, and field data forms must be generated during the planning stage to ensure that the required data are captured. Information and data collected during the field data collection activities must enable the project team members to recreate or reconstruct the events that occurred during the activity. Due to project data needs ranging from simple to complex, not all steps provided below will apply to all projects.

- **Schedule -** The project manager is responsible for scheduling the field activity. Each field activity event will be defined by the site requirements and the data requiring collection. The appropriate work plans will be referenced to specify the data that will be collected. After completing the schedule, the field team and data manager are informed of the requirements by holding a field planning meeting.

- **Mobilization -** Mobilizing for a field activity includes generating any specific field forms or checklists, ordering, receiving and inspecting required field equipment, and conducting required project-specific training.

- **Field Data Forms -** Field data forms that will contain predefined information about the field event (e.g., location identifiers, site name, and quality control samples) shall be preprinted to ensure consistency and increase efficiency in the field. Some projects may have automated field data collection systems that would replace the need for field forms (e.g., data loggers). These data loggers will be prepared and tested at this time.

- **Field Instruments -** Many instruments used for collecting field measurements require calibration. Calibration of these instruments provides for accurate field measurements. Information that must be collected during the calibration of field equipment includes the type of instrument, instrument serial number or property number, time and date of calibration, instrument reading before and after calibration, and the calibration medium used. Calibrations of field equipment shall always be completed in accordance with the manufacturer’s recommendations. For field equipment that only requires a calibration check, the vendor’s date of calibration shall be recorded.

- **Field Data -** Field data are always collected at the same time as analytical samples. Examples of field data are:
  - Photographs
  - Water quality parameters
  - Checklists
  - Surveys
  - Time and date of sample collection
  - Weather conditions

- **Quality Assurance Review -** The project manager is responsible for ensuring that quality assurance reviews are completed. A quality assurance review of the field data collected will be completed. The field data (e.g., logbooks, field forms) review ensures that the data are recorded correctly and the activities are completed in compliance with the planning documents. The quality assurance review will determine if discrepancies between the planned events and actual events occurred.

- **Compilation of Field Data** - The field team leader is responsible for ensuring that the field data are compiled and submitted to the data manager. Compiling the field data will include copying the field forms, downloading data loggers, and verifying that the field data were recorded as required.

5.2.3 Field Data Processing

Processing field data provides the mechanism for making the data available to the data users. The project manager is responsible for completing this process. Field data will include logbook copies, field forms, checklists, and data logger data. Since project data collection will vary significantly from one project to the next, not every project will require the completion of the following steps. An important part of preparing the data management plan is defining this process specific to the project requirements.

- **Project Files -** The field data collected during the field activity and any changes or deviations implemented must be documented and placed into the project files.

- **Field Data -** The following steps only apply to a project where an electronic database is required. Hardcopy field data will be entered into the electronic database. The data entry will be reviewed for accuracy by an independent person to verify correctness. Electronic field data (e.g., from data loggers) will be processed by programs that are designed for use with the specific piece of equipment that logged the data.

- **Error Resolution -** Any errors identified during field data processing or on review of field documentation must be resolved. Resolution is accomplished through discussions with project personnel.

- **Updates -** Upon completion of field data processing, the project database and project files must be updated. The data manager then makes the data available to project personnel for use.

5.2.4 Field Sample Collection

Field sample collection includes all activities implemented to gather samples from a particular site. Field sampling activities are planned and scheduled. Before implementation, the required field data forms, field logbooks, etc. are prepared. Recorded information is intended to provide data and observations to enable the reconstruction of the field sampling activities. The following process steps can be implemented as required:

- **Schedule -** The project manager will prepare a schedule of sampling events. The schedule shall include the types and number of samples to be collected at each location.

- **Generation of Sampling Labels and Forms -** Each sample collected during the scheduled sampling event will receive a sample label and sample collection form. Information to be captured on the sample container labels includes the sample location, container type, preservative, and analysis. Field forms for each can also be generated. Field forms may be preprinted and include lines for documenting conditions under which the sample was collected (e.g., moisture content, depth, water quality parameters).

- **Notification of Analytical Laboratories -** The analytical laboratories need to be notified of the sampling activity schedule. The laboratory needs to be informed of the anticipated arrival of sample shipments including the numbers of samples and the types of analyses that will be requested.

- **Acquisition of Equipment and Supplies -** All equipment required to complete the field sampling activity must be ordered, received, and documented. Notation of all equipment identification numbers and serial numbers must be made. An equipment checklist may be used to document this step. All supplies needed to accomplish the scheduled sampling activities, including sample containers and shipping materials need to be assembled.

- **Sample Collection -** Samples will be collected in accordance with required sampling procedures. Information regarding sampling activities, site conditions, and deviations from the planning documents will be recorded in the field logbook or field data forms.

- **Sample Processing -** Samples collected in the field may need additional preparation before shipping to the laboratory. Two examples of additional processing that may be required are compositing of samples and filtering of an aliquot of the sample.

- **Updates -** The project database and project files need to be updated with the information collected during the field activities. A part of this process includes the verification that field data entered into the database are correct. Verification consists of comparing field forms and field logbooks to the information entered.

5.2.5 Submitting Samples for Analysis

Submitting samples to a laboratory for analysis includes preparation, packing, documenting, shipping, and verification of sample receipt. The process for submitting samples to a laboratory for analysis is detailed below.

- **Preparation for Shipment -** Preparing to ship samples includes the final sample processing such as splitting, compositing, or filtering. All sample containers shipped to a laboratory must have labels identifying, at a minimum, the sample number or identifier, analyses to be completed, and sample collection date and time. Sampling shipments shall be completed in accordance with SOP 2-1, *Packaging and Shipping of Environmental Samples*.

- **Chain-of-Custody Documentation -** All samples collected need to be documented and accompanied by a chain-of-custody form. The chain-of-custody must identify, at a minimum, the following:

  - Sample identification number
  - Matrix
  - Collection date and time
  - Sample type
  - Preservative
  - Analyses
  - Signature blocks for documenting sample transfers

  Sample chain-of-custody must be completed in accordance with SOP 1-2, *Sample Custody*.

- **Shipping Samples -** Samples will be shipped in accordance with SOP 2-1, *Packaging and Shipping of Environmental Samples*. Each sample shipped shall be checked against the chain-of-custody as it is packed for shipment.

- **Laboratory Receipt of Samples -** The laboratory will confirm that custody seals are still intact, the number of samples received matches the chain-of-custody, and the analyses match the sample labels and chain-of-custody. Additionally, the laboratory will note the condition of the samples when they are received against any noted requirements (e.g., 4° Celsius) on the chain-of-custody. The chain-of-custody will be signed and dated as received by the laboratory. A copy of the chain-of-custody shall be faxed back to the shipper for confirmation of sample receipt.

- **Confirmation of Sample Receipt -** The laboratory coordinator is responsible for confirming that the information provided by the laboratory is accurate. Confirmation is required for the following items:

  - What samples were received
  - Condition of samples upon receipt
  - Presence of signature on laboratory chain-of-custody form
  - Sample identification numbers
  - Types of analyses performed

  The laboratory coordinator is responsible for resolution and reconciliation of any conflicting information.

- **Sample Shipping Documentation -** Sample shipment files will include information with respect to the completion of the shipping process. This documentation will include:

  - Signed copy of the chain-of-custody
  - Shipping company airbill if applicable
  - Laboratory sample receipt or login form
  - Field forms associated with samples included in the shipment

- **Laboratory Analysis -** The laboratory will analyze samples according to the laboratory statement of work and the requested analyses identified on the chain-of-custody.

5.2.6 Sample Data Processing

Sample data processing includes receiving and processing the laboratory data package and making the data available for review. Activities associated with this process are data package receipt, evaluation of the data package, and updating the project database with the data package information. The process for these activities is detailed below.

- **Receiving the Data Package -** The laboratory shall send the data package to the project laboratory coordinator. At a minimum, the data package will consist of a hardcopy of the analytical results. The laboratory coordinator will note which samples the data package represents and review the data package for completeness and legibility. Any problems identified during this review must be communicated to the laboratory and corrected. If an electronic data deliverable is a part of the data package, it may be either sent directly to the data management team or retained by the laboratory coordinator and distributed after review. If an electronic data deliverable is not provided as a component of the data package and the data needs to be entered into the database, the laboratory coordinator will provide a copy of the data package to the data management team as required for data entry.

- **Evaluation of the Data Package -** Upon receipt of electronic data deliverables, the CD-ROM or other media will be scanned for possible viruses before loading the information onto a computer. If a virus is detected, the laboratory will be notified immediately and another electronic deliverable requested. Electronic data deliverables shall be compared to the hardcopy version of the data package to ensure consistency and accuracy. In cases where no electronic copy exists, and the entry of the hardcopy data package into an electronic database is a project requirement, verification of the accuracy of the entered data is required subsequent to completion of data entry. All errors and problems identified during the evaluation must be documented and resolved during the evaluation. Any changes made to the hardcopy data package and the electronic data package must be documented.

- **Update the Project Database -** The project database will be updated with the sample results and associated laboratory data qualifiers. Some projects may also require additional quality control information in the database. Examples of the type of information that may be required include:

  - Results from the matrix spike/matrix spike duplicates
  - Percent recoveries
  - Laboratory control samples
  - Blanks

  Documentation of problem resolution and changes made to the data package must be maintained.

5.3 Review and Data Use

The data review process determines whether a set of environmental data meets the requirements established during the project scoping. The process involves the data management team, the laboratory coordinator, and the data users. Before completing the data review, the data validation and evaluation process must be completed to ensure data meet analytical guidelines since qualifiers affect the usability of the data..

5.3.1 Data Validation and Evaluation

Validation and evaluation of environmental data is performed to evaluate the usability of the data for the intended application. The process is equally applicable to field data as well as analytical laboratory data. Data of questionable quality or representativeness are qualified to inform the data user of the limitations associated with the data use. The process to complete a data validation and evaluation is presented below.

- **Data Deliverables** - Data are received in either hardcopy or electronic format by the data validation coordinator. These data deliverables are evaluated against the requirements specified in the analytical laboratory statement of work or the client requirements. Upon completion of the evaluation of the data deliverables with respect to the contract requirements (laboratory subcontract or client contract), the data deliverables are forwarded to the validation and evaluation personnel. If the data validation and evaluation is not required for the data deliverable, it is forwarded to the data manager for uploading into the project database.

- **Validation and Evaluation of Data** - Data deliverables are validated and evaluated according to the procedures and requirements established during the project planning and data management plan development. Following validation and evaluation, the data are forwarded to the data management team for subsequent update of the project database.

- **Data Validation and Evaluation Report** - The data validator and evaluator will prepare a report documenting the process used to validate and evaluate the data, the usability of the data, and the qualification of the data, if applicable.

5.3.2 Data Review

Review of the data encompasses all data and supporting documentation, historical and recent, collected by the project activities as defined during the project scoping. Evaluation of the data will include the following process.

- **Evaluate Data for Outliers** - The data evaluation will first review the data to detect possible outliers. If extreme values are observed, a review of the potential for sampling and analysis problems must be completed to determine the accuracy of the data point. This review may include the evaluation of historical data ranges for the particular analyte at a particular location, or comparing similar analytical method results for samples processed differently (e.g., filtered vs. unfiltered). Based on the results of this evaluation, a determination about the use of the outlier result can be made.

- **Evaluate Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC)** - Precision, accuracy, representativeness, completeness, and comparability make up the PARCC parameters.

  Precision is the degree of agreement between independent measurements and is determined by the evaluation of laboratory control sample and laboratory control sample duplicate pairs, the matrix spike/matrix spike duplicate pair or an environmental sample and environmental duplicate pair analyses.

  Accuracy is the closeness of agreement between an observed value and an accepted value. Accuracy is determined by comparing percent recovery of spiked samples such as laboratory control samples and matrix spike samples.

  Representativeness expresses the degree to which the data accurately reflect the analyte or parameter for the environmental media examined at the site. Representativeness is a qualitative term and is evaluated based on use of proper sample design, sample collection methods, use of standard analysis methods, etc.

  Completeness is the measure of the amount of valid data received from the laboratory or field measurements. Completeness is determined by dividing the number of valid results by the number of possible results.

  Comparability is the confidence with which one data set may be compared to another data set produced by different laboratories or field instruments. Comparability is a qualitative term and can be evaluated by reviewing sampling methods, sampling devices, and standard control limits. Understanding the PARCC parameters provides a level of confidence in the data reported for decisionmaking purposes.

- **Evaluate Data Quality** - An integral component of the data review process is the comparison of results against the project-specific data quality requirements established during project planning. Results of the data quality evaluation will determine if the data meet or exceed the data quality requirements necessary for decisionmaking. A final usability determination is made by the data reviewers. If required, data qualifiers are placed on the data to indicate usability.

- **Update Database** - After the data review is complete, the project database must be updated with the qualifiers assigned. Updating of the database also includes noting the qualifiers on the hardcopy of the data package.

5.3.3 Data Analysis and Use

Data analysis and use consists of the activities necessary to process the data and transform the entire data set into customized data sets for the generation of deliverables for decisionmaking and reporting. Data users may use only portions of data (e.g., geological or chemical) or summarize the data to generate tables, graphs, text, maps, or other deliverables necessary to describe the results obtained and the conclusions drawn. The analysis process is very often iterative. Results and conclusions from one analysis will often lead to other analyses. The process for data analysis and use is presented below.

- **Data Selection** - Data analysis will usually focus on a particular subset of the data collected. Data selection involves defining these subsets, querying the data, consolidating these data from the project database, and transferring the data to the appropriate tool for analysis (drafting, GIS, statistical program, etc.). Standardization may also need to occur at this point in the process (e.g., units, analytes, spatial).

- **Report and Analyze Data** - Data analysis involves summarizing the data to ensure that the technical requirements of the project are met. Examples of data analysis include statistical, risk assessment, and modeling. Results of the analysis are then used to report information in the form of tables, graphs, maps, text, and three-dimensional visualizations.

- **Documentation** - The information necessary to recreate a data analysis must be documented and kept. This includes the query criteria used to acquire the data subset, the database that provided the data for analysis, the procedure completed to perform the analysis, and the date the analysis is performed.

6.0 Software and Computer System

This section defines the documentation, quality assurance, and configuration control requirements for software and databases used on environmental projects. Section 6.1 applies to all projects using an electronic database and provides requirements for project-specific databases and software. Section 6.2 applies to all projects using an electronic database and defines requirements for the day-to-day operation of the data management system. The project data manager is responsible for implementation and providing guidance to meet the project objectives.

6.1 Project-Specific Database and Software Requirements

The need for a project-specific database and software will vary depending on the requirements of the project. A project may use an existing data management system and therefore not have project-specific software or databases, while other projects may develop project-specific databases and spreadsheets or software programs to analyze the project data. This section presents the minimum documentation, quality assurance, and configuration control requirements for project-specific databases and software developed during the course of a project.

- **Database Documentation** - Project databases will include spreadsheets and databases defined by the project data management team. The database documentation will identify the commercial database product, the database name, structure, and location using an entity relationship diagram (ERD) and data dictionary. The backup and recovery plans and processes for the database will also be documented. The minimum database documentation will consist of the name of the software used, names of the project databases created, database structure definitions (including names and field descriptions), any table relationships, and the storage location.

- **Software Documentation** - Software documentation will include the software program name, description, special requirements, revision, completion date, and evidence of technical and quality review. Documentation of deliverables created must also include the necessary information required to describe exactly how the data deliverable was produced. Software documentation may be maintained in hardcopy or included as a comment block embedded within the project software program. The minimum software documentation will consist of the name of the commercial software, name and version of any software written by the project personnel, author, date, revision, system requirements, and storage location.

- **Software Quality Assurance -** The project will define the quality assurance requirements for project-specific software. At a minimum, the functionality and analytical results of software programs will be reviewed to ensure that they meet requirements and objectives. The reviewer of the software will be someone other than the person who wrote the program. The project-specific software quality assurance requirements will be defined in the project data management plan.

- **Software Configuration Control** - Project-specific software will be protected from unauthorized modification or deletion. This can be accomplished by administrative controls or file security options. Changes to project software will be documented and maintained in the project files. The minimum project software configuration control documentation will include the commercial software used, the program names, revisions including the date, and the storage location.

6.2 System Administration

This section addresses the day-to-day operations of the data management system, including backups, access, security, data entry, and database control. All projects using an electronic database will adhere to the requirements in this section. The data manager is responsible for implementation of system security.

- **System Backup** - Project data will be protected from loss through a preventive backup and recovery process. Database backups will be performed on a periodic basis at a frequency to be defined for each project in the data management plan. The frequency will be selected to minimize the extent of consequences of data loss and time required to recover the data. Recovery procedures will be developed and documented. The detailed description of the backup and recovery procedures will be presented in the data management plan.

- **System Access -** Access to the computer system will be made available only to authorized personnel with an assigned role that specifies their access rights. Before gaining access, personnel may login by providing a login name and password.

- **Database Access** - Projects will protect data from unauthorized access by implementing administrative controls. Access will be managed based on the specific data user role. The mechanism for implementing control will be documented in the project data management plan.

- **Data Security** - Security considerations must establish a balance between making the data inaccessible to unauthorized individuals while still making it accessible to those who have access and maintaining the integrity of the data. Security processes apply to field data, electronic data, the database, and distribution of data outside of CDM Smith. Original copies of all field records (e.g., chain-of-custody forms, sample collection sheets, and shipping airbills) will be placed in the permanent project file. All electronic files will be maintained in an electronic file management system and administered accordingly. Security of data distributed outside of CDM Smith will be maintained by providing read only access to the data and/or including time, date, and version on the data files within the file naming convention.

- **Data Entry -** Data entry and transcription activities will be reviewed and checked to ensure that data integrity is maintained. Review and checking must occur for all data when moving or copying data from one media to another. For example, if a field technician collects data from a water quality instrument and records it in a logbook, enters the data from the logbook into an electronic format, and then transfers the data into a deliverable, verification of accuracy would be completed during or immediately after the transcription. The mechanism for data entry and transcription must be documented in the project data management plan.

- **Database Control -** Each project must establish database control requirements for the contents of the project database. The requirements must ensure traceability of field and laboratory data from its original reported values through changes to current values stored in the database. The control requirements will define the approval process required for making changes to the database and the documentation required for each database change. The minimum information maintained for each database change will include:

  - Description of the change
  - Reason the change was made
  - Name of the individual making the change
  - Date the change was made

7.0 References

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Section 5.0

Field Equipment Operating Procedures

Control of Measurement and Test Equipment	SOP 5-1 Revision: 9 Date: January 2012

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1.0 Objective
The objective of this technical standard operating procedure (SOP) is to establish the baseline requirements, procedures, and responsibilities inherent to the control and use of all measurement and test equipment (M&TE). Contractual obligations may require more specific or stringent requirements that must also be implemented.

2.0 Background
2.1 Definitions
Traceability - The ability to trace the history, application, or location of an item and like items or activities by means of recorded identification.

2.2 Associated Procedures
- SOP 4-1, *Field Logbook Content and Control*
- CDM Smith Quality Procedures (QPs) 2.1 and 2.3
- Manufacturer's operating and maintenance and calibration procedures

2.3 Discussion
M&TE may be government furnished (GF), rented or leased from an outside vendor, or purchased. It is essential that measurements and tests resulting from the use of this equipment be of the highest accountability and integrity. To facilitate that, the equipment shall be used in full understanding and compliance with the instructions and specifications included in the manufacturer's operations and maintenance and calibration procedures and in accordance with any other related project-specific requirements.

3.0 Responsibilities
All staff with responsibility for the direct control and/or use of M&TE are responsible for being knowledgeable of and understanding and implementing the requirements contained herein as well as any other related project-specific requirements.

The project manager (PM) or designee (equipment coordinator, quality assurance coordinator, field team leader, etc.) is responsible for initiating and tracking the requirements contained herein.

***Note*:** Responsibilities may vary from site to site. Therefore, all field team member responsibilities shall be defined in the field plan or site-/project-specific quality assurance plan.

4.0 Requirements for M&TE
- Determine and implement M&TE related project-specific requirements
- The maintenance and calibration procedures must be followed when using M&TE
- Obtain the maintenance and calibration procedures if they are missing or incomplete
- Attach or include the maintenance and calibration procedures with the M&TE
- Prepare and record maintenance and calibration in an equipment log or a field log as appropriate (Figure 1)
- Maintain M&TE records
- Label M&TE requiring routine or scheduled calibration (when required)
- Perform maintenance and calibration using the appropriate procedure and calibration standards
- Identify and take action on nonconforming M&TE

5.0 Procedures

5.1 Determine if Other Related Project-Specific Requirements Apply

For all M&TE:

The PM or designee shall determine if M&TE related project-specific requirements apply. If M&TE related project-specific requirements apply, obtain a copy of them and review and implement as appropriate.

5.2 Obtain the Operating and Maintenance and Calibration Documents

For GF M&TE that is to be procured:

Requisitioner - Specify that the maintenance and calibration procedures be included.

For GF M&TE that is acquired as a result of a property transfer:

Receiver - Inspect the M&TE to determine whether maintenance and calibration procedures are included with the item. If missing or incomplete, order the appropriate documentation from the manufacturer.

For M&TE that is to be rented or leased from an outside vendor:

Requisitioner - Specify that the maintenance and calibration procedures, the latest calibration record, and the calibration standards certification be included. If this information is not delivered with the M&TE, ask the procurement division to request it from the vendor.

5.3 Prepare and Record Maintenance and Calibration Records

For all M&TE:

PM or Designee - Record all maintenance and calibration events in a field log unless other project-specific requirements apply.

For GF M&TE only (does not apply to rented or leased M&TE):

If an equipment log is a project specific requirement, perform the following:

Receiver - Notify the PM or designee for the overall property control of the equipment upon receipt of an item of M&TE.

PM or Designee and User:

- Prepare a sequentially page numbered equipment log for the item using the maintenance and calibration form (or equivalent) (Figure 1).
- Record all maintenance and calibration events in an equipment log.

5.4 Label M&TE Requiring Calibration

For GF M&TE only (does not apply to rented or leased M&TE):

If calibration labeling is a project specific requirement, perform the following:

PM or Designee:

- Read the maintenance and calibration procedures to determine the frequency of calibration required.
- If an M&TE item requires calibration before use, affix a label to the item stating “Calibrate Before Use.”
- If an M&TE item requires calibration at other scheduled intervals, e.g., monthly, annually, etc., affix a label listing the date of the last calibration, the date the item is next due for a calibration, the initials of the person who performed the calibration, and a space for the initials of the person who shall perform the next calibration.

5.5 Operating, Maintaining or Calibrating an M&TE Item

For all M&TE:

PM or Designee and User - Operate, maintain, and calibrate M&TE in accordance with the maintenance and calibration procedures. Record maintenance and calibration actions in the equipment log or field log.

5.6 Shipment

<u>For GF M&TE</u>:

Shipper - Inspect the item to ensure that the maintenance and calibration procedures are attached to the shipping case, or included, and that a copy of the most recent equipment log entry page (if required) is included with the shipment. If the maintenance and calibration procedures and/or the current equipment log page (if required) is missing or incomplete, do not ship the item. Immediately contact the PM or designee and request a replacement.

<u>For M&TE that is rented or leased from an outside vendor</u>:

Shipper - Inspect the item to ensure that the maintenance and calibration procedures and latest calibration and standards certification records are included prior to shipment. If any documentation is missing or incomplete, do not ship the item. Immediately contact the procurement division and request that they obtain the documentation from the vendor.

5.7 Records Maintenance

<u>For GF M&TE</u>:

PM or Designee - Create a file upon the initial receipt of an item of M&TE or calibration standard. Organize the files by contract origin and by M&TE item and calibration standard. Store all files in a cabinet, file drawer, or other appropriate storage media at the pertinent warehouse or office location.

Receiver - Forward the original packing slip to the procurement division and a photocopy to the PM or designee.

PM or Designee and User:

- Maintain all original documents in the equipment file except for the packing slip and field log.
- File the photocopy of the packing slip in the M&TE file.
- Record all maintenance and calibration in an equipment log or field log (as appropriate). File the completed equipment logs in the M&TE records. Forward completed field logs to the PM for inclusion in the project files.

<u>For M&TE rented or leased from an outside vendor</u>:

Receiver - Forward the packing slip to the procurement division.

User:

- Forward the completed field log to the PM for inclusion in the project files.
- Retain the most current maintenance and calibration record and calibration standards certifications with the M&TE item and forward previous versions to the PM for inclusion in the project files.

5.8 Traceability of Calibration Standards

<u>For all items of M&TE</u>:

PM or Designee and User:

- When ordering calibration standards, request nationally recognized standards as specified or required. Request commercially available standards when not otherwise specified or required. Or, request standards in accordance with other related project-specific requirements.
- Require certifications for standards that clearly state the traceability.
- Require Material Safety Data Sheets to be provided with standards.
- Note standards that are perishable and consume or dispose of them on or before the expiration date.

5.9 M&TE That Fails Calibration

<u>For any M&TE item that cannot be calibrated or adjusted to perform accurately</u>:

PM or Designee

- Immediately discontinue use and segregate the item from other equipment. Notify the appropriate PM and take appropriate action in accordance with the CDM Smith QP 2.3 for nonconforming items.
- Review the current and previous maintenance and calibration records to determine if the validity of current or previous measurement and test results could have been affected and notify the appropriate PM(s) of the results of the review.

6.0 Restrictions/Limitations

On an item-by-item basis, exemptions from the requirements of this SOP may be granted by the Headquarters health and safety manager and/or Headquarters quality assurance director. All exemptions shall be documented by the grantor and included in the equipment records as appropriate.

7.0 References

CDM Federal Programs Corporation. 2007. *Quality Assurance Manual.* Rev. 11.

CDM Federal Programs Corporation. 2005. *Government Property Manual*. Rev. 3.

Figure 1

CDM Smith A subsidiary of Camp Dresser & McKee Inc.

Maintenance and Calibration

Date: Time: (a.m./p.m.)

Employee Name: ______ Equipment Description: ______

Contract/Project: ______ Equipment ID No.: ______

Activity: ______ Equipment Serial No.: ______

Maintenance

Maintenance Performed: ______

______

______

Comments: ______

______

______

Signature: ______ Date: ______

Calibration/Field Check

Calibration Standard: ______ Concentration of Standard: ______

Lot No. of Calibration Standard: ______ Expiration Date of Calibration Standard: ______

Pre-Calibration Reading: ______ Post-Calibration Reading: ______

Additional Readings: ______ Additional Readings: ______

Additional Readings: ______ Additional Readings: ______

Pre-Field Check Reading: ______ Post-Field Check Reading: ______

Adjustment(s): ______

______

______

Calibration: ☐ Passed ☐ Failed

Comments: ______

______

______

Signature: ______ Date: ______

Appendix C – Field Forms

DAILY STATUS REPORT

PROJECT NAME: National Park Service, Yosemite National Park, Vogelsang Former Waste Disposal Area

DATE:	**WEATHER:**
Personnel and Visitors Onsite:	
Planned Activity:	
Activity Completed:	
Status of Schedule & Priority Work:	
Issues/Concerns/Resolutions (include work performed that was not planned or anticipated):	
Samples Collected, Measurements Made: (List Locations, Matrix & Sample type):	
Miscellaneous (Equipment needs, health and safety issues, Staffing):	
SIGNATURE: ______________________________	**DATE:** ____________________

EQUIPMENT CALIBRATION LOG

SITE NAME: ____

Instrument (Name/Model No./Serial No.): ____

Manufacturer: ____

Calibration Date	**Initial Setting**	**Standard/ Gas Used (Concentration)**	**Lot Control No. Expiration Date**	**Adjustments Made**	**Final Reading**	**Comments Pass/Fail**	**Signature**

PHOTOLOG

SITE NAME: ________________________________

CAMERA # ____

Photograph #	Description	Date/Time	Photographer

SAMPLE TRACKING LOG

CLP CASE NO: ____________________________ INORGANIC CLP LAB: _________________________ SUBCONTRACT LAB: _________________________

SAMPLE ID	SAMPLE DATE	SAMPLE TIME	MATRIX	DEPTH (feet)	LDL VOC CLP NO.	ORGANIC CLP NO.	INORGANIC CLP NO.	SUBCONTRACT ANALYSIS	QA/QC

ANALYSIS SUMMARY: ____

____

REV 5/01

Incremental Sampling Methodology - Soil Sampling Log
Vogelsang Former Waste Disposal Area

Date:	Start Time:	End Time:	Weather:

Sampler(s):

Decision Unit:	Replicate #:
Description of Decision Unit:	Size of Decision Unit:
Approximate Spacing between Incremental borings:	Sampling Method:

Sample ID/ Chain of Custody Number:

Incremental Sample #	Time	Sample Start Depth (feet bgs)	Sample End Depth (feet bgs)	Comments
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Type of Container: ______________________________

Analysis: ______________________________

General Comments: ______________________________

FIELD WORK TASK/EQUIPMENT LIST

Paperwork	
Contract	
Sampling and Analysis Plan(s)	
Health and Safety Plan(s)	
Chain-of-Custody Records	
Site Maps	
Log Book	
Calibration Log Forms	
Photo Logs	
Sample Track & ISM Forms	
Trench Log Forms	
Boring Log Forms	
Site Contact Name & Phone #	
Contact Lead Agency	
Directions to Site, FedEx, Lab	

Safety Equipment	
Hard Hat	
Nitrile Gloves	
Work Gloves	
Safety Glasses	
Safety Vest	
Steel-toed Boots	
Sun Block	
Drinking Water	
First Aid Kit	
Portable Eye Wash	
Hearing Protection	
Work Gloves	
Disposable dust Mask	
PID & 4-Gas Meter	

General Supplies	
Stakes	
Flags	
Survey Tape	
Spray Paint	
Pocket Tape Measure	
50'-100' Measure Tape/Wheel	
Deliniation Rope (1500'/DU)	
Tape Gun & Tape	
Hand Lens	
Five Gallon Buckets	
Calibrated Buckets for % est.	
Clip Boards	
Folding Chair/Tables	
Duct Tape	
Coolers	
Ice	
Trash Bags (kitchen and large)	
Paper Towels	
Ziplock bags	
Zip Ties	
Scissors	
Calculator	
Small White Board for photos	
Permanent Markers (Sharpie)	

Soil Sample Custody	
ASTM II Water	
Distilled/Deionized Water	
Sample Labels	
5 gallon Buckets	
Non-hazardous Waste Labels	
Alconox	
Sprayers	
Plastic Bags & Zip ties	
Brushes	
Coolers & Ice	
Custody Tape	
Sample Containers	

Tools	
Trowels	
Multitool with Knife	
Screwdriver	
Shovel	
Mallet	
Ulitilty Cart(s)	
Hand Auger	
Slide Hammer	
Gator Probe (s) for ISM	
Munsell	
Satellite Field Phone	
Camera	
Compass	
Differential GPS	

BORING ID:

CDM Smith

CLIENT:
GEOLOGIST:
JOB NUMBER:
DATE DRILLED:
TOTAL DEPTH:
LOCATION:
DRILLING COMPANY:
DRILLING METHOD/RIG:
SURFACE ELEVATION:
NORTHING/EASTING:
SAMPLE METHOD:

Depth (ft bgs)	Samples	Sample ID	Sample Time	PID Headspace (ppm)	Recovery (feet)	GEOLOGIC DESCRIPTION																		
						% gravel	% sand	% silt	% clay	NAME	Soil Classification	COLOR	moisture	Density	plasticity	gravel grading	grain size range/gravel	gravel angularity	sand grading	grain size range/sand	sand angularity	modifiers	litho. contact (ft bgs)
Notes:						>1/4 inch	visible - 1/4 in	visible with hand lens	not visible	[See USCS flow charts] <5-5%=trace, 10%=few,15-25%=little, 30-45%=some, 50%+=mostly (cobbles only)		Use Munsell color chart	Dry Moist Wet		High Med Low Non	Well Gap Poorly	Fine Medium Coarse	Angular SA,SR Rounded	Well Gap Poorly	Very Fine Fine Medium Coarse	Angular SA,SR Rounded	odor, staining, mineralogy, etc. Well graded - typically 5 consecutive sieve sizes Gap graded - one or more particle sizes missing Poorly graded - most particles basically one size	

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Fax: (559) 275-4422
coc@applinc.com

CHAIN OF CUSTODY RECORD

C.O.C. ____________________

Report to: PLEASE PRINT	Invoice to: PLEASE PRINT
Company Name: ______________ Phone: __________	Company Name: ______________ Phone: __________
Address: ______________ Fax: __________	Address: ______________ Fax: __________
Attn: ______________	Attn: ______________
Email: ______________	Email: ______________

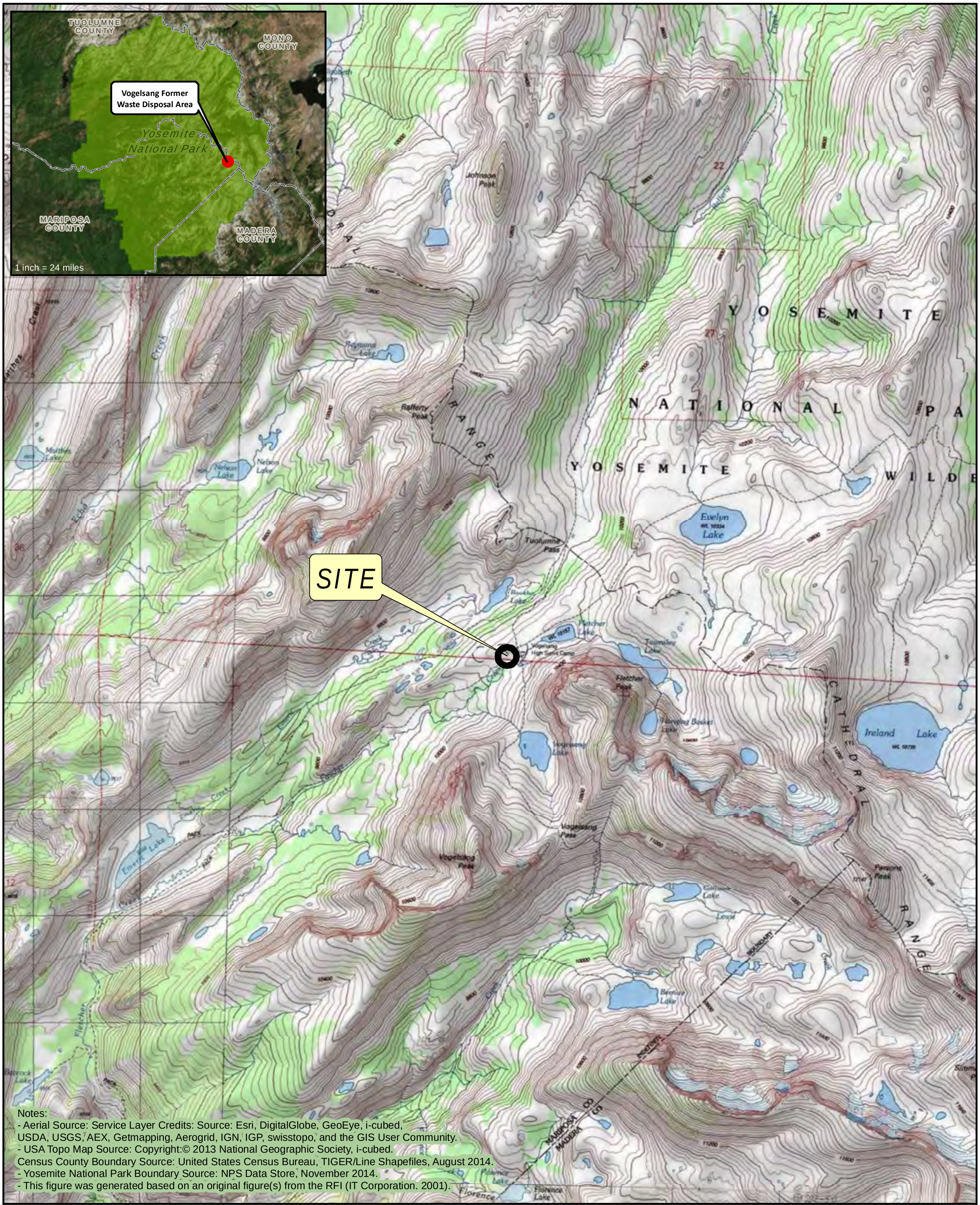
Project Name/Number	Sampler (Print)				No. of Containers	Matrix				Analysis Requested/Method Number												Date Shipped:
Purchase Order Number	Sampler (Signature)					Aq	Sed.	Soil														Carrier:
																						Waybill No.:
																						Comments:
Sample Identification	Location	Date Collected	Time Collected	Time Zone																		

Shuttle Temperature:	Turnaround Requested: Check one ☐ Standard 2-3 wk ☐ One week ☐ 3 days ☐ 24/48 Hrs. ☐ Other: ______________						Sample Disposal: ☐ Return to client ☐ Disposal by Lab (30-day retention)
Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

See page 2 for Container Preservative and Sampling Information

	Types of Samples	Types of Preservatives		Requested Information:
		Keep all Samples on Ice		The person responsible for sampling should fill out the section pertaining to the sampler. For each sampling event, the date and time of the sampling should be recorded in the space provided. If there are any additions or changes to the test descriptions indicated, please make the appropriate modifications on this form. The sampler should SIGN and DATE the Chain of Custody prior to the samples being relinquished to the transporter. A responsible party at the sampling site should retain the FIELD copy. The remaining Chain of Custody should be returned to APPL labs with the samples.
	Liquids	$H2SO_4$	Sulfuric Acid	
		HCL	Hydrochloric Acid	
DW	Drinking Water	NaOH	Sodium Hydroxide	
GW	Ground Water	$Na_2S_2O_3$	Sodium Thiosulfate	
MW	Monitoring Water	HNO_3	Nitric Acid	
SW	Surface Water	ZnAc	Zinc Acetate	
TB	Travel Blank	MeOH	Methanol	
WW	Waste Water	$NaHSO_4$	Sodium Bisulfate	
		Types of Containers		
	Solids	A	Amber Glass	
		C	Clear Glass	
S	Soil	B	Brass Tube	
SLD	Solid	M	Metal Tube	
SL	Sludge	P	Plastic	
Oil	Oil	G	Bag	
M	Miscellaneous	AV	Amber Glass VOA	
W	Wipes	GV	Glass VOA	
SED	Sediment	O	Other ________________	

Figures



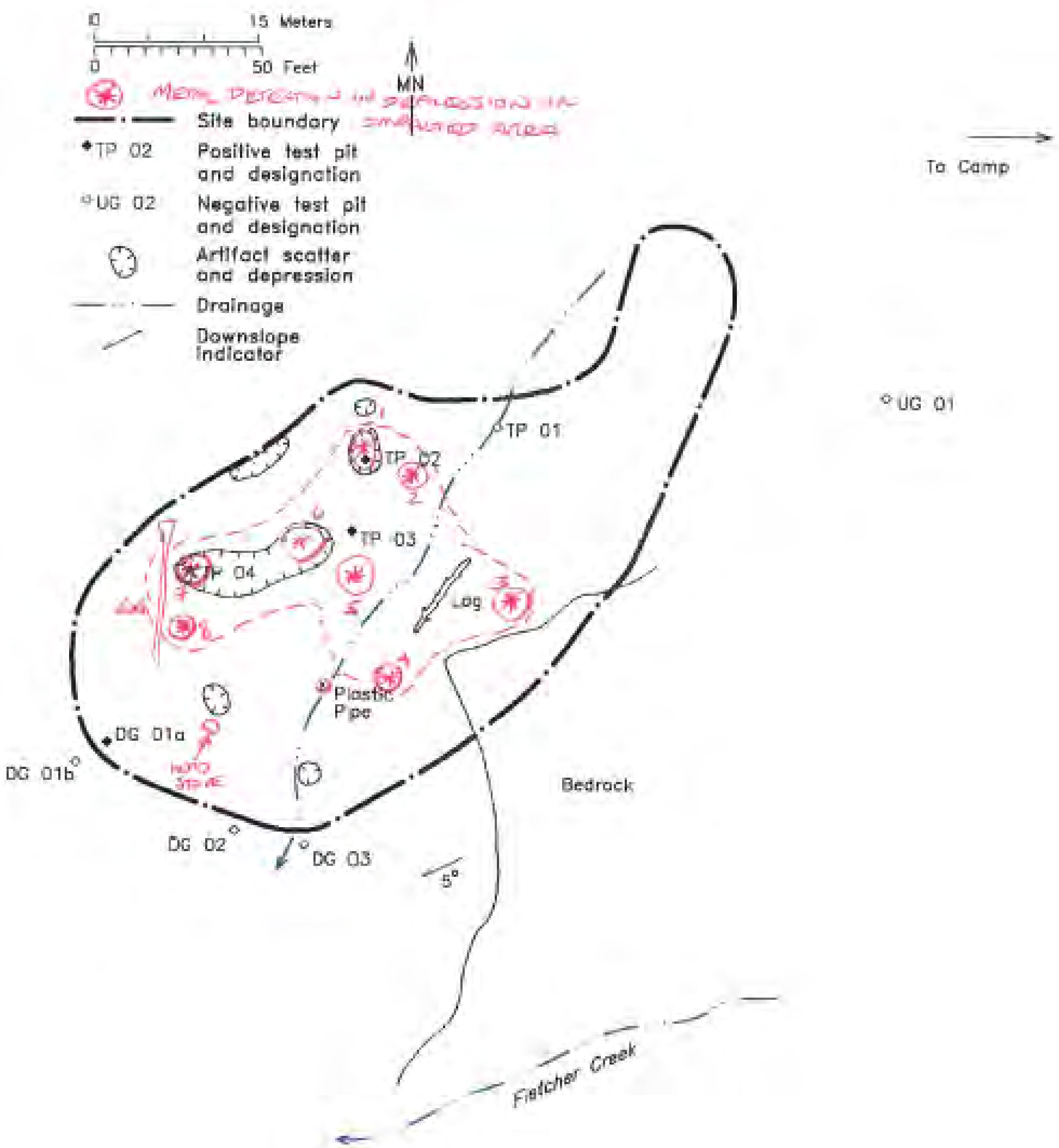
Notes:
- Aerial Source: Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.
- USA Topo Map Source: Copyright:© 2013 National Geographic Society, i-cubed.
Census County Boundary Source: United States Census Bureau, TIGER/Line Shapefiles, August 2014.
- Yosemite National Park Boundary Source: NPS Data Store, November 2014.
- This figure was generated based on an original figure(s) from the RFI (IT Corporation. 2001).

0 4,000 8,000
Feet

Figure 1
Site Location Map
Vogelsang Former Waste Disposal Area,
Yosemite National Park, California

Figure 2. Field Sketch and Notes from 2018 Site Reconnaissance

Vogelsang Former Waste Disposal Area, Yosemite National Park



Note: Base map source is Figure 7.2 from the *Victory Culture* report (Burton et al. 2003)

FIGURE 3. CONCEPTUAL SITE MODEL FOR EXPOSURE OF HUMAN AND ECOLOGICAL RECEPTORS

Vogelsang Former Waste Disposal Area, Yosemite National Park, California

Exposure Source	Release / transport	Exposure Media	Exposure Routes	Terrestrial Ecological Receptors of Interest: Terrestrial Plants	Soil Invertebrates	Birds	Mammals	Human Receptors of Interest: NPS Personnel	Recreational Visitors
Former Waste Disposal Area (FWDA)	resuspension/ volatilization, deposition	Ambient air	Inhalation	X	X	O	O	● [1]	● [1]
	Debris disposal on the surface, historical spills	Surface soil [0-6 inches]	Ingestion	X	X	●	●	●	●
			Direct/Dermal Contact	●	●	O	O	● [1]	● [1]
	uptake into tissues	Terrestrial Dietary Items *(Plants, Invertebrates, Birds, Mammals)*	Ingestion	X	X	●	●	X	X
	Debris disposal/burial, historical spills	Subsurface Soil [>6 inches - 4 feet]	Ingestion	X	X	● [2]	● [2]	X	X
			Inhalation	X	X	O [2]	O [2]	X	X
			Direct/Dermal Contact	●	●	O [2]	O [2]	X	X
	leaching	Groundwater							
	upwelling	Surface Seeps	Ingestion	X	X	X	X	X	X
			Direct/Dermal Contact	X	X	X	X	X	X

LEGEND

●	Pathway is believed to be complete and may be an important contribution to the total risk to the receptor.
O	Pathway is believed to be complete but is unlikely to be a major contributor to the total risk to the receptor (in comparison to one or more other pathways that are evaluated).
X	Pathway is incomplete or believed to be negligible

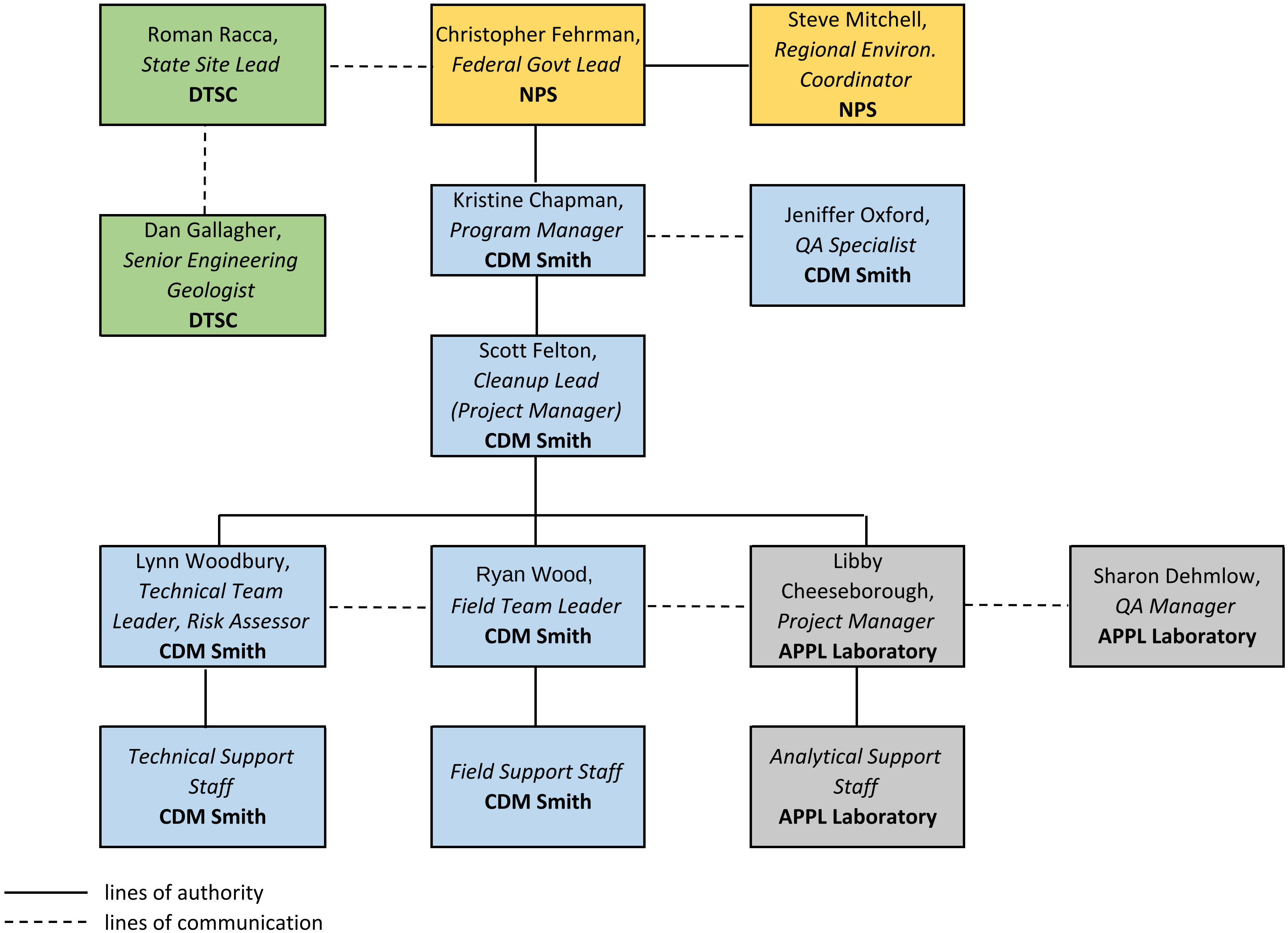
[1] It is anticipated inhalation and dermal contact exposures are likely to be minor, but these pathways will be evaluated quantitatively to demonstrate this assumption.

[2] Burrowing animals may be exposed to subsurface soils while digging both via incidental ingestion, inhalation, and dermal contact. However, available exposure and toxicity data are too limited to perform a quantitative evaluation of inhalation and dermal exposures.

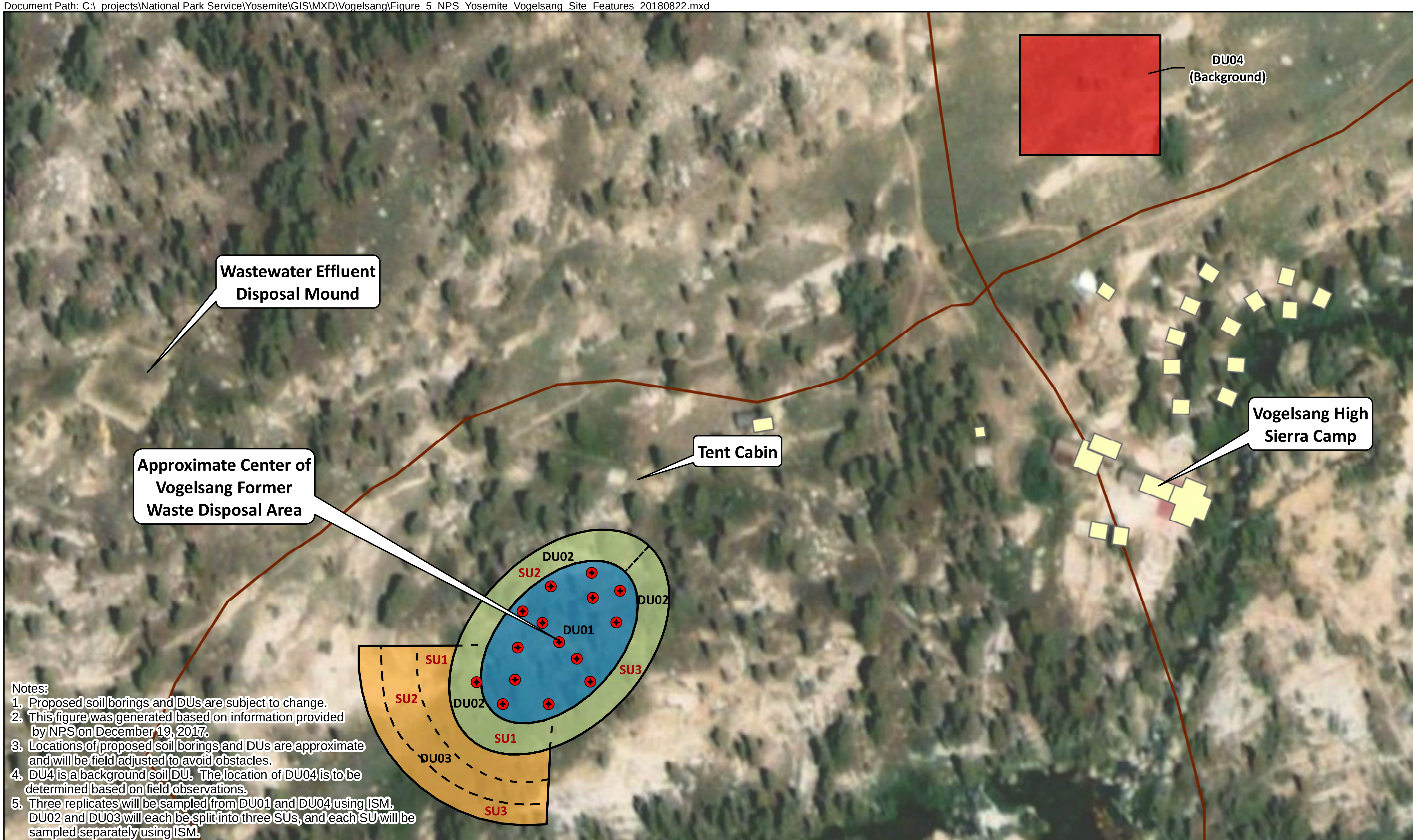
[3] It is highly unlikely that human receptors would drink seep water; however, this hypothetical exposure pathway will be evaluated to inform site managers about water quality.

FIGURE 4. PROJECT TEAM ORGANIZATIONAL CHART

Vogelsang Former Waste Disposal Area, Yosemite National Park, California



Document Path: C:_projects\National Park Service\Yosemite\GIS\MXD\Vogelsang\Figure_5_NPS_Yosemite_Vogelsang_Site_Features_20180822.mxd



Notes:
1. Proposed soil borings and DUs are subject to change.
2. This figure was generated based on information provided by NPS on December 19, 2017.
3. Locations of proposed soil borings and DUs are approximate and will be field adjusted to avoid obstacles.
4. DU4 is a background soil DU. The location of DU04 is to be determined based on field observations.
5. Three replicates will be sampled from DU01 and DU04 using ISM. DU02 and DU03 will each be split into three SUs, and each SU will be sampled separately using ISM.

Legend

- Proposed Soil Boring Location
- Trail
- Structure
- Sampling Unit
- DU01
- DU02
- DU03
- DU04 (Background)

0 75 150 Feet

Figure 5
Proposed Soil Borings and Decision Unit Locations
Vogelsang Former Waste Disposal Area,
Yosemite National Park, California

CDM Smith

Tables

Table 1
Laboratory Quantitation Limits and Screening Levels
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Contaminant Type	EPA	Target Analyte	Soil							
			Units							
				Limits		DTSC HERO Note 3		EPA RSL[3,4]	NPS ESV	
	Soil Method			PQL	MDL	Cancer Endpoint	Noncancer Endpoint	Residential Soil	Plants and Soil Invertebrates	Birds and Mammals
Metals	SW 6020A	ANTIMONY	mg/kg	0.2	0.1	NA	NA	3.1	5.0	0.248
Metals	SW 6020A	ARSENIC	mg/kg	0.5	0.07	0.11	0.4	0.68	6.8	0.25
Metals	SW 6020A	BARIUM	mg/kg	0.25	0.07	NA	NA	1500	110	17.2
Metals	SW 6020A	BERYLLIUM	mg/kg	1	0.07	1600	15	16	2.5	2.42
Metals	SW 6020A	CADMIUM	mg/kg	0.1	0.03	NA	NA	7.1	4.0	0.27
Metals	SW 6020A	CHROMIUM (TOTAL)	mg/kg	0.5	0.07	NA	NA		0.34	28
Metals	SW 6020A	COBALT	mg/kg	0.1	0.02	NA	NA	2.3	13	96
Metals	SW 6020A	COPPER	mg/kg	2.5	0.04	NA	NA	310	50	15
Metals	SW 6020A	LEAD	mg/kg	0.1	0.02	NE	80	400	50	0.94
Metals	SW 6020A	MOLYBDENUM	mg/kg	0.2	0.01	NA	NA	39	NA	NA
Metals	SW 6020A	NICKEL	mg/kg	0.35	0.14	15000	490	150	30	9.7
Metals	SW 6020A	SELENIUM	mg/kg	0.5	0.1	NA	NA	39	0.52	0.331
Metals	SW 6020A	SILVER	mg/kg	0.1	0.02	NE	390	39	2.0	2.6
Metals	SW 6020A	THALLIUM	mg/kg	0.1	0.02	NA	NA	0.078	0.05	0.027
Metals	SW 6020A	VANADIUM	mg/kg	0.5	0.08	NE	390	39	2.0	0.714
Metals	SW 6020A	ZINC	mg/kg	2.5	1.2	NA	NA	2300	6.62	12
Metals	SW 7471A	MERCURY	mg/kg	0.1	0.06	NE	1	1.1	0.05	0.013
SVOCs	EPA 8270C	1,2,4-TRICHLOROBENZENE	mg/kg	0.33	0.0494	NA	NA	5.8	1.2	0.27
SVOCs	EPA 8270C	1,2-DICHLOROBENZENE	mg/kg	0.33	0.0512	NA	NA	180	20	0.92
SVOCs	EPA 8270C	1,3-DICHLOROBENZENE	mg/kg	0.33	0.0507	NA	NA	NA	20	0.73
SVOCs	EPA 8270C	1,4-DICHLOROBENZENE	mg/kg	0.33	0.0489	NA	NA	2.6	1.2	0.88
SVOCs	EPA 8270C	2,4,5-TRICHLOROPHENOL	mg/kg	0.33	0.0601	NA	NA	630	4.0	No ESV
SVOCs	EPA 8270C	2,4,6-TRICHLOROPHENOL	mg/kg	0.33	0.0483	7.5	63	6.3	10	No ESV
SVOCs	EPA 8270C	2,4-DICHLOROPHENOL	mg/kg	0.33	0.0505	NA	NA	19	No ESV	No ESV
SVOCs	EPA 8270C	2,4-DIMETHYLPHENOL	mg/kg	0.33	0.0439	NA	NA	130	0.01	No ESV
SVOCs	EPA 8270C	2,4-DINITROPHENOL	mg/kg	0.66	0.054	NA	NA	13	20	No ESV
SVOCs	EPA 8270C	2,4-DINITROTOLUENE	mg/kg	0.66	0.0638	NA	NA	1.7	6	13
SVOCs	EPA 8270C	2,6-DINITROTOLUENE	mg/kg	0.66	0.0606	NA	NA	0.36	30	4.1
SVOCs	EPA 8270C	2-CHLORONAPHTHALENE	mg/kg	0.33	0.0524	NA	NA	480	No ESV	No ESV
SVOCs	EPA 8270C	2-CHLOROPHENOL	mg/kg	0.33	0.0443	NA	NA	39	No ESV	0.39
SVOCs	EPA 8270C	2-METHYLNAPHTHALENE	mg/kg	0.33	0.0504	NA	NA	24	No ESV	16
SVOCs	EPA 8270C	2-METHYLPHENOL	mg/kg	0.33	0.0452	NA	NA	320	0.67	590
SVOCs	EPA 8270C	2-NITROANILINE	mg/kg	0.66	0.0624	NA	NA	63	No ESV	5.4
SVOCs	EPA 8270C	2-NITROPHENOL	mg/kg	0.33	0.0478	NA	NA	NA	7.0	No ESV

Table 1
Laboratory Quantitation Limits and Screening Levels
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Contaminant Type	EPA	Target Analyte	Soil							
			Units							
				Limits		DTSC HERO Note 3		EPA RSL[3,4]	NPS ESV	
	Soil Method			PQL	MDL	Cancer Endpoint	Noncancer Endpoint	Residential Soil	Plants and Soil Invertebrates	Birds and Mammals
SVOCs	EPA 8270C	3,3´-DICHLOROBENZIDINE	mg/kg	0.66	0.0563	1.2	--	1.2	No ESV	No ESV
SVOCs	EPA 8270C	3-NITROANILINE	mg/kg	0.66	0.0611	NA	NA	NA	No ESV	No ESV
SVOCs	EPA 8270C	3/4-METHYLPHENOL	mg/kg	0.33	0.0464	NA	NA	NA	NA	NA
SVOCs	EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	mg/kg	0.66	0.0564	NA	NA	0.51	No ESV	No ESV
SVOCs	EPA 8270C	4-BROMOPHENYL PHENYL ETHER	mg/kg	0.33	0.0566	NA	NA	NA	No ESV	No ESV
SVOCs	EPA 8270C	4-CHLORO-3-METHYLPHENOL	mg/kg	0.33	0.0588	NA	NA	630	No ESV	No ESV
SVOCs	EPA 8270C	4-CHLOROANILINE	mg/kg	0.33	0.0165	NA	NA	2.7	1.0	No ESV
SVOCs	EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	mg/kg	0.33	0.0607	NA	NA	NA	No ESV	No ESV
SVOCs	EPA 8270C	4-NITROANILINE	mg/kg	0.33	0.073	NA	NA	25	No ESV	No ESV
SVOCs	EPA 8270C	4-NITROPHENOL	mg/kg	0.66	0.0598	NA	NA	NA	7.0	No ESV
SVOCs	EPA 8270C	ACENAPHTHENE	mg/kg	0.33	0.0538	NA	NA	360	0.25	120
SVOCs	EPA 8270C	ACENAPHTHYLENE	mg/kg	0.33	0.0531	NA	NA	NA	No ESV	120
SVOCs	EPA 8270C	ANTHRACENE	mg/kg	0.33	0.0613	NA	NA	1800	6.8	210
SVOCs	EPA 8270C	BENZO(A)ANTHRACENE	mg/kg	0.33	0.058	NA	NA	1.1	18	0.8
SVOCs	EPA 8270C	BENZO(A)PYRENE	mg/kg	0.33	0.0507	NA	NA	0.11	No ESV	53
SVOCs	EPA 8270C	BENZO(B)FLUORANTHENE	mg/kg	0.33	0.06	NA	NA	1.1	18	38
SVOCs	EPA 8270C	BENZO(G,H,I)PERYLENE	mg/kg	0.33	0.0552	NA	NA	NA	No ESV	1.98
SVOCs	EPA 8270C	BENZO(K)FLUORANTHENE	mg/kg	0.33	0.061	NA	NA	11	No ESV	62
SVOCs	EPA 8270C	BENZOIC ACID	mg/kg	0.33	0.03	NA	NA	25000	NA	NA
SVOCs	EPA 8270C	BENZYL ALCOHOL	mg/kg	0.33	0.0558	NA	NA	630	NA	NA
SVOCs	EPA 8270C	BIS(2-CHLORETHOXY)METHANE	mg/kg	0.33	0.0499	NA	NA	19	No ESV	No ESV
SVOCs	EPA 8270C	BIS(2-CHLOROETHYL)ETHER	mg/kg	0.33	0.05	NA	NA	0.23	No ESV	No ESV
SVOCs	EPA 8270C	BIS(2-CHLOROISOPROPYL)ETHER	mg/kg	0.33	0.0473	NA	NA	NA	NA	NA
SVOCs	EPA 8270C	BIS(2-ETHYLHEXYL)PHTHALATE	mg/kg	0.66	0.0616	NA	NA	39	No ESV	0.02
SVOCs	EPA 8270C	BUTYL BENZYL PHTHALATE	mg/kg	0.33	0.0555	NA	NA	290	No ESV	90
SVOCs	EPA 8270C	CARBAZOLE	mg/kg	0.33	0.0816	NA	NA	NA	No ESV	80
SVOCs	EPA 8270C	CHRYSENE	mg/kg	0.33	0.0606	NA	NA	110	No ESV	2.4
SVOCs	EPA 8270C	DI-N-BUTYL PHTHALATE	mg/kg	0.33	0.0659	NA	NA	630	160	0.011
SVOCs	EPA 8270C	DI-N-OCTYL PHTHALATE	mg/kg	0.33	0.0584	NA	NA	63	No ESV	0.91
SVOCs	EPA 8270C	DIBENZ (A,H) ANTHRACENE	mg/kg	0.33	0.0594	NA	NA	0.11	No ESV	12
SVOCs	EPA 8270C	DIBENZOFURAN	mg/kg	0.66	0.0573	NA	NA	7.3	6.1	No ESV
SVOCs	EPA 8270C	DIETHYL PHTHALATE	mg/kg	0.33	0.0621	NA	NA	5100	100	3600
SVOCs	EPA 8270C	DIMETHYL PHTHALATE	mg/kg	0.33	0.0633	NA	NA	NA	10	38
SVOCs	EPA 8270C	FLUORANTHENE	mg/kg	0.33	0.0654	NA	NA	240	10	22

Table 1
Laboratory Quantitation Limits and Screening Levels
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Contaminant Type	EPA	Target Analyte	Soil							
			Units							
				Limits		DTSC HERO Note 3		EPA RSL[3,4]	NPS ESV	
	Soil Method			PQL	MDL	Cancer Endpoint	Noncancer Endpoint	Residential Soil	Plants and Soil Invertebrates	Birds and Mammals
SVOCs	EPA 8270C	FLUORENE	mg/kg	0.33	0.0613	NA	NA	240	3.7	250
SVOCs	EPA 8270C	HEXACHLOROBENZENE	mg/kg	0.66	0.0603	NA	NA	0.21	10	0.079
SVOCs	EPA 8270C	HEXACHLOROBUTADIENE	mg/kg	0.33	0.0517	1.2	78	1.2	No ESV	No ESV
SVOCs	EPA 8270C	HEXACHLOROETHANE	mg/kg	0.33	0.0499	NA	NA	1.8	No ESV	No ESV
SVOCs	EPA 8270C	INDENO (1,2,3-CD) PYRENE	mg/kg	0.33	0.0604	NA	NA	1.1	No ESV	62
SVOCs	EPA 8270C	ISOPHORONE	mg/kg	0.33	0.057	NA	NA	570	No ESV	No ESV
SVOCs	EPA 8270C	N-NITROSODI-N-PROPYLAMINE	mg/kg	0.33	0.0549	NA	NA	0.078	No ESV	No ESV
SVOCs	EPA 8270C	N-NITROSODIMETHYLAMINE	mg/kg	0.33	0.0874	NA	NA	0.002	NA	NA
SVOCs	EPA 8270C	N-NITROSODIPHENYLAMINE	mg/kg	0.33	0.0506	NA	NA	110	20	No ESV
SVOCs	EPA 8270C	NAPHTHALENE	mg/kg	0.33	0.0505	NA	NA	3.8	1.0	3.4
SVOCs	EPA 8270C	NITROBENZENE	mg/kg	0.33	0.0498	NA	NA	5.1	2.2	4.9
SVOCs	EPA 8270C	PENTACHLOROPHENOL	mg/kg	0.66	0.0587	NA	NA	1	3.0	0.36
SVOCs	EPA 8270C	PHENANTHRENE	mg/kg	0.66	0.0582	NA	NA	NA	5.5	10
SVOCs	EPA 8270C	PHENOL	mg/kg	0.33	0.043	NA	NA	1900	0.79	38
SVOCs	EPA 8270C	PYRENE	mg/kg	0.33	0.0541	NA	NA	180	10	22
PAHs	8270C-SIM	1-METHYLNAPHTHALENE	mg/kg	0.005	0.001	NA	NA	18	NA	NA
PAHs	8270C-SIM	2-METHYLNAPHTHALENE	mg/kg	0.005	0.0009	NA	NA	24	No ESV	16
PAHs	8270C-SIM	ACENAPHTHENE	mg/kg	0.005	0.001	NA	NA	360	0.25	120
PAHs	8270C-SIM	ACENAPHTHYLENE	mg/kg	0.005	0.0009	NA	NA	NA	No ESV	120
PAHs	8270C-SIM	ANTHRACENE	mg/kg	0.005	0.0008	NA	NA	1800	6.8	210
PAHs	8270C-SIM	BENZO(A)ANTHRACENE	mg/kg	0.005	0.0009	NA	NA	1.1	18	0.8
PAHs	8270C-SIM	BENZO(A)PYRENE	mg/kg	0.005	0.0009	NA	NA	0.11	No ESV	53
PAHs	8270C-SIM	BENZO(B)FLUORANTHENE	mg/kg	0.005	0.0011	NA	NA	1.1	18	38
PAHs	8270C-SIM	BENZO(GHI)PERYLENE	mg/kg	0.005	0.0013	NA	NA	NA	No ESV	1.98
PAHs	8270C-SIM	BENZO(K)FLUORANTHENE	mg/kg	0.005	0.001	NA	NA	11	No ESV	62
PAHs	8270C-SIM	CHRYSENE	mg/kg	0.005	0.0008	NA	NA	110	No ESV	2.4
PAHs	8270C-SIM	DIBENZ(A,H)ANTHRACENE	mg/kg	0.005	0.0009	NA	NA	0.11	No ESV	12
PAHs	8270C-SIM	FLUORANTHENE	mg/kg	0.005	0.0012	NA	NA	240	10	22
PAHs	8270C-SIM	FLUORENE	mg/kg	0.005	0.001	NA	NA	240	3.7	250
PAHs	8270C-SIM	INDENO(1,2,3-CD)PYRENE	mg/kg	0.005	0.0009	NA	NA	1.1	No ESV	62
PAHs	8270C-SIM	NAPHTHALENE	mg/kg	0.005	0.0009	NA	NA	3.8	1.0	3.4
PAHs	8270C-SIM	PHENANTHRENE	mg/kg	0.005	0.0011	NA	NA	NA	5.5	10
PAHs	8270C-SIM	PYRENE	mg/kg	0.005	0.0012	NA	NA	180	10	22
PAHs	8270C-SIM	PENTACHLOROPHENOL	mg/kg	0.01	0.008	NA	NA	1	3.0	0.36

Table 1
Laboratory Quantitation Limits and Screening Levels
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Contaminant Type	EPA	Target Analyte	Soil							
			Units							
				Limits		DTSC HERO Note 3		EPA RSL[3,4]	NPS ESV	
	Soil Method			PQL	MDL	Cancer Endpoint	Noncancer Endpoint	Residential Soil	Plants and Soil Invertebrates	Birds and Mammals
TPH	EPA 8015B-e	TPH-DRO (C10-C24)	mg/kg	5	0.65	NA	NA	226	NA	NA
TPH	EPA 8015B-e	TPH-MO (C24-C36)	mg/kg	50	3.5	NA	NA	5143	NA	NA
Dioxins/Furans[1]	EPA 8290	2,3,7,8-TCDD[1]	pg/g	5.0	NA	NA	NA	4.8	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,7,8-PECDD	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,4,7,8-HXCDD	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,6,7,8-HXCDD	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,7,8,9-HXCDD	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,4,6,7,8-HPCDD	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	OCDD	pg/g	25	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	2,3,7,8-TCDF	pg/g	5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,7,8-PECDF	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	2,3,4,7,8-PECDF	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,4,7,8-HXCDF	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,6,7,8-HXCDF	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	2,3,4,6,7,8-HXCDF	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,7,8,9-HXCDF	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,4,6,7,8-HPCDF	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	1,2,3,4,7,8,9-HPCDF	pg/g	12.5	NA	NA	NA	NA	NE	NE
Dioxins/Furans[1]	EPA 8290	OCDF	pg/g	25	NA	NA	NA	NA	NE	NE
Dioxins/Furans	EPA 8290	TEQ	pg/g	NA	NA	NA	NA	NA	NE	NE
Pesticides	EPA 8081A	4,4'-DDD	mg/kg	0.05	0.0004	NA	NA	0.19	No ESV	0.0063
Pesticides	EPA 8081A	4,4'-DDE	mg/kg	0.05	0.002	NA	NA	2	No ESV	0.021
Pesticides	EPA 8081A	4,4'-DDT	mg/kg	0.05	0.0004	NA	NA	1.9	4.1	0.021
Pesticides	EPA 8081A	ALDRIN	mg/kg	0.05	0.001	NA	NA	0.039	0.00332	0.037
Pesticides	EPA 8081A	ALPHA-BHC	mg/kg	0.05	0.001	NA	NA	0.086	No ESV	0.10
Pesticides	EPA 8081A	ALPHA-CHLORDANE	mg/kg	0.05	0.001	NA	NA	NA	2.2	0.27
Pesticides	EPA 8081A	BETA-BHC	mg/kg	0.05	0.001	NA	NA	0.3	0.00398	0.27
Pesticides	EPA 8081A	DELTA-BHC	mg/kg	0.05	0.001	NA	NA	NA	No ESV	0.10
Pesticides	EPA 8081A	DIELDRIN	mg/kg	0.05	0.001	NA	NA	0.034	10	0.0045
Pesticides	EPA 8081A	ENDOSULFAN I	mg/kg	0.05	0.0004	NA	NA	NA	No ESV	0.64
Pesticides	EPA 8081A	ENDOSULFAN II	mg/kg	0.05	0.0004	NA	NA	NA	No ESV	0.64
Pesticides	EPA 8081A	ENDOSULFAN SULFATE	mg/kg	0.05	0.001	NA	NA	NA	No ESV	0.64

Table 1
Laboratory Quantitation Limits and Screening Levels
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Contaminant Type	EPA	Target Analyte	Soil							
			Units							
				Limits		DTSC HERO Note 3		EPA RSL[3,4]	NPS ESV	
	Soil Method			PQL	MDL	Cancer Endpoint	Noncancer Endpoint	Residential Soil	Plants and Soil Invertebrates	Birds and Mammals
Pesticides	EPA 8081A	ENDRIN	mg/kg	0.05	0.001	NA	NA	1.9	0.0034	0.0014
Pesticides	EPA 8081A	ENDRIN ALDEHYDE	mg/kg	0.05	0.003	NA	NA	NA	No ESV	No ESV
Pesticides	EPA 8081A	ENDRIN KETONE	mg/kg	0.05	0.004	NA	NA	NA	No ESV	No ESV
Pesticides	EPA 8081A	GAMMA-BHC	mg/kg	0.05	0.001	NA	NA	0.57	0.005	0.0094
Pesticides	EPA 8081A	GAMMA-CHLORDANE	mg/kg	0.05	0.001	NA	NA	NA	NA	NA
Pesticides	EPA 8081A	HEPTACHLOR	mg/kg	0.05	0.001	NA	NA	0.13	0.40	0.059
Pesticides	EPA 8081A	HEPTACHLOR EPOXIDE	mg/kg	0.05	0.001	NA	NA	0.07	No ESV	No ESV
Pesticides	EPA 8081A	METHOXYCHLOR	mg/kg	0.05	0.001	NA	NA	32	No ESV	5.0
Pesticides	EPA 8081A	TOXAPHENE	mg/kg	1	0.015	NA	NA	0.49	No ESV	4.1
PCBs	EPA 8082	AROCLOR 1016	mg/kg	0.05	0.01	NA	NA	0.41	No ESV	1
PCBs	EPA 8082	AROCLOR 1221	mg/kg	0.05	0.006	NA	NA	0.2	No ESV	No ESV
PCBs	EPA 8082	AROCLOR 1232	mg/kg	0.05	0.004	NA	NA	0.17	No ESV	No ESV
PCBs	EPA 8082	AROCLOR 1242	mg/kg	0.05	0.004	NA	NA	0.23	No ESV	0.041
PCBs	EPA 8082	AROCLOR 1248	mg/kg	0.05	0.004	NA	NA	0.23	No ESV	0.0072
PCBs	EPA 8082	AROCLOR 1254	mg/kg	0.05	0.004	NA	NA	0.12	160	0.041
PCBs	EPA 8082	AROCLOR 1260	mg/kg	0.05	0.004	NA	NA	0.24	No ESV	0.88
PCBs	EPA 8082	AROCLOR 1262	mg/kg	0.05	0.011	NA	NA	NA	No ESV	No ESV
PCBs	EPA 8082	AROCLOR 1268	mg/kg	0.05	0.011	NA	NA	NA	No ESV	No ESV
PCBs	EPA 8082	TOTAL PCBs	mg/kg	0.05	0.004	NA	NA	0.23	40	No ESV

Notes:

1. Dioxin and furan analytical results will be multiplied by the 2005 World Health Organization TEFs and summed to calculate the TEQ, and compared to the project screening levels for 2,3,7,8-TCDD, which is the screening level presented for dioxin/furans.
2. DTSC recommends the use of values from the HERO Risk Assessment Note 3, which are screening levels that are more conservative than the RSLs. January 2018.
3. EPA RSLs with a total risk of 1 x 10^{-6} and target hazard quotient of 0.1, for residential soil (May 2018).
4. There are no EPA RSL for TPH-DRO and TPH-MO. The values presented for TPH-DRO and TPH-MO under EPA RSL are the Environmental Screening Levels (ESLs) from the San Francisco Regional Water Quality Control Board, February 2016.

Highlighted cells denote PQL and/or MDL that are of higher concentration than at least one associated screening level.

California MCL = Maximum Contaminant Level, California Department of Health updated September 29, 2016.

DTSC HERO = Department of Toxic Substances Human Health Risk Note 3, updated August 2017.

EPA = Environmental Protection Agency

ESL = Environmental Screening Level, San Francisco Regional Water Quality Control Board, February 2016.

Federal MCL = Maximum Contaminant Level, EPA updated June 2017.

MDL = method detection limit

Table 1
Laboratory Quantitation Limits and Screening Levels
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Contaminant Type	EPA	Target Analyte	Soil							
			Units							
				Limits		DTSC HERO Note 3		EPA RSL[3,4]	NPS ESV	
	Soil Method			PQL	MDL	Cancer Endpoint	Noncancer Endpoint	Residential Soil	Plants and Soil Invertebrates	Birds and Mammals

mg/kg = milligram per kilogram
NA = not available (not listed in the respective screening level list)
NE = not evaluated (listed in the respective screening level list but value not provided)
No ESV = No NPS ESV was found for this constituent
NPS ESV = National Park Service Environmental Screening Level, updated February 18, 2016.
PAHs = polyaromatic hydrocarbons
PCBs = polychlorinated biphenyls
pg/kg = picogram per kilogram
PQL = Practical Quantitation Limit
RSL = Regional Screening Level, EPA updated June 2017
SVOCs = semi-volatile organic compounds
TCDD = tetrachloro dibenzo-p-dioxin
TEF = toxicity equivalency factor
TEQ = toxicity equivalency quotient
TPH = total petroleum hydrocarbon
VOCs = volatile organic compounds

Table 2 - Field Measurement and Sampling and Analysis Plan
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Media	DU	Sampling Interval	Sample Type	Sample ID[3]	MS/MSD[2]	GPS - Elevations and Coordinates[5]	SVOCs	PAHs	Dioxin / Furan[4]	TPH-Diesel / Motor Oil	TPH-Diesel / Motor Oil with Silica Gel Cleanup	Metals	Metal - Mercury	Pesticides	PCBs
							EPA 8270C	EPA 8270C (SIM)	EPA 8290	EPA 8015B	EPA 8015B	SW 6020A	SW 7471A	EPA 8081A	EPA 8082
Soil	DU01	Surface Soil (0 to 6 inches bgs)	ISM - Replicate 1	DU01-SS-01	--	x	x	x	x	x	x	x	x	x	x
			ISM - Replicate 2	DU01-SS-02	--		x	x	OH	x	x	x	x	x	x
			ISM - Replicate 3	DU01-SS-03	--		x	x	OH	x	x	x	x	x	x
		Subsurface Soil (6 inches to 4 feet bgs)	ISM - Replicate 1	DU01-SB-01	x	x	x	x	x	x	x	x	x	x	x
			ISM - Replicate 2	DU01-SB-02	--		x	x	OH	x	x	x	x	x	x
			ISM - Replicate 3	DU01-SB-03	--		x	x	OH	x	x	x	x	x	x
	DU02	Surface Soil (0 to 6 inches bgs)	ISM - SU1	DU02-SS-01	--	x	x	x	x	x	x	x	x	x	x
			ISM - SU2	DU02-SS-02	--	x	x	x	OH	x	x	x	x	x	x
			ISM - SU3	DU02-SS-03	--	x	x	x	OH	x	x	x	x	x	x
	DU03	Surface Soil (0 to 6 inches bgs)	ISM - SU1	DU03-SS-01	--	x	x	x	x	x	x	x	x	x	x
			ISM - SU2	DU03-SS-02	--	x	x	x	OH	x	x	x	x	x	x
			ISM - SU3	DU03-SS-03	--	x	x	x	OH	x	x	x	x	x	x
	DU04 (Background Area)	Surface Soil (0 to 6 inches bgs)	ISM - Replicate 1	DU04-SS-01	--	x	x	x	x	x	x	x	x	x	x
			ISM - Replicate 2	DU04-SS-02	--		x	x	OH	x	x	x	x	x	x
			ISM - Replicate 3	DU04-SS-03	--		x	x	OH	x	x	x	x	x	x
	Discrete Samples	Variable, see note 6	Discrete - Location 1	B01-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 2	B02-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 3	B03-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 4	B04-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 5	B05-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 6	B06-XX-01[7]	x	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 7	B07-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 8	B08-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 9	B09-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 10	B10-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 10 (field duplicate)	B10-XX-02[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 11	B11-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 12	B12-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 13	B13-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 14	B14-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
			Discrete - Location 15	B15-XX-01[7]	--	x	--	--	--	--	--	x	x	--	--
Water	NA	Other	Equipment Blank	G-11-SS-04[1]	--	--	x	x	OH	x	--	x	x	x	x
		Total Number of Measurements / Analysis				25	16	16	5	16	15	32	32	16	16

Notes:
1 - One equipment blank per week per analyses will be required.
2 - MS/MSD samples will be analyzed at the rate of 1 per 20 samples by the laboratory. Extra volumes of samples will be collected for MS/MSD analysis.
3 - Sampling date will be added to the end of each sample ID
4 - Dioxin/furan will only be analyzed in one of three replicate/SU per sampling interval per DU. Remaining samples will be placed on hold, and will not be analyzed unless the results from the dioxin/furan analysis are above background and abov
5 - GPS coordinates and elevations shall be recorded for the boundaries and elevation limits at each sampling interval for DU01 and DU04, and at each SU for DU02 and DU03.
6 - If debris is present within the borehole, the soil sample will be collected near the middle of the debris depth interval. If no debris is present within the borehole, the soil sample should be collected from 0 to 6 inches bgs
7 - Replace "XX" with "SS" (for surface soil) or "SB" (for subsurface soil), depending on the sampling depth per note 6.

Sample ID Number Code:
01 - Original Sample
02 - Field Duplicate or Replicate #2
03 - Replicate #3
04 - Equipment Blanks

VOCs - volatile organic compounds
SVOCs - semi-volatile organic compounds
PAH - polycyclic aromatic hydrocarbons
PCBs - polychlorinated biphenyls
TPH - total petroleum hydrocarbon

SIM - secondary ion mass spectrometry
SS - surface soil 0-0.5 feet
SB - subsurface soil 0.5-4 feet
OH - place samples on hold
NA - not applicable

Table 3 - Measurement Performance Criteria
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Metals	Matrix	Soil		
	Analytical Group	CAM 17 Metals by SW 6020A + SW 7471A		
	Concentration Level	milligrams per kilogram (mg/kg)		
	Data Quality Indicators	**QC Sample or Measurement Performance Activity**	**Measurement Performance Criteria**	**QC Sample Assesses Error for Sampling (S), Analytical (A), or both (S&A)**
	Precision	Laboratory Duplicates; MS/MSD	≤25% RPD	A
			ABS ≤ PQL[1]	A
	Accuracy	MS/MSD[2]	80-120 %R	S&A
		LCS[2]	80-120 %R	A
		Field Blank	No analyte > PQL	S&A
	Sensitivity/	Method blanks	≤ PQL	A
	Completeness	Assessed during DQA	≥ 90% collection and analysis	S&A
	Comparability	Assessed during DQA	Comparable units; adherence to sampling SOP	S&A

TPH	Matrix	Soil		
	Analytical Group	EPA 8015B (M) Total Petroluem Hydrocarbon - diesel and motor oil range and 8260B Volatile Organic Compounds		
	Concentration Level	milligrams per kilogram (mg/kg)		
	Data Quality Indicators	**QC Sample or Measurement Performance Activity**	**Measurement Performance Criteria**	**QC Sample Assesses Error for Sampling (S), Analytical (A), or both (S&A)**
	Precision	Laboratory Duplicates; MS/MSD	≤25% RPD	A
			ABS ≤ PQL[1]	A
	Accuracy	MS/MSD[2]	Varies by compound, see table 4.	S&A
		LCS[2]	Varies by compound, see table 4.	A
		Field Blank, Method Blank, Trip Blank	No analyte > PQL	S&A
	Sensitivity/	Method blanks	≤ PQL	A
	Completeness	Assessed during DQA	≥ 90% collection and analysis	S&A
	Comparability	Assessed during DQA	Comparable units; adherence to sampling SOP	S&A

SVOCs	Matrix	Soil		
	Analytical Group	EPA 8270C Semi-Volatile Organic / EPA 8270C (SIM) PAHs		
	Concentration Level	micrograms per kilogram (mg/kg)		
	Data Quality Indicators	**QC Sample or Measurement Performance Activity**	**Measurement Performance Criteria**	**QC Sample Assesses Error for Sampling (S), Analytical (A), or both (S&A)**
	Precision	Laboratory Duplicates; MS/MSD	≤25% RPD	A
			ABS ≤ PQL[1]	A
	Accuracy	MS/MSD[2]	Varies by compound, see table 4.	S&A
		LCS[2]	Varies by compound, see table 4.	A
		Field Blank	No analyte > PQL	S&A
	Sensitivity/	Method blanks	≤ PQL	A
	Completeness	Assessed during DQA	≥ 90% collection and analysis	S&A
	Comparability	Assessed during DQA	Comparable units; adherence to sampling SOP	S&A

Table 3 - Measurement Performance Criteria
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Pesticides		
	Matrix	Soil
	Analytical Group	EPA 8081A Organochlorine Pesticides
	Concentration Level	micrograms per kilogram (mg/kg)

Data Quality Indicators	QC Sample or Measurement Performance Activity	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A), or both (S&A)
Precision	Laboratory Duplicates; MS/MSD	≤25% RPD	A
		ABS ≤ PQL[1]	A
Accuracy	MS/MSD[2]	Varies by compound, see table 4.	S&A
	LCS[2]	Varies by compound, see table 4.	A
	Field Blank, Method Blank, Trip Blank	No analyte > PQL	S&A
Sensitivity/	Method blanks	≤ PQL	A
Completeness	Assessed during DQA	≥ 90% collection and analysis	S&A
Comparability	Assessed during DQA	Comparable units; adherence to sampling SOP	S&A

Dioxin/Furans		
	Matrix	Soil
	Analytical Group	EPA 8290 Dioxin/Furans
	Concentration Level	picograms per gram (pg/g)

Data Quality Indicators	QC Sample or Measurement Performance Activity	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A), or both (S&A)
Precision	Laboratory Duplicates; MS/MSD	≤25% RPD	A
		ABS ≤ PQL[1]	A
Accuracy	MS/MSD[2]	70-130 %R	S&A
	LCS[2]	70-130 %R	A
	Field Blank, Method Blank, Trip Blank	No analyte > PQL	S&A
Sensitivity/	Method blanks	≤ PQL	A
Completeness	Assessed during DQA	≥ 90% collection and analysis	S&A
Comparability	Assessed during DQA	Comparable units; adherence to sampling SOP	S&A

PCBs		
	Matrix	Soil
	Analytical Group	EPA 8082 Polychlorinated Biphenyls
	Concentration Level	micrograms per kilogram (mg/kg)

Data Quality Indicators	QC Sample or Measurement Performance Activity	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A), or both (S&A)
Precision	Laboratory Duplicates; MS/MSD	≤25% RPD	A
		ABS ≤ PQL[1]	A
Accuracy	MS/MSD[2]	Varies by compound, see table 4.	S&A
	LCS[2]	Varies by compound, see table 4.	A
	Field Blank, Method Blank, Trip Blank	No analyte > PQL	S&A
Sensitivity/	Method blanks	≤ PQL	A
Completeness	Assessed during DQA	≥ 90% collection and analysis	S&A
Comparability	Assessed during DQA	Comparable units; adherence to sampling SOP	S&A

[1] ABS < PQL accuracy criteria only applies at low concentration when result is less than 5 times the PQL.
[2] For measurement performance criteria for MS/MSD and LCS, laboratory may use in-house statistically based limits.
RPD - Relative percent difference
ABS - Absolute difference
PQL - Quantitation limit
%R - Percent recovery
DQA - Data quality assessment
S - Sampling
A - Analytical
MS/MSD - Matrix spike/matrix spike duplicate

Table 4 - Laboratory Control Limits - Soil
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Laboratory Analytical Method	Contaminant	LCS/MS/MSD Control Limit (%)
EPA 8290	1,2,3,4,6,7,8-HPCDD	70-130
EPA 8290	1,2,3,4,6,7,8-HPCDF	70-130
EPA 8290	1,2,3,4,7,8,9-HPCDF	70-130
EPA 8290	1,2,3,4,7,8-HXCDD	70-130
EPA 8290	1,2,3,4,7,8-HXCDF	70-130
EPA 8290	1,2,3,6,7,8-HXCDD	70-130
EPA 8290	1,2,3,6,7,8-HXCDF	70-130
EPA 8290	1,2,3,7,8,9-HXCDD	70-130
EPA 8290	1,2,3,7,8,9-HXCDF	70-130
EPA 8290	1,2,3,7,8-PECDD	70-130
EPA 8290	1,2,3,7,8-PECDF	70-130
EPA 8290	2,3,4,6,7,8-HXCDF	70-130
EPA 8290	2,3,4,7,8-PECDF	70-130
EPA 8290	2,3,7,8-TCDD	70-130
EPA 8290	2,3,7,8-TCDF	70-130
EPA 8290	OCDD	70-130
EPA 8290	OCDF	70-130
EPA 8290	TEQ	NA
EPA 8015B-e	DIESEL FUEL	64-122
EPA 8015B-e	MOTOR OIL	50-150
6020A/3050B^2014	ANTIMONY (SB)	80-120
6020A/3050B^2014	ARSENIC (AS)	80-120
6020A/3050B^2014	BARIUM (BA)	80-120
6020A/3050B^2014	BERYLLIUM (BE)	80-120
6020A/3050B^2014	CADMIUM (CD)	80-120
6020A/3050B^2014	CHROMIUM (CR)	80-120
6020A/3050B^2014	COBALT (CO)	80-120
6020A/3050B^2014	COPPER (CU)	80-120
6020A/3050B^2014	LEAD (PB)	80-120
6020A/3050B^2014	MOLYBDENUM (MO)	80-120
6020A/3050B^2014	NICKEL (NI)	80-120
6020A/3050B^2014	SELENIUM (SE)	80-120
6020A/3050B^2014	SILVER (AG)	80-120
6020A/3050B^2014	THALLIUM (TL)	80-120
6020A/3050B^2014	VANADIUM (V)	80-120
6020A/3050B^2014	ZINC (ZN)	80-120
7471A/7471A	Mercury	80-120
8270C-SIM	1-METHYLNAPHTHALENE	45-105
8270C-SIM	2-METHYLNAPHTHALENE	45-105
8270C-SIM	ACENAPHTHENE	45-110
8270C-SIM	ACENAPHTHYLENE	45-105
8270C-SIM	ANTHRACENE	55-105
8270C-SIM	BENZO(A)ANTHRACENE	50-110
8270C-SIM	BENZO(A)PYRENE	50-110
8270C-SIM	BENZO(B)FLUORANTHENE	45-115

Table 4 - Laboratory Control Limits - Soil
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Laboratory Analytical Method	Contaminant	LCS/MS/MSD Control Limit (%)
8270C-SIM	BENZO(GHI)PERYLENE	40-125
8270C-SIM	BENZO(K)FLUORANTHENE	45-125
8270C-SIM	CHRYSENE	55-110
8270C-SIM	DIBENZ(A,H)ANTHRACENE	40-125
8270C-SIM	FLUORANTHENE	55-115
8270C-SIM	FLUORENE	50-110
8270C-SIM	INDENO(1,2,3-CD)PYRENE	40-120
8270C-SIM	NAPHTHALENE	40-105
8270C-SIM	PHENANTHRENE	50-110
8270C-SIM	PYRENE	45-125
EPA 8270C	1,2,4-TRICHLOROBENZENE	45-110
EPA 8270C	1,2-DICHLOROBENZENE	45-95
EPA 8270C	1,3-DICHLOROBENZENE	40-100
EPA 8270C	1,4-DICHLOROBENZENE	35-105
EPA 8270C	2,4,5-TRICHLOROPHENOL	50-110
EPA 8270C	2,4,6-TRICHLOROPHENOL	45-110
EPA 8270C	2,4-DICHLOROPHENOL	45-110
EPA 8270C	2,4-DIMETHYLPHENOL	30-105
EPA 8270C	2,4-DINITROPHENOL	15-130
EPA 8270C	2,4-DINITROTOLUENE	50-115
EPA 8270C	2,6-DINITROTOLUENE	50-110
EPA 8270C	2-CHLORONAPHTHALENE	45-105
EPA 8270C	2-CHLOROPHENOL	45-105
EPA 8270C	2-METHYLNAPHTHALENE	45-105
EPA 8270C	2-METHYLPHENOL	40-105
EPA 8270C	2-NITROANILINE	45-120
EPA 8270C	2-NITROPHENOL	40-110
EPA 8270C	3,3´-DICHLOROBENZIDINE	10-130
EPA 8270C	3-NITROANILINE	25-110
EPA 8270C	3/4-METHYLPHENOL	40-105
EPA 8270C	4,6-DINITRO-2-METHYLPHENOL	30-135
EPA 8270C	4-BROMOPHENYL PHENYL ETHER	45-115
EPA 8270C	4-CHLORO-3-METHYLPHENOL	45-115
EPA 8270C	4-CHLOROANILINE	10-95
EPA 8270C	4-CHLOROPHENYL PHENYL ETHER	45-110
EPA 8270C	4-NITROANILINE	35-115
EPA 8270C	4-NITROPHENOL	15-140
EPA 8270C	ACENAPHTHENE	45-110
EPA 8270C	ACENAPHTHYLENE	45-105
EPA 8270C	ANTHRACENE	55-105
EPA 8270C	BENZ (A) ANTHRACENE	50-110
EPA 8270C	BENZO (A) PYRENE	50-110
EPA 8270C	BENZO (B) FLUORANTHENE	45-115
EPA 8270C	BENZO (G,H,I) PERYLENE	40-125

Table 4 - Laboratory Control Limits - Soil
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Laboratory Analytical Method	Contaminant	LCS/MS/MSD Control Limit (%)
EPA 8270C	BENZO (K) FLUORANTHENE	45-125
EPA 8270C	BENZOIC ACID	10-110
EPA 8270C	BENZYL ALCOHOL	20-125
EPA 8270C	BIS (2-CHLORETHOXY) METHANE	45-110
EPA 8270C	BIS (2-CHLOROETHYL) ETHER	40-105
EPA 8270C	BIS (2-CHLOROISOPROPYL) ETHER	20-115
EPA 8270C	BIS (2-ETHYLHEXYL) PHTHALATE	45-125
EPA 8270C	BUTYL BENZYL PHTHALATE	50-125
EPA 8270C	CARBAZOLE	45-115
EPA 8270C	CHRYSENE	55-110
EPA 8270C	DI-N-BUTYL PHTHALATE	55-110
EPA 8270C	DI-N-OCTYL PHTHALATE	40-130
EPA 8270C	DIBENZ (A,H) ANTHRACENE	40-125
EPA 8270C	DIBENZOFURAN	50-105
EPA 8270C	DIETHYL PHTHALATE	50-115
EPA 8270C	DIMETHYL PHTHALATE	50-110
EPA 8270C	FLUORANTHENE	55-115
EPA 8270C	FLUORENE	50-110
EPA 8270C	HEXACHLOROBENZENE	45-120
EPA 8270C	HEXACHLOROBUTADIENE	40-115
EPA 8270C	HEXACHLOROETHANE	35-110
EPA 8270C	INDENO (1,2,3-CD) PYRENE	40-120
EPA 8270C	ISOPHORONE	45-110
EPA 8270C	N-NITROSODI-N-PROPYLAMINE	40-115
EPA 8270C	N-NITROSODIMETHYLAMINE	20-115
EPA 8270C	N-NITROSODIPHENYLAMINE	50-115
EPA 8270C	NAPHTHALENE	40-105
EPA 8270C	NITROBENZENE	40-115
EPA 8270C	PENTACHLOROPHENOL	25-120
EPA 8270C	PHENANTHRENE	50-110
EPA 8270C	PHENOL	40-100
EPA 8270C	PYRENE	45-125
EPA 8081A	4,4'-DDD	30-135
EPA 8081A	4,4'-DDE	70-125
EPA 8081A	4,4'-DDT	45-140
EPA 8081A	ALDRIN	45-140
EPA 8081A	ALPHA-BHC	60-125
EPA 8081A	ALPHA-CHLORDANE	65-120
EPA 8081A	BETA-BHC	60-125
EPA 8081A	DELTA-BHC	55-130
EPA 8081A	DIELDRIN	65-125
EPA 8081A	ENDOSULFAN I	15-135
EPA 8081A	ENDOSULFAN II	35-140
EPA 8081A	ENDOSULFAN SULFATE	60-135
EPA 8081A	ENDRIN	60-135

Table 4 - Laboratory Control Limits - Soil
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Laboratory Analytical Method	Contaminant	LCS/MS/MSD Control Limit (%)
EPA 8081A	ENDRIN ALDEHYDE	35-145
EPA 8081A	ENDRIN KETONE	65-135
EPA 8081A	GAMMA-BHC	60-125
EPA 8081A	GAMMA-CHLORDANE	65-125
EPA 8081A	HEPTACHLOR	50-140
EPA 8081A	HEPTACHLOR EPOXIDE	65-130
EPA 8081A	METHOXYCHLOR	55-145
EPA 8081A	TOXAPHENE	50-150
EPA 8082A	AROCLOR 1016	47-134
EPA 8082A	AROCLOR 1221	NA
EPA 8082A	AROCLOR 1232	NA
EPA 8082A	AROCLOR 1242	NA
EPA 8082A	AROCLOR 1248	NA
EPA 8082A	AROCLOR 1254	NA
EPA 8082A	AROCLOR 1260	53-140
EPA 8082A	AROCLOR 1262	NA
EPA 8082A	AROCLOR 1268	NA
EPA 8082A	TOTAL PCBS	NA

Notes:
Controls limits were provided by Agriculture & Priority Pollutants Laboratories, Inc.
LCS - Laboratory Control Sample
MS - Matrix Spike
MSD - Matrix Spike Duplicate

Table 5 - Field Equipment Calibration, Maintenance, and Testing
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
RAE Systems MiniRAE 3000 organic vapor meter/photoionization detector (OVM-PID) or equivalent with 10.6 electron volt (eV) lamp	Calibrate at the beginning of each work day; check calibration at end of each day	As needed in field; semi-annually by supplier	Measure known concentration of Isobutylene 100 ppm (calibration gas)	Upon receipt, successful operation	Calibrate am, check pm	± 10% of the calibrated value	Manually zero meter or service as necessary and recalibrate	FTL in conjunction with equipment manufacturer's specifications	Manufacturer's specifications
QRAE Gas Detector combustible gas indicator or equivalent	Calibrate at the beginning of each work day; check calibration at end of each day	As needed in field; semi-annually by supplier	Measure known concentrations of carbon monoxide (50 parts per million [ppm]), hydrogen sulfide (10 ppm), lower explosive limit (LEL) (50%), and oxygen (20.9%) (calibration gas)	Upon receipt, successful operation	Calibrate am, check pm	± 10% of the calibrated value	Manually zero meter or service as necessary and recalibrate	FTL in conjunction with equipment manufacturer's specifications	Manufacturer's specifications
Dust Monitor (PDF-1000 Personal DataRAM or equivalent)	Calibrate at the beginning of each work day; check calibration at end of each day	Performed before shipment and as needed.	Check instrument is in working order	Check instrument is in working order	Check daily, before use	Pass / Fail	Return to rental company for replacement	FTL in conjunction with equipment manufacturer's specifications	Manufacturer's specifications
Trimble GeoXH or equivalent with Differential Global Positioning System (DGPS) capability	Factory calibrated by manufacturer prior to purchase or rental	Performed before shipment and as needed	Check instrument is in working order	Check instrument is in working order	Check daily, before use	Must be capable of collecting coordinates with an accuracy less than 1 meter	Return to rental company for replacement	FTL in conjunction with equipment manufacturer's specifications	Manufacturer's specifications

Notes:
NIST - National Institute for Standards and Technology
DO - dissolved oxygen
LEL - lower explosive limit
FTL - field team leader
µS/cm - microSiemen per centimeter
OVM-PID - organic vapor meter/photoionization detector
eV - electron volt
ppm - parts per million

Table 6 - Best Management Practices for Greener Cleanups
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Category	Best Management Practice	BMP Process: Priority (High, Medium, Low)	BMP Process: Selected for Implementation? (Y/N)	BMP Process: Rationale for Selection
Materials	Purchase materials in bulk quantities and packed in reusable/recyclable containers and drums to reduce packaging waste	Low	N	Low priority
Materials	Use products, packing material, and equipment that can be reused or recycled	Medium	Y	Recyclable materials will be used where possible
Materials	Prepare, store, and distribute documents electronically using an environmental information management system	Medium	Y	Electronic data management is already in use
Materials	Recycle as much non-usable/spent equipment/materials as possible following completion of project	Medium	Y	Recyclable materials will be recycled when possible
Project Planning and Team Management	Select facilities with green policies for worker accommodations and periodic meetings	Medium	N	Minimum meetings, limited choices for accommodations
Project Planning and Team Management	Use local staff (including subcontractors) when possible to minimize resource consumption	High	Y	Local staff are being used whenever possible
Project Planning and Team Management	Establish green requirements (for example, SMPs and BMPs) as evaluation criteria in the selection of contractors and include language in RFPs, RFQs, subcontracts, contracts, etc.	High	Y	Include green requirements in future subcontractor RFPs
Sampling and Analysis	Use field test kits for screening analysis of soil and groundwater contaminants such as petroleum, polychlorinated biphenyls, pesticides, explosives, and inorganics to minimize the need for offsite laboratory analysis and associated sample packing and shipping	Medium	N	Lab quality results and reporting limit not otherwise achievable
Sampling and Analysis	Contract a laboratory that uses green practices and/or chemicals	Medium	N	Local labs will be chosen over lab that uses green practices and/or chemicals.
Sampling and Analysis	Use tree core sampling to estimate the source/extent and/or age of a contaminant (for example, metals, VOCs, SVOCs) plume	Low	N	Low priority
Sampling and Analysis	Use local laboratory to minimize impacts from transportation	High	Y	A local laboratory is of high priority because samples are time-sensitive.
Sampling and Analysis	Use stressed vegetation to locate contaminant hotspots to guide development of sampling and analysis plans and optimize design of monitoring well network	Medium	Y	Stressed vegetation area was used to determine investigation areas
Site Preparation/Land Restoration	Revegetate excavated areas and/or areas disrupted by equipment or vehicles as quickly as possible using native vegetation, if possible, and restore as close as possible to original conditions	High	N	No revegetation, only backfilling with native soil, presumably containing native seeds
Site Preparation/Land Restoration	Minimize clearing of trees throughout investigation and cleanup	High	Y	NPS priority to preserve trees
Site Preparation/Land Restoration	Maximize use of native, non-invasive and/or drought resistant vegetative cover across the site during restoration using a suitable mix of shrubs, grasses, and forbs to preserve biodiversity and related ecosystem services	Medium	N	No revegetation, only backfilling with native soil, presumably containing native seeds
Site Preparation/Land Restoration	Minimize soil compaction and land disturbance during site activities by restricting traffic to confined corridors and protecting ground surfaces with biodegradable covers, where applicable	High	Y	NPS priority to preserve natural areas
Site Preparation/Land Restoration	Use onsite or nearby sources of backfill material for excavated areas, if shown to be free of contaminants	High	Y	will be backfilling with excavated materials regardless of contamination

Table 6 - Best Management Practices for Greener Cleanups
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Category	Best Management Practice	BMP Process		
		Priority (High, Medium, Low)	Selected for Implementation? (Y/N)	Rationale for Selection
Site Preparation/Land Restoration	When canopy closure has reached high percentage (for example, 75+%) allow naturalization to occur (that is, do not remove downed trees/branches except for safety/access issues, allow leaf litter to lay to create forest floor providing natural mulching and weed control)	Medium	Y	NPS priority to preserve natural areas
Site Preparation/Land Restoration	Design systems to allow natural volunteer growth/spreading to fill in entire target area over time (minimize initial planting; fill in over time), if time permits	Medium	Y	Top soil of backfilled area will be backfilled with top soil from before excavation
Surface/Storm Water	Use gravel roads, porous pavement, and separated pervious surfaces rather than impermeable materials to maximize infiltration	Low	N	Low priority

Notes:

1. BMPs presented in this table are BMPs from the ASTM Standard Guide for Greener Cleanups (ASTM 2014) Table X3.2. Only BMPs applicable to investigation activities at the Gaylor Former Waste Disposal Area are included.

List of Acronyms

BACT	best available control technology
BMP	best management practice
DPT	direct-push technology
MACT	maximum achievable control technology
REC	renewable energy credit
RFP	request for proposal
RFQ	request for quotation
SMP	standard management practice
SVOC	semi-volatile organic compound
VOC	volatile organic compound
TBD	to be determined
Y/N	yes/no

Table 7 - Sample Handling Requirements
Vogelsang Former Waste Disposal Area
National Park Service, Yosemite National Park, California

Sample Matrix	Analysis	Analytical Method	Container Type	No. Containers	Required Vol. (total)	Preservation	Technical Holding Time
Soil (discrete)	CAM 17 Metals	SW 6020A	Small zip-lock bag	1	50 grams	none	180 days
Soil (discrete)	Mercury	SW 7471A					28 days
Soil (ISM)[1]	TPH-D/MO w/wo silica gel cleanup	EPA 8015B	--	–	–	–	Extraction - 14 days Analysis - 40 days
Soil (ISM)[1]	SVOCs	EPA 8270C	--	–	–	–	Extraction - 14 days Analysis - 40 days
Soil (ISM)[1]	PAHs	EPA 8270C (SIM)	--	–	–	–	Extraction - 14 days Analysis - 40 days
Soil (ISM)[1]	CAM 17 Metals	SW 6020A	--	–	–	–	180 days
Soil (ISM)[1]	Mercury	SW 7471A	--	–	–	–	28 days
Soil (ISM)[1]	Dioxin/ Furan	EPA 8290	--	–	–	–	Extraction - 30 days Analysis - 45 days
Soil (ISM)[1]	PCBs	EPA 8082	--	–	–	–	Extraction - 14 days Analysis - 40 days
Soil (ISM)[1]	Pesticides	EPA 8081A	--	–	–	–	Extraction - 14 days Analysis - 40 days
ISM Soil Samples[1]	TPH-D/MO,SVOCs, PAHs, CAM 17 Metals, Mercury, Pesticides, Dioxin/ Furan, Pesticides, PCBs	(see above for separate analyses)	1 gallon zip-lock bag / 1 kg	1	1 kg	Store at $0^{o}C$ to $6^{o}C$	(see above for separate analyses requirements)
Water - Equipment Blank	CAM 17 Metals Total	SW 6020A	250 mL HDPE	1	150 mL	HNO_3, Store at $0^{o}C$ to $6^{o}C$	180 days
Water - Equipment Blank	Mercury Total	SW 7470A	250 mL HDPE (same bottle as total CAM 17 metals)	1	150 mL	HNO_3, Store at $0^{o}C$ to $6^{o}C$	28 days
Water - Equipment Blank	SVOCs	EPA 8270C	1L Amber glass bottle	2	2000 mL	Store at $0^{o}C$ to $6^{o}C$	7 days
Water - Equipment Blank	PAHs	EPA 8270C (SIM)	1L Amber glass bottle	2	2000 mL	Store at $0^{o}C$ to $6^{o}C$	7 days
Water - Equipment Blank	TPH-D/MO	EPA 8015B	1L Amber glass bottle	2	2000 mL	Store at $0^{o}C$ to $6^{o}C$	Extraction - 7 days Analysis - 40 days
Water - Equipment Blank	Pesticides	EPA 8081A	1L Amber glass bottle	2	2000 mL	Store at $0^{o}C$ to $6^{o}C$	Extraction - 7 days Analysis - 40 days
Water - Equipment Blank	PCBs	EPA 8082	1L Amber glass bottle	1	1000 mL	Store at $0^{o}C$ to $6^{o}C$	7 days
Water - Equipment Blank	Dioxin/ Furan	EPA 8290	1-Lamber glass	2	2000 mL	Store at 4°C (+/- 2°C)	extraction - 30 days analysis - 45 days

Notes:
1. These soil samples will be collected via the incremental sampling methodology (ISM). Subcontractor laboratory shall process all soil samples per ISM before undergoing analysis.

Abbreviations:

TPH - total petroleum hydrocarbon
D/MO - diesel and motor oil range
VOCs - volatile organic compounds
SVOCs - semi-volatile organic compounds

gm - gram
mL - milliliter
HDPE - high density polyethylene
VOA - volatile organic analysis

PAHs = Polyaromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
PCP = Pentachlorophenol
CAM = California Assessment Manual

Appendix C – Human Health and Ecological Risk Assessment

Draft

EE/CA Appendix C

Human Health and Ecological Risk Assessments

Vogelsang Former Waste Disposal Area

Yosemite National Park, California

Prepared by Kane Environmental

July 2021

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List of Abbreviations and Acronyms

95UCL	95 percent upper confidence limit
ABS	absorption fraction
ADD	average daily dose
AT	averaging time
ATSDR	Agency for Toxic Substances and Disease Registry
AUF	area use factor
BERA	baseline ecological risk assessment
bgs	below ground surface
BW	body weight
C	concentration
CalEPA	California Environmental Protection Agency
CADD	carcinogen average daily dose
CCME	Canadian Council of Ministers of the Environment
CDC	Centers for Disease Control
CF	conversion factor
CFR	Code of Federal Regulations
cm2	square centimeter
COC	chemical of concern
COEC	chemical of ecological concern
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CSM	conceptual site model
CTE	central tendency exposure
CV	coefficient of variation
DA	absorbed dose
DAD	dermally absorbed dose
DAF	dermal adherence factor
DF	dietary fraction
DI	daily intake
DTSC	California Department of Toxic Substances Control
DU	decision unit
EcoSSL	ecological soil screening level
EC	exposure concentration
ED	exposure duration
EE/CA	engineering evaluation/cost analysis
EF	exposure frequency
EPC	exposure point concentration
ERA	ecological risk assessment
ERAGS	Ecological Risk Assessment Guidance for Superfund

ESL	ecological screening level
ESV	ecological screening value
ET	exposure time
EU	exposure unit
EV	event frequency
foc	fraction organic carbon
g	gram
GLWQI	Great Lakes Water Quality Initiative
HERO	Human and Ecological Risk Office
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
hr	hour
IR	intake rate
ISM	incremental sampling methodology
ITRC	Interstate Technology & Regulatory Council
IUR	inhalation unit risk
kg	kilogram
L	liter
LANL	Los Alamos National Laboratory
LOAEL	lowest observed adverse effect level
m^3	cubic meter
MDL	method detection limit
mg	milligram
NCADD	non-carcinogen average daily dose
NCEA	National Center for Environmental Assessment
NOAEL	no observed adverse effect level
NPS	National Park Service
OEHHA	CalEPA Office of Environmental Health Hazard Assessment
ORNL	Oak Ridge National Laboratory
PAH	polycyclic aromatic hydrocarbon
Park	Yosemite National Park
PCP	pentachlorophenol
PEF	particulate emission factor
PQL	practical quantitation limit
PRG	preliminary removal goal
QC	quality control
RAGS	Risk Assessment Guidance for Superfund
RBA	relative bioavailability
RfC	reference concentration
RfD	reference dose
RL	reporting limit
RME	reasonable maximum exposure
RSL	regional screening level
SA	surface area
SF	slope factor
Site	Vogelsang Former Waste Disposal Area
SLERA	screening level ecological risk assessment

SVOC	semi-volatile organic compound
TCDD	2,3,7,8-tetrachlorodibenzodioxin
TEF	toxicity equivalency factor
TEQ	toxic equivalent
TOC	total organic carbon
TPH	total petroleum hydrocarbon
TRV	toxicity reference value
TWA	time-weighted average
UF	uncertainty factor
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
µg	microgram

1. Introduction

1.1. Document Purpose

This document presents the human health and ecological risk assessments for the Vogelsang Former Waste Disposal Area (Site) in Yosemite National Park (Park) in California. The purpose of this document is to estimate potential site-related risks to human health and the environment, both now and in the future, from chemicals present in environmental media due to historical activities at the Site. Results of this assessment are intended to help inform risk managers and the public about the magnitude of any human or ecological risks attributable to site-related chemicals and to help determine if there is a need for action at the Site.

This risk assessment is Appendix C of the engineering evaluation/cost analysis (EE/CA) for the response action being conducted at the Site by NPS and complies with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act and the National Oil and Hazardous Substances Pollution Contingency Plan. This risk assessment was generated in basic accordance with the United States Environmental Protection Agency's (USEPA's) *Risk Assessment Guidance for Superfund (RAGS)* for human health (*Part A* [USEPA 1989], *Part E* [USEPA 2004a], and *Part F* [USEPA 2009]) and *Ecological Risk Assessment Guidance for Superfund (ERAGS)* (USEPA 1997). As appropriate, the California Department of Toxic Substances Control (DTSC)-specific risk assessment guidance provided by the Human and Ecological Risk Office[1] (HERO) was also incorporated.

NPS has a number of regulations that apply to the release of hazardous substances on property under the jurisdiction of NPS (see NPS 2015), including the Organic Act of 1916 (16 U.S. Code § 1, et seq. 36 Code of Federal Regulations [CFR] Part 1), which requires that NPS manage parks in order "*to conserve the scenery and the natural and historic objects, and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.*" Therefore, determining whether contaminants at the Site pose risks to current and future human and ecological receptors is especially relevant to the NPS responsibility to protect park resources.

1.2. Document Organization

In addition to this introduction, this document is organized as follows:

- Section 2 – This section provides a brief overview of the site location, history, geology, hydrology, and local biotic environment; the reason for contamination concern; and a summary of the investigations that have been conducted at the Site.

[1] http://www.dtsc.ca.gov/AssessingRisk/index.cfm

- Section 3 – This section provides a human health risk assessment (HHRA), including the conceptual site model (CSM) of contamination and exposed human populations, the selection of chemicals of potential concern (COPCs) for human health, an exposure assessment, toxicity assessment, risk characterization, and uncertainty assessment.
- Section 4 – This section provides an ecological risk assessment (ERA), including the ecological problem formulation, a screening level ecological risk assessment (SLERA) that identifies chemicals of potential ecological concern (COPECs), and an initial baseline ecological risk assessment (BERA) that provides a simple risk characterization and uncertainty assessment.
- Section 5 – This section would typically develop risk-based preliminary removal goals (PRGs) for the chemicals in each exposure medium where unacceptable risks were identified in the risk assessments; however, for this Site, no COCs or COECs were identified, and no PRGs are developed.
- Section 6 – This section provides full citations for all guidance documents, reports, and journal articles cited in this document.

All cited tables, figures, and attachments are included at the end of this document.

2. Site Background

This section summarizes the known environmental information and historical activities that have previously occurred at the Site. Detailed information on the site history and previous investigation results is presented in the main EE/CA report and will not be repeated in this document.

2.1. Location

The Site is in a wilderness area within the Cathedral Range south of Tuolumne Meadows at an elevation of approximately 10,300 feet above mean sea level. The Site is within a sparsely vegetated subalpine pine forest and is accessed from Tuolumne Meadows via a 6.9-mile hiking trail along Rafferty Creek. The FWDA is about 100 feet southwest of the Vogelsang HSC in a grassy ephemeral drainage between two low granite outcrops. It is bordered by Fletcher Creek to the south, a meadow and leach field to the west, a corral for pack animals to the north, and a granite outcrop to the east. The FWDA encompasses less than 0.65 acre, with most of the subsurface debris concentrated in several depressions. Figure 1 in the main body of this EE/CA report shows the site location.

2.2. Environmental Setting

2.2.1. Site Geology and Hydrogeology

As described in the SI, and taken from the 2002 FSI (IT Corporation 2002), the Vogelsang FWDA is located within the Sierra Nevada granitic batholith. The native soil at the site consists mostly of sand and silt with minor clay and gravel. The soil materials are primarily granitic in origin with lesser amounts derived from local metamorphic rocks. The depth to bedrock within the main portion of the FWDA varied between 2.5 and 3.5 feet below ground surface (bgs).

There is no evidence of surface water at the site, although there may be ephemeral drainage across the site from the northeast to the southwest. The nearest down-slope surface water occurrence is Fletcher Creek, approximately 350 feet southwest of the site. Other nearby surface water bodies include Fletcher Lake, Vogelsang Lake, and Boothe Lake; of which only Boothe Lake is downslope from the Site. Due to the distance from the site, surface water is not considered to be a pathway of exposure for ecological or human receptor populations at the Site.

2.2.2. Site Hydrology

The Site has a southwest facing aspect and about a 15% slope that slopes down to Fletcher creek about 350 feet from the site. Fletcher creek is a Palustrine, Emergent, Persistent, Seasonally Flooded wetland (Harris 2020) that flows from Fletcher Lake down to the Merced River.

The SI found no groundwater at the site above the bedrock at 2-3 feet bgs. The nearest drinking water well is located at the Tuolumne Meadows Ranger Station, 7.5 miles north of Vogelsang in the Tuolumne River drainage system. The nearest drinking water wells near the Merced River drainage are at Yosemite Lodge, approximately 16 miles from the FWDA. Due to the distance of these locations from the site, drinking water is not considered to be an exposure route for human receptor populations.

2.3. Sensitive Environments

The USEPA defines sensitive environments as "a terrestrial or aquatic resource, fragile natural setting, or other area with unique or highly valued environmental or cultural features" (USEPA 1991a). The Site is considered a sensitive environment because it is located inside the Park, and national parks are defined as sensitive environments by the USEPA (USEPA 1992a).

2.4. Current and Future Property Use Scenarios

The Vogelsang HSC, which consists of several tent cabins, a kitchen and dining tent, and stable facilities, was established in 1940 as a refuge for backpackers and hikers. The Vogelsang HSC continues to be used as a basecamp for hikes to the surrounding alpine lakes, including Evelyn Lake, Ireland Lakes, Booth Lake, Emeric Lake, and Vogelsang Lake. There is no direct access road into the camp; recreational users access the camp on foot and by horseback The Vogelsang HSC consists of several tent cabins, a kitchen and dining tent, and stable facilities.

Although the Site was used as a waste disposal area in the past, disposal records verifying uses of the site were not kept. It is likely that waste disposal spanned from 1940 to 1965. Debris has been found burned at the site.

The Site is considered natural wilderness and will not be developed in the future per the Wilderness Act. No construction activities are anticipated in the future.

2.5. Reason for Concern

Following the completion of the RFA, in August 2001, IT Corporation conducted an FSI of the Vogelsang FWDA to determine potential impacts to soil as a result of waste accumulation at the Site. According to the FSI, the investigation was conducted to determine the nature and extent of chemicals in the soil as a result of waste accumulation from the Vogelsang High Sierra Camp (HSC) from the early 1930s to the late 1960s or early 1970s (IT Corporation 2002). As part of the FSI, data presented in the RFA were used to complete the Potential Hazardous Waste Site PA Form (provided in Appendix A of the FSI). The FSI concluded site soil had the potential to be adversely impacted but recommended further investigation to better define the nature and extent of these impacts (IT Corporation 2002).

2.6. Summary of Site Investigations

The EE/CA and the SI reports provide detailed discussions of the various historical investigations that have been performed at the Site. These are summarized briefly below (presented in chronological order):

- In 1998, a PA site visit conducted by NPS concluded that all detection contaminants were less than default human health screening levels except arsenic, which exceeded the residential soil screening level but was less than the industrial soil screening level. No ecological screening was conducted.

- For the 2002 FSI, four test pits were hand excavated within the main debris area at the Site. Sampling locations and site characteristics are illustrated in Figure 2-2 of the SI. Subsurface debris was noted in three test pits (TP02, TP03, and TP04), with a maximum known depth at 3.5 feet bgs (IT Corporation 2002). The lateral extent of the subsurface debris as approximately 1,800 square feet (ft^2). Waste was observed on the surface over lateral extent of about 19,500 ft^2 (see dotted line in Figure 2-2 of the SI). Waste areas appear to be a series of small discrete pits across the FWDA, with each pit approximately 10 feet in diameter and up to 4 feet in depth.

- In 2011, a letter to DTSC (NPS 2011) confirmed the extent of surface debris, and described the nature of the debris, the condition of vegetation at the Site, and the proximity of the Site to surface water and developments associated with the Vogelsang HSC.

- In 2018, using a magnetic utility locator, NPS identified eight areas with concentrated metal that aligned with depressions or flat areas with sparse vegetation. Field sketches from this site reconnaissance are presented in Figure 2-3 of the SI report (CDM Smith 2018). The area encompassed by these eight potential waste areas was estimated to be less than about 0.65 acre in size. The waste areas appeared to be small discrete pits, approximately 10 feet in diameter.

- In 2018, an ESI was conducted to provide an expanded assessment of site conditions and address data gaps in the FSI (CDM Smith 2018). The SI provides a summary of the objectives and results of the ESI sampling program. Surface soil sampling was performed at each DU using an ISM approach (ITRC 2012). A detailed description of the ISM sample collection and field documentation procedures is provided in the ESI SAP. The following provides a summary of each component of the sampling performed:

  - *DU-1*: DU-1 encompassed the extent of the FWDA with subsurface debris present with an area of approximately 8,271 ft2 (0.19 acres). The DU was divided into 30 equal area increments with three surface (0 to 6 inches bgs) and three subsurface (6 inches to 4 feet bgs) replicates collected. For surface sampling, 28 of 30 increments were collected for each of three replicates (2 of 30 were not collected due to refusal at the surface). For subsurface sampling, between 17 and 19 increments out of 30 were successfully collected for each of three replicates, with missing increments due to shallow refusal on bedrock.

  - *DU-2*: DU-2 encircled the DU-1 area by approximately 15 to 30 feet in all directions with an area of approximately 9,326 ft2 (0.21 acres). DU-2 was subdivided into three roughly equal SU areas, with SU-1 located in the downgradient direction, and SU-2/SU-3 located in the up/cross gradient direction. One ISM sample of 30 increments was collected in each SU area. Several shallow refusals in SU-2 and SU-3 were encountered on the surface due to exposed bedrock in these areas. The approximate size of each SU area in DU-2 is as follows:

  - SU-1: 3,311 ft2 (0.076 acre)
  - SU-2: 2,614 ft2 (0.060 acre)
  - SU-3: 3,398 ft2 (0.078 acre)

- *DU-3*: DU-3 extended beyond DU-2 by approximately 80 to 90 feet in the downgradient direction with an area of approximately 10,224 ft2 (0.23 acre). DU-3 was subdivided into three roughly equal SU areas with SU-1, SU-2, and SU3 located at increasing distance in the downgradient direction. One ISM sample of 30 increments was collected in each SU area. Shallow refusals at DU-3 were generally not encountered due to more well-developed soil. The approximate size of each SU area in DU-3 is as follows:
  - SU-1: 3,180 ft2 (0.073 acre)
  - SU-2: 2,962 ft2 (0.068 acre)
  - SU-3: 4,095 ft2 (0.094 acre).

A map depicting the locations of the DUs at the Vogelsang Site is provided in Figure 2 in the main EE/CA report.

2.7. Data Summary

The soil samples collected in 2018 are used in this risk assessment to characterize potential exposures and risks for human and ecological receptors at the Site. The site data are presented in the Final Vogelsang SI report (CDM Smith 2019), and summarized in the EE/CA report to which this risk assessment is appended.

Data from the EE/CA investigations were used in this risk assessment as per the following:

- All surface soil data from four Decision Units were used to characterize exposures. Subsurface soil data collected from Decision Unit 1 were used to evaluate subsurface soil exposures.

- Data collected from soil bore holes were not used to assess risks, since they were not collected for that purpose. The Decision Unit sampling methodology was designed to provide data for evaluating receptor exposures for use in risk assessment; all exposures were evaluated based on those data.

- All data used in the risk assessment were validated; data qualified as “R” to indicate rejected data were not used in the risk assessment. Data qualified with “J” indicating estimated values, were retained. Estimated results are considered sufficiently certain for use in risk assessment, but the values could be biased high or low. Non-detect results (qualified with “U”) were used in the risk assessment.

- Field quality control (QC) samples (e.g., field, trip, and equipment rinsate blanks) and laboratory QC samples (e.g., matrix spikes, internal standards) were excluded from use in the risk assessment.

3. Human Health Risk Assessment

This section presents the HHRA for the Site. This section includes the conceptual model of site contamination; summarizes the exposed human populations; presents the COPC selection for human health; and provides the exposure assessment, toxicity assessment, risk characterization, and uncertainty assessment.

3.1. Conceptual Site Exposure Model for Humans

The CSM depicts the understanding of how chemical contaminants have been released to the environment at the Site. The CSM also lists the exposure pathways and routes for human and ecological receptors that were quantitatively evaluated in the risk assessment. The human receptors and the pathways and routes through which they might be exposed to contaminants at the Site are depicted in a graphical presentation of the CSM in Figure 3-1. The main features of the CSM and the rationale supporting which human receptors and pathways/routes are identified for risk quantification in the HHRA are discussed below.

3.1.1. Contaminant Source Areas

According to the 2002 FSI, debris was scattered in the surface across the Site (0.45 acre), with a portion of debris extending to the subsurface. The maximum known depth of subsurface debris is 3.5 feet bgs (IT Corporation 2002). The subsurface debris acreage estimated in the FSI assumed a contiguous debris zone; however, during the ESI, debris was observed in small, discrete piles at depths less than 3.5 feet bgs.

The primary medium of potential concern is soil. Given the elevation of the Site, the presence of bedrock at a shallow depth (less than 4 feet bgs), the relatively shallow extent of debris (less than 3.5 feet bgs), and the absence of groundwater at these shallow depths, groundwater is assumed to be not of concern at this Site. Although an ephemeral drainage is present, no surface water has been observed during any of the site investigations. Thus, it is expected water is only present in this drainage during snowmelt and does not provide any aquatic habitat, nor would it provide a source for significant human exposures, though it may cause contaminant migration.

3.1.2. Transport in the Environment

Chemical contaminants released to soil due to historical waste disposal activities may migrate in the environment by several processes:

- Fine-grained soil particulates may be released into air because of wind erosion and/or human disturbances.

- Contaminants in soil may be dissolved by water (rain or snowmelt). Infiltration of precipitation into subsurface (vadose zone) soils may result in subsurface soil contamination.

- Contaminants in soil may be taken up into the tissues of terrestrial plants and animals (e.g., soil invertebrates, small mammals), which can be ingested by terrestrial wildlife.

3.1.3. Land Use and Populations of Concern

The Site is located 100 feet southwest of the Vogelsang HSC, which is one of five HSCs in the Park and features 12 cabins with a total capacity of 42 guest beds. More than 13,000 visitors stay at the HSCs every year and several thousand backpackers stop at the camps for meals[2]. NPS personnel visit the Vogelsang HSC periodically, especially during the peak tourist season (July to September).

Park visitors engaged in recreation and Park personnel are the primary human population of concern under both current and future use scenarios. Recreational activities at the Site could include picnicking and hiking. Site visitor receptors are assumed to consist of young children (less than 6 years old), older children (6 to 16 years old), and adults (greater than 16 years old). Complete exposure routes for these receptors include inhalation of ambient air containing dust particles from surface soils, and ingestion of and dermal contact with surface soil (0 to 6 inches bgs). Due to the Site's age, any volatile organic compounds in the soil would likely have volatilized, and exposure through inhalation of volatile contaminants is likely to be low or negligible.

NPS employees could visit the Site as part of normal outdoor maintenance activities under both current and future conditions. Although no construction activities are planned at the Site, restoration projects or construction activities could occur in the future; thus, a future Park worker scenario and construction scenario are evaluated. Construction workers could be exposed to both surface and subsurface soils during excavation activities.

3.1.4. Exposure Routes of Concern

Humans can be exposed to contaminated environmental media by three general routes—ingestion, inhalation, and dermal contact. Human receptors may be exposed to contaminants at the Site through multiple exposure media and pathways; however, not all human exposure pathways are likely to be of equal concern. To be of concern, an exposure pathway must be complete. That is, there must be contact between a human receptor and a contaminated environmental medium. The relative importance of one pathway or route to another is related to the amount of chemical taken into the body. The following subsections present a more detailed

[2] https://www.travelyosemite.com/lodging/high-sierra-camps/#vogelsang

description of exposure pathways and routes, and an analysis of their relative importance for human exposure.

Incidental Ingestion of Soil

The primary medium of concern at the Site is soil. Even though few people intentionally ingest soil, anyone who has direct contact with contaminated soil may incidentally ingest small amounts that adhere to their hands during outdoor activities. Incidental ingestion of soil is often one of the most important routes of human exposure; thus, ingestion of soil will be evaluated for all human receptor populations.

For park visitors, the soil depth interval of interest is surface soil, which is usually defined as 0 to 6 inches bgs. For NPS employees, most exposure is likely to occur at the surface. However, during any possible construction activities, exposure could also occur to soils deeper than 6 inches. Subsurface soils are considered to be the exposure medium for construction workers.

Dermal Contact with Soil

Park workers and visitors may also be exposed to soil through dermal contact. Information on the rate and extent of dermal absorption of chemicals in soil across the skin is limited, and this route is likely to be minor in comparison to exposure through ingestion. Metal contaminants in particular tend to bind to soils and have a relatively lower absorption across the skin compared to other chemicals. Dermal contact with surface soil (0 to 6 inches) was evaluated quantitatively for all receptors, and dermal contact with subsurface soil (0.5 to 4 feet) was evaluated for construction workers.

Inhalation of Airborne Particulates

Humans may be exposed to airborne particulates when fine-grained particles become suspended in air by wind and/or human activity. When soil is disturbed only by wind or light human activity, such as during walking/hiking, the amount of particulate material inhaled from air is generally quite small compared to the amount that is typically assumed for incidental ingestion.

Inhalation of airborne particulates derived from surface soil (0 to 6 inches) was evaluated quantitatively in the HHRA for all receptors. Inhalation of airborne particulates derived from subsurface soil (0.5 to 6 feet), which might be generated during excavation/construction activities, was evaluated for NPS construction workers.

Inhalation of Volatiles

Since volatile chemicals were not detected in soils, inhalation of volatiles from soils is not an exposure pathway of concern for the Site.

Exposure to Surface Water or Groundwater

As described above, there are no surface water features at the Site, other than possible ephemeral water flows, which would not likely be an exposure pathway for human receptors. Groundwater was not encountered prior to encountering bedrock during soil boring events, and is not presently and would not be useful in the future as a drinking water source. Both surface water, and associated sediments, and groundwater exposures are not evaluated further in this risk assessment.

Summary

In summary, the following human exposure pathways and routes are complete and were evaluated quantitatively in the HHRA:

- Current and Future Park Visitors (Young Children, Older Children, and Adults)
  - Incidental ingestion of and dermal contact with surface soil
  - Inhalation of airborne particulates derived from surface soil.
- Current and Future NPS Workers (Adults)
  - Incidental ingestion of and dermal contact with surface soil
  - Incidental ingestion of and dermal contact with subsurface soil during construction activities
  - Inhalation of airborne particulates derived from both surface and subsurface soil
- Current and Future Construction Workers (Adults)
  - Incidental ingestion of and dermal contact with surface soil
  - Incidental ingestion of and dermal contact with subsurface soil during construction activities
  - Inhalation of airborne particulates derived from both surface and subsurface soil.

3.2. Selection of COPCs

Chemicals of Potential Concern (COPCs) are chemicals that exist in the environment at the Site at concentration levels that might be a health concern to people. USEPA risk assessment methodology includes the identification of COPCs as those chemicals that are evaluated quantitatively for potential human health risks. The methodology for identifying COPCs consists of a screening process, whereby concentrations of chemicals in a given medium are compared with screening criteria that are designed to be health protective; i.e., any concentration below the screening value would not be expected to pose health risks to human receptor populations. The procedure consists of comparing the maximum concentration across all samples for each analyte in each medium to a risk-based screening level.

The lowest screening level across the following sources was used to identify human health COPCs:

- USEPA regional screening levels (RSLs) (November 2020 version) for residential soil, consistent with NPS guidelines. Although it is recognized that residential receptors are not present at the Site, nor are they anticipated in the future, the COPC selection was performed based on residential RSLs because these are the most conservative values. For carcinogens, the RSL is a concentration that corresponds to an excess cancer risk[3] of 1E-06. For non-carcinogens, the RSL is a concentration that corresponds to a hazard quotient (HQ) of 0.1[4].

- DTSC HERO HHRA Note 3 (DTSC 2018) for soil.

The COPC selection process is designed to eliminate chemicals that would pose little or no concern from further evaluation, and to focus on those chemicals that could pose an unacceptable risk. The Uncertainty Assessment (Section 3.6) discusses uncertainty around chemicals that were excluded as COPCs.

3.2.1. Soil COPC Selection

Human health COPCs for soil were identified by comparing the maximum detected concentration (across all collected soil samples) to the lowest residential soil screening level. COPCs were identified separately for surface soil (0 to 6 inches bgs) and subsurface soil (0.5 to 4 feet bgs).

The results of the soil COPC selection for human health are summarized in Table 3-1 and presented in further detail in Attachment A.1 (surface soil) and Attachment A.2 (subsurface soil). In total, four human health COPCs were identified for surface soil: arsenic, chromium, cobalt, and thallium. Two human health COPCs were identified for subsurface soil: arsenic and chromium.

3.2.2. Evaluation of Laboratory Limits

The COPC selection procedure focuses only on chemicals that have been detected. Excluding chemicals that are not detected is appropriate provided data were collected using analytical

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[3] Excess cancer risk can be expressed in several formats. A cancer risk expressed in a scientific notation format as 1E-06 is equivalent to 1 in 1,000,000 or 10^{-6}. For the purposes of this document, all cancer risks are presented in a scientific notation format (i.e., 1E-06).
[4] Use of a target HQ of 0.1 differs from the recommendation in DTSC HERO Note 3 (which states a target HQ of 1 should be used). Use of a target HQ of 0.1 is preferred by NPS and is a more conservative (i.e., health protective) approach for the purposes of identifying COPCs.

methods with detection limits that would have detected the chemical if it were present at a level of concern. Therefore, to ensure that analytical detection limits were adequate to support risk management decision-making, method- specific limits for each non-detected analyte in each medium were compared to the risk-based screening levels.

There are two different types of laboratory limits identified in the laboratory deliverables—a method detection limit (MDL) and a reporting limit (RL). The MDL is defined as the minimum concentration of a chemical that can be measured and reported with 99% confidence it is present above zero. The RL is an arbitrary number defined by the laboratory and is sometimes set equal to the practical quantitation limit (PQL). PQLs are often equal to the lowest laboratory standard level within the sample set and are normally about 3 to 10 times higher than the MDL. Confidence in reported concentrations above the PQL is higher than for concentrations between the MDL and the PQL.

For the soil analytical results, the detect/non-detect status for a chemical was determined based on the MDL. If the chemical was not present at a level above the MDL, the result was qualified with "U" and reported as non-detect. When the chemical was present at a concentration between the MDL and the RL, the result was qualified with the "J" qualifier and reported as an estimated concentration. Note that J-qualified data are considered by regulatory agencies as acceptable for use in risk assessments.

Whether the MDL for each chemical was low enough to detect a concentration that might be of concern for human health risk was determined by comparing the maximum MDL (across all non-detect samples) to the lowest available human health screening level. The comparisons for surface soil and subsurface soil analytical results are presented in Attachments A-1 and A-2. For those chemicals in which the maximum MDL is higher than the lowest available screening level, the MDL was deemed to be inadequate. Table 3-2 summarizes the list of chemicals in Site soils for which the MDL was not adequate relative to the human health screening levels.

The maximum MDL for 11 SVOCs for soil (both surface and subsurface soil) were deemed to be inadequate relative to the residential soil screening levels:

- 2,4-Dinitrotoluene
- 2,6-Dinitrotoluene
- 2-Nitrophenol
- 3,3´-Dichlorobenzidine
- 4,6-Dinitro-2-methylphenol
- Bis (2-chloroethyl) ether
- Hexachlorobenzene
- Hexachlorobutadiene
- Hexachloroethane
- N-Nitrosodimethylamine
- N-Nitrosodi-n-propylamine.

The residential screening levels are based on a default exposure frequency of 350 days per year for 26 years, whereas exposures to soils at the remote Site are likely to be much less frequent (e.g., at most 10 days per year for visitors and up to 30 days per year for Park workers). The levels of exceedance of the MDLs above the screening levels were mostly less than 2-5 times (see Attachment A). Also, no other organic chemical was detected in Site soils above its screening level, suggesting a lack of contamination by this class of chemicals at the Site. For all these reasons, these chemicals are not likely to pose risks to human receptors at the Site.

3.3. Exposure Assessment

Exposure is the process by which human or ecological receptors come into contact with chemicals in the environment. In general, receptors can be exposed to chemicals in a variety of environmental media (e.g., soil, water, air), and these exposures can occur through several pathways (e.g., ingestion, inhalation, dermal contact). The following two sections describe the basic equations and selected parameter inputs used to quantify exposures for the populations of interest for the Site.

3.3.1. Basic Equations

Ingestion Exposures

The amount of a chemical that is ingested is referred to as "intake" or "dose." For chemicals other than lead, exposure is quantified using an equation of the following general form:

$$DI = C \times (IR / BW) \times (EF \times ED / AT) \times RBA$$

where:

DI = daily intake of chemical (milligram of chemical per kilogram of body weight per day [mg/kg BW-day]).

C = concentration of the chemical in the contaminated environmental medium (soil) to which the person is exposed. The units are milligrams per kilogram (mg/kg) for soil.

IR = intake rate of the contaminated environmental medium. The units are kg/day for soil.

BW = body weight of the exposed person (kg).

EF = exposure frequency (days/year). This describes how often a person is likely to be exposed to the contaminated medium over the course of a typical year.

ED = exposure duration (years). This describes how long a person is likely to be exposed to the contaminated medium during their lifetime.

AT = averaging time (days). This term specifies the length of time over which the average dose is calculated. Two different averaging times are considered:

- Chronic exposure includes averaging times on the scale of years. Typically, residential exposures are averaged over 70 years; for this Site, exposures will be averaged for recreational time periods for children and adults, and for Park workers. This exposure duration is used when assessing non-cancer risks.
- Lifetime exposure employs an averaging time of 70 years. This exposure interval is selected when evaluating cancer risks.

RBA = relative bioavailability (unitless). This is a ratio of the amount absorbed from site media compared to amount absorbed in toxicity tests.

Dermal Exposures

Dermal exposures are evaluated following the methodology presented in USEPA's Risk Assessment Guidance for Superfund (RAGS) Part E: Supplemental Guidance for Dermal Risk Assessment (USEPA 2004a). Exposure to a chemical by the dermal pathway is generally expressed in terms of the amount of chemical that is absorbed into the body, rather than the amount ingested or inhaled. The amount of a chemical absorbed across the skin is referred to as the dermally absorbed dose (DAD), which is quantified using an equation of the following general form (USEPA 2004a):

$$DAD = DAevent \times EF \times ED \times EV \times SA / (BW \times AT)$$

where:

DAD = dermally absorbed dose (mg/kg BW-day).

DAevent = absorbed dose per event (mg of chemical per square centimeter of skin surface area per event [mg/cm^2/event]). This is media-specific and further described below.

EF = exposure frequency (days/year). This describes how often a person is likely to be exposed to the contaminated medium over the course of a typical year.

ED = exposure duration (years). This describes how long a person is likely to be exposed to the contaminated medium during their lifetime.

EV = event frequency (events/day). This describes the number of times per day a person comes into contact with a contaminant in soil.

SA = surface area (cm^2). This describes the amount of skin exposed to the contaminated media.

BW = body weight of the exposed person (kg).

AT = averaging time (days). This term specifies the length of time over which the average dose is calculated.

For chemicals in soil, DAevent is estimated as follows:

$$DAevent = C \times CF \times DAF \times ABSd$$

where:

C = chemical concentration in soil or sediment (mg/kg).

CF = conversion factor (10^{-6} kg/mg).

DAF = dermal adherence factor (mg/cm^2/event). This describes the amount of soil that adheres to the skin per unit of surface area.

ABSd = dermal absorption fraction (unitless). This value is chemical-specific and represents the contribution of absorption of a chemical across a person's skin from soil to the systemic dose.

Inhalation Exposures

Inhalation exposures are evaluated in accordance with the inhalation dosimetry methodology presented in USEPA's Risk Assessment Guidance for Superfund (RAGS) Part F: Inhalation Risk Assessment (USEPA 2009).

In accordance with USEPA (2009), the human intake equation does not include an inhalation rate (cubic meter [m^3]/day) or body weight because the amount of the chemical that reaches the target site is not a simple function of these factors. Instead, the interaction of the inhaled contaminant with the respiratory tract is affected by factors such as species-specific relationships of exposure concentrations to deposited/delivered doses and physiochemical characteristics of the inhaled contaminant (USEPA 2009).

Therefore, the inhaled exposure concentration (EC) for chronic exposures is calculated as follows:

$$EC = EPC_{air} \times (ET \times EF \times ED / AT)$$

where:

EC = exposure concentration (milligrams or micrograms per cubic meter [mg/m^3 or $\mu g/m^3$] of air). This is the time-weighted concentration based on the characteristics of the exposure scenario being evaluated.

EPC_{air} = concentration of the chemical in air (mg/m^3) to which the person is exposed.

ET = exposure time (hours/day). This describes how long a person is likely to be exposed to the contaminated medium over the course of a typical day.

EF = exposure frequency (days/year). This describes how often a person is likely to be exposed to the contaminated medium over the course of a typical year.

ED = exposure duration (years). This describes how long a person is likely to be exposed to the contaminated medium during their lifetime.

AT = averaging time (hours). This term specifies the length of time over which the TWA concentration is calculated.

3.3.2. Exposure Parameters

For every exposure pathway of potential concern, it is expected that there will be differences between different individuals in the level of exposure at a specific location due to differences in intake rates, body weights, exposure frequencies, and exposure durations. Thus, there is normally a wide range of average daily intakes between different members of an exposed population. In order to account for this range, daily intake calculations are based on intakes that are considered average or are otherwise near the central portion of the range, and on intakes that are near the upper end of the range. These two exposure estimates are intended to capture the range of exposures that would reasonably be expected for a given human population, and are referred to as central tendency exposure (CTE) and reasonable maximum exposure (RME), respectively. Both CTE and RME receptors are evaluated in the HHRA; however, in accordance with risk assessment guidance (USEPA 1991b), risk management decisions are based on the RME.

Tables 3-3 and 3-4 present the CTE and RME exposure parameters for Park workers and visitors, respectively. The values were selected based on site information, USEPA or DTSC HERO default guidelines (USEPA 2011, 2014; DTSC HERO Note 1), or professional judgement, which includes considering precedence set at similar sites in Yosemite National Park, which are based on recommendations from Park personnel and agency regulators. Note that while the total amount of time spent at the Park may be higher, it is not reasonable to assume the entirety of a receptor’s time at the Park would be spent at the Site, particularly given its location. Therefore, lower exposure time, frequency, and duration values were selected for use in estimating site-specific risks.

3.3.3. Exposure Point Concentrations

Soil

An exposure point (also referred to as an exposure unit or exposure area) is an area where a receptor may be exposed to one or more environmental media. Based on the assumption of random exposure over an exposure area, risk from a chemical is related to the arithmetic mean concentration of that chemical averaged over the entire exposure area. Because the true arithmetic mean concentration cannot be calculated with certainty from a limited number of measurements, USEPA recommends that the 95 percent upper confidence limit (95UCL) of the arithmetic mean be used as the exposure point concentration (EPC) when calculating exposure and risk at that location (USEPA 1992b). The mathematical approach that is most appropriate for computing the 95UCL of a dataset depends on several factors, including the number of data points available, the shape of the distribution of the values, the amount of variance in the data, and the degree of censoring (USEPA 2002a).

As shown in Figure 2 of the main body of the EE/CA report, the EE/CA investigations established three site soil Decision Units (DUs) (DU1 through DU3) and one background soil DU (DU4). The soil areas that the DUs address are described above in Section 2. In general, DUs were established such that they were no larger than about 0.25 acre in size, to correspond with the smallest exposure area assumed for the Site, which is for the shrew (see Section 4).

For most receptors, given the long-term nature of the exposure scenario (i.e., multiple days and years of exposure), it is likely that human receptors would be exposed to soils across the Site. With the exception of the construction/excavation activities discussed below, it is unlikely receptors would spend the entirety of their exposure within a single DU. Nevertheless, to be conservative, for surface soil (0 to 6 inches bgs) exposures were evaluated both on a DU-by-DU basis and on a sitewide basis. For each DU-specific exposure area, 95UCLs were derived from the Incremental Sampling Methodology (ISM) triplicate results using the Chebyshev calculation method as recommended by ITRC (2012). The EPC was set equal to the recommended 95UCL (even when the 95UCL was higher than the maximum replicate concentration) (ITRC 2012). If one or two of the ISM replicates for a DU were non-detect, the EPC was set equal to the maximum detected replicate concentration. If all three ISM replicates for a DU were non-detect, no risks were calculated for that chemical in that DU.

The sitewide exposure area was set equal to the entire Site (i.e., DU1 through DU3). All surface soil data from those three DUs were used to calculate surface soil 95UCLs. Subsurface soils were only collected from DU1, and sitewide subsurface data are not available; subsurface soil EPCs are based on the 95UCL on the three subsurface samples.

EPCs for surface soil were also calculated for the background DU (DU4) using the same procedures as described above (i.e., 95UCLs were calculated from the ISM triplicate results). Background EPCs are used to provide a frame of reference for interpreting site risks, by comparing risks associated with background exposures.

Tables 3-5 and 3-6 present the EPCs for surface soil and subsurface soil, respectively, that are used to quantify exposures in the HHRA.

Air

No measured data on air concentrations at the Site are available. Therefore, air concentrations were estimated from soil to evaluate inhalation exposures from airborne fugitive dust. There were no volatile COPCs identified for soil; therefore, no evaluation of inhalation of chemical vapors derived from soil was performed. A particulate emission factor (PEF) was used to estimate chemical concentrations in airborne dust for non-volatile contaminants from fugitive dust emission. Chemical concentrations in outdoor air were calculated as follows:

$$EPC_{air} = EPC_{soil} / (PEF) \times \text{fraction contaminated}$$

where:

EPC_{air} = exposure point concentration in air (milligrams per cubic meter [mg/m^3])

EPC_{soil} = concentration in soil (mg/kg); as presented as the EPCs in Tables 3-5 and 3-6

PEF = soil-to-air particulate emission factor (m^3/kg)

fraction contaminated = assumed to be 100% of the soil is contaminated.

For park visitors, the PEF is equal to the default value of 1.36E+09 m^3/kg (USEPA 2002b; DTSC HERO Note 1). For NPS employees and restoration workers, because both types of worker engage in digging activities, the PEF is equal to the default construction worker value of 1.00E+06 m^3/kg, as recommended in DTSC HERO Note 1.

The derivation of air particulate EPCs for each human receptor population at each DU is presented in Table 3-7.

3.4. Toxicity Assessment

3.4.1. Overview

The objective of a toxicity assessment is to identify the adverse health effects caused by a chemical and how the appearance of these adverse effects relates to the exposure dose. The toxic effects of a chemical often depend on the route of exposure (oral, inhalation, dermal) and the duration of exposure. Thus, a full description of the toxic effects of a chemical includes a listing of what adverse health effects the chemical may cause and how the occurrence of these effects depends upon dose, route, and duration of exposure.

The toxicity assessment process is usually divided into two parts: the first characterizes and quantifies the non-carcinogenic (non-cancer) effects of the chemical, and the second addresses the carcinogenic (cancer) effects of the chemical. This two-part approach is employed because there are typically major differences in the time-course of action and the shape of the dose-response curve for cancer and non-cancer effects.

3.4.2. Non-cancer Effects

Essentially all chemicals can cause adverse health effects at a sufficient dose. However, when the dose is sufficiently low, typically no adverse effect is observed. Thus, in characterizing the non-cancer effects of a chemical, the key parameter is the threshold dose at which an adverse effect first becomes evident. Doses below the threshold are considered safe, whereas doses above the threshold are likely to cause an effect.

The threshold dose is typically estimated from toxicological data (derived from studies of humans and/or animals) by finding the highest dose that does not produce an observable adverse effect and the lowest dose that does produce an effect. These are referred to as the "no observed adverse effect level" (NOAEL) and the "lowest observed adverse effect level" (LOAEL), respectively. The threshold is presumed to lie in the interval between the NOAEL and the LOAEL. However, to be conservative (protective), non-cancer risk evaluations are not based directly on the threshold exposure level but on a value referred to as the reference dose (RfD) for oral exposures or the reference concentration (RfC) for inhalation exposures.

The RfD and RfC are estimates (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

The RfD and RfC values are derived from the NOAEL or LOAEL by dividing by an uncertainty factor (UF) that reflects the limitations of the data used. If the data are from studies in humans and if the observations are considered reliable, the UF may be as small as 1.0. However, the UF is normally at least 10 and can be much higher if the data are limited. UFs are assigned to account for uncertainty arising from extrapolation of animal data to humans, the use of a LOAEL instead of a NOAEL, the use of less than chronic exposure, and other limitations in the available data (e.g., lack of reproductive data).

The effect of dividing the NOAEL or the LOAEL by a UF is to ensure that the RfD or RfC is not higher than the threshold level for adverse effects. Thus, there is always a margin of safety built into an RfD and RfC, and levels equal to or less than the RfD or RfC are nearly certain to be without any risk of adverse effect. Levels higher than the RfD or RfC may carry some risk, but because of the margin of safety, a level above the RfD or RfC does not mean that an effect will necessarily occur. The protectiveness of this margin of safety will vary from chemical to chemical, depending upon the quality of the data and the size of any applied UF. A chemical for which a large UF has been applied will generally have a higher margin of safety than a chemical with a smaller UF.

3.4.3. Cancer Effects

For cancer effects, the toxicity assessment process has two components. The first is a qualitative evaluation of the weight of evidence (WOE) that the chemical does or does not cause cancer in humans. Previously, this evaluation was performed by USEPA using the system summarized below:

WOE Group	Meaning	Description
A	Known human carcinogen	Sufficient evidence of cancer in humans
B1	Probable human carcinogen	Suggestive evidence of cancer incidence in humans
B2	Probable human carcinogen	Sufficient evidence of cancer in animals but lack of data or insufficient data in humans
C	Possible human carcinogen	Suggestive evidence of carcinogenicity in animals
D	Cannot be evaluated	No evidence or inadequate evidence of cancer in animals or humans
E	Not carcinogenic to humans	Strong evidence that it does not cause cancer in humans

USEPA has developed a revised classification system for characterizing WOE for carcinogens (USEPA 2005a). However, this system has not yet been implemented for several chemicals; thus, the older classification system is retained for use in this assessment.

For chemicals classified in Groups A, B1, B2, or C, using the USEPA guidelines (USEPA 1986), the second part of the toxicity assessment is to describe the carcinogenic potency of the chemical. This is done by quantifying how the number of cancers observed in exposed animals or humans increases as the dose increases. Typically, it is assumed that the dose-response curve for cancer has no threshold, arising from the origin and increasing linearly until high doses are reached. Thus, the most convenient descriptor of cancer potency is the slope of the dose-response curve at low doses (where the slope is still linear). This slope is referred to as the slope factor (SF), which has dimensions of risk of cancer per unit dose.

Estimating the cancer SF is often complicated by the fact that observable increases in cancer incidence usually occur only at relatively high doses, frequently in the part of the dose-response curve that is no longer linear. Thus, it is necessary to use mathematical models to extrapolate from the observed high dose data to the desired (but unmeasurable) slope at low dose. To account for the uncertainty in this extrapolation process, USEPA typically chooses to employ the 95UCL of the slope as the SF. That is, there is a 95% probability that the true cancer potency is lower than the value chosen for the SF. This approach ensures that there is a margin of safety in cancer and non-cancer risk estimates.

For inhalation exposures, cancer risk is characterized by an inhalation unit risk (IUR) value. This value represents the upper-bound excess lifetime cancer risk estimated to result from continuous lifetime exposure to a chemical at a concentration of 1 $\mu g/m^3$ in air.

3.4.4. Toxicity Values

Ingestion and Inhalation Exposures

Toxicity values (RfD, RfC, SF, and IUR values) established by USEPA are listed in the Integrated Risk Information System (IRIS) (USEPA 2020a). Other toxicity values are available as interim recommendations from USEPA's Superfund Technical Assistance Center operated by the National Center for Environmental Assessment (NCEA). A toxicity value hierarchy was developed by USEPA for use in site-specific risk assessments (USEPA 2003a). This hierarchy provides an order of preference of toxicity values, with Tier 1 being the preferred source of toxicity information if available, then Tier 2, followed by Tier 3. The recommended hierarchy of toxicity values is as follows:

- Tier 1 – USEPA’s IRIS: IRIS assessments have undergone external peer review in accordance with USEPA peer review guidance at the time of the assessment. IRIS health assessments contain USEPA consensus toxicity values.

- Tier 2 – USEPA’s PPRTVs: The Office of Research and Development/NCEA/Superfund Health Risk Technical Support Center develops PPRTVs on a chemical-specific basis when requested by USEPA’s Superfund program.

- Tier 3 – Other Toxicity Values: Tier 3 includes additional USEPA and non-USEPA sources of toxicity information, such as CalEPA and the Agency for Toxic Substances and Disease Registry (ATSDR). Priority should be given to those sources of information that are the most current, the basis for which is transparent and publicly available, and which have been peer-reviewed.

A table of toxicity values derived from these sources using the tiered system described above is maintained by USEPA as part of the RSL tables and updated bi-annually (USEPA 2020b). All toxicity values used in this assessment were taken from the most recent version of the RSL tables. Table 3-8 presents the human health toxicity values for each COPC:

For several chemicals (e.g., arsenic), the CalEPA OEHHA has developed alternate toxicity values for use in California, which differ from the values identified in IRIS. In addition, CalEPA has specified an alternate toxicity value hierarchy (DTSC HERO Note 10), in which CalEPA OEHHA toxicity values are given preference to IRIS, unless the IRIS values are more stringent. Table 3-8 also presents the CalEPA toxicity values. For the purposes of this HHRA, risk calculations are performed using the USEPA hierarchy (i.e., using IRIS toxicity values).

Additional considerations for specific COPCs are discussed below:

- For cadmium, two oral RfD values are available, depending on exposure medium (diet or water). The value for water is assumed to apply to surface water exposures, of which there are none at this Site, whereas the value for diet is assumed to apply to all other media (i.e., soil and air).

- In the environment, chromium may be present in various valence states, but the trivalent form and the hexavalent form are the most predominant, depending upon the nature of the contamination source and environmental conditions (Shahid *et al.* 2017). In the absence of a specific hexavalent chromium source, chromium exists in the environment mainly as trivalent chromium (ATSDR 2012; Han et al. 2004). The valence state of chromium in soil at the Site is not known, and data are available only for total chromium. However, given that there are no specific sources of hexavalent chromium at the Site, risk calculations assumed the form of chromium present in the collected soil samples was trivalent.

Dermal Exposures

Oral toxicity factors (oral RfDs and oral SFs) are expressed in terms of toxicity per unit dose of chemical ingested, rather than in terms of toxicity per unit amount of chemical absorbed. However, the equations for characterizing dermal contact with chemicals provides exposure values that are based on absorbed dose rather than ingested dose. Thus, oral RfD and SF values must be adjusted for use in evaluating dermal exposures as follows:

$$\text{RfD(dermal)} = \text{RfD(oral)} \times \text{oral absorption fraction}$$

$$\text{SF(dermal)} = \text{SF(oral)} / \text{oral absorption fraction.}$$

Table 3-8 lists the oral absorption fractions (GIABS) used to adjust oral toxicity values for use in assessing dermal exposure, as recommended in USEPA (2004a). If chemical-specific oral absorption fractions are not available or if the GIABS value is greater than 0.5 (50%), a value of 1.0 (100%) is assumed in accordance with dermal guidance (USEPA 2004a).

3.4.5. Relative Bioavailability

An accurate assessment of human exposure to ingested chemicals requires knowledge of the amount of chemical absorbed from the gastrointestinal tract into the body from site media compared to the amount of absorption that occurred in the toxicity studies used to derive the toxicity factors. This ratio (amount absorbed from site media compared to the amount absorbed in toxicity tests) is referred to as RBA.

In general, metals in soil exist in mineral forms that are not rapidly solubilized in gastrointestinal fluids when ingested, whereas toxicity studies often utilize readily soluble forms of the test chemical. Thus, oral RBA values for metals in soil are often less than 1.0. For the purposes of the risk estimates, with the exception of arsenic, it was assumed the oral RBA values for all COPCs was 1.0. This assumption is likely to result in an overestimation of exposure and risk, especially for metals in soil. For arsenic, because no site-specific estimates of bioavailability are available, the USEPA default RBA of 0.60 was assumed (USEPA 2012).

3.5. Risk Characterization

3.5.1. Basic Approach

The following subsections provide the basic approach for characterizing risks for non-cancer and cancer effects from exposure to non-lead COPCs.

Non-cancer Effects

Hazards from Ingestion and Dermal Contact

The potential for non-cancer effects from site-related ingestion exposures is evaluated by comparing the estimated exposure from site media to an exposure level that is believed to be safe (USEPA 1989). This ratio is called an HQ and is calculated as follows for ingestion and dermal contact exposures:

$$HQ = NCADD / RfD$$

where:

HQ = hazard quotient

NCADD = non-carcinogen average daily dose (mg/kg-day)

RfD = reference dose (mg/kg-day)

Hazards from Inhalation

For inhalation exposures, the potential for non-cancer effects is evaluated by comparing the time-weighted EC over a specific period to the RfC for that chemical as follows (USEPA 1994):

$$HQ = NEC / RfC$$

where:

HQ = hazard quotient

NEC = non-carcinogen exposure concentration (mg/m^3)

RfC = inhalation reference concentration (mg/m^3).

Hazard Interpretation

If the HQ for a chemical is less than or equal to 1, it is believed there is no appreciable risk that non- cancer health effects will occur. If an HQ exceeds 1, non-cancer effects could occur although an HQ above 1 does not indicate an effect will definitely occur. This is because the margin of safety inherent in the derivation of all RfD values will likely lead to overestimation of non-cancer hazards. However, the larger the HQ value above 1, the greater is the concern that adverse health effects may occur.

If an individual is exposed to more than one chemical, a screening level estimate of the total non-cancer risk is derived simply by summing the HQ values for that individual. This total is referred to as the hazard index (HI). If the HI value is less than or equal to 1, non-cancer risks are not expected from any chemical, alone or in combination with others. If the screening level HI exceeds 1, it may be appropriate to perform a follow-on evaluation in which HQ values are added only across chemicals that affect the same target tissue or organ system (see Table 3-8 for a summary of the target organs). This is because chemicals that do not cause toxicity in the same tissues are not likely to cause additive effects.

Cancer Effects

Risks from Ingestion and Dermal Contact

The excess risk of cancer from exposure to a chemical is described in terms of the probability that an exposed individual will develop cancer because of that exposure. The excess risk of cancer from ingestion and dermal contact exposure to a chemical is calculated as follows (USEPA 1989):

$$\text{Excess cancer risk} = 1 - \exp(-\text{CADD} \times \text{SF})$$

where:

CADD = carcinogen

average daily dose, averaged over a lifetime (mg/kg-day)

SF = slope factor $(\text{mg/kg-day})^{-1}$

In most cases (except when the product of CADD × SF is larger than about 0.01), this equation may be approximated by the following:

$$\text{Excess cancer risk} = \text{CADD} \times \text{SF}$$

Risks from Inhalation

The excess risk of cancer from inhalation exposure for non-radionuclide chemicals is calculated based on IUR values as follows (USEPA 2009):

$$\text{Excess cancer risk} = \text{CEC} \times \text{IUR}$$

where:

CEC = carcinogen exposure concentration ($\mu g/m^3$)

IUR = inhalation unit risk $(\mu g/m^3)^{-1}$

Risk Interpretation

Excess cancer risks are summed across all carcinogenic chemicals and all exposure pathways that contribute to exposure of an individual in a given population. In general, NPS employs a threshold of 1E- 06 when evaluating the potential need for remedial actions. Risks that are below 1E-06 are so small as to be negligible, and risks that are above 1E-06 may warrant additional evaluation or some sort of remediation.

3.5.2. Risk Summary

Detailed risk estimates for each receptor, DU, exposure pathway, and COPC are presented in Attachment B. Tables 3-9 and 3-10 summarize the total HI and cancer risks, respectively, for exposures to surface soil and subsurface soil for each human receptor population and each DU. These tables highlight which exposure scenarios have total excess cancer risks greater than 1E-06 or non-cancer HIs greater than 1. Risk estimates for the site- specific background area (DU4) are also presented in these tables to provide a frame of reference for interpreting risk estimates for the Site.

As Tables 3-9 and 3-10 illustrate, no exposure scenarios resulted in non-cancer HIs greater than 1 or cancer risks greater than 1E-06 based on either RME or CTE exposures. These risk estimates support the conclusion that current and future exposures to contaminants at the Site would not result in unacceptable human health risks for park visitors, NPS employees, or construction workers.

3.6. Uncertainty Assessment

Confidence in quantitative estimates of risks to humans from environmental contamination may be limited by uncertainty regarding several key data items. These uncertainties are usually addressed by making assumptions or estimates for uncertain parameters based on whatever limited data are available. Because of these assumptions and estimates, the results of risk calculations are themselves uncertain, and it is important for risk managers and the public to keep this in mind when interpreting the results of a risk assessment. The following sections review the main sources of uncertainty in the risk calculations performed at the Site.

3.6.1. Exposure Assessment

Uncertainties from Exposure Pathways Not Evaluated

As discussed above, humans may be exposed to site-related chemicals by several pathways, but not all pathways were evaluated quantitatively in this risk assessment. This is because the contribution of the pathways excluded from the quantitative assessment is believed to be minor compared to one or more other pathways that were evaluated.

For example, ingestion and dermal contact exposures to surface water in the ephemeral flows are theoretically complete exposure pathways for park visitors and NPS employees. Because of the transient nature of the ephemeral flowing water, quantitation of exposures and risks associated with ingestion or dermal contact with the surface water would be highly uncertain and would not pose risks higher than exposures to soil or dust through inhalation. In other words, pathways that were not evaluated in the HHRA are likely insignificant compared to the other complete pathways that were quantitatively evaluated. Exclusion of exposure to ephemeral surface water flows could result in a small underestimation of exposure and risk, but the magnitude of this underestimation is expected to be too small to affect the conclusions of the risk assessment.

Uncertainties from Chemicals Not Evaluated Quantitatively

Chemicals for which the maximum detected concentration was below the respective screening level were not retained as COPCs and were not evaluated quantitatively in this assessment. Exclusion of these chemicals is not a significant source of uncertainty because the highest level of the chemical detected did not exceed conservative screening levels.

Chemicals that were never detected in Site soils but detection limits exceeded screening levels were not identified as COPCs and were excluded from quantitative evaluation in the risk assessment. Excluding chemicals that are not detected is appropriate provided that the achieved detection limits were low enough to detect a chemical if it were present at a level of concern. The maximum MDL for 11 SVOCs for soil were deemed to be inadequate relative to the residential screening levels (see Table 3-2). The analytical methods employed in the investigation provide the best available detection limits using conventional analytical instruments. As discussed previously in Section 3.3, in many instances, the achieved MDLs were variable; thus, for some chemicals, only a subset of the samples achieved adequate MDLs. Additionally, the residential screening levels used to select COPCs are based on a default exposure frequency of 350 days per year for 26 years, whereas receptor exposures to on-site media are likely to be much less frequent (e.g., 30 days per year at most).

Uncertainties from Excluding Chemicals without Toxicity Factors.

As discussed above, toxicity factors are needed to quantify risks from exposure to chemicals detected in environmental media. Toxicity factors are available for all but a few chemicals detected at the Site (see Attachment A). Although no strong conclusions can be reached regarding the potential for risk from chemicals without toxicity factors, it is suspected that the magnitude of the error that results from excluding these chemicals is usually likely to be low. This is because the absence of toxicity information for a chemical is most often because toxicological concern over that chemical is low. That is, chemicals that lack toxicity values have often not been well studied because existing data suggest relatively low toxicity to humans and researchers have focused their studies on chemicals with a higher potential for toxicity.

Uncertainties in Exposure Point Concentrations

In all exposure calculations, the desired input parameter is the true mean concentration of a contaminant within a medium, averaged over the area where random exposure occurs. However, because the true mean cannot be calculated based on a limited set of measurements, USEPA (1989, 1992b) recommends that the exposure estimate be based on the 95UCL. When data are plentiful and inter-sample variability is not large, the 95UCL may be only slightly higher than the mean of the data. However, when data are sparse or are highly variable, the 95UCL may be much higher than the mean of available data. Such is the case for estimating the 95 UCL of three ISM samples at this Site for most of the COPCs. However, because risk estimates were estimated to be low for the Site, this is not a significant limitation in this risk assessment.

Soil samples were collected from multiple locations across the Site. Soil samples were collected using ISM triplicates from each DU, with each ISM sample representing 30 increments. DUs were established based on the delineated extents of waste piles and included both on-site and background areas. As such, these samples are likely to provide a good representation of the levels of contaminants within the waste sources. Measured soil concentrations within each waste pile may be biased high relative to levels in the surrounding area. Thus, because actual receptor exposure areas would encompass locations outside the main waste piles, risk estimates would likely be lower than what is presented in this risk assessment.

In the case of exposures from dust released into air from soil, no measured data were available; therefore, airborne concentrations were estimated using soil-to-air transfer factors (i.e., PEF for airborne dust). In general, such predicted concentration values have high uncertainty compared to measured values; thus, the actual concentrations of COPCs in air are uncertain, and true values might be either higher or lower than the estimated values.

Uncertainties in Human Exposure Parameters

Accurate calculation of risk values requires accurate estimates of the level of human exposure that is occurring. However, many of the required exposure parameters are not known with certainty and must be estimated from limited data or knowledge. For example, data are absent on the exposure frequency and amount of actual soil ingested by park visitors to the Site, and the values used in the calculations are based mainly on professional judgment. In general, when exposure data were limited or absent, exposure parameters were chosen in a way that was intended to be conservative. For example, the construction worker RME scenario assumed exposures to subsurface soil would occur for 5 days per week for 6 weeks over 1 year (see Table 3-4); given the small areal extent of the debris piles within the Site (i.e., only about 0.25 acres of the total site area is within the piles), these exposure assumptions are likely to be conservative.

As illustrated, the values selected are thought to be more likely to overestimate than underestimate actual exposure and risk.

Uncertainties in Chemical Absorption (RBA)

The risk from an ingested chemical depends on how much of the ingested chemical is absorbed from the gastrointestinal tract into the body. This issue is especially important for metals in soil because some of the metals may exist in poorly absorbable forms and failure to account for this may result in a substantial overestimation of exposure and risk. In this assessment, with the exception of arsenic and lead, it was assumed that the RBA was 1.0 (100%) for all COPCs. Use of this assumption is likely to overestimate the true risk, with the magnitude of the error depending on the true RBA value. For arsenic, the USEPA default RBA value was used; i.e., 0.6 (60%) (USEPA 2012). Because risk estimates are already below levels of concern for metals, this uncertainty is unlikely to affect the conclusions of the risk assessment.

3.6.2. Toxicity Assessment

Toxicity information for many chemicals is often limited. Consequently, there are varying degrees of uncertainty associated with toxicity values (e.g., SF, IUR, RfD, RfC). For example, uncertainties can arise from the following sources:

- Extrapolation from animal studies to humans
- Extrapolation from high to low dose
- Extrapolation from continuous to intermittent exposure
- Limited or inconsistent toxicity studies.

In general, uncertainty in toxicity factors is one of the main sources of uncertainty in risk estimates at a site. Because of the conservative methods USEPA uses in dealing with the uncertainties in toxicological information, it is more likely that the uncertainty will result in an overestimation rather than an underestimation of risk.

As noted previously, the CalEPA OEHHA developed alternate toxicity values for several chemicals that differ from the values identified in USEPA's IRIS. The calculations in this risk assessment use the IRIS values. Based on the IRIS toxicity values, cancer risks and non-cancer hazards are below a level of concern. If risks were estimated based on the CalEPA toxicity values for arsenic and chromium, the estimated cancer risk and non- cancer hazard values would be higher, but overall risk conclusions would not change (i.e., risks would still be below a level of concern for all receptor populations).

For chromium, the toxicity factors depend on its valence state. Risks were evaluated assuming that chromium in environmental media at the Site exists in the trivalent form. However, if it were assumed up to 20% of the total chromium present in soil was in the hexavalent form (more toxic than trivalent), risks would still be below a level of concern for chromium. Therefore, uncertainty in the chemical form of chromium is unlikely to affect the conclusions of the risk assessment.

3.6.3. Risk Characterization

Because risk estimates for a chemical are derived by combining uncertain estimates of exposure and toxicity (see above), risk estimates for each chemical are more uncertain than either the exposure estimate or the toxicity estimate alone. Additional uncertainty arises from the issue of how to combine risk estimates across different chemicals. In some cases, the effects caused by one chemical do not influence the effects caused by other chemicals. In other cases, the effects of one chemical may interact with effects of other chemicals, causing responses that are approximately additive, greater than additive (synergistic), or less than additive (antagonistic). In most cases, available toxicity data are not sufficient to define what type of interaction is expected; therefore, USEPA generally assumes effects are additive for non- carcinogens that act on the same target tissue and for all carcinogens (all target tissues). Because documented cases of synergistic interactions between chemicals are relatively uncommon at levels of exposure that are environmentally relevant, this approach is likely to be reasonable for most chemicals.

For non-carcinogens, summing HQ values across different chemicals is properly applied only to compounds that induce the same effect by the same mechanism of action. Consequently, summation of HQ values for compounds that are not expected to include the same type of effects or that do not act by the same mechanisms could overestimate the potential for adverse health effects. Thus, all the HI values in this risk assessment, which sum HQ values across multiple COPCs, are likely to overestimate the true level of human health non-cancer hazard.

3.7 Human Health Risk Assessment Conclusions

The HHRA evaluated potential risks to humans, both now and in the future, from exposures to contaminants that may be present at the Site due to the waste debris, assuming no steps are taken to remediate the environment or to reduce human contact with contaminated environmental media. The Site is primarily used by humans for recreational purposes. The receptor populations of interest for the risk assessment include Park visitors, NPS employees, and construction workers. The HHRA included an evaluation of chronic exposures to COPCs in soil (surface and subsurface).

Chronic exposures and risks to humans from COPCs were evaluated based on both cancer and non-cancer effects. Estimated total overall risks to Park visitors, NPS employees, and construction workers were below NPS's acceptable risk thresholds for non-cancer and cancer effects (i.e., cancer risks were at or below 1E-06 and non-cancer hazards were less than 1). Based on this, it is concluded that site-related chronic exposures to COPCs would not result in unacceptable risks for any current or future recreational and occupational receptor populations. No COCs were identified for human health risks for the Vogelsang Site.

4. Ecological Risk Assessment

This section presents the Ecological Risk Assessment (ERA) for the Site and includes both a Screening Level ERA (SLERA) and an initial Baseline ERA (BERA). The ERA describes the problem formulation, including a summary of the ecological setting, the conceptual model of site contamination, and the ecological management goals and evaluation endpoints for the risk characterization. The BERA provides the exposure assessment, toxicity assessment, risk characterization, and uncertainty assessment for the evaluation of ecological risks at the Site.

4.1. Problem Formulation

Problem formulation is a systematic planning step that identifies the major concerns and issues to be considered in an ecological risk assessment and describes the basic approaches that will be used to characterize ecological risks (USEPA 1997). The following sections summarize the ecological setting of the Site, CSM, and the site management goals.

4.1.1. Ecological Setting

Discussion of the ecological setting of the Vogelsang site includes a general discussion of Yosemite National Park habitat and vegetative communities, sources for species inventory, and a discussion on threatened and endangered species.

***Habitat*.**

The Park is within the Sierra Nevada Ecoregion. The Park contains five major vegetation zones: foothill/woodland, lower montane, upper montane, subalpine, and alpine (NPS 2017). Vegetation ranges from valley grasslands and woodlands through chaparral-covered slopes to montane coniferous forests and alpine meadows. The Site is also within the Sierra Lodgepole Pine (White bark Pine)/ (Ross Sedge-Shorthair Sedge) Forest Super association (Harris 2020). No perennial surface water, aquatic habitat, or wetlands are present within the Site.

The Site is located within a sparsely vegetated subalpine pine forest and is 6.9 miles by trail from the nearest road. The Site is on a grassy ephemeral drainage between two low granite outcrops, bordered by Fletcher Creek 350 feet to the south and a meadow to the west, a corral for pack animals to the north, and a granite outcrop to the east.

The vegetation at the Vogelsang site is very pristine sub-alpine habitat. There were no signs of non-native plant species during a 2020 site visit (Harris 2020). The ground cover is dense in bunch grasses and sedges. There were a few small willow shrubs, and Sierra lodgepole pine trees scattered throughout. This area is suitable habitat for white bark pine (*Pinus albicaulis*), a candidate species for federal listing under the Endangered Species Act. To the south of the Site is Sierra Lodgepole Pine Mesic Forest Super association and Sierra Willow/Swamp Onion Seasonally Flooded Shrubland Alliance.

Wildlife

The Park encompasses 1,200 square miles of scenic wild lands and supports a diversity of plants and wildlife. The Park has more than 300 species of vertebrate animals, and 85 of these are native mammals. Yosemite supports approximately 9 species of amphibians, 20 species of reptiles, 165 species of birds, and 81 species of mammals. Yosemite has a large number of native amphibian and reptile species: 2 toads, 1 chorus frog, 1 true frog, 5 newts and salamanders, 12 snakes (one poisonous), 7 lizards, and 1 turtle. The mammal species inhabiting Yosemite consist of a diverse array, including: five shrews and one mole; seventeen species of bats (including 12 special-status species); seventeen carnivores (e.g., black bear, bobcat, coyote, raccoon, gray fox, mountain lion, ringtail, and several weasel species). Additionally, six species of squirrels, six species of chipmunks, nine species of mice, and other species of rodents, including woodrats, voles, and pocket gophers. Over 150 species of birds regularly occur in the Park, including great gray owls (*Strix nebulosi*) (NPS 2017). Ungulates include large numbers of mule deer. Bighorn sheep formerly populated the Sierra crest, but have been reduced to several remnant populations.

High elevation meadows and riparian areas within Yosemite National Park are productive, diverse, and support a high level of species diversity. High elevation meadow habitats within the park can support the breeding of the Yosemite toad, the Pacific treefrog, nesting habitat for water birds, and provide forage for herbivores such as mule deer. Furthermore, riparian vegetation along rivers provides corridors for movement of larger species such as mule deer, black bear, mountain lions, bobcats, coyotes, fisher, and the Sierra Nevada red fox.

Representative wildlife species of higher elevation sites in Yosemite include: marmots, golden-mantled ground squirrel, chickaree (Douglas squirrel), marten, Steller's jay, hermit thrush, northern goshawk, Peregrine falcon, rubber boa, western fence lizard, and alligator lizard, and the Mount Lyell salamander. Bat species could also occur in the project area during the breeding season and may use cavities in snags or trees for nesting. There are 17 species of bats, including Townsend's big-eared bat, spotted bat, western red bat, and western mastiff bat.

Species of Special Concern

There is suitable habitat or documented records for more than 160 rare plants in the Park (NPS 2017), and about 40 species have special status in the park. Some of the Park's threatened, endangered and sensitive animal species include the Yosemite toad, mastiff and spotted bats, the Sierra Nevada red fox, the Sierra Nevada bighorn sheep, the spotted owl, the California wolverine, the northern goshawk, the willow flycatcher, and Bohart's blue butterfly.

The habitat study performed by Harris (2020) identified proposed or critical habitat for the Sierra Nevada Yellow-legged Frog and Yosemite toad within the area of the Vogelsang project area. The Sierra Nevada yellow- legged frog and Yosemite toad are experiencing serious population declines likely due to habitat destruction, the presence of bullfrogs, pesticides, and diseases. In addition, nonnative fish are causing decline on the yellow-legged frog. These species are still observed at higher elevations; however, they are substantially reduced in population size and range. Furthermore, the California red-legged frog could be considered in this area as it has been reintroduced into the Park and there are currently active populations within the Park. In addition to these species, the Sierra Nevada bighorn sheep have been observed by NPS staff on the plateau located above the Site, though not necessarily within the Site itself.

No federally-listed rare plants are documented within Yosemite National Park, however, six federal Species of Concern have been documented in Yosemite National Park, including: Sierra false coolwort (*Bolandra californica),* mountain lady's slipper (*Cypripedium montanum),* stream orchid (*Epipactis gigantea),* short-leaved hulsea (*Hulsea brevifolia),* and Torrey's popcorn flower (*Plagiobothrys torreyi* var. *torreyi)* (NPS 2016).

Harris (2020) queried the U.S. Fish and Wildlife Service's (USFWS) Information, Planning, and Conservation System (IPaC)[5] to review species and critical habitat occurring within one or more delineated US Geological Survey 7.5- minute quadrangles intersecting the project area. Federal status species occurring within two miles of the project include:

Common Name	Scientific Name	Status
Fisher	*Pekania pennanti*	Endangered, California Threatened
Sierra Nevada yellow- legged frog	*Rana sierrae*	Endangered, California Threatened
Yosemite toad	*Anaxyrus canorus*	Threatened, California Species of Concern
Delta smelt	*Hypomesus transpacificus*	Threatened
Paiute cutthroat trout	*Oncorhynchus clarkii seleniris*	Threatened

4.1.2. Conceptual Site Model for Ecological Exposures

Figure 4-1 presents a pictogram of the CSM for ecological exposures at the Vogelsang Site. The CSM depicts the understanding of how chemical contaminants have been released to the environment at the Site, and lists the exposure pathways for ecological receptors that were quantitatively evaluated in the risk assessment. The main features of this CSM and the rationale supporting which ecological receptors and pathways/routes are identified for risk quantification in the ERA are discussed below.

[5] https://ecos.fws.gov/ipac/

Sources of Contamination

According to the 2002 FSI, debris was scattered in the surface across the Site (0.45 acre), with a portion of debris extending to the subsurface. The maximum known depth of subsurface debris is 3.5 feet bgs (IT Corporation 2002). The subsurface debris acreage estimated in the FSI assumed a contiguous debris zone; however, during the ESI, debris was observed in small, discrete piles at depths less than 3.5 feet bgs.

Although the Site was used as a waste disposal area in the past, disposal records verifying uses of the site were not kept. It is likely that waste disposal spanned from 1940 to 1965. Debris has been found buried at the site.

Exposure Pathways

Chemical contaminants released to soil due to historical waste disposal activities may migrate in the environment by several processes. Section 3.1.2 summarized the various migration pathways. In brief, contaminants in soil may be released to air as particulates, and infiltrate into subsurface soil. Soil contaminants can be taken up into terrestrial and aquatic tissues, which can be ingested by wildlife. Due to the absence of surface water at the Site, aquatic pathways of exposure are not evaluated.

Receptors of Concern and Exposure Routes

Numerous ecological species are present in the Park[6]; however, specific information on species present at the Site is not available. Several species of mammals, birds, plants, and soil invertebrates adapted to high elevation climates are expected to be present at the Site and could be exposed to site- related contaminants. However, it is generally not feasible or necessary to evaluate risks to each species individually. Rather, it is usually appropriate to group receptors with similar behaviors and exposure patterns and evaluate the risks to each receptor group. Due to the absence of surface water at the Site, aquatic ecological receptors are not evaluated. Terrestrial ecological receptor groups that are anticipated to be present at the Site consist of the following:

- Terrestrial plants
- Soil invertebrates
- Birds
- Mammals.

[6] https://www.nps.gov/yose/learn/nature/npspecies.htm

As mentioned, no threatened or endangered species have been identified at the Site. Potential ecological risks are evaluated for these four receptor groups; in the more detailed BERA, representative wildlife species within the birds and mammals groupings are evaluated, as described in subsequent sections.

Terrestrial Plants and Soil Invertebrates

The structure and function of the terrestrial plant and invertebrate community is important because it provides a significant portion of the energy, organic matter, and nutrient inputs for terrestrial systems. Plant communities also provide habitat and forage for a variety of wildlife species. Terrestrial plants and soil organisms are good indicators of soil condition because they reside directly in the soil and are not mobile.

The primary exposure route for soil invertebrates is direct contact with (and ingestion of) contaminated soils. For terrestrial plants, the primary exposure route is direct contact of the roots with contaminants in soil. Although most terrestrial plants (e.g., ground cover and grasses) and invertebrates would only be exposed to surface soils (0 to 6 inches bgs), it is possible deeper soils (up to 4 feet bgs) could be encountered by plants with deeper roots (e.g., trees) and burrowing soil invertebrates. For terrestrial plants, exposure may also occur from deposition of dust on foliar (leaf) surfaces. However, because foliar surfaces have an insoluble waxy coating (cuticle) that limits chemical uptake, exposures due to foliar deposition are believed to be minor compared to root exposures. Most plants and soil invertebrates are exposed to surficial soils, which generally contains the vast majority of biological activity (USEPA 2015b). For this risk assessment, surface soil is defined as soils from 0 to 6 inches bgs.

Birds and Mammals

Birds and mammals may be exposed to site-related contaminants by two primary routes: (1) ingestion of contaminants in or on food items and (2) incidental ingestion of soil while feeding or digging. Direct contact (i.e., dermal exposure) of birds and mammals to soil may occur in some cases, and inhalation exposure to airborne dusts is possible for all birds and mammals, but these exposure routes (i.e., dermal and inhalation) are usually considered to be minor compared to exposures from ingestion (USEPA 2005b).

Exposure Media and Routes of Exposure

Surface water is not present at the Site and groundwater does not discharge to the surface in the immediate vicinity of the Vogelsang site, so there is no potential exposure for ecological receptors to surface water, sediment, or groundwater at the Site. Site contaminants can be taken up by biota, so only soil and biota are considered to be relevant exposure media for this ERA.

Complete and potentially important exposure routes for birds and mammals include ingestion of surface soils (0 to 6 inches bgs), subsurface soils for burrowing mammals (6 inches to 4 feet bgs), and terrestrial dietary items. Except for burrowing mammals, most wildlife exposures to soil are likely to occur at the surface (i.e., in the upper 6 inches of soil). For burrowing mammals, it is assumed burrowing activities could occur at depths up to 3.5 feet, as this is the bottom of the depth interval where the waste debris was encountered at the Site, and where bedrock is encountered. The rationale for selecting this depth for burrowing animals at the Site is consistent with CalEPA guidance provided in DTSC HERO EcoNote 1. Burrowing mammals at Yosemite include the California ground squirrel, yellow-bellied marmot, and the montane shrew.

4.1.3. Evaluation Endpoints

Evaluation endpoints consist of the ecological characteristics that are to be protected (referred to as *Assessment Endpoints*) and the approach and methods for evaluating those characteristics (referred to as *Measurement Endpoints*).

Assessment Endpoints

Assessment endpoints are explicit statements of the characteristics of the ecological system that are to be protected. Because the risk management goals are formulated in terms of the protection of populations and communities of ecological receptors, the assessment endpoints selected for use in this problem formulation focus on endpoints that are directly related to the management goals, such as survival, growth, and reproduction (USEPA 2004b). Specific ecological assessment endpoints for this Site can be identified as the following:

- Ensure that contaminants in soils at the Site do not cause unacceptable impacts to terrestrial plant and soil invertebrate communities

- Ensure that contaminants in biota and environmental media at the Site do not cause unacceptable impacts to bird and mammal populations.

Measures of Exposure/Effect

Measurement endpoints are quantifiable environmental or ecological characteristics that can be measured, interpreted, and related to the valued ecological components chosen as the assessment endpoints (USEPA 1997, 1998). Measures of exposure must be compatible with the measures of effects. For example, if effects are evaluated as a toxicity value that is a concentration in soil of a chemical that is below a level of risk to an ecological receptor, then the measure of exposure must be the concentration of that chemical in the soil that the receptor could be exposed to. Similarly, if the effect is measured by a toxicity value that is based on the dose of a chemical to an organism (typically in units of mg/kg-day), then the measure of exposure is also expressed in terms of dose, with the same units. Doses are modeled based on the intake of chemicals from various environmental media that the receptor could be exposed to.

Additional more advanced methods for evaluating exposures and effects, which would be incorporated into a BERA, include a) toxicity testing, either in the laboratory using soil from the site, or *in situ* at the Site itself, and b) community or population studies, whereby various metrics of an exposed population are compared with metrics from a similar population located in a reference area that is free of the contamination. These more advanced methods for evaluating ecological risk entail substantial data that are not available for this site, and are not used in this risk assessment.

4.2. Screening Level Ecological Risk Assessment

A SLERA is an intentionally conservative risk evaluation with the goal of determining if there is the potential for unacceptable ecological risk. The purpose of the SLERA is to determine if a more-refined BERA is necessary and, if so, which media, chemicals, exposure pathways, exposure routes, and receptors should be retained for further evaluation.

4.2.1. Selection of COPECs

COPECs were identified by comparing the maximum soil concentrations within each DU to screening levels for ecological receptors. Screening levels used in this SLERA are the ecological screening values (ESVs) presented in NPS's *Protocol for the Selection and Use of Ecological Screening Values for Non-Radiological Analytes (Revision 3)* (NPS 2018) (hereafter referred to as the NPS Protocol). Screening levels are not available in the NPS Protocol for TPH as diesel fuel/motor oil; however, because ESVs are available for many of the TPH chemical constituents (e.g., PAHs), the lack of an ESV is not expected to limit risk interpretations. For that reason, TPH was not selected as a COPEC.

For soil, maximum concentrations were compared to the lowest NPS COPEC selection soil ESV for terrestrial plants, soil invertebrates, birds, and mammals. While most terrestrial ecological receptors are primarily exposed to surface soil (0 to 6 inches bgs), for simplicity, COPECs were identified for both surface soil and subsurface soil (0.5 to 4 feet bgs) using the lowest soil ESV.

The results of the COPEC selection for ecological receptors are summarized in Table 4-1 and presented in further detail in Attachment C. A total of 14 COPECs were identified for surface soil (see Table C-1 in Attachment C), including 12 metals (antimony, arsenic, barium, chromium, copper, lead, mercury, molybdenum, nickel, thallium, vanadium, and zinc), and pentachlorophenol (PCP). The list of COPECs for subsurface soil is similar to surface soil but with the exclusion of barium, nickel, PCP, and TEQ.

4.2.2. Evaluation of Laboratory Limits

Section 3.3 provides a brief discussion of laboratory limits. The adequacy of each chemical MDL to be protective of ecological receptors was determined by comparing the maximum MDL to the lowest NPS ESV. For those chemicals where the maximum MDL is greater than the lowest ESV and there is a low detection frequency (less than 10%), the MDL was deemed to be inadequate.

As shown in Table 4-2, 12 SVOCs for soil had inadequate MDLs for this screening level ecological evaluation, meaning that the maximum MDL was higher than the ESV. The analytical methods used for the analyses provide the best available detection limits using conventional analytical instruments. The MDLs for all other analytes were deemed to be adequate to support a SLERA.

4.2.3. *Refined Screening Level*

After the selection of COPECs, the methodology outlined in the NPS protocol for a SLERA is to refine the list of COPECs by screening against *refined ESVs*. This step of the SLERA calculates screening level risks using the hazard quotient (HQ) method. The HQ is the ratio of the estimated exposure of a receptor to a toxicity value that is believed to be without significant risk of unacceptable adverse effect:

HQ = Exposure / Toxicity Value

For this Site, where the environmental medium with measured contaminant concentrations is soil, the screening level hazard quotient is expressed as:

HQ = Exposure Concentration in Soil / Soil Toxicity Value

The exposure concentration in soil at the site and the soil toxicity value are expressed in the same units of mg chemical / kg soil. The exposure concentration is the maximum detected concentration of each COPEC in soil. The toxicity values for this step are the *refined SLERA ESVs* in the NPS (2018) protocol. The refined SLERA ESVs for soil are considered to be no-effect levels, determined from the basis of each value. They are designed to be protective of all species within the receptor group, and are intended to be protective of populations and communities of organisms. They are selected to represent the threshold for a toxicity endpoint that is relevant to population sustainability (e.g., survival, growth, reproduction).

Refined SLERA HQs for soil were calculated separately for surface and subsurface soil in each DU and for each terrestrial receptor of interest (i.e., terrestrial plants, soil invertebrates, birds, mammals), except birds are not exposed to subsurface soils, as per the CSM. If the value of an HQ is less than 1, it is assumed that the risk of adverse effects to the receptor is acceptable. If the HQ is greater than or equal to 1, the risk of adverse effects to the receptor may be of concern, and the chemical may be evaluated further or identified for risk management. It is further assumed that the likelihood and/or severity of adverse effects increase as the value of the HQ increases.

Terrestrial Plants

Tables 4-3 and 4-4 provide the refined screening level HQ results for terrestrial plants exposed to COPECs in surface soil and subsurface soil, respectively. Several COPECs (chromium, molybdenum, vanadium) have refined HQs greater than 1 based on the no-effect ESV.

Soil Invertebrates

Tables 4-5 and 4-6 provide the refined screening level HQ results for soil invertebrates exposed to COPECs in surface soil and subsurface soil, respectively. Chromium has a refined HQ greater than 1 based on the no-effect ESV, but not greater than 1 based on the low-effect ESL.

Birds

Table 4-7 provides the refined screening level HQ results for birds exposed to COPECs in surface soil. Four metals have refined HQs greater than 1 for surface soils based on the no-effect ESV (lead, mercury, molybdenum, vanadium). These metals are identified as *refined COPECs* for birds for further evaluation in the BERA.

Mammals

Tables 4-7 and 4-8 provide the refined screening level HQ results for mammals exposed to COPECs in surface soil and subsurface soil, respectively. Two metals (antimony and molybdenum) have refined HQs greater than 1 for surface soils based on the no-effect ESV. In subsurface soils, two metals (antimony, molybdenum) have refined HQs greater than 1. These COPECs are identified as *refined COPECs* for mammals for further evaluation in the BERA.

Summary of Refined COPECs

Based on the refined screening level HQ results, the following refined COPECs in soil were retained for further evaluation in the BERA in one or more DUs:

- *Terrestrial Plants:* Chromium, molybdenum, vanadium
- *Soil Invertebrates*: Chromium
- *Birds:* Lead, mercury, molybdenum, vanadium
- *Mammals:* antimony, molybdenum.

4.3. Baseline Ecological Risk Assessment

Typically, the BERA further evaluates potential ecological risk by refining the evaluation of COPECs through more involved methodology. As described earlier, these might include incorporation of site-specific bioaccumulation factors, revised species-specific toxicity values, laboratory or *in situ* toxicity tests, field-based assessments of community density and diversity, habitat evaluations, and tissue burden estimates. Consistent with the initial steps for BERA described in USEPA (2001) guidance on ecological risk assessment, COPECs identified in this SLERA undergo further refinement, which consists of the following:

- Evaluate alternate (non-maximum) EPC values

- Compare species- specific estimated exposure doses to toxicity thresholds for select receptors of concern

- Compare concentrations in soil to background concentrations to determine potential non-site-related concentrations of COECs (both natural and anthropogenic).

4.3.1. BERA Evaluation Endpoints

The Assessment Endpoints described above in the Problem Formulation step for the SLERA are applicable to the BERA:

- Ensure that contaminants in soils at the Site do not cause unacceptable impacts to terrestrial plant and soil invertebrate communities.

- Ensure that contaminants in biota and environmental media at the Site do not cause unacceptable impacts to bird and mammal populations.in general, maintenance of populations of ecological receptors.

Measurement endpoints for the BERA use the same soil data as in the SLERA, but the estimation of exposures and toxicity values for wildlife are more specific to the types of species that may be present at the Site. The general methodology follows the HQ approach described above for the SLERA, except that wildlife risks are estimated through a dose evaluation, which consists of evaluating exposures via ingestion of food items, as described more fully in subsequent sections.

The assessment endpoint is based on the sustainability of exposed populations, and risks to some individuals in a population may be acceptable if the population is expected to remain healthy and stable. The HQ approach is intended to characterize population risks by quantifying individual HQ values that are greater than 1 and by the magnitude of the exceedances. Whether all of the HQ values or a fraction of them should be less than 1 for the population to remain stable depends on the species being evaluated and the toxicological endpoint underlying the toxicity value. In addition, reliable characterization of the impact of a chemical stressor on an exposed population requires knowledge of population size, birth and death rates, and immigration and emigration rates. This type of detailed knowledge of population dynamics is not available for this Site, and extrapolation from a distribution of individual HQ values to a characterization of population-level risks is generally uncertain.

HQ values are predictions and subject to the uncertainties that are inherent in both the estimates of exposure and the estimates of toxicity values. In lieu of more detailed risk evaluations and population studies conducted under a BERA, HQ values above 1 should be interpreted as indicators of potential risk rather than definitive evidence that adverse effects are occurring.

4.3.2. Plants and Soil Invertebrates Evaluation

As described above in the conceptual site model, toxicity data on plant and invertebrate species are limited, and are used to evaluate potential risks to communities of plants and invertebrates rather than to individual organisms.

Exposure Assessment

Exposure Routes

The primary exposure route for plants and soil invertebrates is direct contact with contaminated soils, and ingestion of soils for invertebrates. Although most terrestrial plants (e.g., ground cover and grasses) and invertebrates would only be exposed to surface soils (0 to 6 inches bgs), it is possible deeper soils (up to 4 feet bgs) could be encountered by plants with deeper roots (e.g., trees) and burrowing soil invertebrates.

Exposure Point Concentrations

For the simple BERA, exposures are evaluated using the 95 UCL on the mean surface soil and subsurface soil concentrations as the EPC. The 95UCLs were derived using the USEPA ProUCL model. The EPC was set equal to the recommended 95UCL, unless the 95UCL was higher than the maximum concentration, then the maximum value was used.

Toxicity Assessment

The toxicity values used to evaluate terrestrial plants and soil invertebrates are similar to those used above to select COPECs, but are designed to be estimates of the thresholds for toxic effects. The toxicity values used to identify COPECs are based primarily on no-effect levels. As mentioned above, a second toxicity value for each COPEC has been identified as a low-effect level. The low-effect level toxicity values selected for each COPEC are the Ecological Screening Levels (ESL) from the LANL database (2017), except for molybdenum, for which values are not available in the LANL database. For molybdenum, a screening value was taken from the Risk Assessment Information System (RAIS) database (ORNL 2020), which provides the Dutch Intervention Value[7]. The low-effects toxicity value is designed to relate to potential impacts to a small portion of a population, usually less than 20%, which has been identified as a level above which effects to populations may occur. This low-effects level is based on the understanding that a small portion of a population may be impacted without impacting the population itself or impacting the community or ecosystem of which the population is a component.

The threshold-based toxicity value for adverse effects lies between the no-effect level and the low-effect level toxicity values. For each COPEC, the threshold toxicity value is calculated as the geometric mean of the no-effect-based and the low-effect-based toxicity values (USEPA 1998). It

[7] The ecological Intervention Value is the concentration expected to be hazardous to 50% of the species in the ecosystem. It cannot be assumed that sensitive species will be protected at the Intervention levels. Site concentrations less than Target Values indicate no restrictions necessary; concentrations between Target Values and Intervention Values suggests further investigation or restrictions may be warranted.

is expected that the adverse effect threshold will vary from species to species within any receptor group. Because toxicity data are not available for most plant and soil invertebrate species, single plant and soil invertebrate threshold toxicity value are used to represent the communities of organisms.

Risk Characterization

This step of the BERA for terrestrial plants and soil invertebrates calculates potential risks using the hazard quotient (HQ) method, similar to the method used to select refined COPECs. As mentioned, the EPC used for the BERA is the 95UCL, or the maximum detected concentration if the 95 UCL exceeds the maximum, of each refined COPEC in soil. The toxicity values for this step are the *Threshold-Based ESLs*. The risk results are expressed as the *Threshold-Based HQ* for each refined COPEC:

Threshold-Based HQ = 95UCL or Maximum / Threshold Toxicity Value

Where the threshold-based HQ > 1, the refined COPEC is identified as a chemical of ecological concern (COEC).

Results of the calculation of threshold-based HQs, and identification of COECs, are presented in Tables 4-2 and 4-3 for terrestrial plants exposed to contaminants in surface and subsurface soils, respectively, and in Tables 4-4 and 4-5 for soil invertebrates exposed to contaminants in surface and subsurface soils, respectively. No COECs were identified for terrestrial plants exposed to surface soils or subsurface soils at the Vogelsang Site. Similarly, no COECs were identified for soil invertebrates exposed to surface soils or subsurface soils.

4.3.3. Wildlife Evaluation

Birds and mammals may be exposed to site-related contaminants by three primary routes: (1) ingestion of contaminants in or on food items; (2) incidental ingestion of soil while feeding, preening, or digging; and (3) ingestion of drinking water. Since contaminated surface water is not a medium of concern for this Site, ingestion of drinking water was not identified as an exposure route for wildlife in the CSM. Direct contact (i.e., dermal exposure) of birds and mammals to environmental media may occur in some cases, and inhalation exposure to airborne dusts is possible for all birds and mammals, but these exposure routes (i.e., dermal and inhalation) are usually considered to be minor in comparison to exposures from ingestion (USEPA 2005b).

The method for evaluating risks to wildlife differs from that used for plants or invertebrates. The exposures of birds and mammals are evaluated through dose modeling, based on the ingestion of food items and the ingestion of soil. The modeling methodology and input parameters are discussed below.

COPECs

As presented in Tables 4-7 and 4-8, four metals (lead, mercury, molybdenum, and vanadium) were identified as COPECs in soil for birds, and two metals (antimony and molybdenum) were identified as COPECs in soil for mammals. These COPECs are further evaluated in this BERA.

Exposure Assessment

Daily Dose Equation

The basic equation used for calculation of exposure of a wildlife receptor to a chemical by ingestion of an environmental medium is as a daily dose:

$$\mathrm{Dose}_r = \Sigma(\mathrm{C}_{i,m} \times \mathrm{IR}_{m,r}) \times \mathrm{AUF}_r$$

where:

Dose_r = average daily ingested dose of chemical by receptor *r*

$\mathrm{C}_{i,m}$ = concentration of chemical *i* in medium *m* (e.g., mg/kg)

$\mathrm{IR}_{m,r}$ = intake rate of medium *m* by receptor *r* (e.g., kg food/kg BW-day)

AUF = area use factor by receptor *r*.

For each receptor, the specific food items that are ingested, and the rates of ingestion, are identified. Concentrations of COPECs in each ingested food item are modeled using soil concentration data from each DU at the Site, as described below.

Surrogate Receptors

The Park website[8] provides detailed species lists of the types of wildlife expected at the Site. More than 350 different bird and mammal species are expected to be present at the Park. It is not feasible to evaluate exposures and risks for every bird and mammal species potentially present at the Site. For this reason, surrogate species are selected to serve as representatives of birds and mammals. An effective way to group ecological receptors is according to their feeding guild.

[8] https://www.nps.gov/yose/learn/nature/npspecies.htm Accessed January 21, 2021

Feeding guilds are based on the type of food item that is mostly consumed by the receptor. The following are the typical feeding guilds for birds and mammals:

- Herbivores – consuming plants
- Insectivores – consuming soil invertebrates and insects
- Carnivores – consuming small mammals.

For each of these feeding guilds, USEPA (2005b) has identified the bird and mammal species for which the highest exposures are expected to occur, based on their natural history, i.e., the food items they consume, the rate the food items are consumed, the body weight of the receptor. Each of these components of their behavior characterize their metabolic intake on a daily basis. The surrogate species selected by USEPA are similar to the representative species recommended by DTSC and the NPS for the Shaw (2010) FIR. For this BERA, the surrogate species developed by USEPA are used to represent the feeding guilds. The surrogate species selected in the EcoSSL guidance (USEPA 2005b) for each guild are the following:

- **Avian herbivore: Mourning dove** (*Zenaida macroura*) - representing local herbivorous species, such as the mountain chickadee, song sparrow, ruby-crowned kinglet, Brewer's blackbird, and Western scrub jay). The avian herbivore is assumed to consume 100% plants with inadvertent soil ingestion.

- **Avian insectivore: American woodcock** (*Scolopax minor*) - representing local insectivorous species, such as the acorn woodpecker, Northern flicker, and American robin. The avian insectivore is assumed to consume 100% earthworms as surrogates for all invertebrates, with inadvertent soil ingestion.

- **Avian carnivore: Red-tailed hawk** (*Buteo jamaicensis*) - representing local carnivorous species, such as the red-tailed hawk, great horned owl, and Western screech-owl. The avian carnivore is assumed to consume 100% small mammals, with inadvertent soil ingestion.

- **Mammalian herbivore: Meadow vole** (*Microtus pennsylvanicus*) - representing local herbivorous species, such as the montane vole, lodgepole chipmunk, California ground squirrel, Western jumping mouse, pika, and mountain pocket gopher. The mammalian herbivore is assumed to consume 100% plants with inadvertent soil ingestion.

- **Mammalian insectivore: Short-tailed shrew** (*Blarina brevicauda*) - representing local invertivorous, insectivorous, and omnivorous species, such as the montane shrew, deer mouse, and broad-footed mole. The mammalian insectivore is assumed to consume 100% earthworms as surrogates for all invertebrates, with inadvertent soil ingestion.

- **Mammalian carnivore: Long-tailed weasel** (*Mustela frenata*) - representing local carnivorous species, such as the gray fox, striped skunk, marten, fisher, and badger. The mammalian carnivore is assumed to consume 100% small mammals, with inadvertent soil ingestion.

While these surrogate species may not necessarily occur at the Site, they serve as indicators for local species within the same feeding guild with similar home range sizes, such as those identified above. The key species that could use the habitat near the site and for which the surrogate species represent are described below, with information taken from the FIR (Shaw 2003) and California Department of Fish and Game (CDFG 2008).

American Robin – represented by the American Woodcock

The American robin (*Turdus migratorius*) is an omnivore that feeds on both plants (primarily fruit) and terrestrial invertebrates including earthworms. The robin lives in a variety of habitats, including woodlands, wetlands, suburbs and parks. Robins are likely to forage throughout Yosemite and are present year-round. Most robins build nests of mud and vegetation on the ground or in the crotches of trees or shrubs. Robins have an average home range of 1.2 acres. The average longevity of a robin that survives to its first January is from 1.3 to 1.4 years.

The robin is an insectivorous bird and the feeding guild is represented by the woodcock in this ERA, as recommended by USEPA (2005a).

California Vole – represented by the meadow vole

The California vole (*Microtus californicus*) occurs in the Sierra Nevada and other mountains in California. It occupies a wide variety of habitats, but is most abundant in early seral stages of montane riparian, dense annual grassland, and wet meadow. The vole feeds mainly on leafy parts of grasses, sedges, and herbs. It forages on the ground, clipping grasses and forbs at the bases, forming a network of runways leading from the burrow. Burrows are constructed in soft soil. The vole is active year-round, with circadian activity.

Mean home range sizes for the vole vary from 0.25 to 2.5 ac (0.37 ac average). Territorial behavior is weak; the size of area defended is unknown. The vole breeds throughout the year, reaching peaks whenever food and cover are abundant. Its abundance and widespread distribution, along with daylong activity, make it an important prey. Predators include nocturnal and diurnal birds of prey, predatory mammals, and snakes. (Information extracted from the CDFG, 2008).

The vole represents herbivorous mammals for this ERA.

Dusky Shrew – represented by the short-tailed shrew

The dusky shrew (*Sorex monticolus*), also commonly known as the montane shrew, is found in montane habitats in the high Sierra Nevada including Yosemite National Park. Their preferred foods include insects, arachnids, snails, and earthworms, typically in a layer of debris on the forest floor. The shrew is active year-round and does not hibernate. They frequently use burrows for reproduction (Thomas, 1979), breeding from February through October, with a peak in late spring-early summer (Ingles, 1965).

The shrew is rarely found more than a few meters from water in the summer (Ingles, 1965), and prefers riparian and wet meadow habitats. Thomas (1979) indicated that suitable habitat (home range) of at least 2 hectare (ha) (5 ac) is required to support a population of shrews. Size of home range averages 0.04 ha (0.1 ac) (Hawes, 1977) but varies greatly. The shrews are notoriously solitary, but home ranges may overlap.

The shrew is representative of insectivorous mammals and burrowing mammals for this ERA.

Long-Tailed Weasel

The long-tailed weasel (*Mustela frenata*) is a common to uncommon, permanent resident of most habitats, except xeric brush, shrub, and desert scrub. It mostly uses intermediate cover stages of conifer and deciduous habitats, interspersed with lower seral stages and open forest, woodland areas and shrubs, from sea level to alpine meadows. Long-tailed weasels are carnivorous, consuming small mammals such as mice, gophers, chipmunks, ground squirrels, and rabbits. They will also consume birds, some insects, salamanders, and small amounts of fruit. Foraging occurs on ground, among rocks, in snags, stumps, logs, wood piles, in brush, and occasionally in trees.

Nests are often located in burrows of chipmunks, ground squirrels, gophers, moles, or mountain beavers. The weasel is active year-round, nocturnal and diurnal. Suggested home ranges are 25-50 ac. The weasel may be territorial, and mates in July or August. They are major predators of voles and mice, and they, themselves are preyed upon occasionally by minks, martens, fishers, bobcats, coyotes, red foxes, and gray foxes.

The weasel is representative of carnivorous mammals for this ERA.

Exposure Factors

Exposure parameters and dietary intake factors used in the modeling of doses to each receptor were taken from USEPA (2007) guidance on deriving EcoSSLs (EcoSSL Attachment 4-1). Food ingestion rates were calculated from the mean food intake rates presented in Table 1 of EcoSSL Attachment 4-1. Soil ingestion rates were calculated from the mean values of the fraction of diet that is soil (Psoil) provided in Table 3 of EcoSSL Attachment 4-1. Table 4-9 summarizes the exposure parameters selected for each representative wildlife receptor.

Exposure Areas

When designing the EE/CA soil investigations, the size of the on-site surface soil DUs was specified such that acreage did not exceed about 0.25 acre because this represented the approximate home range size for a small mammal (e.g., shrew). For the purposes of estimating risks to wildlife receptors from incidental ingestion of soil and ingestion of terrestrial prey items, exposures were assumed to occur entirely within each on-site DU (i.e., the area use factor (AUF) was assumed to be 1.0). Because most DUs are smaller in extent, this assumption is likely to overestimate potential exposures. This assumption is also likely to overestimate exposures for receptors with larger home ranges (e.g., hawk). For this reason, in addition to calculating DU-specific exposures, a sitewide exposure area was also evaluated (across DUs 1-3).

Exposure Point Concentrations

Wildlife receptors are likely to move at random across an exposure area. Therefore, exposure is best characterized as the arithmetic mean concentration across the exposure area. Because the true arithmetic mean concentration cannot be calculated with certainty from a limited number of measurements, USEPA recommends that the 95UCL of the arithmetic mean for each exposure area be used as the EPC when calculating exposure and risk (USEPA 1992b). The mathematical approach that is most appropriate for computing the 95UCL of a dataset depends on several factors, including the number of data points available, the shape of the distribution of the values, and the degree of censoring (USEPA 2002a). For each DU, 95UCLs were derived using the ISM triplicate results, calculated using the Chebyshev calculation method as recommended in ITRC's ISM guidance (ITRC 2012). When one or two of the triplicate results was non-detect, the EPC was set equal to the maximum replicate concentration. 95 UCLs were derived using the most recently available version of the USEPA program ProUCL v 5.1 (USEPA 2015a).

Except for burrowing mammals, most wildlife exposures to soil are likely to occur at the surface (i.e., in the upper 6 inches of soil). For burrowing mammals, it was assumed burrowing activities could occur at depths up to 4 feet. Table 4-10 (surface soil) and Table 4-11 (subsurface soil) summarizes the detailed EPCs for all soil COPECs in each soil DU and the sitewide exposure area.

Estimating Dietary Tissue Concentrations

Measured data on concentrations in terrestrial dietary items are not available for the Site. Therefore, dietary concentrations were estimated using uptake factors and/or bioaccumulation models from the literature. Uptake factors, uptake equations, and bioaccumulation models were developed for the following dietary items:

- Soil to plant
- Soil to earthworm
- Soil to small mammal.

The uptake factors and equations used to model the concentrations of each COPEC in each of these three dietary items are shown in Table 4-12. As shown in the table, earthworm tissue concentrations for most metals were estimated from soil using the same uptake models as those used in the development of the EcoSSLs (USEPA 2007). For mercury uptake into earthworm and small mammal tissues, tissue concentrations were estimated using regression models developed for use by ORNL (Sample et al. 1998a, 1998b). Uptake values were not available for molybdenum; antimony was used as a surrogate source of values. An invertebrate uptake value for antimony is not available, so an uptake factor of 1 was assumed.

Toxicity Assessment

Dose-based Toxicity Reference Values

For wildlife, two types of dose-based toxicity reference values (TRVs) are identified in the literature. The first TRV is an estimate of the dose (mg/kg BW-day) that is not associated with any adverse effects and is referred to as the no-observed-adverse-effect level (NOAEL) TRV. The second TRV is an estimation of the dose that causes an observable adverse effect and is referred to as the low-observed-adverse-effect level (LOAEL) TRV. The threshold for adverse effects lies between the NOAEL and LOAEL TRVs. For each COPEC for all soil receptors, the threshold TRV is calculated as the geometric mean of the NOAEL-based and LOAEL-based TRVs (USEPA 1998).

It is expected that the adverse effect threshold will vary from species to species within any wildlife group. However, toxicity data are not available for most birds and mammals, and therefore, a single bird TRV and a single mammal TRV for each COPEC are used to represent all bird and all mammal species, respectively. Intertaxon extrapolation (i.e., using allometric scaling to adjust laboratory study dose to wildlife species-specific dose level), taxonomic scaling (i.e., using phylogenic factors to adjust dose level across organism family or order) and extrapolation of toxicity data across taxonomic classes (i.e., mammalian toxicity data extrapolated to birds or vice-versa) were not performed due to the associated uncertainties (USEPA 2005b; Allard et al. 2010).

Because the purpose of this assessment was to evaluate wildlife exposures from ingestion of contaminated media at the Site over the lifetime of the receptor, TRVs derived from studies in which the exposure route was oral (e.g., via ingestion in diet or water or via gavage) and dosing occurred over a long period of time (chronic exposure) or during a critical life stage period were given preference. In addition, to the extent feasible, wildlife TRVs were selected to represent relevant toxicity endpoints for population sustainability (e.g., growth, reproduction, survival).

Dose-based TRVs for wildlife were mainly compiled from secondary literature sources. As per guidance from DTSC, the following hierarchy was used to select wildlife TRVs:

- **EcoSSL[9].** EcoSSLs NOAEL dose-based TRVs for birds and wildlife were preferentially selected for use because they are derived from toxicity data drawn from multiple studies across multiple species and because these values have undergone review. Dose-based LOAEL TRVs for birds and mammals have also been derived from the same underlying EcoSSL toxicity datasets and setting the TRV equal to the geometric mean of growth and reproduction endpoints (TechLaw, 2008). As such, these LOAEL TRVs likely represent the mid-range of adverse effects and not necessarily a LOAEL.

- **LANL ECORISK Database[10]**. LANL developed and maintains a database of ESLs and toxicity data for use in quantifying hazards to the environment and associated exposure to radioactive and chemical wastes from past treatment, storage, and disposal practices at LANL (LANL 2017). This Microsoft Access® database can be downloaded from the LANL website and searched by chemical or screening receptor to provide printable reports for all ESLs, dose-based TRVs, exposure parameters, and uptake factors used to develop ESLs. TRVs that were selected from the ECORISK Database are used to represent LOAEL-based toxicity values and doses.

- **DTSC HERO EcoNOTE-4[11]**. The U.S. Department of the Navy/USEPA Region 9 Biological Technical Assistance Group developed TRVs for several inorganic and organic COCs at hazardous waste sites (Engineering Field Activity West 1998). The TRVs were selected from the published literature following a consensus effort among several federal and state agencies. TRVs were calculated that represent no-effect levels (TRV-Low) and mid-range adverse effect levels (TRV-High). Note that the TRV-High represents the mid-point of a variety of adverse effects levels and therefore is not necessarily a LOAEL. A TRV-Low dose would not be expected to produce an adverse effect and is protective of an individual or population of organisms; a TRV- High dose would be expected to produce an adverse effect to an individual or population of organisms.

- **ORNL**. Sample et al. (1996) summarized available literature on the toxicity of contaminants to a variety of wildlife receptors. After reviewing the literature, Sample et al. (1996) selected a critical study for mammals and a critical study for birds that identified dose-based NOAEL and LOAEL TRVs. Although the selection of a single critical study to establish TRVs is a less robust derivation procedure than EcoSSL or LANL (which derives TRVs in consideration of multiple studies), the basis of the selected TRVs is well documented.

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[9] https://www.epa.gov/ecobox/epa-ecobox-tools-effects-terrestrial
[10] http://www.lanl.gov/environment/protection/eco-risk-assessment.php Version 4.1
[11] https://dtsc.ca.gov/wp-content/uploads/sites/31/2019/05/HHRA-Note-Number-4-May-14-2019.pdf

In identifying the NOAEL TRV, values were selected according to the hierarchy listed above, except for the avian TRVs for lead. In identifying the LOAEL TRV, unless the TechLaw (2008) values were lower, the LOAEL values provided by LANL were given preference to TechLaw (2008) as the LANL values were more likely to represent the low end of the effects range. The avian TRVs for lead were taken from Sample et al. (2019), who re-evaluated avian toxicity data contained in the EcoSSL compilation. Table 4-14 shows the selected dose-based TRVs for birds, and Table 4-15 shows the dose-based TRVs used for mammals in this BERA. As seen, no TRVs were derived from DTSC HERO, (i.e., the selected NOAEL and LOAEL TRVs are primarily based on the Sample et al. [1996] TRVs, the LANL ECORISK TRVs, or the TechLaw TRVs).

Relative Bioavailability

Dose-based TRVs from literature studies are generally expressed in units of ingested dose (mg/kg BW-day). However, the toxicity of an ingested dose depends on how much of the ingested dose is absorbed, which in turn depends on the properties of both the chemical and the exposure medium. Ideally, toxicity studies would be available that establish empiric TRVs for the site media of concern (i.e., food, soil). However, most laboratory tests use either food or water as the exposure medium, and essentially no studies use soil. Therefore, in cases where a TRV is based on a study in which the oral absorption fraction is different than what would be expected for a site medium, it is desirable to adjust the TRV to account for the difference in absorption whenever data permit. For the purposes of this assessment, the absorption for all COPECs in all site media was assumed to be 100%. This approach is likely to be realistic for contaminants in food but may tend to overestimate exposure and risk from incidental ingestion of soil.

However, no site-specific information on RBA was available that would provide a basis to modify this assumption.

Risk Estimates

HQ Equation

The basic equation for calculating HQ values for the exposure of wildlife receptors to COPECs in soil is:

$$HQ_{i,r} = Dose_{i,r} / TRV_{i,r}$$

where:

$HQ_{i,r}$ = hazard quotient for chemical ‘i’ by receptor ‘r’

$Dose_{i,r}$ = average daily ingested dose of chemical *i* by receptor *r* (mg/kg BW-day)

$TRV_{i,r}$ = toxicity reference value for chemical *i* for receptor *r* (mg/kg BW-day).

Interpretation of the HQ estimates depends upon the basis of the TRV. If the HQ based on the NOAEL TRV is less than or equal to 1, risk is considered acceptable. If the HQ based on the NOAEL TRV is greater than 1 and the HQ based on the LOAEL TRV is less than 1, there is the potential that risks would be unacceptable. However, this would depend upon the proximity of the site dose to the threshold for adverse effects. If the HQ based on the LOAEL TRV exceeds 1, risk of adverse effects in the exposed organisms may be of potential concern. An HQ based on the threshold TRV was calculated for all receptors and COPECs. The threshold TRV is the geometric mean of the NOAEL and LOAEL TRVs, and as explained in the Toxicity Assessment above, is intended to represent the threshold where potential effects might occur between the level of no effects (NOAEL) and the level of low effects (LOAEL). Threshold-based HQs greater than 1 suggest a potential for adverse effects.

Risk Results

Attachment D presents the detailed wildlife HQ calculations for each DU and the sitewide exposure area for surface and subsurface soil. Tables 4-16 summarizes the threshold-based HQs for each COPEC in surface and subsurface soil. HQs are also presented in these tables for the background area (DU4) to provide a frame of reference for interpreting the site HQ estimates.

- *Surface Soil*

As Table 4-16 shows, insectivorous mammals are the only receptors with HQs exceeding 1; none of the other feeding guilds had HQs greater than 1. This finding is partly because bioaccumulation of contaminants into terrestrial invertebrate (earthworm) tissues often tends to be greater than into plants and small mammal tissues. The highest HQs were for antimony and molybdenum in surface soil. Antimony and molybdenum are more toxic to mammals than to birds. The highest HQs were found in DU2 and DU3.

Herbivorous and Carnivorous Birds (see Tables D-1 and D-3, Attachment D) – No COPECs were found to exceed the threshold-based HQ of 1; no COECs were identified for these avian feeding guilds.

Insectivorous Birds (see Table D-2, Attachment D) – No COPECs were found to exceed the threshold-based HQ of 1; no COECs were identified for these avian feeding guilds. Although threshold-based HQs did not exceed 1, NOAEL-based HQs were greater than 1 for lead and mercury in one or more site DUs (Table D-2). For lead, the NOAEL-based HQ exceeded 1 in DU 2 only. Ingestion of soil and invertebrates are the sources of exposure, with ingestion of invertebrates accounting for almost all the exposure. For mercury, NOAEL-based HQs exceeded 1 in all three Site DUs and in the background DU4. Most soil sample values for mercury in the four DUs were non-detect; with single detections out of the three replicates in DU1 and DU2 that were close to the detection limits of the non-detected samples. The risk estimates for exposures of insectivorous birds to mercury at the Site are highly uncertain due to the inadequacy of the detection limits.

Herbivorous and Carnivorous Mammals (see Tables D-4 and D-7, Attachment D) – No COPECs were found to exceed threshold-based HQ of 1; no COECs were identified for these mammalian feeding guilds.

Insectivorous Mammals (see Table D-5, Attachment D) – Threshold-based HQs were greater than 1 in surface soil at two site DUs for antimony and at three site DUs for molybdenum (Table 4-16). The majority of the exposure was due to ingestion of contaminants in food (earthworms); incidental ingestion of soil contributed little to the total exposure. Antimony and molybdenum are preliminarily identified as COECs based on the threshold-based HQs.

- *Subsurface Soil*

Insectivorous Mammals (see Table D-6, Attachment D) – Subsurface soil exposures were calculated for a burrowing mammal exposure scenario; the insectivorous shrew was used as a representative receptor. As shown in Table 4-16, threshold-based HQs were greater than 1 in subsurface soil of DU1 for antimony and molybdenum, which are retained as preliminary COECs. LOAEL-based HQs did not exceed 1 for any COPEC in subsurface soils (Table D-6). A comparison of the subsurface soil HQs to the surface soil HQs shows subsurface soil concentrations were within the range of surface soil concentrations throughout the three DUs.

Adequacy of Laboratory Limits

For antimony, one of the three ISM replicate soil samples were non-detect in both DU 2 and DU 3. Thus, the HQs presented in Table 4-16 for those DUs are based on a mix of detects and detection limits. The detection limits for the remaining COPECs are considered adequate for making ecological risk management decisions.

Comparison to Background

COEC concentrations in on-site ISM soil samples were compared statistically to concentrations in the background area (DU4) using several two-sample hypothesis testing approaches recommended by USEPA (2002c) that have been demonstrated to work well with ISM datasets (Pooler et al. 2018). Hypothesis testing was performed based on a one-tailed Student's t-test, using both a Form 1 and Form 2 null hypothesis and an α of 0.05, and based on a two-tailed test with an α of 0.1 (USEPA 2002c).

Table 4-17 presents the results of the background evaluation for surface soil for the wildlife COECs. Panel B of Table 4-17 presents the ratio of the mean soil concentration in each DU to the mean background concentration (see Panel A of Table 4-17) to provide information on the magnitude of the difference in soil concentrations when site levels are elevated. The elevations above background for surface soil concentrations are highest (exceeding 5 to 10-fold) for antimony in DU1 and DU2, and molybdenum in all three DUs. Surface soil concentrations of antimony and molybdenum were statistically higher in all three DUs relative to background, which suggests on-site soil concentrations are attributable, at least in part, to site-related impacts.

4.4. ERA Uncertainty Assessment

There are a variety of sources of uncertainty in each line of evidence used in the risk assessment that need to be evaluated and considered when developing the weight of evidence and making risk management decisions. This section discusses the uncertainties associated with the BERA.

This section provides a detailed discussion of the main sources of uncertainty in the HQ-based evaluation along with a qualitative estimate of the direction and magnitude of the likely errors attributable to the uncertainty. Because of the inherent conservatism in the derivation of many of the exposure estimates and toxicity values, HQ values presented in this risk assessment should generally be viewed as being more likely to be high than low, and conclusions should be interpreted accordingly.

4.4.1. Nature and Extent of Contamination

Representativeness of Sampling Data.

For surface and subsurface soil, samples were collected using ISM from three DUs established based on the general areas of waste debris area. A fourth DU served as a background area. As such, these samples are likely to provide a good representation of the levels of contaminants in the waste areas. However, the soil DUs were not established based on the ecological exposure areas of interest but rather based on site characteristics (e.g., waste extents) and tended to be placed in areas with a higher potential for contamination. Thus, soil results may be biased high relative to the Site as a whole.

Accuracy of Analytical Measurements

Laboratory analysis of environmental samples is subject to technical difficulties, and values reported by the laboratory may not always be correct. The magnitude of analytical error is usually small compared to other sources of uncertainty although the relative uncertainty increases for results that are near the MDL. In particular, the MDL for mercury was found to be inadequate for assessing ecological risk for insectivorous birds, since the MDL assigned to non-detected samples was greater than soil concentrations associated with potential risk. The risk assessment includes J-qualified results, which are considered estimated values for varying reasons, recognizing there is a higher degree of analytical uncertainty in these estimated values.

4.4.2. Exposure Assessment

Exposure Pathways and Routes not Evaluated.

Exposure pathways and routes selected for quantitative evaluation in this assessment do not include all potential exposure pathways or routes for all ecological receptors. Omission of these pathways or routes will tend to lead to an underestimation of total risk to the exposed receptors.

As discussed previously, many of these exposure pathways and routes (e.g., dermal exposures of wildlife) are likely to be minor compared to other routes that were evaluated, and the magnitude of the underestimation is not likely to be significant in most cases.

Chemicals not Detected

The analyte list for samples collected at the Site was extensive, and several chemicals were not detected in soil. Any chemical that was not detected in any sample was not included as a COPEC. Omission of these chemicals is not likely to result in an underestimation of risk, provided that the data were collected using an analytical method that would have detected the chemical if it were present at a level of concern.

As was shown earlier, and taken from the SI report (CDM Smith 2018), the MDLs for numerous SVOCs were above ecological screening criteria, and were therefor inadequate for evaluating potential risk. The samples were analyzed in accordance with standard analytical methods; thus, for some chemicals, available instrumentation is simply not able to achieve MDLs low enough to support meaningful ecological risk estimates. For chemicals that do not bioaccumulate, although inadequate MDLs are a source of uncertainty and might lead to an underestimation of risk, it is not likely to be a significant limitation.

Wildlife Exposure Parameters and Dose Modeling

The intake (ingestion) rates for food and soil used to estimate exposure of wildlife at the Site are subject to uncertainty from multiple sources. Most intake rates are derived from literature reports of intake rates, body weights, and dietary compositions in receptors at other locations or from measurements of laboratory-raised organisms. These values may or may not serve as appropriate models for site-specific intake rates of typical wildlife receptors at this Site. For this BERA, receptors were assumed to have a diet that was 100% of the food item with the highest uptake of soil chemicals, such as the assumption that insectivorous birds and mammals consume only earthworms. However, the actual dietary composition of an organism will vary daily and seasonally. These uncertainties could either under- or overestimate the actual exposures of wildlife to chemicals in soil and diet.

Data on incidental ingestion of soil by wildlife species are generally limited; therefore, the intake rates for soil used in these calculations are uncertain, and actual values might be either higher or lower than assumed.

Exposure estimates were derived assuming that the absorption of all COPECs in site soils was 100%. However, for some metals, it is considered likely that absorption may not be as high as from food or water; thus, this approach is likely to overestimate risks from incidental ingestion of soil.

For this assessment, it was assumed that wildlife exposures were continuous and receptor home ranges were located entirely within the site DUs (i.e., the entire total dietary intake was from the

Site). In the case of resident receptors with small home ranges, this assumption may be appropriate. However, this assumption likely overestimates exposures for receptors that have larger home ranges and/or migratory species that may not be exposed on-site most of the time.

Concentrations in Tissues of Dietary Items

Measured data on concentrations in dietary items are not available for the Site. Therefore, to estimate exposures to wildlife, dietary tissue concentrations were estimated using uptake factors and/or bioaccumulation models from the literature. These uptake models may not account for site-specific factors that may influence accumulation into biota. Therefore, predictions of wildlife risk based on estimated tissue concentrations are considered uncertain and are likely to overestimate the actual exposures of wildlife to chemicals in dietary items.

4.4.3. Toxicity Assessment

Receptors Evaluated

Risks to wildlife were assessed for a selected subset of avian and mammalian species that were representative of a feeding guild (i.e., insectivores, herbivores, carnivores) likely to be present at the Site. Although the wildlife receptors evaluated in the risk assessment were selected to represent species within this feeding guild, they may not represent the full range of sensitivities present. The species selected may be more or less sensitive to chemical exposure than typical species located within the area.

Selected Toxicity Values

In the risk evaluation, HQs were calculated using toxicity values compiled from the literature (i.e., not site-specific toxicity values). There are several sources of uncertainty associated with the selected toxicity values that are discussed in more detail below. In general, the HQs are more likely to be overestimated than underestimated. Therefore, when NOAEL-based HQs are below 1, it is possible to draw meaningful conclusions regarding the low likelihood of risks despite the uncertainties in the selected toxicity values. However, when NOAEL-based HQs are above 1 and LOAEL-based HQs are below 1, the uncertainties in the selected toxicity values should be carefully considered in making risk management decisions.

Soil ESVs for Terrestrial Plants and Invertebrates

The toxicity values used in HQ calculations for terrestrial plants and invertebrates are usually based on laboratory studies in which soluble forms of test metals are added to test soils. Thus, these values do not account for occurrence of metals in mineral forms in soil that are largely insoluble and do not contribute as much toxicity as soluble forms. For example, the available chromium toxicity values for plants (and terrestrial invertebrates) were based on hexavalent chromium, Cr(VI), which is more soluble and generally more toxic than trivalent chromium, Cr(III) (Efroymson et al. 1997a). Chromium was identified as a COPEC for plants and soil invertebrates. However, Efroymson et al. (1997b) point out that the relative toxicity of Cr(III) and

Cr(VI) to soil invertebrates is not clear from the available toxicity studies. Cr(VI) ions can pass through cell membranes with much greater ease than Cr(III) ions. However, it is thought that Cr(VI) is reduced to Cr(III) inside the cell (Molnar et al., 1989); this latter may be the final active form. Molnar et al. (1989) found that soil invertebrate reproduction and mass gain of juveniles were more sensitive to Cr(III) than to Cr(VI), despite other studies summarized in Efroymson et al. (1997b) showing higher sensitivity to Cr(VI). Efroymson et al. (1997b) state that without a better understanding of chromium transformations in soil, transport across earthworm cell membranes, and reactions within the cell, it is difficult to separate the effects of the two different forms. Although the form of chromium is not known for the Site, it is likely to be in a trivalent form (Shahid et al., 2017; ATSDR 2012; Han et al. 2004).

Another limitation of the toxicity values is that the values do not account for variations in environmental factors, such as pH and TOC content, which may influence the toxicity of metals in soils. In addition, the laboratory tests may not utilize test species that are likely to occur at the Site.

Based on these considerations, confidence in the risk estimates for terrestrial plants and soil invertebrates is low, and risks are likely to be overestimated.

Toxicity Values for Wildlife

The TRVs used in the dose-based HQ calculations for the evaluation of wildlife exposures to contaminants in soil do not account for site-specific environmental attributes that may influence uptake and toxicity. As noted above, these uncertainties in wildlife TRVs limit the reliability of the risk estimates and calculated HQs are more likely to overestimate than underestimate actual risk.

Extrapolation from Laboratory to Field Conditions

Available toxicity data are usually generated under laboratory conditions, and extrapolation of those data to free-living receptors in the field is uncertain. One factor is that laboratory organisms are more homogeneous than wild populations. For example, laboratory test populations are usually all the same genetic strain, age, and sex, and all are usually healthy. In contrast, wild populations are genetically diverse, consist of individuals of different ages and genders, and health status may vary widely between individuals. In addition, laboratory animals are generally free from the stresses experienced by a wild population. Because of these factors, extrapolation of dose-response data and toxicity factors from laboratory species to wild populations is uncertain. The magnitude and direction of error introduced by this extrapolation is unknown.

Absence of Toxicity Data

Evaluation of risks from chemicals using the HQ approach requires the availability of reliable toxicity data. When no reliable toxicity data are available, it is not possible to calculate HQ values, thus, precluding this approach as a potential line of evidence in drawing risk conclusions.

Tables 4-14 and 4-15 identify the detected chemicals in soil for which no reliable ecological toxicity data were available. No COPEC was lacking a terrestrial plant ESV, or an avian or mammalian TRV.

For chemicals without toxicity data, which occurs with molybdenum, silver, thallium, and vanadium for soil invertebrates in this risk assessment, the inability to quantify risks from these chemicals could result in an underestimation of total risk. However, for most chemicals, it is suspected that the magnitude of any underestimation of risk is likely to be low, at least in comparison to chemicals where toxicity values exist. This is based on the assumption that absence of laboratory studies to establish a toxicity value reflects a relatively low level of concern for the chemical. To the extent that this assumption is true, risks from detected chemicals without toxicity values are likely not to contribute risks of the same magnitude as those predicted for detected chemicals that do have a toxicity value.

4.4.4. Risk Characterization

Chemical Interactions

Most toxicity values are derived from studies of the adverse effects of a single contaminant. However, exposures to ecological receptors usually involve multiple contaminants, raising the possibility that synergistic or antagonistic interactions might occur. Generally, data are not adequate to permit any quantitative adjustment in toxicity values or risk calculations based on inter-chemical interactions. In accordance with USEPA guidance, effects from different chemicals are not added unless reliable data are available to indicate that the two (or more) chemicals act on the same target tissue by the same mode of action. In this risk assessment, risk estimates were not added across different COPECs. If any of the COPECs at the Site act by a similar mode of action, total risks could be higher than estimated. Conversely, if the COPECs at the Site act antagonistically, total risks could be lower than estimated.

Estimation of Population-Level Impacts

Assessment endpoints for the receptors at this site are based on the sustainability of exposed populations (i.e., the ability of a population to maintain normal levels of diversity and density), and risks to some individuals in a population can occur and still allow for a healthy and stable population. However, even if it is possible to accurately characterize the distribution of risks or effects across the members of the exposed population, estimating the impact of those effects on the population is generally difficult and uncertain.

The relationship between adverse effects on individuals and effects on the population is complex and depends on the demographic and life history characteristics of the receptor being considered and the nature, magnitude, and frequency of the chemical stresses and associated adverse effects. Thus, the actual risks that will lead to population-level adverse effects will vary from receptor to receptor. Further discussion on the potential for population-level impacts for the insectivorous mammal receptor is presented below.

Uncertainties Specific to the Insectivorous Mammal

The shrew was selected as the representative species of concern for insectivorous mammals, and risks to shrew were estimated to be above a level of concern, due to exposures to antimony and molybdenum. Ecological risks are intended to estimate potential impacts on populations of organisms, or on communities, even though the toxicity values used to estimate risks are typically based on laboratory studies. Therefore, the endpoints of the laboratory toxicity studies are selected for potentially impacting a population of organisms, and generally consist of reproduction, growth, and mortality. However, whether a risk estimate with an HQ>1 suggests a potential impact on a population of receptors depends on a variety of factors, with varying levels of uncertainty.

The threshold-based HQs for shrews in this BERA range from 2 to 7 from exposures to antimony and molybdenum, and suggest that shrews that are exposed to Site contaminants could experience adverse impacts. However, whether the risk estimates indicate that a population of shrews or other insectivorous mammals could be impacted at the Site is highly uncertain, for the following reasons:

- The risks to shrew are largely driven by the soil concentrations of molybdenum. However, the toxicity of molybdenum to shrews is uncertain. The TRV that was used for molybdenum comes from the ORNL compilation of mammalian TRVs, in which only a couple of studies were deemed adequate for evaluation (see Sample et al. 1996). The final molybdenum TRV was based on a single reproductive study of mice, from which the LOAEL was derived. The low number of available studies and the reliance on a single dose to develop the TRV entails high uncertainty in the TRV for molybdenum.

- A second but lower driver of risks to the shrew is antimony. The TRV for antimony was selected as the lowest NOAEL available, derived from a study on rodent reproduction, out of over a dozen studies that passed USEPA criteria for inclusion in the soil EcoSSL development. The TRV for antimony has moderate certainty because of the available number of studies, but some uncertainty because the limited number of studies that were precluded by USEPA in their percentile approach to developing EcoSSLs.

- Earthworms are assumed to comprise 100% of the diet of shrew at the Site for the purpose of this BERA. Shrews typically consume a mix of insects and earthworms, rather than earthworms alone. However, insects are not modeled in the diet of shrew in this risk assessment because the uptake of metals from soils into insects has not been studied to the extent that intake into earthworms has. Therefore, modeling parameters for insects are not available to use in addition to the parameters for earthworms. The availability of earthworms as a food source at the Site, which is above 10,000 feet in elevation, is unknown. Based on these considerations, the assumption that the shrew consumes only earthworms at the Site adds uncertainty.

- The risks to shrew are driven by the ingestion of earthworms, rather than soil. Data for modeling the uptake from soils to earthworm tissue are available for many metals; however, data are not available for modeling antimony uptake into earthworms, and are limited for modeling uptake of molybdenum. For antimony, it was conservatively assumed that the earthworm tissue concentrations would essentially be the same as the soil concentration. However, for the majority of metals, actual data show that earthworm tissue concentrations are much lower than the soil concentrations. For molybdenum, an uptake factor was not recommended in the compendium by Oak Ridge National Laboratory (Sample et al, 1998b), due to the limited number of samples (n=4), so the uptake factor was selected as the median of the four values presented in Table C-1, Appendix C, of the compendium, at which the earthworm tissue concentration is assumed to almost equal the soil concentration. Whether earthworms actually take up antimony or molybdenum from soils at the high rates assumed for this BERA, such that tissue concentrations are almost the same as soil concentrations, has moderate to high uncertainty.

- The size of the area of contamination where HQs were greater than 1 for the shrew totals about 0.65 acres (DUs 1-3). This is about two to three times the size of the foraging range of typical shrews. This is usually interpreted to mean that a mated pair of shrews or possibly a few shrews would be exposed to the soil contaminants within the three DUs at the Site. Whether impacts to such a small number of foraging shrews would in turn impact a reproducing population of shrews in the vicinity of the Site is unknown. The number of shrews that would constitute a population, and the size of an area necessary to maintain a population, in the High Sierras are both unknown. Hence, whether the DUs at the Site with HQs greater than 1 for the shrew present a risk to local populations of shrews or other small mammals is very uncertain.

Contribution from Background

All of the COECs identified in the ERA have the potential to be present at the Site because they are naturally occurring (e.g., metals). In the BERA, risk estimates were presented for the site-specific background area (DU4) to provide a frame of reference for interpreting site risks and distinguish between site-related contamination and levels consistent with local background conditions. In general, concentrations of COECs in Site soils are clearly elevated relative to background, indicating exposures are site-related. However, there were also several instances where background conditions may be contributing to overall exposures and risks, suggesting a portion of the total risk may be attributable to natural contributions that are not site-related. An example at this site is vanadium, where the concentration in the background DU4 does not differ statistically from the concentrations in site DUs (Table 4-17B).

4.5. Ecological Risk Assessment Conclusions

The SLERA identified the list of COPECs for further evaluation in the BERA (see Table 4-1). Based on the BERA, two metals in soil (antimony and molybdenum) are elevated above background and have threshold HQs > 1 for insectivorous mammals exposed to surface soil and to subsurface soil through burrowing.

There are several different evaluation methods, or lines of evidence, that can be used in a typical BERA for determining the impact of site releases on ecological receptors; these can include HQ estimates through modeling, toxicity tests performed with site media, and habitat and community evaluations. Each of these lines of evidence has inherent advantages and limitations. For this reason, conclusions based on only one line of evidence may be incomplete. The best approach for reaching reliable conclusions about potential ecological risks is to combine the findings across all the evaluation methods for which data are available, taking the relative strengths and weaknesses of each method into account. If the methods all yield similar conclusions, confidence in the conclusion is increased. If different methods yield different conclusions, a careful review must be performed to identify the basis of the discrepancy (if possible) and decide which methods provide the most reliable information.

For the present BERA at the Vogelsang site, there is one primary line of evidence— estimates of HQs—available for characterizing potential ecological risks, which is supplemented with additional lines of evidence consisting of vegetation and wildlife observations (Harris Environmental Group, 2020) and a qualitative evaluation of the likelihood of exposures by comparison of receptor home range sizes with the size of site contamination. Risk conclusions based only on modeled HQs should be viewed as having substantial uncertainty, and HQ values presented in this risk assessment should generally be viewed as being more likely to be high than low.

For plants and invertebrates, the HQ results show that none of the chemicals detected in Site soils have concentrations sufficiently elevated to result in adverse impacts for terrestrial plants and/or soil invertebrate communities. Similarly, for the three bird feeding guilds and for herbivorous and carnivorous mammals, none of the chemicals detected in Site soils are sufficiently elevated to be above a target level for risks.

For insectivorous mammals, threshold-based HQs were greater than 1 for one or more site DUs, for antimony and molybdenum, for exposures to surface soil, subsurface soil, and terrestrial food items. That risk estimates are highest for insectivorous mammals is not unexpected since the bioaccumulation of contaminants into terrestrial invertebrate (earthworm) tissues often tends to be greater than into plants and small mammal tissue, which is the case in this risk assessment. Thus, if risk management decisions are based on this feeding guild, they will be adequately protective of other feeding guilds with lower exposures.

The list of COECs identified in the ecological risk assessment consist of the following:

- Terrestrial Plants: none.
- Soil Invertebrates: none

- Wildlife: antimony and molybdenum.

Soil concentrations of all of these COECs were higher in one or more DUs relative to background, which suggests on-site soil concentrations are attributable, at least in part, to site-related impacts.

However, a number of major uncertainties with the assessment of risks to shrew from exposures to antimony and molybdenum in soil have been identified in the Uncertainty Assessment:

- Toxicity data are very limited for both metals and therefore the most stringent toxicity value, or the only toxicity value available, were used to estimate risks to shrews.

- Shrews were assumed to consume only earthworms in the BERA, yet they are known to consume a mix of worms and insects, and some plant material. It is likely that earthworms are limited at the high-altitude Site, and may not even be present, and that shrews consume primarily insects. The intake of soil contaminants by earthworms is considerably higher than by insects, however, uptake factors are not available for insects for use as surrogate exposure and risk modeling. The assumptions that shrews consume only earthworms from the Site soils entails very high uncertainty.

- The modeled concentrations of antimony and molybdenum in the tissues of earthworms is highly uncertain. No value was recommended for molybdenum in the standard source, so the few available values from scientific literature were used to select one. No data were available for antimony, so the concentration of antimony in earthworm was assumed to be the same concentration as in soil.

- The size of the contaminated area is small (about 0.65 acres) and is about the size of an area that is assumed to support a few mated pairs of shrews, but not likely a population of shrews. Ecological risk assessment is intended to protect populations and communities of organisms, rather than individual organisms unless that organism is federal listed as endangered or threatened. For shrews at the Vogelsang site, whether exposures to contaminants from the small sized area is sufficient to present risks to a population is very uncertain.

These above reasons provide substantial uncertainties with the risk estimates at the Site, such that they lead to the conclusion that the concentrations of antimony and molybdenum in Site soils are very unlikely to cause adverse effects to populations of insectivorous mammals, despite the exceedances of 1 by the threshold HQs. This analysis satisfies the USEPA Superfund ERA 8-step process (USEPA 1997) scientific management decision point that *"Ecological threats are negligible."* Thus, no contaminants, including antimony and molybdenum, are identified as COECs for the Vogelsang FWDA site.

5. Development of Risk-Based Preliminary Removal Goals

The human health and ecological risk assessments are designed to identify contaminants at the Site that have the potential to pose unacceptable risks for a range of different receptors. For this Site, neither human health risks nor ecological risks were considered to exceed a level of unacceptability. Consequently, no COCs were identified for human health and, as described in the preceding section, due to the high uncertainties in the ecological risk estimates for this Site, no ecological COECs are identified.

Typically, this section would develop risk-based concentrations, identified as preliminary removal goals (PRGs), following NPS guidelines. The PRGs would be developed for each contaminant and exposure medium where the risk assessment determined there is the potential for unacceptable risk. PRGs are risk-based in that they are intended to be protective of the human and ecological exposure scenarios of interest for the Site, and are based on the same exposure and toxicity information and derived using the same risk assessment methods that were used in the risk assessments for the Site.

However, in accordance with USEPA guidance (USEPA 2002c), because no unacceptable human health or ecological risks were estimated for this Site, and COCs and COECs were not identified, PRGs are not developed. Removal or remediation to mitigate risks is not anticipated for the Vogelsang Site.

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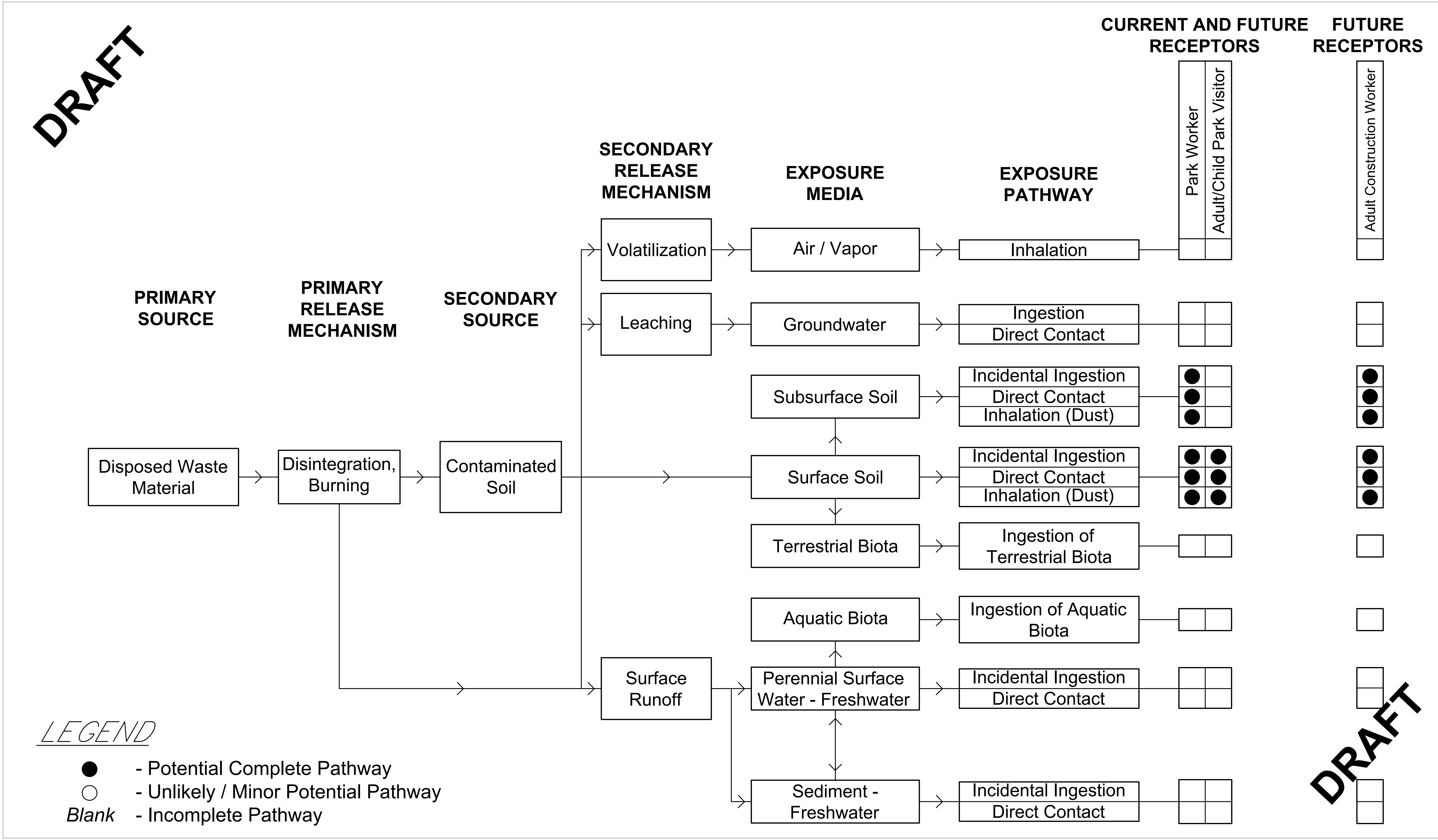
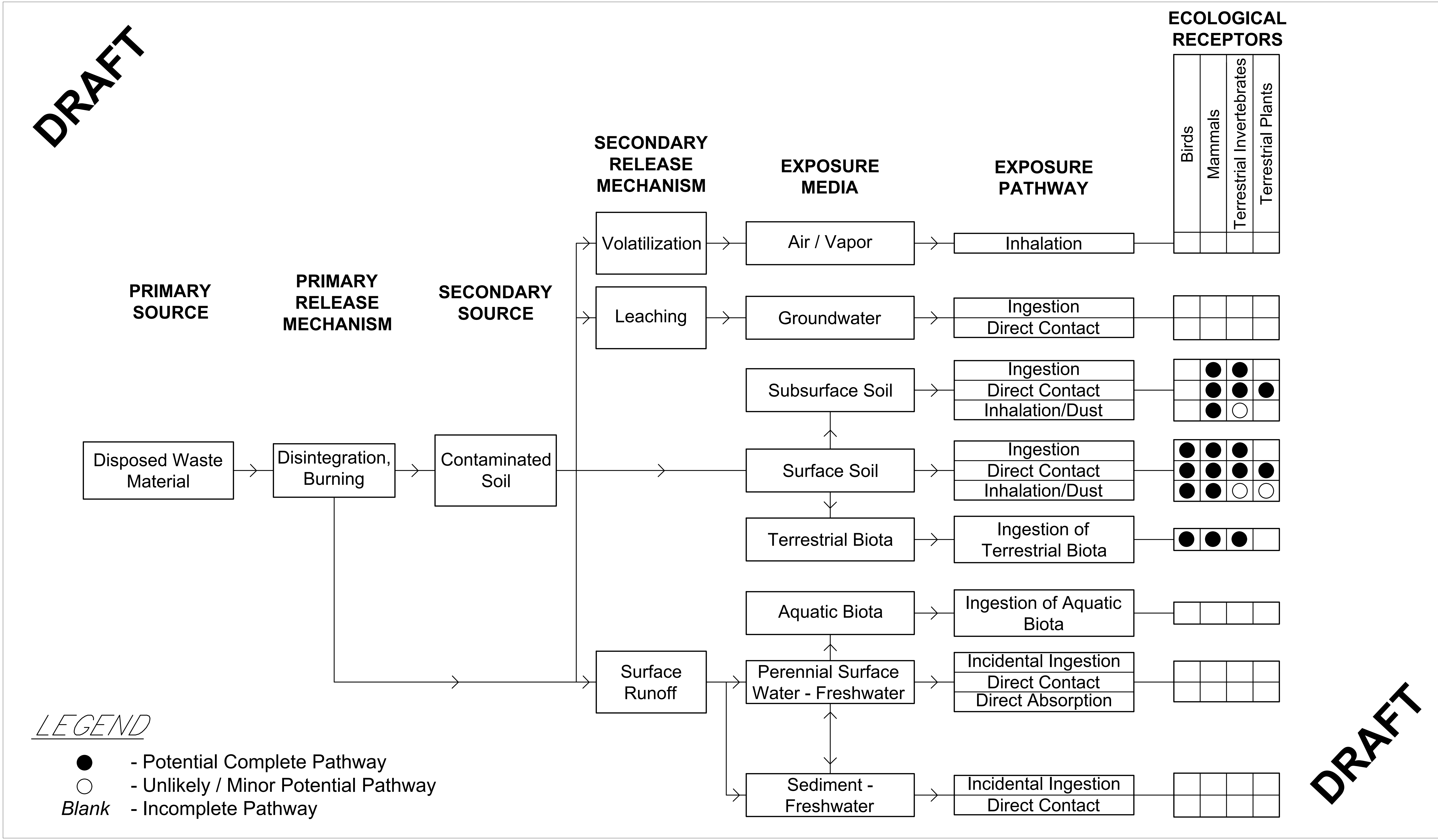
FIGURES



KANE ENVIRONMENTAL INC
Project #49723-2

Engineering Evaluation / Cost Analysis
Vogelsang Former Waste Disposal Area Site
Yosemite National Park, California

Figure 3-1 Conceptual Site Model For Human Exposures



KANE ENVIRONMENTAL INC
Project #49723-2

Engineering Evaluation / Cost Analysis
Vogelsang Former Waste Disposal Area Site
Yosemite National Park, California

Figure 4-1 Conceptual Site Model For Ecological Exposures

TABLES

Table 3.1. COPC Selection Summary for Human Health

Chemical Group	Chemical Name	CASRN	Human Health	
			Surface Soil	Subsurface Soil
Metals	Arsenic	7440-38-2	x	x
	Chromium	7440-47-3	x	x
	Cobalt	7440-48-4	x	
	Thallium	7440-28-0	x	

Notes:

CASRN = Chemical Abstracts Service Registry Number

COPC - Chemcial of Potential Concern

Table 3-2 Summary of Chemicals with MDLs greater than Screening Levels

Chemical Group	Chemical Name	CASRN	Human Health	
			Surface Soil	Subsurface Soil
SVOCs	2,4-DINITROTOLUENE	121-14-2	x	--
	2,6-DINITROTOLUENE	606-20-2	x	x
	2-NITROPHENOL	88-75-5	x	--
	3,3´-DICHLOROBENZIDINE	91-94-1	x	--
	4,6-DINITRO-2-METHYLPHENOL	534-52-1	x	x
	BIS (2-CHLOROETHYL) ETHER	111-44-4	x	x
	HEXACHLOROBENZENE	118-74-1	x	x
	HEXACHLOROBUTADIENE	87-68-3	x	--
	HEXACHLOROETHANE	67-72-1	x	--
	N-NITROSODIMETHYLAMINE	62-75-9	x	x
	N-NITROSODI-N-PROPYLAMINE	621-64-7	x	x

Notes:

CASRN = Chemical Abstracts Service Registry Number

SVOC = Semi-Volatile Organic Compounds

Table 3-3. Exposure Parameters for Park Workers

			CTE		RME		CTE		RME	
Exposure Pathway	**Exposure Input Parameter**	**Units**	**Adult Employee**	**Source**	**Adult Employee**	**Source**	**Construction/ Restoration Worker**	**Source**	**Construction/ Restoration Worker**	**Source**
General	Body weight (adult)	kg	80	[1,2]	80	[1,2]	80	[1,2]	80	[1,2]
	Exposure frequency	days/yr	12	[4,b]	24	[4,a]	15	[4,b]	30	[4,a]
	Exposure duration	yr	5	[4]	10	[4,c]	1	[4]	3	[4,d]
	Averaging time, non-cancer	dy	1825	[1,3]	3650	[1,3]	365	[1,3]	1095	[1,3]
	Averaging time, cancer	dy	25550	[1,3]	25550	[1,3]	25550	[1,3]	25550	[1,3]
Incidental Ingestion of Soil	Ingestion rate	mg/day	50	[4,b]	100	[1,2]	165	[4,b]	330	[1,6]
	Conversion factor	kg/mg	1.E-06	--	1.E-06	--	1.E-06	--	1.E-06	--
Dermal Contact with Soil	Exposed surface area	cm^2/event	2,479	[5,e]	6,032	[1]	6,032	[1]	6,032	[1]
	Adherence factor	mg/cm^2	0.02	[5]	0.2	[5]	0.8	[1]	0.8	[1]
	Event frequency	events/day	1	[5]	1	[5]	1	[5]	1	[5]
	Conversion factor	kg/mg	1.E-06	--	1.E-06	--	1.E-06	--	1.E-06	--
Inhalation of Airborne Dust (Derived from	Exposure time	hr/day	4	[4,b]	8	[4]	8	[4]	10	[7]
	Conversion factor	µg/mg	1.E+03	--	1.E+03	--	1.E+03	--	1.E+03	--

Sources:

[1] DTSC HERO Note 1. Recommended DTSC Default Exposure Factors, Adults Industrial and Construction.
[2] USEPA 2014. OSWER Directive 9200.1-120. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Parameters.
[3] USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December.
[4] Professional judgment.
[5] USEPA 2004a. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part E - Dermal), average of males and females. CTE = face, forearms, and hands; RME =
[6] USEPA 2002b. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
[7] USEPA 2009. Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual (Part F- Inhalation).

Notes:

[a] Assumes exposure occurs over 24 weeks (May-October) for a worker, and 30 weeks for a construction/restoration worker, when ground is not covered with snow, for 1 day per week.
[b] Assumes CTE receptor is half that of the RME receptor.
[c] The default outdoor worker exposure duration is 25 years; however, it is not reasonable to assume all 25 years of an NPS employees' outdoor working time at the Park would be spent at the
[d] Assumes construction and restoration projects could take up to 3 years to complete.
[e] Face, forearms, hands

cm2 = square centimeter
CTE = central tendency exposure
DTSC = Department of Toxic Substances Control
HERO = Human and Ecological Risk Office
HIF = human intake factor
hr = hour
kg = kilogram
mg = milligram
NPS = National Park Service
OSWER = Office of Solid Waste and Emergency Response
RME = reasonable maximum exposure
TWF = time-weighting factor
USEPA = United States Environmental Protection Agency
yr = year

Table 3-4. Exposure Parameters for Park Visitors

			CTE				RME			
Exposure Pathway	**Exposure Input Parameter**	**Units**	**Young Child**	**Older Child [d]**	**Adult**	**Source**	**Young Child**	**Older Child [d]**	**Adult**	**Source**
General	Body weight	kg	15	44	80	[1,3]	15	44	80	[1,3]
	Exposure frequency	days/yr	1	5	5	[4,a]	2	10	10	[4,a,e]
	Exposure duration	yr	2	5	5	[4]	6	10	10	[4, e]
	Averaging time, non-cancer	dy	730	1825	1825	[1,2]	2190	3650	3650	[1,2]
	Averaging time, cancer	dy	25550	25550	25550	[1,2]	25550	25550	25550	[1,2]
Incidental Ingestion of Soil	Ingestion rate	mg/day	100	50	50	[b]	200	100	100	[1,3,c]
	Conversion factor	kg/mg	1.E-06	1.E-06	1.E-06	--	1.E-06	1.E-06	1.E-06	--
Dermal Contact with Soil	Exposed surface area	cm2/event	1558	2,479	2,479	[4,g]	2,208	4,849	4,849	[4,h]
	Adherence factor	mg/cm2	0.2	0.07	0.07	[1]	0.2	0.07	0.07	[1]
	Event frequency	events/day	1	1	1	[5]	1	1	1	[5]
	Conversion factor	kg/mg	1.E-06	1.E-06	1.E-06	--	1.E-06	1.E-06	1.E-06	--
Inhalation of Airborne Dust	Exposure time	hr/day	0.5	0.5	0.5	[4, f]	2	2	2	[4, f]
	Conversion factor	µg/mg	1.E+03	1.E+03	1.E+03	--	1.E+03	1.E+03	1.E+03	--

Sources:

[1] DTSC HERO Note 1. Recommended DTSC Default Exposure Factors, Children.

[2] USEPA 1989. Risk Assessment Guidance for Superfund, Volume I, Part A.

[3] USEPA 2014. OSWER Directive 9200.1-120. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Parameters.

[4] Professional judgement.

[5] USEPA 2004a. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part E - Dermal). CTE = face, forearms, and hands; RME = CTE plus lower

Notes:

[a] Assumes exposure for an RME visitor is limited to 10 days/year (5 weekends/year), and a CTE visitor's exposure is half of the RME visitor (i.e., 5 days).

[b] Assumes CTE value is half of the RME value.

[c] Assumes RME soil ingestion by a park visitor is equal to a resident defualt ingestion rate.

[d] An older child is assumed to be between 6 and 16 years old; an adult is assumed to be 16 years and older.

[e] While the amount of time spent at Yosemite National Park may be higher, it is not reasonable to assume the entirety of a visitors' time at the Park would be spent at the

[f] RME time assumes about 2 hours would be spent at the Site while camping or staying nearby. CTE is based on a through-hiker scenario; assumes it would take 30 minutes to

[g] Face, forearms, hands

[h] Face, forearms, hands,lower legs

cm2 = square centimeter
CTE = central tendency exposure
DTSC = Department of Toxic Substances Control
HERO = Human and Ecological Risk Office
HIF = human intake factor
hr = hour
kg = kilogram
mg = milligram
OSWER = Office of Solid Waste and Emergency Response
RME = reasonable maximum exposure
TWF = time weighting factor
USEPA = United States Environmental Protection Agency
yr = year

Table 3-5. Exposure Point Concentrations, Human Health - Surface Soil

Chemical Group	COPC	CASRN	ISM Replicate Result (mg/kg)			Mean (mg/kg)	Calculated 95UCL (mg/kg)	Exposure Point Concentration (EPC)	
			Rep 1	Rep 2	Rep 3			(mg/kg)	EPC Basis
Decision Unit 1 (DU1)									
Metals	ARSENIC	7440-38-2	1.3	1.4	1.4	1.4	1.512	1.5	95% Chebyshev(Mean, Sd) UCL
	CHROMIUM III	7440-47-3	2.5	3.1	3.7	3.1	4.61	4.6	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	1.8	1.7	1.8	1.8	1.912	1.9	95% Chebyshev(Mean, Sd) UCL
	THALLIUM	7440-28-0	0.04	0.047	0.043	0.043	0.0522	0.052	95% Chebyshev(Mean, Sd) UCL
Decision Unit 2 (DU2)									
Metals	ARSENIC	7440-38-2	1.3	1	1.3	1.2	1.636	1.6	95% Chebyshev(Mean, Sd) UCL
	CHROMIUM III	7440-47-3	3.5	2.3	2.9	2.9	4.41	4.4	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	2	1.8	2.5	2.1	3.007	3.0	95% Chebyshev(Mean, Sd) UCL
	THALLIUM	7440-28-0	0.065	0.06	0.082	0.069	0.098	0.098	95% Chebyshev(Mean, Sd) UCL
Decision Unit 3 (DU3)									
Metals	ARSENIC	7440-38-2	1.3	1.2	1.2	1.2	1.379	1.4	95% Chebyshev(Mean, Sd) UCL
	CHROMIUM III	7440-47-3	2.6	2.7	2.7	2.7	2.812	2.8	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	1.7	1.7	1.7	1.7	1.7	1.7	--
	THALLIUM	7440-28-0	0.059	0.067	0.064	0.063	0.0735	0.074	95% Chebyshev(Mean, Sd) UCL
Decision Units 1-3 (DU 1-3) All On-Site Areas									
Metals	ARSENIC	7440-38-2	--	--	--	1.3	1.445	1.4	95% Chebyshev(Mean, Sd) UCL
	CHROMIUM III	7440-47-3	--	--	--	2.9	3.564	3.6	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	--	--	--	1.9	2.234	2.2	95% Chebyshev(Mean, Sd) UCL
	THALLIUM	7440-28-0	--	--	--	0.1	0.0779	0.078	95% Chebyshev(Mean, Sd) UCL
Decision Unit 4 (DU 4), Background Area									
Metals	ARSENIC	7440-38-2	1.6	1.6	1.4	1.5	1.824	1.8	95% Chebyshev(Mean, Sd) UCL
	CHROMIUM III	7440-47-3	2.8	3.4	2.5	2.9	4.053	4.1	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	1.8	1.7	1.6	1.7	1.952	2.0	95% Chebyshev(Mean, Sd) UCL
	THALLIUM	7440-28-0	0.072	0.083	0.064	0.073	0.097	0.097	95% Chebyshev(Mean, Sd) UCL

Notes:

COPC - Chemical of Potential Concern

95UCL = 95 percent upper confidence limit

CASRN = Chemical Abstracts Service Registry Number

DU = decision unit

EPC = exposure point concentration

ISM = incremental soil sampling

mg/kg - milligrams per kilogram

Rep = replicate

UCL = upper confidence level

Table 3-6. Exposure Point Concentrations, Human Health - Subsurface Soil

Chemical Group	COPC	CASRN	ISM Replicate Result (mg/kg)			Mean (mg/kg)	Calculated 95UCL (mg/kg)	Exposure Point Concentration (EPC)	
			Rep 1	Rep 2	Rep 3			(mg/kg)	EPC Basis
Decision Unit 1 (DU1)[a]									
Metals	ARSENIC	7440-38-2	2.1	1.8	1.9	1.93	2.318	2.3	95% Chebyshev(Mean, Sd) UCL
	CHROMIUM III	7440-47-3	4.3	4.3	4.7	4.4	5.015	5.0	95% Chebyshev(Mean, Sd) UCL

Notes:

COPC - Chemical of Potential Concern

95UCL = 95 percent upper confidence limit

CASRN = Chemical Abstracts Service Registry Number

DU = decision unit

EPC = exposure point concentration

ISM = incremental soil sampling

mg/kg - milligrams per kilogram

Rep = replicate

UCL = upper confidence level

a - Decision Units 2, 3, and 4 have no subsurface soil data.

Table 3-7. Air Particulate Modeling from Surface and SubSurface Soil

Chemical Group	COPC	CASRN	Adult Park Worker Surface Soil C_{soil} mg/kg	Adult Park Worker Subsurface Soil $C_{subsoil}$ mg/kg	Adult and Child Visitors C_{soil} mg/kg	Worker / Construction PEF m^3/kg	Recreational PEF m^3/kg	Fraction Contaminated 100%	Adult Park Worker Surface Soil C_{air}, Particulate mg/m^3	Adult Park Worker Subsurface Soil C_{air}, Particulate mg/m^3	Adult and Child Visitor C_{air}, Particulate mg/m^3
Decision Unit 1 (DU1)											
Metals	ARSENIC	7440-38-2	1.51E+00	2.32E+00	1.51E+00	1.00E+06	1.36E+09	1	1.51E-06	2.32E-06	1.11E-09
	CHROMIUM III	7440-47-3	4.61E+00	5.02E+00	4.61E+00	1.00E+06	1.36E+09	1	4.61E-06	5.02E-06	3.39E-09
	COBALT	7440-48-4	1.91E+00	NA	1.91E+00	1.00E+06	1.36E+09	1	1.91E-06	NA	1.41E-09
	THALLIUM	7440-28-0	5.22E-02	NA	5.22E-02	1.00E+06	1.36E+09	1	5.22E-08	NA	3.84E-11
Decision Unit 2 (DU2)											
Metals	ARSENIC	7440-38-2	1.64E+00	NA	1.64E+00	1.00E+06	1.36E+09	1	1.64E-06	NA	1.20E-09
	CHROMIUM III	7440-47-3	4.41E+00	NA	4.41E+00	1.00E+06	1.36E+09	1	4.41E-06	NA	3.24E-09
	COBALT	7440-48-4	3.01E+00	NA	3.01E+00	1.00E+06	1.36E+09	1	3.01E-06	NA	2.21E-09
	THALLIUM	7440-28-0	9.80E-02	NA	9.80E-02	1.00E+06	1.36E+09	1	9.80E-08	NA	7.21E-11
Decision Unit 3 (DU3)											
Metals	ARSENIC	7440-38-2	1.38E+00	NA	1.38E+00	1.00E+06	1.36E+09	1	1.38E-06	NA	1.01E-09
	CHROMIUM III	7440-47-3	2.81E+00	NA	2.81E+00	1.00E+06	1.36E+09	1	2.81E-06	NA	2.07E-09
	COBALT	7440-48-4	1.70E+00	NA	1.70E+00	1.00E+06	1.36E+09	1	1.70E-06	NA	1.25E-09
	THALLIUM	7440-28-0	7.35E-02	NA	7.35E-02	1.00E+06	1.36E+09	1	7.35E-08	NA	5.40E-11
Decision Units 1-3 (DU 1-3) All On-Site Areas											
Metals	ARSENIC	7440-38-2	1.45E+00	NA	1.45E+00	1.00E+06	1.36E+09	1	1.45E-06	NA	1.06E-09
	CHROMIUM III	7440-47-3	3.56E+00	NA	3.56E+00	1.00E+06	1.36E+09	1	3.56E-06	NA	2.62E-09
	COBALT	7440-48-4	2.23E+00	NA	2.23E+00	1.00E+06	1.36E+09	1	2.23E-06	NA	1.64E-09
	THALLIUM	7440-28-0	7.79E-02	NA	7.79E-02	1.00E+06	1.36E+09	1	7.79E-08	NA	5.73E-11
Decision Unit 4 (DU 4), Background Area											
Metals	ARSENIC	7440-38-2	1.82E+00	NA	1.82E+00	1.00E+06	1.36E+09	1	1.82E-06	NA	1.34E-09
	CHROMIUM III	7440-47-3	4.05E+00	NA	4.05E+00	1.00E+06	1.36E+09	1	4.05E-06	NA	2.98E-09
	COBALT	7440-48-4	1.95E+00	NA	1.95E+00	1.00E+06	1.36E+09	1	1.95E-06	NA	1.44E-09
	THALLIUM	7440-28-0	9.70E-02	NA	9.70E-02	1.00E+06	1.36E+09	1	9.70E-08	NA	7.13E-11

Notes:

$C_{air,}$ Particulate = C_{soil}/PEF x fraction contaminated

PEF = Particulate Emission Factor, default values from Cal DTSC HERO Note 1 (DTSC 2019b).

Table 3-8. Toxicity Values for COPCs

Chemical Group	COPC	CASRN	Cancer Slope Factor (CSF_o)[1] Oral (mg/kg-day)$^{-1}$	Source	Inhalation Unit Risk Factor (IUR) Inhalation (µg/m^3)$^{-1}$	Source	Reference Dose (RfD_o)[1] Oral (mg/kg-day)	Source	Reference Concentration (RFC_i)[1] Inhalation mg/m^3	Source	Cancer Slope Factor (CSF_d)[2] Dermal (mg/kg-day)$^{-1}$	Reference Dose (RfD_d)[2] Dermal (mg/kg-day)	GI Absorption Factor (GIABS)[3] Unitless	Dermal Absorption Factor (ABS_d)[3] Unitless	Critical Effect Systems Oral	Critical Effect Systems Inhalation
Metals	ARSENIC	7440-38-2	1.5E+00	I	3.3E-03	O	3.0E-04	I	1.5E-05	C	1.50E+00	3.00E-04	1	0.03	NC: cardiovascular, dermal, C: dermal	C: respiratory
	CHROMIUM III	7440-47-3	NA		NA		1.5E+00	I	NA		NA	1.95E-02	0.013	NA	NC: Other	---
	COBALT	7440-48-4	NA		9.0E-03	P	3.0E-04	P	6.0E-06	P	NA	3.00E-04	1	NA	NC: thyroid	Respiratory
	THALLIUM	7440-28-0	NA		NA		1.0E-05	X	NA		NA	1.00E-05	1	NA	hair follicle atrophy	---

Notes:

1 - Toxicity values (RfD, CSF, IUR) are taken from the USEPA RSL database, November 2020 (I=IRIS; A=ATSDR, C=CalEPA, G=RSL User's Guide, H=HEAST, O=OEHHA, P=PPRTV, X=PPRTV Screening Level), except where noted.

2 - The dermal reference doses and cancer slope factors are develped by adjusting the oral values as recommended by the USEPA Risk Assessment Guidance for Superfund (RAGS), Part E (USEPA, 2004a).

3 - Gastrointestinal absorption (GIABS) factors and dermal absorption (ABSd) factors were obtained from the RSL dataabase (November 2020).

NA - Toxicity or chemical-specific parameters were not available.
mg/kg-day - milligrams per kilogram-day
(mg/kg-day)$^{-1}$ - per milligrams per kilogram-day
mg/m^3 - milligrams per cubic meter
(µg/m^3)$^{-1}$ -per microgram per cubic meter
OEHHA - California EPA's Office of Environmental Health Hazard Assessment (OEHHA) Technical Support Document for Cancer Potency https://oehha.ca.gov/media/CPFs042909.pdf
CASRN - Chemical Abstracts Service Registry Number COPC = chemical of potential concern
COPC - Chemcial of Potential Concern
C - Cancer
NC - Non-cancer
RSL = Regional Screening Level Database, USEPA, May 2020 https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables
NA - Not applicable because not a COPC
95% UCL - 95% upper confidence limit on the mean concentration; as recommended by ProUCL Version 4.1 (USEPA, 2011).
chromium = chromium III
thallium = soluble salts

Table 3-9. Summary of NonCancer Hazard Quotients

Route of Exposure	Adult Park Worker		Construction/Restoration Worker		Young Child Visitor Scenario		Older Child Visitor Scenario		Adult Visitor Scenario	
	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME
Decision Unit 1 - Surface Soil										
Incidental Ingestion of Surface Soil	3.4E-04	1.4E-03	1.4E-03	5.6E-03	3.0E-04	1.2E-03	2.6E-04	1.0E-03	1.4E-04	5.7E-04
Dermal Contact with Surface Soil	3.1E-06	1.5E-04	3.7E-04	7.5E-04	8.6E-06	2.4E-05	8.2E-06	3.2E-05	4.5E-06	1.8E-05
Inhalation of Particles from Surface Soil	2.3E-03	9.2E-03	5.7E-03	1.4E-02	2.4E-05	1.9E-04	1.2E-04	9.6E-04	1.2E-04	9.6E-04
Hazard Index	2.6E-03	1.1E-02	7.5E-03	2.1E-02	3.4E-04	1.4E-03	3.9E-04	2.0E-03	2.7E-04	1.5E-03
Decision Unit 1 - Subsurface Soil										
Incidental Ingestion of SubSurface Soil	NE	NE	6.6E-04	2.6E-03	NE	NE	NE	NE	NE	NE
Dermal Contact with SubSurface Soil	NE	NE	5.7E-04	1.1E-03	NE	NE	NE	NE	NE	NE
Inhalation of Particles from SubSurface Soil	NE	NE	2.1E-03	5.3E-03	NE	NE	NE	NE	NE	NE
Hazard Index	NE	NE	3.3E-03	9.1E-03	NE	NE	NE	NE	NE	NE
Decision Unit 2										
Incidental Ingestion of Surface Soil	5.2E-04	2.1E-03	2.1E-03	8.6E-03	4.6E-04	1.8E-03	3.9E-04	1.6E-03	2.2E-04	8.7E-04
Dermal Contact with Surface Soil	3.3E-06	1.6E-04	4.1E-04	8.1E-04	9.3E-06	2.6E-05	8.8E-06	3.5E-05	4.9E-06	1.9E-05
Inhalation of Particles from Surface Soil	3.3E-03	1.3E-02	8.4E-03	2.1E-02	3.5E-05	2.8E-04	1.7E-04	1.4E-03	1.7E-04	1.4E-03
Hazard Index	3.9E-03	1.6E-02	1.1E-02	3.0E-02	5.1E-04	2.2E-03	5.8E-04	3.0E-03	4.0E-04	2.3E-03
Decision Unit 3										
Incidental Ingestion of Surface Soil	3.6E-04	1.4E-03	1.5E-03	6.0E-03	3.2E-04	1.3E-03	2.7E-04	1.1E-03	1.5E-04	6.0E-04
Dermal Contact with Surface Soil	2.8E-06	1.4E-04	3.4E-04	6.8E-04	7.8E-06	2.2E-05	7.5E-06	2.9E-05	4.1E-06	1.6E-05
Inhalation of Particles from Surface Soil	2.1E-03	8.2E-03	5.1E-03	1.3E-02	2.1E-05	1.7E-04	1.1E-04	8.6E-04	1.1E-04	8.6E-04
Hazard Index	2.4E-03	9.8E-03	7.0E-03	2.0E-02	3.5E-04	1.5E-03	3.9E-04	2.0E-03	2.6E-04	1.5E-03
Decision Units 1-3										
Incidental Ingestion of Surface Soil	4.1E-04	1.6E-03	1.7E-03	6.8E-03	3.7E-04	1.5E-03	3.1E-04	1.2E-03	1.7E-04	6.9E-04
Dermal Contact with Surface Soil	2.9E-06	1.4E-04	3.6E-04	7.2E-04	8.2E-06	2.3E-05	7.8E-06	3.1E-05	4.3E-06	1.7E-05
Inhalation of Particles from Surface Soil	2.6E-03	1.0E-02	6.4E-03	1.6E-02	2.7E-05	2.1E-04	1.3E-04	1.1E-03	1.3E-04	1.1E-03
Hazard Index	3.0E-03	1.2E-02	8.5E-03	2.4E-02	4.0E-04	1.7E-03	4.5E-04	2.3E-03	3.1E-04	1.8E-03
Decision Unit 4 Background Area										
Incidental Ingestion of Surface Soil	4.6E-04	1.8E-03	1.9E-03	7.6E-03	4.1E-04	1.6E-03	3.5E-04	1.4E-03	1.9E-04	7.6E-04
Dermal Contact with Surface Soil	3.7E-06	1.8E-04	4.5E-04	9.0E-04	1.0E-05	2.9E-05	9.9E-06	3.9E-05	5.4E-06	2.1E-05
Inhalation of Particles from Surface Soil	2.4E-03	9.8E-03	6.1E-03	1.5E-02	2.6E-05	2.0E-04	1.3E-04	1.0E-03	1.3E-04	1.0E-03
Hazard Index	2.9E-03	1.2E-02	8.5E-03	2.4E-02	4.4E-04	1.9E-03	4.8E-04	2.4E-03	3.2E-04	1.8E-03

Notes:

HI - Non-cancer risks are expressed as a Hazaard Index, which is the cumulative risk across all routes of exposure for the particular scenario.

NE - Pathway not evaluated under this exposure scenario.

CTE =Central Tendency Exposure

RME = Reasonable Maximum Exposure

Table 3-10. Summary of Excess Lifetime Cancer Risk Estimates

Route of Exposure	Adult Park Worker		Construction/Restoration Worker		Young Child Visitor Scenario		Older Child Visitor Scenario		Adult Visitor Scenario	
	CTE	RME	CTE	RME	CTE	RME	CTE	RME	CTE	RME
Decision Unit 1 - Surface Soil										
Incidental Ingestion of Surface Soil	3.3E-09	2.7E-08	2.7E-09	3.3E-08	1.2E-09	1.4E-08	2.5E-09	2.0E-08	1.4E-09	1.1E-08
Dermal Contact with Surface Soil	9.9E-11	9.6E-09	2.4E-09	1.4E-08	1.1E-10	9.4E-10	2.6E-10	2.1E-09	1.4E-10	1.1E-09
Inhalation of Particles from Surface Soil	8.7E-09	7.0E-08	4.3E-09	3.3E-08	3.6E-11	8.7E-10	4.5E-10	7.2E-09	4.5E-10	7.2E-09
Cumulative Risk Across All Routes of Exposure	1.E-08	1.E-07	9.E-09	8.E-08	1.E-09	2.E-08	3.E-09	3.E-08	2.E-09	2.E-08
Decision Unit 1 - Subsurface Soil										
Incidental Ingestion of SubSurface Soil	NE	NE	4.2E-09	5.1E-08	NE	NE	NE	NE	NE	NE
Dermal Contact with SubSurface Soil	NE	NE	3.7E-09	2.2E-08	NE	NE	NE	NE	NE	NE
Inhalation of Particles from SubSurface Soil	NE	NE	1.5E-09	1.1E-08	NE	NE	NE	NE	NE	NE
Cumulative Risk Across All Routes of Exposure	NE	NE	9.E-09	8.E-08	NE	NE	NE	NE	NE	NE
Decision Unit 2										
Incidental Ingestion of Surface Soil	3.6E-09	2.9E-08	3.0E-09	3.6E-08	1.3E-09	1.5E-08	2.7E-09	2.2E-08	1.5E-09	1.2E-08
Dermal Contact with Surface Soil	1.1E-10	1.0E-08	2.6E-09	1.6E-08	1.2E-10	1.0E-09	2.8E-10	2.2E-09	1.6E-10	1.2E-09
Inhalation of Particles from Surface Soil	1.3E-08	1.0E-07	6.4E-09	4.8E-08	5.3E-11	1.3E-09	6.6E-10	1.1E-08	6.6E-10	1.1E-08
Cumulative Risk Across All Routes of Exposure	2.E-08	1.E-07	1.E-08	1.E-07	1.E-09	2.E-08	4.E-09	3.E-08	2.E-09	2.E-08
Decision Unit 3										
Incidental Ingestion of Surface Soil	3.0E-09	2.4E-08	2.5E-09	3.0E-08	1.1E-09	1.3E-08	2.3E-09	1.8E-08	1.3E-09	1.0E-08
Dermal Contact with Surface Soil	9.0E-11	8.8E-09	2.2E-09	1.3E-08	1.0E-10	8.6E-10	2.4E-10	1.9E-09	1.3E-10	1.0E-09
Inhalation of Particles from Surface Soil	7.8E-09	6.2E-08	3.9E-09	2.9E-08	3.2E-11	7.8E-10	4.0E-10	6.5E-09	4.0E-10	6.5E-09
Cumulative Risk Across All Routes of Exposure	1.E-08	1.E-07	9.E-09	7.E-08	1.E-09	1.E-08	3.E-09	3.E-08	2.E-09	2.E-08
Decision Units 1-3										
Incidental Ingestion of Surface Soil	3.2E-09	2.5E-08	2.6E-09	3.1E-08	1.1E-09	1.4E-08	2.4E-09	1.9E-08	1.3E-09	1.1E-08
Dermal Contact with Surface Soil	9.5E-11	9.2E-09	2.3E-09	1.4E-08	1.1E-10	9.0E-10	2.5E-10	2.0E-09	1.4E-10	1.1E-09
Inhalation of Particles from Surface Soil	9.7E-09	7.8E-08	4.9E-09	3.7E-08	4.1E-11	9.7E-10	5.1E-10	8.1E-09	5.1E-10	8.1E-09
Cumulative Risk Across All Routes of Exposure	1.E-08	1.E-07	1.E-08	8.E-08	1.E-09	2.E-08	3.E-09	3.E-08	2.E-09	2.E-08
Decision Unit 4 Background Area										
Incidental Ingestion of Surface Soil	4.0E-09	3.2E-08	3.3E-09	4.0E-08	1.4E-09	1.7E-08	3.0E-09	2.4E-08	1.7E-09	1.3E-08
Dermal Contact with Surface Soil	1.2E-10	1.2E-08	2.9E-09	1.7E-08	1.3E-10	1.1E-09	3.2E-10	2.5E-09	1.7E-10	1.4E-09
Inhalation of Particles from Surface Soil	9.2E-09	7.4E-08	4.6E-09	3.5E-08	3.8E-11	9.2E-10	4.8E-10	7.7E-09	4.8E-10	7.7E-09
Cumulative Risk Across All Routes of Exposure	1.E-08	1.E-07	1.E-08	9.E-08	2.E-09	2.E-08	4.E-09	3.E-08	2.E-09	2.E-08

Notes:

NE - Pathway not evaluated under this exposure scenario.

The excess lifetime cancer risk were rounded to one significant figure.

CTE =Central Tendency Exposure

RME = Reasonable Maximum Exposure

Table 4-1. COPEC Selection Summary for Ecological Receptors

Chemical Group	Chemical Name	CASRN	Surface Soil Plants/Inverts COPEC	Surface Soil Birds/Mammals COPEC	Subsurface Soil Plants/Inverts COPEC	Subsurface Soil Birds/Mammals COPEC
EPA 6020A Metals	ANTIMONY	7440-36-0	--	x	--	x
	ARSENIC	7440-38-2	--	x	--	x
	BARIUM	7440-39-3	--	x	--	--
	CHROMIUM	7440-47-3	x	--	x	--
	COPPER	7440-50-8	--	x	--	x
	LEAD	7439-92-1	--	x	--	x
	MOLYBDENUM	7439-98-7	x	x	x	x
	Nickel	7440-02-0	--	x	--	--
	THALLIUM	7440-28-0	x	x	--	x
	VANADIUM	7440-62-2	x	x	x	x
	ZINC	7440-66-6	x	x	x	x
EPA 7471A	MERCURY	7439-97-6	--	x	--	x
EPA 8270C (SVOCs)	PENTACHLOROPHENOL	87-86-5	--	x	--	--
EPA 8290 Dioxins/Furans	TEQ	TEQ	--	--	--	--

Notes:

x = selected as COPEC

CASRN = Chemical Abstracts Service Registry Number

COPEC - Chemcial of Potential Ecological Concern

EPA = Environmental Protection Agency

SVOC = semi-volatile organic compound

TEQ = toxic equivalent

Table 4-2. Summary of Inadequate Method Detection Limits for Ecological Receptors

Chemical Group	Chemical Name	CASRN	Ecological Surface Soil	Ecological Subsurface Soil
EPA 8270C SVOCs	1,2,4-TRICHLOROBENZENE	120-82-1	x	x
	1,2-DICHLOROBENZENE	95-50-1	x	x
	1,3-DICHLOROBENZENE	541-73-1	x	x
	1,4-DICHLOROBENZENE	106-46-7	x	x
	2,4-DIMETHYLPHENOL	105-67-9	x	x
	2-CHLOROPHENOL	95-57-8	x	x
	2-METHYLPHENOL	95-48-7	x	x
	BIS (2-ETHYLHEXYL) PHTHALAT	117-81-7	x	x
	DI-N-BUTYL PHTHALATE	84-74-2	x	x
	DI-N-OCTYL PHTHALATE	117-84-0	x	x
	HEXACHLOROBENZENE	118-74-1	x	x
	PHENOL	108-95-2	x	x

Notes:

x = maximum MDL is greater than the ecological screening level

CASRN = Chemical Abstracts Service Registry Number

MDL = method detection limit

SVOC = semi-volatile organic compound

Taken from Table 5-2 of the SI report (CDM Smith 2018)

Table 4-3. Refined COPEC and COEC Selection for Terrestrial Plants, Surface Soil

COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	Refined ESV-Based Hazard Quotient	Terrestrial Plants Refined COPEC Surface Soil	95 UCL Surface Soil Conc. (mg/kg)	LANL Low-Effect ESL (mg/kg)	Threshold ESL (mg/kg)	Low-Effect-Based Hazard Quotient	Terrestrial Plants COEC Surface Soil
Decision Unit 1										
Metals										
Chromium, total	7440-47-3	3.7	1	4	Chromium, total	4.6	4.7	2	1	--
Molybdenum	7439-98-7	10.8	2	5	Molybdenum	12.3	200	20	0.06	--
Vanadium	7440-62-2	17.8	2	9	Vanadium	20.0	80	13	0.3	--
Zinc	7440-66-6	50.2	160	0.3	--	Not COPEC	810	360	NA	--
Decision Unit 2										
Metals										
Chromium, total	7440-47-3	3.5	1	4	Chromium, total	4.4	4	2	1	--
Molybdenum	7439-98-7	15.9	2	8	Molybdenum	24.0	200	20	0.1	--
Thallium	7440-28-0	0.1	1	0.08	--	Not COPEC	3.2	2	NA	--
Vanadium	7440-62-2	19.0	2	10	Vanadium	25.0	80	13	0.3	--
Zinc	7440-66-6	58.3	160	0.4	--	Not COPEC	810	360	NA	--
Decision Unit 3										
Metals										
Chromium, total	7440-47-3	2.70	1	3	Chromium, total	2.8	4	2	0.7	--
Molybdenum	7439-98-7	25.40	2	13	Molybdenum	32.8	200	20	0.2	--
Vanadium	7440-62-2	20.9	2	10	Vanadium	23.5	80	13	0.3	--
Zinc	7440-66-6	27.7	160	0.2	--	Not COPEC	810	360	NA	--
Decision Unit 4										
Metals										
Chromium, total	7440-47-3	3.4	1	3	Chromium, total	3.6	4	2	0.9	--
Thallium	7440-28-0	0.083	1	0.08	--	Not COPEC	3.2	2	NA	--
Vanadium	7440-62-2	19	2	10	Vanadium	20.8	80	13	0.3	--
Zinc	7440-66-6	21.3	160	0.1	--	Not COPEC	810	360	NA	--

Notes:

Refined SLERA ESVs from NPS 2018, except where noted; low-level effect ESLs are from LANL (2017)

Threshold ESVs are calculated as the geometric mean of the Refined ESV and the LANL Low-Level ESL

COPECs selected where Maximum Concentration > Refined ESV

COECs selected where 95 UCL (or maximum if lower) > Threshold-Based ESL

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESL = ecological screening level

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

NC - Not calculated

a. LANL Low-Effect ESL value for molybdenum is not available; Low Effect screening level is the Dutch Intervention Soil Screening Benchmark, which is the concentration expected to be hazardous to 50% of the species in the ecosystem. Site concentrations between Target Values (no effect levels) and Intervention Values suggests further investigation or restrictions may be warranted (ORNL 2020).

Table 4-4. Refined COPEC and COEC Selection for Terrestrial Plants, Subsurface Soil

COPEC	CASRN	Maximum Subsurface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	Refined ESV-Based Hazard Quotient	Terrestrial Plants Refined COPEC Subsurface Soil	95 UCL Subsurface Soil Conc. (mg/kg)	LANL Low-Effect ESL (mg/kg)	Threshold ESL (mg/kg)	Low-Effect-Based Hazard Quotient	Terrestrial Plants COEC Subsurface Soil
Decision Unit 1										
Metals										
Chromium, total	7440-47-3	4.70	1	5	Chromium, total	5.0	4.7	2	1	--
Molybdenum	7439-98-7	13.90	2	7	Molybdenum	17.54	200	20	0.09	--
Vanadium	7440-62-2	20.90	2	10	Vanadium	20.90	80	13	0.3	--
Zinc	7440-66-6	56.20	160	0	--	Not COPEC	810	360	NA	--

Notes:

Refined SLERA ESVs from NPS 2018, except where noted; low-level effect ESLs are from LANL (2017)

Threshold ESVs are calculated as the geometric mean of the Refined ESV and the LANL Low-Level ESL

COPECs selected where Maximum Concentration > Refined ESV

COECs selected where 95 UCL (or maximum if lower) > Threshold-Based ESL

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESL = ecological screening level

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

NC - Not calculated

a. LANL Low-Effect ESL value not available; Low Effect screening level is the Dutch Intervention Soil Screening **Benchmark, which is the concentration expected** to be hazardous

to 50% of the species in the ecosystem. Site concentrations between Target Values (no effect levels) and Intervention Values suggests further investigation or restrictions may be warranted (ORNL 2020).

Table 4-5. Refined COPEC and COEC Selection for Soil Invertebrates, Surface Soil

COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	Refined ESV-Based Hazard Quotient	Soil Invertebrates Refined COPEC Surface Soil	95 UCL Surface Soil Conc. (mg/kg)	LANL Low-Effect ESL (mg/kg)	Threshold ESL (mg/kg)	Low-Effect-Based Hazard Quotient	Soil Invertebrates COEC Surface Soil
Decision Unit 1										
Metals										
Chromium, total	7440-47-3	3.7	0.4	9	Chromium, total	4.6	3.4	1.2	1	--
Molybdenum	7439-98-7	10.8	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	17.8	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	50.2	120	0.4	--	Not COPEC	930	334	NA	--
Decision Unit 2										
Metals										
Chromium, total	7440-47-3	3.5	0.4	9	Chromium, total	4.4	3.4	1.2	1	--
Molybdenum	7439-98-7	15.9	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Thallium	7440-28-0	0.1	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	19.0	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	58.3	120	0.5	--	Not COPEC	930	334	NA	--
Decision Unit 3										
Metals										
Chromium, total	7440-47-3	2.70	0.4	7	Chromium, total	2.8	3.4	1.2	1	--
Molybdenum	7439-98-7	25.40	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	20.9	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	27.7	120	0.2	--	Not COPEC	930	334	NA	--
Decision Unit 4										
Metals										
Chromium, total	7440-47-3	3.4	0.4	9	Chromium, total	3.6	3.4	1.2	1	--
Thallium	7440-28-0	0.083	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	19	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	21.3	120	0.2	--	Not COPEC	930	334	NA	--

Notes:

Refined SLERA ESVs from NPS (2018); except molybdenum and dioxin TEQ are from LANL (2017)

Low-effect ESLs are from the LANL (2017) database

EPC based on the maximum concentration

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

COEC - chemical of ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

Table 4-6. Refined COPEC and COEC Selection for Soil Invertebrates, Subsurface Soil

COPEC	CASRN	Maximum Subsurface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	Refined ESV-Based Hazard Quotient	Soil Invertebrates Refined COPEC Subsurface Soil	95 UCL Subsurface Soil Conc. (mg/kg)	LANL Low-Effect ESL (mg/kg)	Threshold ESL (mg/kg)	Low-Effect-Based Hazard Quotient	Soil Invertebrates COEC Subsurface Soil
Decision Unit 1										
Metals										
Chromium, total	7440-47-3	4.7	0.4	12	Chromium, total	5.0	3.4	1.2	1	--
Molybdenum	7439-98-7	13.9	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Vanadium	7440-62-2	20.9	No ESV	NA	--	Not COPEC	No ESL	No ESL	NA	--
Zinc	7440-66-6	56.2	120	0.5	--	Not COPEC	930	334	NA	--

Notes:

Refined SLERA ESVs from NPS (2018); except molybdenum and dioxin TEQ are from LANL (2017)

Low-effect ESLs are from the LANL (2017) database

EPC based on the maximum concentration

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

COEC - chemical of ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

Table 4-7. Refined COPEC Selection for Birds and Mammals, Surface Soil

COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)		Screening Level Hazard Quotient (HQ)		Birds Refined COPECs Surface Soil	Mammals Refined COPECs Surface Soil
			Birds	Mammals	Birds	Mammals		
Decision Unit 1								
Metals								
Antimony	7440-36-0	1.6	No ESV	0.27	NA	**6**	--	Antimony
Arsenic	7440-38-2	1.4	43	46	0.03	0.03	--	--
Copper	7440-50-8	33.3	28	49	1	0.7	--	--
Lead	7439-92-1	19.1	36.3	56	1	0.3	--	--
Molybdenum	7439-98-7	10.8	15	0.52	0.7	**21**	--	Molybdenum
Nickel	7440-02-0	23.3	210	130	0.1	0.2	--	--
Thallium	7440-28-0	0.047	6.3	0.22	0.01	0.2	--	--
Vanadium	7440-62-2	17.8	7.8	280	**2**	0.06	Vanadium	--
Zinc	7440-66-6	50.2	46	79	1	0.6	--	--
Metals								
Mercury	7439-97-6	0.02	0.013	1.7	**2**	0.01	Mercury	--
Decision Unit 2								
Metals								
Antimony	7440-36-0	1.0	No ESV	0.27	NA	**4**	--	Antimony
Arsenic	7440-38-2	1.3	43	46	0.03	0.03	--	--
Barium	7440-39-3	26.1	820	2000	0.03	0.01	--	--
Copper	7440-50-8	32.2	28	49	1	0.7	--	--
Lead	7439-92-1	23.0	11	56	**2**	0.4	Lead	--
Molybdenum	7439-98-7	15.9	15	0.52	1	**31**	--	Molybdenum
Thallium	7440-28-0	0.1	6.3	0.22	0.01	0.4	--	--
Vanadium	7440-62-2	19.0	7.8	280	**2**	0.07	Vanadium	--
Zinc	7440-66-6	58.3	46	79	1	0.7	--	--
Metals								
Mercury	7439-97-6	0.021	0.013	1.7	**2**	0.01	Mercury	--
PAHs / PCP								
Pentachlorophenol	87-86-5	0.54	2.1	2.8	0.3	0.2	--	--
Decision Unit 3								
Metals								
Arsenic	7440-38-2	1.30	43	46	0.03	0.03	--	--
Lead	7439-92-1	5.40	11	56	0.5	0.1	--	--
Molybdenum	7439-98-7	25.40	15	0.52	**2**	**49**	Molybdenum	Molybdenum
Thallium	7440-28-0	0.07	6.3	0.22	0.01	0.3	--	--
Vanadium	7440-62-2	20.9	7.8	280	**3**	0.07	Vanadium	--
Zinc	7440-66-6	27.7	46	79	0.6	0.4	--	--
Metals								
Mercury	7439-97-6	0.02	0.013	1.7	**2**	0.01	Mercury	--
Decision Unit 4								
Metals								
Antimony	7440-36-0	0.07	No ESV	0.27	NA	0.3	--	--
Arsenic	7440-38-2	1.6	43	46	0.04	0.03	--	--
Copper	7440-50-8	8.6	28	49	0.3	0.2	--	--
Lead	7439-92-1	5.3	11	56	0.5	0.09	--	--
Molybdenum	7439-98-7	1.4	15	0.52	0.09	**3**	--	Molybdenum
Thallium	7440-28-0	0.083	6.3	0.22	0.01	0.38	--	--
Vanadium	7440-62-2	19	7.8	280	**2**	0.07	Vanadium	--
Zinc	7440-66-6	21.3	46	79	0.5	0.3	--	--
Metals								
Mercury	7439-97-6	0.02	0.013	1.7	**2**	0.01	Mercury	--

Table 4-7. Refined COPEC Selection for Birds and Mammals, Surface Soil

COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)		Screening Level Hazard Quotient (HQ)		Birds Refined COPECs Surface Soil	Mammals Refined COPECs Surface Soil
			Birds	Mammals	Birds	Mammals		

Notes:

Refined SLERA ESVs from NPS 2018; except lead ESV for Birds is from Sample et al 2019

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

PAHs/PCP = polycyclic aromatic hydrocarbons/pentachlorophenol

SLERA = Screening level ecological risk assessment

Table 4-8. Refined COPEC Selection for Mammals, Subsurface Soil

COPEC	CASRN	Maximum Subsurface Soil Conc. (mg/kg)	Refined SLERA ESV (mg/kg)	Refined SLERA Hazard Quotient (HQ)	Mammals Refined COPECs Subsurface Soil
			Mammals	Mammals	
Decision Unit 1					
Metals					
Antimony	7440-36-0	1.8	0.27	**7**	Antimony
Arsenic	7440-38-2	2.1	46	0.05	--
Copper	7440-50-8	56.8	49	1	--
Lead	7439-92-1	29.4	56	0.5	--
Molybdenum	7439-98-7	13.9	0.52	**27**	Molybdenum
Thallium	7440-28-0	0.07	0.22	0.3	--
Vanadium	7440-62-2	20.9	280	0.07	--
Zinc	7440-66-6	56.2	79	0.7	--
Metals					
Mercury	7439-97-6	0.02	1.7	0.01	--

Notes:

Refined SLERA ESVs from NPS 2018

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

SLERA = Screening level ecological risk assessment

HQ>1

Table 4-9. Wildlife Receptor Exposure Parameters

Parameter	Herbivorous Bird: Dove	Insectivorous Bird: Woodcock	Carnivorous Bird: Hawk	Herbivorous Mammal: Vole	Insectivorous Mammal: Shrew	Carnivorous Mammal: Weasel
Food Ingestion Rate (kg dw/kg bw-d)[a]	0.137	0.142	0.026	0.076	0.167	0.071
Proportion Soil in Diet (Psoil)[b]	0.068	0.075	0.026	0.013	0.011	0.016
Soil Intake Rate (kg dw/kg BW/d)[c]	0.0093	0.011	0.00068	0.001	0.0018	0.0011
Dietary Compositiion[d]:						
Terrestrial Plants	100%	0%	0%	100%	0%	0%
Terrestrial Invertebrates	0%	100%	0%	0%	100%	0%
Small Mammals	0%	0%	100%	0%	0%	100%
Area Use Factor	1	1	1	1	1	1

Notes:

a - Mean value calculated from specied-specific ingestion rates in Eco-SSL Attachment 4-1 (USEPA 2007)

b - Fraction of diet that is soil; based on the mean value reported in EcoSSL Attachment 4-1, Table 3.

c - Calculated as Psoil x Food Ingestion Rate

d - Dietary proportions were assumed to be 100% of the primary food source for the represented guild. Risks for receptors that consume a mixed diet are bracketed by representative receptors. For example, risks for an omnivorous bird are bracketed by calculated risks for an invertivore and an herbivore.

EcoSSL = Ecological Soil Screening Level

% = percent

bw = body weight

d = day

dw = dry weight

kg = kilogram

Table 4-10. Exposure Point Concentrations for Ecological Receptors - Surface Soil

Chemical Group	COPEC	CASRN	ISM Replicate Result (mg/kg)			Mean (mg/kg)	Calculated 95UCL (mg/kg)	Exposure Point Concentration (EPC)	
			Rep 1	Rep 2	Rep 3			(mg/kg)	EPC Basis
Decision Unit 1 (DU1)									
Metals	ANTIMONY	7440-36-0	0.5	0.57	1.6	0.9	2.44	2.4	95% Chebyshev(Mean, Sd) UCL
	ARSENIC	7440-38-2	1.3	1.4	1.4	1.4	1.512	1.5	95% Chebyshev(Mean, Sd) UCL
	BARIUM	7440-39-3	20.2	20.8	24.3	21.8	27.34	27.3	95% Chebyshev(Mean, Sd) UCL
	CADMIUM	7440-43-9	0.10	0.088	0.18	0.12	Not COPEC	0.18	Maximum
	CHROMIUM III	7440-47-3	2.5	3.1	3.7	3.1	4.610	4.6	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	1.8	1.7	1.8	1.8	Not COPEC	1.80	Maximum
	COPPER	7440-50-8	14.5	17.4	33.3	21.7	47.21	47.2	95% Chebyshev(Mean, Sd) UCL
	LEAD	7439-92-1	8.7	11.5	19.1	13.1	26.64	26.6	95% Chebyshev(Mean, Sd) UCL
	MOLYBDENUM	7439-98-7	9.2	10.8	10.5	10.2	12.31	12.3	95% Chebyshev(Mean, Sd) UCL
	NICKEL	7440-02-0	10	23.3	11.2	14.8	33.35	33.4	95% Chebyshev(Mean, Sd) UCL
	SILVER	7440-22-4	0.053	0.093	0.11	0.085	Not COPEC	0.11	Maximum
	THALLIUM	7440-28-0	0.04	0.047	0.043	0.043	0.0522	0.05	95% Chebyshev(Mean, Sd) UCL
	VANADIUM	7440-62-2	15.8	17.8	17.8	17.1	20.04	20.0	95% Chebyshev(Mean, Sd) UCL
	ZINC	7440-66-6	31.4	31.8	50.2	37.8	64.83	64.8	95% Chebyshev(Mean, Sd) UCL
Metals	MERCURY	7439-97-6	0.02	0.021	0.02	0.020	0.0218	0.022	95% Chebyshev(Mean, Sd) UCL
PAHs / PCP	PENTACHLOROPHENOL	87-86-5	0.17	0.17	0.17	0.170	NC	NA	All ND
Dioxin / Furan	TEQ Avian	TEQ	9.8E-08	--	--	NC	NC	9.8E-08	single replicate
Dioxin / Furan	TEQ Mammalian	TEQ	3.1E-07	--	--	NC	NC	3.1E-07	single replicate
Decision Unit 2 (DU2)									
Metals	ANTIMONY	7440-36-0	1	0.29	0.07	0.5	1.677	1.7	95% Chebyshev(Mean, Sd) UCL
	ARSENIC	7440-38-2	1.3	1	1.3	1.2	1.636	1.6	95% Chebyshev(Mean, Sd) UCL
	BARIUM	7440-39-3	26.1	18.1	24.1	22.8	33.24	33.2	95% Chebyshev(Mean, Sd) UCL
	CADMIUM	7440-43-9	0.15	0.12	0.073	0.11	Not COPEC	0.15	Maximum
	CHROMIUM III	7440-47-3	3.5	2.3	2.9	2.9	4.410	4.4	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	2	1.8	2.5	2.1	Not COPEC	2.50	Maximum
	COPPER	7440-50-8	32.2	10.8	8.7	17.2	49.96	50.0	95% Chebyshev(Mean, Sd) UCL
	LEAD	7439-92-1	23	18	5.2	15.4	38.5	38.5	95% Chebyshev(Mean, Sd) UCL
	MOLYBDENUM	7439-98-7	15.9	4.7	8.3	9.6	24.02	24.0	95% Chebyshev(Mean, Sd) UCL
	NICKEL	7440-02-0	14.2	7.3	9.5	10.3	19.2	19.2	95% Chebyshev(Mean, Sd) UCL
	SILVER	7440-22-4	0.12	0.075	0.041	0.079	Not COPEC	0.12	Maximum
	THALLIUM	7440-28-0	0.065	0.06	0.082	0.069	0.098	0.10	95% Chebyshev(Mean, Sd) UCL
	VANADIUM	7440-62-2	19	13.4	18.7	17.0	24.96	25.0	95% Chebyshev(Mean, Sd) UCL
	ZINC	7440-66-6	58.3	29.2	24	37.2	83.69	83.7	95% Chebyshev(Mean, Sd) UCL
Metals	MERCURY	7439-97-6	0.02	0.021	0.02	0.020	0.0218	0.022	95% Chebyshev(Mean, Sd) UCL
PAHs / PCP	PENTACHLOROPHENOL	87-86-5	0.33	0.33	0.54	0.400	0.705	0.71	95% Chebyshev(Mean, Sd) UCL
Dioxin / Furan	TEQ Avian	TEQ	4.5E-09	--	--	NC	NC	4.5E-09	single replicate
Dioxin / Furan	TEQ Mammalian	TEQ	1.4E-08	--	--	NC	NC	1.4E-08	single replicate

Table 4-10. Exposure Point Concentrations for Ecological Receptors - Surface Soil

Chemical Group	COPEC	CASRN	ISM Replicate Result (mg/kg)			Mean (mg/kg)	Calculated 95UCL (mg/kg)	Exposure Point Concentration (EPC)	
			Rep 1	Rep 2	Rep 3			(mg/kg)	EPC Basis
Decision Unit 3 (DU3)									
Metals	ANTIMONY	7440-36-0	0.34	0.2	0.07	0.20	0.543	0.54	95% Chebyshev(Mean, Sd) UCL
	ARSENIC	7440-38-2	1.3	1.2	1.2	1.2	1.379	1.4	95% Chebyshev(Mean, Sd) UCL
	BARIUM	7440-39-3	17.7	18.9	18	18.2	19.77	19.8	95% Chebyshev(Mean, Sd) UCL
	CADMIUM	7440-43-9	0.064	0.056	0.041	0.054	Not COPEC	0.06	Maximum
	CHROMIUM III	7440-47-3	2.6	2.7	2.7	2.7	2.812	2.8	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	1.7	1.7	1.7	1.7	Not COPEC	1.70	Maximum
	COPPER	7440-50-8	18.1	14.1	11.5	14.6	22.93	22.9	95% Chebyshev(Mean, Sd) UCL
	LEAD	7439-92-1	5.4	4.9	4.7	5.0	5.907	5.9	95% Chebyshev(Mean, Sd) UCL
	MOLYBDENUM	7439-98-7	25.4	20.9	15.8	20.7	32.79	32.8	95% Chebyshev(Mean, Sd) UCL
	NICKEL	7440-02-0	9.1	10.5	7.9	9.2	12.44	12.4	95% Chebyshev(Mean, Sd) UCL
	SILVER	7440-22-4	0.07	0.077	0.053	0.067	Not COPEC	0.08	Maximum
	THALLIUM	7440-28-0	0.059	0.067	0.064	0.063	0.0735	0.07	95% Chebyshev(Mean, Sd) UCL
	VANADIUM	7440-62-2	20.9	18.8	17.4	19.0	23.47	23.5	95% Chebyshev(Mean, Sd) UCL
	ZINC	7440-66-6	27.7	24	20.3	24.0	33.31	33.3	95% Chebyshev(Mean, Sd) UCL
Metals	MERCURY	7439-97-6	0.02	0.02	0.02	0.02	NC	0.02	All ND
PAHs / PCP	PENTACHLOROPHENOL	87-86-5	0.17	0.17	0.34	0.23	NC	0.34	All ND
Dioxin / Furan	TEQ Avian	TEQ	1.1E-09	--	--	NC	NC	1.1E-09	single replicate
Dioxin / Furan	TEQ Mammalian	TEQ	3.3E-09	--	--	NC	NC	3.3E-09	single replicate
Decision Units 1-3 (DU 1-3) All On-Sitte Areas									
Metals	ANTIMONY	7440-36-0				0.5	1.2	1.2	95% Chebyshev(Mean, Sd) UCL
	ARSENIC	7440-38-2	--	--	--	1.3	1.445	1.4	95% Chebyshev(Mean, Sd) UCL
	BARIUM	7440-39-3				20.9	25.5	25.5	95% Chebyshev(Mean, Sd) UCL
	CADMIUM	7440-43-9				0.1	Not COPEC	0.00	Maximum
	CHROMIUM III	7440-47-3	--	--	--	2.9	3.564	3.6	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	--	--	--	1.9	Not COPEC	0.00	Maximum
	COPPER	7440-50-8				17.8	30.88	30.9	95% Chebyshev(Mean, Sd) UCL
	LEAD	7439-92-1				11.2	21.51	21.5	95% Chebyshev(Mean, Sd) UCL
	MOLYBDENUM	7439-98-7				13.5	23.06	23.1	95% Chebyshev(Mean, Sd) UCL
	NICKEL	7440-02-0				11.4	18.53	18.5	95% Chebyshev(Mean, Sd) UCL
	SILVER	7440-22-4				0.1	Not COPEC	0.00	Maximum
	THALLIUM	7440-28-0	--	--	--	0.1	0.0779	0.08	95% Chebyshev(Mean, Sd) UCL
	VANADIUM	7440-62-2				17.7	20.83	20.8	95% Chebyshev(Mean, Sd) UCL
	ZINC	7440-66-6				33.0	51.55	51.6	95% Chebyshev(Mean, Sd) UCL
Metals	MERCURY	7439-97-6				0.02	0.0209	0.021	95% Chebyshev(Mean, Sd) UCL
PAHs / PCP	PENTACHLOROPHENOL	87-86-5				0.3	0.454	0.45	95% Chebyshev(Mean, Sd) UCL
Dioxin / Furan	TEQ Avian	TEQ					1.7E-07	1.7E-07	95% Chebyshev(Mean, Sd) UC
Dioxin / Furan	TEQ Mammalian	TEQ				3.8E-08	5.5E-07	5.5E-07	95% Chebyshev(Mean, Sd) UC
Decision Unit 4 (DU 4), Background Area									
	ANTIMONY	7440-36-0	0.07	0.07	0.07	0.07	NC	0.07	All ND
	ARSENIC	7440-38-2	1.6	1.6	1.4	1.5	1.824	1.8	95% Chebyshev(Mean, Sd) UCL
	BARIUM	7440-39-3	15.8	18	14.3	16.0	20.72	20.7	95% Chebyshev(Mean, Sd) UCL
	CADMIUM	7440-43-9	0.037	0.038	0.033	0.036	Not COPEC	0.04	Maximum

Table 4-10. Exposure Point Concentrations for Ecological Receptors - Surface Soil

Chemical Group	COPEC	CASRN	ISM Replicate Result (mg/kg)			Mean (mg/kg)	Calculated 95UCL (mg/kg)	Exposure Point Concentration (EPC)	
			Rep 1	Rep 2	Rep 3			(mg/kg)	EPC Basis
Metals	CHROMIUM III	7440-47-3	2.8	3.4	2.5	2.9	4.053	4.1	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	1.8	1.7	1.6	1.7	Not COPEC	1.80	Maximum
	COPPER	7440-50-8	7.6	8.6	7.4	7.9	9.485	9.5	95% Chebyshev(Mean, Sd) UCL
	LEAD	7439-92-1	4.7	5.3	4.3	4.8	6.033	6.0	95% Chebyshev(Mean, Sd) UCL
	MOLYBDENUM	7439-98-7	1	1.4	1.2	1.2	1.703	1.7	95% Chebyshev(Mean, Sd) UCL
	NICKEL	7440-02-0	8	12.3	9.5	9.9	15.43	15.4	95% Chebyshev(Mean, Sd) UCL
	SILVER	7440-22-4	0.033	0.039	0.033	0.035	Not COPEC	0.04	Maximum
	THALLIUM	7440-28-0	0.072	0.083	0.064	0.073	0.097	0.10	95% Chebyshev(Mean, Sd) UCL
	VANADIUM	7440-62-2	16.8	19	15.9	17.2	21.25	21.3	95% Chebyshev(Mean, Sd) UCL
	ZINC	7440-66-6	19.7	21.3	17.8	19.6	24.01	24.0	95% Chebyshev(Mean, Sd) UCL
Metals	MERCURY	7439-97-6	0.02	0.02	0.02	0.02	NC	0.02	All ND
PAHs / PCP	PENTACHLOROPHENOL	87-86-5	0.16	0.16	0.16	0.16	NC	0.16	All ND
Dioxin / Furan	TEQ Avian	TEQ	3.4E-10	--	--	NC	NC	3.4E-10	single replicate
Dioxin / Furan	TEQ Mammalian	TEQ	1.0E-09	--	--	NC	NC	1.0E-09	single replicate

Notes:

Non-detects (U-qualified) used at the reported detection limit value

95UCL - 95 percent upper confidence limit

CASRN - Chemical Abstracts Service Registry Number

DU - decision unit

EPC - exposure point concentration

ISM - incremental soil sampling

Not COPEC - Not selected as a COPEC based on maximum concentration

mg/kg - milligrams per kilogram

Rep - replicate

UCL - upper confidence level

NA - Not available

NC - not calculated

ND - non-detect

pg/g - picogram per gram

TEQ - toxicity equivalency quotient

non-detect

Table 4-11. Exposure Point Concentrations for Ecological Receptors - Subsurface Soil

Chemical Group	COPC	CASRN	ISM Replicate Result (mg/kg)			Mean (mg/kg)	Calculated 95UCL (mg/kg)	Exposure Point Concentration (EPC)	
			Rep 1	Rep 2	Rep 3			(mg/kg)	EPC Basis
Decision Unit 1 (DU1)									
Metals	ANTIMONY	7440-36-0	0.46	1	1.8	1.09	2.783	2.8	95% Chebyshev(Mean, Sd) UCL
	ARSENIC	7440-38-2	2.1	1.8	1.9	1.93	2.318	2.3	95% Chebyshev(Mean, Sd) UCL
	BARIUM	7440-39-3	18.5	17.3	21.1	19.0	Not COPEC	21.1	Maximum
	CADMIUM	7440-43-9	0.12	0.15	0.17	0.15	Not COPEC	0.2	Maximum
	CADMIUM (water)	7440-43-9	0.12	0.15	0.17	0.15	Not COPEC	0.2	Maximum
	CHROMIUM III	7440-47-3	4.3	4.3	4.7	4.4	5.015	5.0	95% Chebyshev(Mean, Sd) UCL
	COBALT	7440-48-4	2	2	2	2.0	Not COPEC	2.0	Maximum
	COPPER	7440-50-8	24.8	23	56.8	34.9	82.72	82.7	95% Chebyshev(Mean, Sd) UCL
	LEAD	7439-92-1	16.5	17.7	29.4	21.2	39.14	39.1	95% Chebyshev(Mean, Sd) UCL
	MOLYBDENUM	7439-98-7	12.4	13.3	13.9	13.2	17.54	17.5	99% Chebyshev(Mean, Sd) UCL
	NICKEL	7440-02-0	3.4	3	4.1	3.5	Not COPEC	4.1	Maximum
	SILVER	7440-22-4	0.076	0.11	0.1	0.10	Not COPEC	0.1	Maximum
	THALLIUM	7440-28-0	0.042	0.069	0.057	0.056	0.09	0.09	95% Chebyshev(Mean, Sd) UCL
	VANADIUM	7440-62-2	19.7	20.9	20	20.2	Not COPEC	20.9	Maximum
	ZINC	7440-66-6	39.1	41.6	56.2	45.6	Not COPEC	56.2	Maximum
Metals	MERCURY	7439-97-6	0.02	0.02	0.02	0.02	NC	NA	All ND
PAHs / PCP	PENTACHLOROPHENOL	87-86-5	0.17	0.17	0.17	0.17	NC	NA	All ND
Dioxin / Furan	TEQ (pg/g)	TEQ	1.4E-07	--	--	NC	NC	1.4E-07	single rep

Notes:

95UCL - 95 percent upper confidence limit
CASRN - Chemical Abstracts Service Registry Number
DU - decision unit
EPC - exposure point concentration
ISM - incremental soil sampling
Not COPEC - Not selected as a COPEC based on maximum concentration
mg/kg - milligrams per kilogram
Rep - replicate
UCL - upper confidence level
Decision Units 2, 3, and 4 have no subsurface soil data.
NA - Not available
NC - not calculated
ND - non-detect
pg/g - picogram per gram
TEQ - toxicity equivalency quotient
(yellow) non-detect

Table 4-12. Terrestrial Uptake Factors

Chemical	Plant Uptake Factor or Equation (dry weight basis)	Source	Invertebrate Uptake Factor or Equation (dry weight basis)	Source	Small Mammal Uptake Factor or Equation (dry weight basis)	Source
<u>Metals</u>						
Antimony	ln(Cp) = 0.938 * ln(Cs) - 3.233	a	Ce = 1.0 * Csoil	e	Cm = 0.001 * 50 * Cdiet	a, p
Lead	ln(Cp) = 0.561 * ln(Cs) - 1.328	a	ln(Ce) = 0.807 * ln(Cs) - 0.218	a	ln(Cm) = 0.4422 * ln(Cs) + 0.0761	a
Mercury	ln(Cp) = 0.544 * ln(Cs) - 0.996	b, k	ln(Ce) = 0.3369*ln(Cs) + 0.0781	c, k	Cm = 0.0543 * Csoil	s
Molybdenum	ln(Cp) = 0.938 * ln(Cs) - 3.233	p, v	Ce = 0.953 * Csoil	q	Cm = 0.001 * 50 * Cdiet	p, v
Vanadium	Cp = 0.0075 * Csoil	a	Ce = 0.042 * Csoil	a	Cm = 0.0123 * Cs	a

Sources and notes:

N/A -- log Kow and/or Koc were not tabulated because they were not needed to determine uptake factors for this chemical.

a - Eco-SSL Attachment 4-1, Table 4a. (USEPA 2007)

b - Bechtel Jacobs 1998

c - Sample et al. 1998b, Table 4.

e - Not available, uptake assumed to be equal to 1 (i.e., equal to soil concentration)

k - Total mercury uptake factors are used for both inorganic and methylmercury.

p - Mammal diet (C_d) is assumed to be earthworms (i.e., insectivore)

q - The median uptake factor for earthworms (n=4) in Table C-1, Appendix C, in Sample et al. (1998)

s - Sample et al. (1998b) [ES/ER/TM-219], Table 7, median uptake factor

v - Not available, value for antimony used as surrogate

Table 4-13. Toxic Equivalency Factors (TEFs) for Mammals and Birds

Chemical	Mammal TEF	Bird TEF	BEF
2,3,7,8-TCDD	1	1	1
1,2,3,7,8-PeCDD	1	1	0.92
1,2,3,4,7,8-HxCDD	0.1	0.05	0.31
1,2,3,6,7,8-HxCDD	0.1	0.01	0.12
1,2,3,7,8,9-HxCDD	0.1	0.1	0.14
1,2,3,4,6,7,8-HpCDD	0.01	0.001	0.051
OCDD	0.0003	0.0001	0.012
2,3,7,8-TCDF	0.1	1	0.8
1,2,3,7,8-PeCDF	0.03	0.1	0.22
2,3,4,7,8-PeCDF	0.3	1	1.59
1,2,3,4,7,8-HxCDF	0.1	0.1	0.094
1,2,3,6,7,8-HxCDF	0.1	0.1	0.23
1,2,3,7,8,9-HxCDF	0.1	0.1	0.78
2,3,4,6,7,8-HxCDF	0.1	0.1	0.84
1,2,3,4,6,7,8-HpCDF	0.01	0.01	0.015
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.52
OCDF	0.0003	0.0001	0.023

Notes:

Mammal TEFs (unitless) are from Van den Berg et al. 2005.

Bird TEFs (unitless) are from Van den Berg et al. (1998).

Bioaccumulation equivalency factors (BEFs) (unitless) are from Table 11 of EPA 1995.

Table 4-14. Avian Toxicity Reference Values

COPEC	Avian NOAEL[a] (mg/kg bw-d)	Avian LOAEL (mg/kg bw-d)	Avian Threshold (Geometric Mean) (mg/kg bw-d)	Sources/Notes
<u>Inorganics</u>				
Lead	4.4	9.8	6.57	4
Mercury	0.019	0.19	0.06	3
Molybdenum	3.5	35	11.1	3
Vanadium	0.344	0.688	0.49	1,3
Zinc	66.1	171	106	1,2

Sources:

1 - USEPA EcoSSL NOAEL TRV

2 - TechLaw LOAEL TRV; as derived from EcoSSL toxicity dataset

3 - Los Alamos National Laboratory ECORISK Database (version 4.1)

4 - Sample et al. (2019)

Notes:

Table 4-15. Mammalian Toxicity Reference Values

COPEC	Mammalian NOAEL (mg/kg bw-d)	Mammalian LOAEL (mg/kg bw-d)	Mammalian Threshold (Geometric Mean) (mg/kg bw-d)	Sources/Notes
<u>Inorganics</u>				
Antimony	0.059	0.59	0.187	1,2
Molybdenum	0.24	2.4	0.76	3

Sources:

1 - USEPA EcoSSL NOAEL TRV (antimony, copper EcoSSLs USEPA 2005, 2007)

2 - Los Alamos National Laboratory ECORISK Database (version 4.1)

3 - Sample et al. (1996)

Notes:

mg/kg bw-d - milligram per kilogram per body weight per day

Threshold TRV - Geometric mean of the NOAEL and LOAEL.

COPEC - chemical of potential ecological concern

EcoSSL - Ecological Soil Screening Level

LOAEL - lowest observed adverse effect level

NOAEL - no observed adverse effect level

TRV - toxicity reference value

USEPA - United States Environmental Protection Agency

Table 4-16. Summary of Risks to Birds and Mammals

COPEC	Threshold-Based HQ					
	Birds			Mammals		
	Herbivore	Insectivore	Carnivore	Herbivore	Insectivore	Carnivore
Decision Unit 1						
Antimony		**--- Not a COPEC ---**		0.1	**2**	0.1
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum		**--- Not a COPEC ---**		0.1	**3**	0.1
Vanadium	0.4	0.7	0.04		**--- Not a COPEC ---**	
Decision Unit 2						
Antimony		**--- Not a COPEC ---**		0.04	**2**	0.04
Lead	0.1	0.4	0.03		**--- Not a COPEC ---**	
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum		**--- Not a COPEC ---**		0.1	**5**	0.1
Vanadium	0.5	0.9	0.1		**--- Not a COPEC ---**	
Decision Unit 3						
Antimony		**--- Not a COPEC ---**		0.01	0.5	0.01
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum		**--- Not a COPEC ---**		0.1	**7**	0.2
Vanadium	0.5	0.8	0.05		**--- Not a COPEC ---**	
Decision Unit 1-3						
Antimony		**--- Not a COPEC ---**		0.03	1	0.0
Lead	0.1	0.2	0.02		**--- Not a COPEC ---**	
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum		**--- Not a COPEC ---**		0.11	**5**	0.1
Vanadium	0.4	0.7	0.04		**--- Not a COPEC ---**	
Decision Unit 4						
Antimony		**--- Not a COPEC ---**		0.002	0.1	0.002
Lead	0.02	0.1	0.01		**--- Not a COPEC ---**	
Mercury	0.1	0.7	0.001		**--- Not a COPEC ---**	
Molybdenum	0.002	0.02	0.0003	0.01	0.4	0.01
Vanadium	0.5	0.7	0.04		**--- Not a COPEC ---**	
Decision Unit 1 - Subsurface Soils						
Antimony		NC		NC	**3**	NC
Molybdenum		NC		NC	**4**	NC

Notes:

bold Identified as a COEC for selected receptor and soil type, based on the Threshold-Based HQ>1

COPEC - Chemical of Potential Ecological Concern

SVOC - Semi-Volatile Organic Chemical

TEQ - Toxicity Equivalents

NC - Not calculated, not exposed to subsurface soils

Table 4-17. Background Statistical Analyses

PANEL A: Background (DU4)

COEC	(mg/kg) Rep 1	Rep 2	Rep 3	Mean (mg/kg)	Standard Deviation	95 UCL (mg.kg)
Antimony	0.07	0.07	0.07	0.07	0	NC
Molybdenum	1	1.4	1.2	1.2	0.20	1.7

Notes:

Non-detect

NC - not calculated

COEC = chemical of ecological concern

ISM - Incremental Sample Method

Rep - Replicate

PANEL B: Site DUs

COEC	DU	ISM Replicate Result (mg/kg)			Mean (mg/kg)	Standard Deviation	Ratio Mean Site:Bkg	1-tail, Form 2 Hypothesis H0: S>=B		2-tail, Hypothesis H0: S=B		1-tail, Form 1 Hypothesis H0: S<=B	
		Rep 1	Rep 2	Rep 3				p value	Outcome?	p value	Outcome?	p value	Outcome?
Antimony	DU1	0.5	0.57	1.6	0.89	0.62	13	0.982	Site>=Bkg	0.0369	Site<>Bkg	0.0185	Site>Bkg
	DU2	1.0	0.3	0.07	0.45	0.49	**6**	0.939	Site>=Bkg	0.121	Site=Bkg	0.0607	Site>Bkg
	DU3	0.34	0.20	0.07	0.20	0.14	**3**	0.939	Site>=Bkg	0.121	Site=Bkg	0.0607	Site>Bkg
Molybdenum	DU1	9.2	10.8	10.5	10.2	0.85	**8**	1.000	Site>=Bkg	0.000	Site<>Bkg	0.000	Site>Bkg
	DU2	15.9	4.7	8.3	9.6	5.72	**8**	0.938	Site>=Bkg	0.125	Site=Bkg	0.062	Site>Bkg
	DU3	25.4	20.9	15.8	20.7	4.80	17	0.990	Site>=Bkg	0.019	Site<>Bkg	0.010	Site>Bkg

Notes:

Non-detect

Ratio >1, <5

Ratio >5, <10

Ratio >10

Site>Bkg

Test results with all detects were based on Student's t test

Test results with nondetects were based on Gehan test

COEC = chemical of ecological concern

DU - Decision Unit

H0 - Null hypothesis

ISM - Incremental Sample Method

Rep - Replicate

ATTACHMENTS

Attachment A – Selection of Chemicals of Potential Concern

Attachment A-1. Selection of COPCs in Surface Soil

Chemical Group	Analyte	CASRN	Units	Number of Samples: Detects	Number of Samples: Total	Detection Frequency (%)	Mean	Maximum Detect	MDL Range for Non-detects: Minimum	MDL Range for Non-detects: Maximum	USEPA RSL [HQ=0.1] Resident Soil	DTSC HERO Resident Soil	Lowest Screening Level	Maximum Detect Above Lowest SL? (Select COPC)	Maximum DL Above Lowest SL? (Inadequate MDL)	Selected COPCs in Surface Soil
Metals	ANTIMONY	7440-36-0	mg/kg	7	9	78%	0.52	1.6	--	--	3.1	--	3.1	no	--	--
	ARSENIC	7440-38-2	mg/kg	9	9	100%	1.3	1.4	--	--	0.68	0.11	0.11	YES	--	ARSENIC
	BARIUM	7440-39-3	mg/kg	9	9	100%	20.9	26.1	--	--	1500	--	1500	no	--	--
	BERYLLIUM	7440-41-7	mg/kg	9	9	100%	0.23	0.27	--	--	16	15	15	no	--	--
	CADMIUM	7440-43-9	mg/kg	9	9	100%	0.10	0.18	--	--	7.1	5.2	5.2	no	--	--
	CHROMIUM	7440-47-3	mg/kg	9	9	100%	2.9	3.7	--	--	0.3	--	0.3	YES	--	CHROMIUM
	COBALT	7440-48-4	mg/kg	9	9	100%	1.9	2.5	--	--	2.3	--	2.3	YES	--	COBALT
	COPPER	7440-50-8	mg/kg	9	9	100%	17.8	33.3	--	--	310	--	310	no	--	--
	LEAD	7439-92-1	mg/kg	9	9	100%	11.2	23	--	--	400	80	80	no	--	--
	MERCURY	7439-97-6	mg/kg	2	9	22%	0.02	0.021	--	--	1.1	1	1	no	--	--
	MOLYBDENUM	7439-98-7	mg/kg	9	9	100%	13.5	25.4	--	--	39	--	39	no	--	--
	NICKEL	7440-02-0	mg/kg	9	9	100%	11.4	23.3	--	--	150	490	150	no	--	--
	SELENIUM	7782-49-2	mg/kg	8	9	89%	0.08	0.10	--	--	39	--	39	no	--	--
	SILVER	7440-22-4	mg/kg	9	9	100%	0.08	0.12	--	--	39	390	39	no	--	--
	THALLIUM	7440-28-0	mg/kg	9	9	100%	0.06	0.082	--	--	0.078	--	0.078	YES	--	THALLIUM
	VANADIUM	7440-62-2	mg/kg	9	9	100%	17.7	20.9	--	--	39	--	39	no	--	--
	ZINC	7440-66-6	mg/kg	9	9	100%	33.0	58.3	--	--	2300	--	2300	no	--	--
PAHs	1-METHYLNAPHTHALENE	90-12-0	mg/kg	0	9	0%	--	--	0.021	0.042	3.1	--	3.1	All ND	no	--
	2-METHYLNAPHTHALENE	91-57-6	mg/kg	0	9	0%	--	--	0.019	0.038	24	--	24	All ND	no	--
	ACENAPHTHENE	83-32-9	mg/kg	0	9	0%	--	--	0.021	0.042	360	--	360	All ND	no	--
	ACENAPHTHYLENE	208-96-8	mg/kg	0	9	0%	--	--	0.019	0.038	--	--	--	All ND	No SL	--
	ANTHRACENE	120-12-7	mg/kg	0	9	0%	--	--	0.017	0.034	1800	--	1800	All ND	no	--
	BENZO(A)ANTHRACENE	56-55-3	mg/kg	2	9	22%	0.032	0.072	--	--	1.1	--	1.1	no	--	--
	BENZO(A)PYRENE	50-32-8	mg/kg	1	9	11%	0.030	0.059	--	--	0.11	--	0.11	no	--	--
	BENZO(B)FLUORANTHENE	205-99-2	mg/kg	0	9	0%	--	--	0.023	0.047	1.1	--	1.1	All ND	no	--
	BENZO(GHI)PERYLENE	191-24-2	mg/kg	1	9	11%	0.037	0.055	--	--	--	--	--	No SL	No SL	--
	BENZO(K)FLUORANTHENE	207-08-9	mg/kg	1	9	11%	0.030	0.042	--	--	11	--	11	no	--	--
	CHRYSENE	218-01-9	mg/kg	1	9	11%	0.030	0.086	--	--	110	--	110	no	--	--
	DIBENZ(A,H)ANTHRACENE	53-70-3	mg/kg	0	9	0%	--	--	0.019	0.038	0.11	--	0.11	All ND	no	--
	FLUORANTHENE	206-44-0	mg/kg	1	9	11%	0.041	0.095	--	--	240	--	240	no	--	--
	FLUORENE	86-73-7	mg/kg	0	9	0%	--	--	0.021	0.042	240	--	240	All ND	no	--
	INDENO(1,2,3-CD)PYRENE	193-39-5	mg/kg	0	9	0%	--	--	0.019	0.038	1.1	--	1.1	All ND	no	--
	NAPHTHALENE	91-20-3	mg/kg	0	9	0%	--	--	0.019	0.038	3.8	--	3.8	All ND	no	--
	PENTACHLOROPHENOL	87-86-5	mg/kg	1	9	11%	0.266	0.540	--	--	1	--	1	no	--	--
	PHENANTHRENE	85-01-8	mg/kg	0	9	0%	--	--	0.023	0.047	--	--	--	All ND	No SL	--
	PYRENE	129-00-0	mg/kg	1	9	11%	0.040	0.085	--	--	180	--	180	no	--	--
SVOCs	1,2,4-TRICHLOROBENZENE	120-82-1	mg/kg	0	9	0%	--	--	1.00	2.10	5.8	--	5.8	All ND	no	--
	1,2-DICHLOROBENZENE	95-50-1	mg/kg	0	9	0%	--	--	1.10	2.20	180	--	180	All ND	no	--
	1,3-DICHLOROBENZENE	541-73-1	mg/kg	0	9	0%	--	--	1.10	2.20	--	--	--	All ND	No SL	--
	1,4-DICHLOROBENZENE	106-46-7	mg/kg	0	9	0%	--	--	1.00	2.10	2.6	--	2.6	All ND	no	--
	2,4,5-TRICHLOROPHENOL	95-95-4	mg/kg	0	9	0%	--	--	1.20	2.50	630	--	630	All ND	no	--
	2,4,6-TRICHLOROPHENOL	88-06-2	mg/kg	0	9	0%	--	--	0.99	2.00	6.3	7.5	6.3	All ND	no	--
	2,4-DICHLOROPHENOL	120-83-2	mg/kg	0	9	0%	--	--	1.10	2.20	19	--	19	All ND	no	--
	2,4-DIMETHYLPHENOL	105-67-9	mg/kg	0	9	0%	--	--	0.91	1.90	130	--	130	All ND	no	--
	2,4-DINITROPHENOL	51-28-5	mg/kg	0	9	0%	--	--	1.10	2.30	13	--	13	All ND	no	--
	2,4-DINITROTOLUENE	121-14-2	mg/kg	0	9	0%	--	--	1.30	2.70	1.7	--	1.7	All ND	YES	2,4-DINITROTOLUENE
	2,6-DINITROTOLUENE	606-20-2	mg/kg	0	9	0%	--	--	1.30	2.60	0.36	--	0.36	All ND	YES	2,6-DINITROTOLUENE
	2-CHLORONAPHTHALENE	91-58-7	mg/kg	0	9	0%	--	--	1.10	2.20	480	--	480	All ND	no	--
	2-CHLOROPHENOL	95-57-8	mg/kg	0	9	0%	--	--	0.91	1.90	39	--	39	All ND	no	--
	2-METHYLPHENOL	95-48-7	mg/kg	0	9	0%	--	--	0.93	1.90	320	--	320	All ND	no	--
	2-NITROANILINE	88-74-4	mg/kg	0	9	0%	--	--	1.30	2.60	63	--	63	All ND	no	--
	2-NITROPHENOL	88-75-5	mg/kg	0	9	0%	--	--	0.99	2.00	--	--	0	All ND	YES	2-NITROPHENOL
	3,3´-DICHLOROBENZIDINE	91-94-1	mg/kg	0	9	0%	--	--	1.20	2.40	1.2	1.2	1.2	All ND	YES	3,3´-DICHLOROBENZIDINE
	3/4-METHYLPHENOL	Cresols, coel	mg/kg	0	9	0%	--	--	0.95	1.90	--	--	--	All ND	No SL	--
	3-NITROANILINE	99-09-2	mg/kg	0	9	0%	--	--	1.30	2.60	--	--	--	All ND	No SL	--
	4,6-DINITRO-2-METHYLPHENOL	534-52-1	mg/kg	0	9	0%	--	--	1.20	2.40	0.51	--	0.51	All ND	YES	4,6-DINITRO-2-METHYLPHENOL
	4-BROMOPHENYL PHENYL ETHER	101-55-3	mg/kg	0	9	0%	--	--	1.20	2.40	--	--	--	All ND	No SL	--
	4-CHLORO-3-METHYLPHENOL	59-50-7	mg/kg	0	9	0%	--	--	1.20	2.50	630	--	630	All ND	no	--
	4-CHLOROANILINE	106-47-8	mg/kg	0	9	0%	--	--	0.35	0.72	2.7	--	2.7	All ND	no	--
	4-CHLOROPHENYL PHENYL ETHER	7005-72-3	mg/kg	0	9	0%	--	--	1.30	2.60	--	--	--	All ND	No SL	--
	4-NITROANILINE	100-01-6	mg/kg	0	9	0%	--	--	1.50	3.10	25	--	25	All ND	no	--
	4-NITROPHENOL	100-02-7	mg/kg	0	9	0%	--	--	1.20	2.50	--	--	--	All ND	No SL	--
	BENZOIC ACID	65-85-0	mg/kg	0	9	0%	--	--	0.62	1.30	25000	--	25000	All ND	no	--

Attachment A-1. Selection of COPCs in Surface Soil

Chemical Group	Analyte	CASRN	Units	Number of Samples: Detects	Number of Samples: Total	Detection Frequency (%)	Mean	Maximum Detect	MDL Range for Non-detects: Minimum	MDL Range for Non-detects: Maximum	USEPA RSL [HQ=0.1] Resident Soil	DTSC HERO Resident Soil	Lowest Screening Level	Maximum Detect Above Lowest SL? (Select COPC)	Maximum DL Above Lowest SL? (Inadequate MDL)	Selected COPCs in Surface Soil
	BENZYL ALCOHOL	100-51-6	mg/kg	0	9	0%	--	--	1.20	2.40	630	--	630	All ND	no	--
	BIS (2-CHLORETHOXY) METHANE	111-91-1	mg/kg	0	9	0%	--	--	1.00	2.10	19	--	19	All ND	no	--
	BIS (2-CHLOROETHYL) ETHER	111-44-4	mg/kg	0	9	0%	--	--	1.00	2.10	0.23	--	0.23	All ND	YES	BIS (2-CHLOROETHYL) ETHER
	BIS (2-CHLOROISOPROPYL) ETHER	39638-32-9	mg/kg	0	9	0%	--	--	0.97	2.00	--	--	--	All ND	No SL	--
	BIS (2-ETHYLHEXYL) PHTHALATE	117-81-7	mg/kg	0	9	0%	--	--	1.30	2.60	39	--	39	All ND	no	--
	BUTYL BENZYL PHTHALATE	85-68-7	mg/kg	0	9	0%	--	--	1.20	2.40	290	--	290	All ND	no	--
	CARBAZOLE	86-74-8	mg/kg	0	9	0%	--	--	1.70	3.50	--	--	--	All ND	No SL	--
	DIBENZOFURAN	132-64-9	mg/kg	0	9	0%	--	--	1.20	2.40	7.3	--	7.3	All ND	no	--
	DIETHYL PHTHALATE	84-66-2	mg/kg	0	9	0%	--	--	1.30	2.60	5100	--	5100	All ND	no	--
	DIMETHYL PHTHALATE	131-11-3	mg/kg	0	9	0%	--	--	1.30	2.70	--	--	--	All ND	No SL	--
	DI-N-BUTYL PHTHALATE	84-74-2	mg/kg	0	9	0%	--	--	1.40	2.80	630	--	630	All ND	no	--
	DI-N-OCTYL PHTHALATE	117-84-0	mg/kg	0	9	0%	--	--	1.20	2.50	63	--	63	All ND	no	--
	HEXACHLOROBENZENE	118-74-1	mg/kg	0	9	0%	--	--	1.20	2.50	0.21	--	0.21	All ND	YES	HEXACHLOROBENZENE
	HEXACHLOROBUTADIENE	87-68-3	mg/kg	0	9	0%	--	--	1.10	2.20	1.2	1.2	1.2	All ND	YES	HEXACHLOROBUTADIENE
	HEXACHLOROETHANE	67-72-1	mg/kg	0	9	0%	--	--	1.00	2.10	1.8	--	1.8	All ND	YES	HEXACHLOROETHANE
	ISOPHORONE	78-59-1	mg/kg	0	9	0%	--	--	1.20	2.40	570	--	570	All ND	no	--
	NITROBENZENE	98-95-3	mg/kg	0	9	0%	--	--	1.00	2.10	5.1	--	5.1	All ND	no	--
	N-NITROSODIMETHYLAMINE	62-75-9	mg/kg	0	9	0%	--	--	1.80	3.70	0.002	--	0.002	All ND	YES	N-NITROSODIMETHYLAMINE
	N-NITROSODI-N-PROPYLAMINE	621-64-7	mg/kg	0	9	0%	--	--	1.10	2.30	0.078	--	0.078	All ND	YES	N-NITROSODI-N-PROPYLAMINE
	N-NITROSODIPHENYLAMINE	86-30-6	mg/kg	0	9	0%	--	--	1.10	2.20	110	--	110	All ND	no	--
	PHENOL	108-95-2	mg/kg	0	9	0%	--	--	0.89	1.80	1900	--	1900	All ND	no	--
Dioxins/Furans	1,2,3,4,6,7,8-HPCDD	35822-46-9	pg/g	1	3	33%	10	21	--	--	evaluated as	TEQ				
	1,2,3,4,6,7,8-HPCDF	67562-39-4	pg/g	1	3	33%	2.89	6.40	--	--	evaluated as	TEQ				
	1,2,3,4,7,8,9-HPCDF	55673-89-7	pg/g	0	3	0%	--	--	0.36	0.84	evaluated as	TEQ				
	1,2,3,4,7,8-HXCDD	39227-28-6	pg/g	0	3	0%	--	--	0.58	0.59	evaluated as	TEQ				
	1,2,3,4,7,8-HXCDF	70648-26-9	pg/g	0	3	0%	--	--	0.12	0.21	evaluated as	TEQ				
	1,2,3,6,7,8-HXCDD	57653-85-7	pg/g	0	3	0%	--	--	0.40	0.54	evaluated as	TEQ				
	1,2,3,6,7,8-HXCDF	57117-44-9	pg/g	0	3	0%	--	--	0.11	0.20	evaluated as	TEQ				
	1,2,3,7,8,9-HXCDD	19408-74-3	pg/g	0	3	0%	--	--	0.55	0.56	evaluated as	TEQ				
	1,2,3,7,8,9-HXCDF	72918-21-9	pg/g	0	3	0%	--	--	0.12	0.25	evaluated as	TEQ				
	1,2,3,7,8-PECDD	40321-76-4	pg/g	0	3	0%	--	--	0.17	0.48	evaluated as	TEQ				
	1,2,3,7,8-PECDF	57117-41-6	pg/g	0	3	0%	--	--	0.13	0.32	evaluated as	TEQ				
	2,3,4,6,7,8-HXCDF	60851-34-5	pg/g	0	3	0%	--	--	0.84	3.40	evaluated as	TEQ				
	2,3,4,7,8-PECDF	57117-31-4	pg/g	0	3	0%	--	--	0.13	0.33	evaluated as	TEQ				
	2,3,7,8-TCDD	1746-01-6	pg/g	0	3	0%	--	--	0.07	0.19	evaluated as	TEQ				
	2,3,7,8-TCDF	51207-31-9	pg/g	0	3	0%	--	--	0.12	0.44	evaluated as	TEQ				
	OCDD	3268-87-9	pg/g	3	3	100%	62	130	--	--	evaluated as	TEQ				
	OCDF	39001-02-0	pg/g	0	3	0%	--	--	1.80	2.20	evaluated as	TEQ				
	TEQ	TEQ	pg/g	3	3	100%	0.11	0.31	--	--	4.8		4.8	no	--	--
Pesticides	4,4'-DDD	72-54-8	mg/kg	0	9	0%	--	--	0.0018	0.0018	0.19	--	0.19	All ND	no	--
	4,4'-DDE	72-55-9	mg/kg	0	9	0%	--	--	0.0016	0.0016	2	--	2	All ND	no	--
	4,4'-DDT	50-29-3	mg/kg	0	9	0%	--	--	0.0008	0.0008	1.9	--	1.9	All ND	no	--
	ALDRIN	309-00-2	mg/kg	0	9	0%	--	--	0.0008	0.0008	0.039	--	0.039	All ND	no	--
	ALPHA-BHC	319-84-6	mg/kg	0	9	0%	--	--	0.0008	0.0008	0.086	--	0.086	All ND	no	--
	ALPHA-CHLORDANE	5103-71-9	mg/kg	0	9	0%	--	--	0.0008	0.0008	1.7	--	1.7	All ND	no	--
	BETA-BHC	319-85-7	mg/kg	0	9	0%	--	--	0.0008	0.0008	0.3	--	0.3	All ND	no	--
	DELTA-BHC	319-86-8	mg/kg	0	9	0%	--	--	0.0008	0.0008	--	--	--	All ND	No SL	--
	DIELDRIN	60-57-1	mg/kg	0	9	0%	--	--	0.0008	0.0008	0.034	--	0.034	All ND	no	--
	ENDOSULFAN I	959-98-8	mg/kg	0	9	0%	--	--	0.0008	0.0008	--	--	--	All ND	No SL	--
	ENDOSULFAN II	33213-65-9	mg/kg	0	9	0%	--	--	0.0008	0.0008	--	--	--	All ND	No SL	--
	ENDOSULFAN SULFATE	1031-07-8	mg/kg	0	9	0%	--	--	0.0008	0.0008	--	--	--	All ND	No SL	--
	ENDRIN	72-20-8	mg/kg	0	9	0%	--	--	0.0008	0.0008	1.9	--	1.9	All ND	no	--
	ENDRIN ALDEHYDE	7421-93-4	mg/kg	0	9	0%	--	--	0.0020	0.0020	--	--	--	All ND	No SL	--
	ENDRIN KETONE	53494-70-5	mg/kg	0	9	0%	--	--	0.0020	0.0020	--	--	--	All ND	No SL	--
	GAMMA-BHC (LINDANE)	58-89-9	mg/kg	0	9	0%	--	--	0.0008	0.0008	0.57	--	0.57	All ND	no	--
	GAMMA-CHLORDANE	5566-34-7	mg/kg	0	9	0%	--	--	0.0008	0.0008	1.7	--	1.7	All ND	no	--
	HEPTACHLOR	76-44-8	mg/kg	0	9	0%	--	--	0.0008	0.0008	0.13	--	0.13	All ND	no	--
	HEPTACHLOR EPOXIDE	1024-57-3	mg/kg	0	9	0%	--	--	0.0008	0.0008	0.07	--	0.07	All ND	no	--
	METHOXYCHLOR	72-43-5	mg/kg	0	9	0%	--	--	0.0008	0.0008	32	--	32	All ND	no	--
	TOXAPHENE	8001-35-2	mg/kg	0	9	0%	--	--	0.0150	0.0150	0.49	--	0.49	All ND	no	--

% = percent
CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential concern
DTSC HERO = Department of Toxic Substances Human Health Risk
HH= Human Health
HQ = Hazard Quotient
MDL = method detection limit
mg/kg = milligram per kilogram
ND = non-detect
PAH = Polycyclic Aromatic Hydrocarbon
pg/g = picogram per gram
RSL = Regional Screening Level
SL = Screening Level
SVOC = Semi-Volatile Organic Compounds
USEPA = U.S. Environmental Protection Agency

Attachment A-2. Selection of COPCs in Subsurface Soil

Chemical Group	Analyte	CASRN	Units	Number of Samples		Detection Frequency	Mean	Maximum	MDL Range for Non-detects		USEPA RSL [HQ=0.1]	DTSC HERO	Lowest Screening	Maximum Detect Above Lowest SL?	Maximum DL Above Lowest SL?	
				Detects	Total	(%)	Mean	Detect	Minimum	Maximum	Resident Soil	Resident Soil	Level	(Select COPC)	(Inadequate MDL)	Selected COPCs
Metals	ANTIMONY	7440-36-0	mg/kg	3	3	100%	1.1	1.8	--	--	3.1	--	3.1	no	--	--
	ARSENIC	7440-38-2	mg/kg	3	3	100%	1.9	2.1	--	--	0.68	0.11	0.11	YES	--	ARSENIC
	BARIUM	7440-39-3	mg/kg	3	3	100%	19.0	21.1	--	--	1500	--	1500	no	--	--
	BERYLLIUM	7440-41-7	mg/kg	3	3	100%	0.21	0.22	--	--	16	15	15	no	--	--
	CADMIUM	7440-43-9	mg/kg	3	3	100%	0.15	0.17	--	--	7.1	5.2	5.2	no	--	--
	CHROMIUM	7440-47-3	mg/kg	3	3	100%	4.4	4.7	--	--	0.3	--	0.3	YES	--	CHROMIUM
	COBALT	7440-48-4	mg/kg	3	3	100%	2.0	2.0	--	--	2.3	--	2.3	no	--	--
	COPPER	7440-50-8	mg/kg	3	3	100%	34.9	56.8	--	--	310	--	310	no	--	--
	LEAD	7439-92-1	mg/kg	3	3	100%	21.2	29.4	--	--	400	80	80	no	--	--
	MERCURY	7439-97-6	mg/kg	0	3	0%	--	--	0.02	0.02	1.1	1	1	All ND	no	--
	MOLYBDENUM	7439-98-7	mg/kg	3	3	100%	13.2	13.9	--	--	39	--	39	no	--	--
	NICKEL	7440-02-0	mg/kg	3	3	100%	3.5	4.1	--	--	150	490	150	no	--	--
	SELENIUM	7782-49-2	mg/kg	3	3	100%	0.11	0.12	--	--	39	--	39	no	--	--
	SILVER	7440-22-4	mg/kg	3	3	100%	0.10	0.11	--	--	39	390	39	no	--	--
	THALLIUM	7440-28-0	mg/kg	3	3	100%	0.06	0.069	--	--	0.078	--	0.078	no	--	--
	VANADIUM	7440-62-2	mg/kg	3	3	100%	20.2	20.9	--	--	39	--	39	no	--	--
	ZINC	7440-66-6	mg/kg	3	3	100%	45.6	56.2	--	--	2300	--	2300	no	--	--
PAHs	1-METHYLNAPHTHALENE	90-12-0	mg/kg	0	3	0%	--	--	0.021	0.021	18	--	18	All ND	no	--
	2-METHYLNAPHTHALENE	91-57-6	mg/kg	0	3	0%	--	--	0.019	0.019	24	--	24	All ND	no	--
	ACENAPHTHENE	83-32-9	mg/kg	0	3	0%	--	--	0.021	0.021	360	--	360	All ND	no	--
	ACENAPHTHYLENE	208-96-8	mg/kg	0	3	0%	--	--	0.019	0.019	--	--	--	All ND	No SL	--
	ANTHRACENE	120-12-7	mg/kg	0	3	0%	--	--	0.017	0.017	1800	--	1800	All ND	no	--
	BENZO(A)ANTHRACENE	56-55-3	mg/kg	0	3	0%	--	--	0.019	0.019	1.1	--	1.1	All ND	no	--
	BENZO(A)PYRENE	50-32-8	mg/kg	0	3	0%	--	--	0.019	0.019	0.11	--	0.11	All ND	no	--
	BENZO(B)FLUORANTHENE	205-99-2	mg/kg	0	3	0%	--	--	0.023	0.023	1.1	--	1.1	All ND	no	--
	BENZO(GHI)PERYLENE	191-24-2	mg/kg	0	3	0%	--	--	0.027	0.027	--	--	--	All ND	No SL	--
	BENZO(K)FLUORANTHENE	207-08-9	mg/kg	0	3	0%	--	--	0.021	0.021	11	--	11	All ND	no	--
	CHRYSENE	218-01-9	mg/kg	0	3	0%	--	--	0.017	0.017	110	--	110	All ND	no	--
	DIBENZ(A,H)ANTHRACENE	53-70-3	mg/kg	0	3	0%	--	--	0.019	0.019	0.11	--	0.11	All ND	no	--
	FLUORANTHENE	206-44-0	mg/kg	0	3	0%	--	--	0.025	0.025	240	--	240	All ND	no	--
	FLUORENE	86-73-7	mg/kg	0	3	0%	--	--	0.021	0.021	240	--	240	All ND	no	--
	INDENO(1,2,3-CD)PYRENE	193-39-5	mg/kg	0	3	0%	--	--	0.019	0.019	1.1	--	1.1	All ND	no	--
	NAPHTHALENE	91-20-3	mg/kg	0	3	0%	--	--	0.019	0.019	3.8	--	3.8	All ND	no	--
	PENTACHLOROPHENOL	87-86-5	mg/kg	0	3	0%	--	--	0.170	0.170	1	--	1	All ND	no	--
	PHENANTHRENE	85-01-8	mg/kg	0	3	0%	--	--	0.023	0.023	--	--	--	All ND	No SL	--
	PYRENE	129-00-0	mg/kg	0	3	0%	--	--	0.025	0.025	180	--	180	All ND	no	--
SVOCs	1,2,4-TRICHLOROBENZENE	120-82-1	mg/kg	0	3	0%	--	--	1.00	1.00	5.8	--	5.8	All ND	no	--
	1,2-DICHLOROBENZENE	95-50-1	mg/kg	0	3	0%	--	--	1.10	1.10	180	--	180	All ND	no	--
	1,3-DICHLOROBENZENE	541-73-1	mg/kg	0	3	0%	--	--	1.10	1.10	--	--	--	All ND	No SL	--
	1,4-DICHLOROBENZENE	106-46-7	mg/kg	0	3	0%	--	--	1.00	1.00	2.6	--	2.6	All ND	no	--
	2,4,5-TRICHLOROPHENOL	95-95-4	mg/kg	0	3	0%	--	--	1.30	1.30	630	--	630	All ND	no	--
	2,4,6-TRICHLOROPHENOL	88-06-2	mg/kg	0	3	0%	--	--	1.00	1.00	6.3	7.5	6.3	All ND	no	--
	2,4-DICHLOROPHENOL	120-83-2	mg/kg	0	3	0%	--	--	1.10	1.10	19	--	19	All ND	no	--
	2,4-DIMETHYLPHENOL	105-67-9	mg/kg	0	3	0%	--	--	0.92	0.92	130	--	130	All ND	no	--
	2,4-DINITROPHENOL	51-28-5	mg/kg	0	3	0%	--	--	1.10	1.10	13	--	13	All ND	no	--
	2,4-DINITROTOLUENE	121-14-2	mg/kg	0	3	0%	--	--	1.30	1.30	1.7	--	1.7	All ND	no	--
	2,6-DINITROTOLUENE	606-20-2	mg/kg	0	3	0%	--	--	1.30	1.30	0.36	--	0.36	All ND	YES	2,6-DINITROTOLUENE
	2-CHLORONAPHTHALENE	91-58-7	mg/kg	0	3	0%	--	--	1.10	1.10	480	--	480	All ND	no	--
	2-CHLOROPHENOL	95-57-8	mg/kg	0	3	0%	--	--	0.92	0.92	39	--	39	All ND	no	--
	2-METHYLPHENOL	95-48-7	mg/kg	0	3	0%	--	--	0.94	0.95	320	--	320	All ND	no	--
	2-NITROANILINE	88-74-4	mg/kg	0	3	0%	--	--	1.30	1.30	63	--	63	All ND	no	--
	2-NITROPHENOL	88-75-5	mg/kg	0	3	0%	--	--	1.00	1.00	--	--	--	All ND	No SL	--
	3,3´-DICHLOROBENZIDINE	91-94-1	mg/kg	0	3	0%	--	--	1.20	1.20	1.2	1.2	1.2	All ND	no	--
	3/4-METHYLPHENOL	Cresols, coel	mg/kg	0	3	0%	--	--	0.96	0.97	--	--	--	All ND	No SL	--
	3-NITROANILINE	99-09-2	mg/kg	0	3	0%	--	--	1.30	1.30	--	--	--	All ND	No SL	--
	4,6-DINITRO-2-METHYLPHENOL	534-52-1	mg/kg	0	3	0%	--	--	1.20	1.20	0.51	--	0.51	All ND	YES	4,6-DINITRO-2-METHYLPHENOL
	4-BROMOPHENYL PHENYL ETHER	101-55-3	mg/kg	0	3	0%	--	--	1.20	1.20	--	--	--	All ND	No SL	--
	4-CHLORO-3-METHYLPHENOL	59-50-7	mg/kg	0	3	0%	--	--	1.20	1.20	630	--	630	All ND	no	--
	4-CHLOROANILINE	106-47-8	mg/kg	0	3	0%	--	--	0.35	0.36	2.7	--	2.7	All ND	no	--
	4-CHLOROPHENYL PHENYL ETHER	7005-72-3	mg/kg	0	3	0%	--	--	1.30	1.30	--	--	--	All ND	No SL	--
	4-NITROANILINE	100-01-6	mg/kg	0	3	0%	--	--	1.50	1.50	25	--	25	All ND	no	--
	4-NITROPHENOL	100-02-7	mg/kg	0	3	0%	--	--	1.30	1.30	--	--	--	All ND	No SL	--
	BENZOIC ACID	65-85-0	mg/kg	0	3	0%	--	--	1.00	1.10	25000	--	25000	All ND	no	--
	BENZYL ALCOHOL	100-51-6	mg/kg	0	3	0%	--	--	1.00	1.10	630	--	630	All ND	no	--
	BIS (2-CHLORETHOXY) METHANE	111-91-1	mg/kg	0	3	0%	--	--	0.98	0.99	19	--	19	All ND	no	--
	BIS (2-CHLOROETHYL) ETHER	111-44-4	mg/kg	0	3	0%	--	--	1.30	1.30	0.23	--	0.23	All ND	YES	BIS (2-CHLOROETHYL) ETHER
	BIS (2-CHLOROISOPROPYL) ETHER	39638-32-9	mg/kg	0	3	0%	--	--	1.20	1.20	--	--	--	All ND	No SL	--
	BIS (2-ETHYLHEXYL) PHTHALATE	117-81-7	mg/kg	0	3	0%	--	--	1.70	1.70	39	--	39	All ND	no	--

Attachment A-2. Selection of COPCs in Subsurface Soil

Chemical Group	Analyte	CASRN	Units	Number of Samples: Detects	Number of Samples: Total	Detection Frequency (%)	Mean	Maximum Detect	MDL Range for Non-detects: Minimum	MDL Range for Non-detects: Maximum	USEPA RSL [HQ=0.1] Resident Soil	DTSC HERO Resident Soil	Lowest Screening Level	Maximum Detect Above Lowest SL? (Select COPC)	Maximum DL Above Lowest SL? (Inadequate MDL)	Selected COPCs
	BUTYL BENZYL PHTHALATE	85-68-7	mg/kg	0	3	0%	--	--	1.20	1.20	290	--	290	All ND	no	--
	CARBAZOLE	86-74-8	mg/kg	0	3	0%	--	--	1.30	1.30	--	--	--	All ND	No SL	--
	DIBENZOFURAN	132-64-9	mg/kg	0	3	0%	--	--	1.30	1.30	7.3	--	7.3	All ND	no	--
	DIETHYL PHTHALATE	84-66-2	mg/kg	0	3	0%	--	--	1.40	1.40	5100	--	5100	All ND	no	--
	DIMETHYL PHTHALATE	131-11-3	mg/kg	0	3	0%	--	--	1.20	1.20	--	--	--	All ND	No SL	--
	DI-N-BUTYL PHTHALATE	84-74-2	mg/kg	0	3	0%	--	--	1.30	1.30	630	--	630	All ND	no	--
	DI-N-OCTYL PHTHALATE	117-84-0	mg/kg	0	3	0%	--	--	1.10	1.10	63	--	63	All ND	no	--
	HEXACHLOROBENZENE	118-74-1	mg/kg	0	3	0%	--	--	1.00	1.10	0.21	--	0.21	All ND	YES	HEXACHLOROBENZENE
	HEXACHLOROBUTADIENE	87-68-3	mg/kg	0	3	0%	--	--	1.20	1.20	1.2	1.2	1.2	All ND	no	--
	HEXACHLOROETHANE	67-72-1	mg/kg	0	3	0%	--	--	1.00	1.10	1.8	--	1.8	All ND	no	--
	ISOPHORONE	78-59-1	mg/kg	0	3	0%	--	--	1.80	1.80	570	--	570	All ND	no	--
	NITROBENZENE	98-95-3	mg/kg	0	3	0%	--	--	1.10	1.20	5.1	--	5.1	All ND	no	--
	N-NITROSODIMETHYLAMINE	62-75-9	mg/kg	0	3	0%	--	--	1.10	1.10	0.002	--	0.002	All ND	YES	N-NITROSODIMETHYLAMINE
	N-NITROSODI-N-PROPYLAMINE	621-64-7	mg/kg	0	3	0%	--	--	0.90	0.90	0.078	--	0.078	All ND	YES	N-NITROSODI-N-PROPYLAMINE
	N-NITROSODIPHENYLAMINE	86-30-6	mg/kg	0	0	0%	0	0	0.00	0.00	110	--	110	All ND	no	--
	PHENOL	108-95-2	mg/kg	0	0	0%	0	0	0.00	0.00	1900	--	1900	All ND	no	--
Dioxins/Furans	1,2,3,4,6,7,8-HPCDD	35822-46-9	pg/g	1	1	100%	12	12	--	--	evaluated as	TEQ				
	1,2,3,4,6,7,8-HPCDF	67562-39-4	pg/g	1	1	100%	2	1.90	--	--	evaluated as	TEQ				
	1,2,3,4,7,8,9-HPCDF	55673-89-7	pg/g	0	1	0%	--	--	2.00	2.00	evaluated as	TEQ				
	1,2,3,4,7,8-HXCDD	39227-28-6	pg/g	0	1	0%	--	--	0.46	0.46	evaluated as	TEQ				
	1,2,3,4,7,8-HXCDF	70648-26-9	pg/g	0	1	0%	--	--	0.65	0.65	evaluated as	TEQ				
	1,2,3,6,7,8-HXCDD	57653-85-7	pg/g	0	1	0%	--	--	0.75	0.75	evaluated as	TEQ				
	1,2,3,6,7,8-HXCDF	57117-44-9	pg/g	0	1	0%	--	--	0.59	0.59	evaluated as	TEQ				
	1,2,3,7,8,9-HXCDD	19408-74-3	pg/g	0	1	0%	--	--	0.97	0.97	evaluated as	TEQ				
	1,2,3,7,8,9-HXCDF	72918-21-9	pg/g	0	1	0%	--	--	0.77	0.77	evaluated as	TEQ				
	1,2,3,7,8-PECDD	40321-76-4	pg/g	0	1	0%	--	--	0.76	0.76	evaluated as	TEQ				
	1,2,3,7,8-PECDF	57117-41-6	pg/g	0	1	0%	--	--	0.46	0.46	evaluated as	TEQ				
	2,3,4,6,7,8-HXCDF	60851-34-5	pg/g	0	1	0%	--	--	5.20	5.20	evaluated as	TEQ				
	2,3,4,7,8-PECDF	57117-31-4	pg/g	0	1	0%	--	--	0.47	0.47	evaluated as	TEQ				
	2,3,7,8-TCDD	1746-01-6	pg/g	0	1	0%	--	--	0.20	0.20	evaluated as	TEQ				
	2,3,7,8-TCDF	51207-31-9	pg/g	0	1	0%	--	--	0.31	0.31	evaluated as	TEQ				
	OCDD	3268-87-9	pg/g	1	1	100%	71	71	--	--	evaluated as	TEQ				
	OCDF	39001-02-0	pg/g	0	1	0%	--	--	3.70	3.70	evaluated as	TEQ				
	TEQ	TEQ	pg/g	1	1	100%	0.14	0.14	--	--	4.8		4.8	no	--	--
Pesticides	4,4'-DDD	72-54-8	mg/kg	0	3	0%	--	--	0.0018	0.0018	0.19	--	0.19	All ND	no	--
	4,4'-DDE	72-55-9	mg/kg	0	3	0%	--	--	0.0016	0.0016	2	--	2	All ND	no	--
	4,4'-DDT	50-29-3	mg/kg	0	3	0%	--	--	0.0008	0.0008	1.9	--	1.9	All ND	no	--
	ALDRIN	309-00-2	mg/kg	0	3	0%	--	--	0.0008	0.0008	0.039	--	0.039	All ND	no	--
	ALPHA-BHC	319-84-6	mg/kg	0	3	0%	--	--	0.0008	0.0008	0.086	--	0.086	All ND	no	--
	ALPHA-CHLORDANE	5103-71-9	mg/kg	0	3	0%	--	--	0.0008	0.0008	1.7	--	1.7	All ND	no	--
	BETA-BHC	319-85-7	mg/kg	0	3	0%	--	--	0.0008	0.0008	0.3	--	0.3	All ND	no	--
	DELTA-BHC	319-86-8	mg/kg	0	3	0%	--	--	0.0008	0.0008	--	--	--	All ND	No SL	--
	DIELDRIN	60-57-1	mg/kg	0	3	0%	--	--	0.0008	0.0008	0.034	--	0.034	All ND	no	--
	ENDOSULFAN I	959-98-8	mg/kg	0	3	0%	--	--	0.0008	0.0008	--	--	--	All ND	No SL	--
	ENDOSULFAN II	33213-65-9	mg/kg	0	3	0%	--	--	0.0008	0.0008	--	--	--	All ND	No SL	--
	ENDOSULFAN SULFATE	1031-07-8	mg/kg	0	3	0%	--	--	0.0008	0.0008	--	--	--	All ND	No SL	--
	ENDRIN	72-20-8	mg/kg	0	3	0%	--	--	0.0008	0.0008	1.9	--	1.9	All ND	no	--
	ENDRIN ALDEHYDE	7421-93-4	mg/kg	0	3	0%	--	--	0.0020	0.0020	--	--	--	All ND	No SL	--
	ENDRIN KETONE	53494-70-5	mg/kg	0	3	0%	--	--	0.0020	0.0020	--	--	--	All ND	No SL	--
	GAMMA-BHC (LINDANE)	58-89-9	mg/kg	0	3	0%	--	--	0.0008	0.0008	0.57	--	0.57	All ND	no	--
	GAMMA-CHLORDANE	5566-34-7	mg/kg	0	3	0%	--	--	0.0008	0.0008	1.7	--	1.7	All ND	no	--
	HEPTACHLOR	76-44-8	mg/kg	0	3	0%	--	--	0.0008	0.0008	0.13	--	0.13	All ND	no	--
	HEPTACHLOR EPOXIDE	1024-57-3	mg/kg	0	3	0%	--	--	0.0008	0.0008	0.07	--	0.07	All ND	no	--
	METHOXYCHLOR	72-43-5	mg/kg	0	3	0%	--	--	0.0008	0.0008	32	--	32	All ND	no	--
	TOXAPHENE	8001-35-2	mg/kg	0	3	0%	--	--	0.0150	0.0150	0.49	--	0.49	All ND	no	--

% = percent
CASRN = Chemical Abstracts Service Registry Number
COPC = Chemical of Potential concern
DTSC HERO = Department of Toxic Substances Human Health Risk
HH= Human Health
HQ = Hazard Quotient
MDL = method detection limit
mg/kg = milligram per kilogram
ND = non-detect
PAH = Polycyclic Aromatic Hydrocarbon
pg/g = picogram per gram
RSL = Regional Screening Level
SL = Screening Level
SVOC = Semi-Volatile Organic Compounds
USEPA = U.S. Environmental Protection Agency

Attachment B – Risk Calculations for Human Receptor Populations

Table B-1. Estimates of Cancer and Noncancer Risks for Current Adult Park Worker Scenario
CTE- Incidental Ingestion of Soil

CTE- Incidental Ingestion of Soil

Body Weight = BW	80	kg
Exposure Frequency = EF	12	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	1,825	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	50	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens

CADD = Average Daily Dose - Carcinogens

HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD

Risk = Cancer Risk = CADD * SF

Notes:

NA - Toxicity value is not available.

CTE = Central Tendency Exposure

yr - year

kg - kilograms

kg/mg - kilograms per milligrams

mg/kg-day - milligrams per kilogram-day

$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day

mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	3.11E-08	2.22E-09	3.0E-04	1.5E+00	1.04E-04	3.33E-09
	CHROMIUM III	4.61E+00	9.47E-08	6.77E-09	1.5E+00	NA	6.32E-08	--
	COBALT	1.91E+00	3.93E-08	2.81E-09	3.0E-04	NA	1.31E-04	--
	THALLIUM	5.22E-02	1.07E-09	7.66E-11	1.0E-05	NA	1.07E-04	--
Cumulative Risk							**3.4E-04**	**3.3E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	3.36E-08	2.40E-09	3.0E-04	1.5E+00	1.12E-04	3.60E-09
	CHROMIUM III	4.41E+00	9.06E-08	6.47E-09	1.5E+00	NA	6.04E-08	--
	COBALT	3.01E+00	6.18E-08	4.41E-09	3.0E-04	NA	2.06E-04	--
	THALLIUM	9.80E-02	2.01E-09	1.44E-10	1.0E-05	NA	2.01E-04	--
Cumulative Risk							**5.2E-04**	**3.6E-09**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	2.83E-08	2.02E-09	3.0E-04	1.5E+00	9.45E-05	3.04E-09
	CHROMIUM III	2.81E+00	5.78E-08	4.13E-09	1.5E+00	NA	3.85E-08	--
	COBALT	1.70E+00	3.49E-08	2.50E-09	3.0E-04	NA	1.16E-04	--
	THALLIUM	7.35E-02	1.51E-09	1.08E-10	1.0E-05	NA	1.51E-04	--
Cumulative Risk							**3.6E-04**	**3.0E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	2.97E-08	2.12E-09	3.0E-04	1.5E+00	9.90E-05	3.18E-09
	CHROMIUM III	3.56E+00	7.32E-08	5.23E-09	1.5E+00	NA	4.88E-08	--
	COBALT	2.23E+00	4.59E-08	3.28E-09	3.0E-04	NA	1.53E-04	--
	THALLIUM	7.79E-02	1.60E-09	1.14E-10	1.0E-05	NA	1.60E-04	--
Cumulative Risk							**4.1E-04**	**3.2E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	3.75E-08	2.68E-09	3.0E-04	1.5E+00	1.25E-04	4.02E-09
	CHROMIUM III	4.05E+00	8.33E-08	5.95E-09	1.5E+00	NA	5.55E-08	--
	COBALT	1.95E+00	4.01E-08	2.86E-09	3.0E-04	NA	1.34E-04	--
	THALLIUM	9.70E-02	1.99E-09	1.42E-10	1.0E-05	NA	1.99E-04	--
Cumulative Risk							**4.6E-04**	**4.0E-09**

Table B-2. Estimates of Cancer and Noncancer Risks for Current Adult Park Worker Scenario
RME- Incidental Ingestion of Soil

RME- Incidental Ingestion of Soil

Body Weight = BW	80	kg
Exposure Frequency = EF	24	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	3,650	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	100	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	1.24E-07	1.78E-08	3.0E-04	1.5E+00	4.14E-04	2.66E-08
	CHROMIUM III	4.61E+00	3.79E-07	5.41E-08	1.5E+00	NA	2.53E-07	--
	COBALT	1.91E+00	1.57E-07	2.25E-08	3.0E-04	NA	5.24E-04	--
	THALLIUM	5.22E-02	4.29E-09	6.13E-10	1.0E-05	NA	4.29E-04	--
Cumulative Risk							**1.4E-03**	**2.7E-08**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	1.34E-07	1.92E-08	3.0E-04	1.5E+00	4.48E-04	2.88E-08
	CHROMIUM III	4.41E+00	3.62E-07	5.18E-08	1.5E+00	NA	2.42E-07	--
	COBALT	3.01E+00	2.47E-07	3.53E-08	3.0E-04	NA	8.24E-04	--
	THALLIUM	9.80E-02	8.05E-09	1.15E-09	1.0E-05	NA	8.05E-04	--
Cumulative Risk							**2.1E-03**	**2.9E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	1.13E-07	1.62E-08	3.0E-04	1.5E+00	3.78E-04	2.43E-08
	CHROMIUM III	2.81E+00	2.31E-07	3.30E-08	1.5E+00	NA	1.54E-07	--
	COBALT	1.70E+00	1.40E-07	2.00E-08	3.0E-04	NA	4.66E-04	--
	THALLIUM	7.35E-02	6.04E-09	8.63E-10	1.0E-05	NA	6.04E-04	--
Cumulative Risk							**1.4E-03**	**2.4E-08**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	1.19E-07	1.70E-08	3.0E-04	1.5E+00	3.96E-04	2.55E-08
	CHROMIUM III	3.56E+00	2.93E-07	4.18E-08	1.5E+00	NA	1.95E-07	--
	COBALT	2.23E+00	1.84E-07	2.62E-08	3.0E-04	NA	6.12E-04	--
	THALLIUM	7.79E-02	6.40E-09	9.15E-10	1.0E-05	NA	6.40E-04	--
Cumulative Risk							**1.6E-03**	**2.5E-08**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	1.50E-07	2.14E-08	3.0E-04	1.5E+00	5.00E-04	3.21E-08
	CHROMIUM III	4.05E+00	3.33E-07	4.76E-08	1.5E+00	NA	2.22E-07	--
	COBALT	1.95E+00	1.60E-07	2.29E-08	3.0E-04	NA	5.35E-04	--
	THALLIUM	9.70E-02	7.97E-09	1.14E-09	1.0E-05	NA	7.97E-04	--
Cumulative Risk							**1.8E-03**	**3.2E-08**

Table B-3. Estimates of Cancer and Noncancer Risks for Current Adult Park Worker Scenario
CTE- Dermal Contact with Soil

CTE- Dermal Contact with Soil

Surface Area for Contact=SA	2,479	cm2/event
Adherence Factor=AF	0.02	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	80	kg
Exposure Frequency = EF	12	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	1,825	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	9.24E-10	6.60E-11	3.00E-04	1.50E+00	3.08E-06	9.90E-11
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**3.1E-06**	**9.9E-11**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	1.00E-09	7.14E-11	3.0E-04	1.5E+00	3.33E-06	1.07E-10
	CHROMIUM III	4.41E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**3.3E-06**	**1.1E-10**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	8.43E-10	6.02E-11	3.0E-04	1.5E+00	2.81E-06	9.03E-11
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**2.8E-06**	**9.0E-11**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	8.83E-10	6.31E-11	3.0E-04	1.5E+00	2.94E-06	9.46E-11
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**2.9E-06**	**9.5E-11**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	1.11E-09	7.96E-11	3.0E-04	1.5E+00	3.72E-06	1.19E-10
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**3.7E-06**	**1.2E-10**

Table B-4. Estimates of Cancer and Noncancer Risks for Current Adult Park Worker Scenario
RME- Dermal Contact with Soil

RME- Dermal Contact with Soil

Surface Area for Contact=SA	6,032	cm2/event
Adherence Factor=AF	0.20	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	80	kg
Exposure Frequency = EF	24	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	3,650	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	4.50E-08	6.43E-09	3.00E-04	1.50E+00	1.50E-04	9.64E-09
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**1.5E-04**	**9.6E-09**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	4.87E-08	6.95E-09	3.00E-04	1.50E+00	1.62E-04	1.04E-08
	CHROMIUM III	4.41E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**1.6E-04**	**1.0E-08**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	4.10E-08	5.86E-09	3.0E-04	1.5E+00	1.37E-04	8.79E-09
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**1.4E-04**	**8.8E-09**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	4.30E-08	6.14E-09	3.0E-04	1.5E+00	1.43E-04	9.21E-09
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**1.4E-04**	**9.2E-09**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	5.43E-08	7.75E-09	3.0E-04	1.5E+00	1.81E-04	1.16E-08
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**1.8E-04**	**1.2E-08**

Table B-5. Estimates of Cancer and Noncancer Risks for Adult Worker Scenario
CTE- Inhalation of Particles from Soil

CTE- Inhalation of Particles from Soil

Exposure Time = ET	4	hr/day
Exposure Frequency = EF	12	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	43,800	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens
CEC = Exposure Concentration - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NEC / RfD
Cancer Risk = CEC * IUR *CF

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
hr/day - hours per day
day/yr - days per year
yr - year
kg - kilogram
µg/mg -micrograms per milligram
mg/kg-day - milligrams per kilogram-day
mg/m^3 - milligrams per cubic meter
$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) Factor $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	8.28E-09	5.92E-10	1.5E-05	3.3E-03	5.52E-04	1.95E-09
	CHROMIUM III	4.61E-06	2.53E-08	1.80E-09	NA	NA	--	--
	COBALT	1.91E-06	1.05E-08	7.48E-10	6.0E-06	9.0E-03	1.75E-03	6.74E-09
	THALLIUM	5.22E-08	2.86E-10	2.04E-11	NA	NA	--	--
Cumulative Risk							**2.3E-03**	**8.7E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	8.96E-09	6.40E-10	1.5E-05	3.3E-03	5.98E-04	2.11E-09
	CHROMIUM III	4.41E-06	2.42E-08	1.73E-09	NA	NA	--	--
	COBALT	3.01E-06	1.65E-08	1.18E-09	6.0E-06	9.0E-03	2.75E-03	1.06E-08
	THALLIUM	9.80E-08	5.37E-10	3.84E-11	NA	NA	--	--
Cumulative Risk							**3.3E-03**	**1.3E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	7.56E-09	5.40E-10	1.5E-05	3.3E-03	5.04E-04	1.78E-09
	CHROMIUM III	2.81E-06	1.54E-08	1.10E-09	NA	NA	--	--
	COBALT	1.70E-06	9.32E-09	6.65E-10	6.0E-06	9.0E-03	1.55E-03	5.99E-09
	THALLIUM	7.35E-08	4.03E-10	2.88E-11	NA	NA	--	--
Cumulative Risk							**2.1E-03**	**7.8E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	7.92E-09	5.66E-10	1.5E-05	3.3E-03	5.28E-04	1.87E-09
	CHROMIUM III	3.56E-06	1.95E-08	1.39E-09	NA	NA	--	--
	COBALT	2.23E-06	1.22E-08	8.74E-10	6.0E-06	9.0E-03	2.04E-03	7.87E-09
	THALLIUM	7.79E-08	4.27E-10	3.05E-11	NA	NA	--	--
Cumulative Risk							**2.6E-03**	**9.7E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	9.99E-09	7.14E-10	1.5E-05	3.3E-03	6.66E-04	2.36E-09
	CHROMIUM III	4.05E-06	2.22E-08	1.59E-09	NA	NA	--	--
	COBALT	1.95E-06	1.07E-08	7.64E-10	6.0E-06	9.0E-03	1.78E-03	6.88E-09
	THALLIUM	9.70E-08	5.32E-10	3.80E-11	NA	NA	--	--
Cumulative Risk							**2.4E-03**	**9.2E-09**

Table B-6. Estimates of Cancer and Noncancer Risks for Adult Worker Scenario
RME- Inhalation of Particles from Soil

RME- Inhalation of Particles from Soil

Exposure Time = ET	8	hr/day
Exposure Frequency = EF	24	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	87,600	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens

CEC = Exposure Concentration - Carcinogens

HQ = Hazard Quotient, Noncarcinogens = NEC / RfD

Cancer Risk = CEC * IUR *CF

Notes:

NA - Toxicity value is not available.

RME = Reasonable Maximum Exposure

hr/day - hours per day

day/yr - days per year

yr - year

kg - kilogram

µg/mg -micrograms per milligram

mg/kg-day - milligrams per kilogram-day

mg/m^3 - milligrams per cubic meter

$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	3.31E-08	4.73E-09	1.5E-05	3.3E-03	2.21E-03	1.56E-08
	CHROMIUM III	4.61E-06	1.01E-07	1.44E-08	NA	NA	--	--
	COBALT	1.91E-06	4.19E-08	5.99E-09	6.0E-06	9.0E-03	6.98E-03	5.39E-08
	THALLIUM	5.22E-08	1.14E-09	1.63E-10	NA	NA	--	--
Cumulative Risk							**9.2E-03**	**7.0E-08**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	3.59E-08	5.12E-09	1.50E-05	3.3E-03	2.39E-03	1.69E-08
	CHROMIUM III	4.41E-06	9.67E-08	1.38E-08	NA	NA	--	--
	COBALT	3.01E-06	6.59E-08	9.42E-09	6.00E-06	9.0E-03	1.10E-02	8.47E-08
	THALLIUM	9.80E-08	2.15E-09	3.07E-10	NA	NA	--	--
Cumulative Risk							**1.3E-02**	**1.0E-07**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	3.02E-08	4.32E-09	1.50E-05	3.3E-03	2.01E-03	1.42E-08
	CHROMIUM III	2.81E-06	6.16E-08	8.80E-09	NA	NA	--	--
	COBALT	1.70E-06	3.73E-08	5.32E-09	6.00E-06	9.0E-03	6.21E-03	4.79E-08
	THALLIUM	7.35E-08	1.61E-09	2.30E-10	NA	NA	--	--
Cumulative Risk							**8.2E-03**	**6.2E-08**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	3.17E-08	4.52E-09	1.50E-05	3.3E-03	2.11E-03	1.49E-08
	CHROMIUM III	3.56E-06	7.81E-08	1.12E-08	NA	NA	--	--
	COBALT	2.23E-06	4.90E-08	6.99E-09	6.00E-06	9.0E-03	8.16E-03	6.30E-08
	THALLIUM	7.79E-08	1.71E-09	2.44E-10	NA	NA	--	--
Cumulative Risk							**1.0E-02**	**7.8E-08**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	4.00E-08	5.71E-09	1.50E-05	3.3E-03	2.67E-03	1.88E-08
	CHROMIUM III	4.05E-06	8.88E-08	1.27E-08	NA	NA	--	--
	COBALT	1.95E-06	4.28E-08	6.11E-09	6.00E-06	9.0E-03	7.13E-03	5.50E-08
	THALLIUM	9.70E-08	2.13E-09	3.04E-10	NA	NA	--	--
Cumulative Risk							**9.8E-03**	**7.4E-08**

Table B-7. Estimates of Cancer and Noncancer Risks for Consruction Worker Scenario
CTE- Incidental Ingestion of Soil

CTE- Incidental Ingestion of Soil

Body Weight = BW	80	kg
Exposure Frequency = EF	15	days/yr
Exposure Duration = ED	1	yr
Averaging Time (Noncancer) = AT	365	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	165	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
(mg/kg-day)$^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF (mg/kg-day)$^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	1.28E-07	1.83E-09	3.0E-04	1.5E+00	4.27E-04	2.75E-09
	CHROMIUM III	4.61E+00	3.91E-07	5.58E-09	1.5E+00	NA	2.60E-07	--
	COBALT	1.91E+00	1.62E-07	2.32E-09	3.0E-04	NA	5.40E-04	--
	THALLIUM	5.22E-02	4.42E-09	6.32E-11	1.0E-05	NA	4.42E-04	--
Cumulative Risk							**1.4E-03**	**2.7E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	1.39E-07	1.98E-09	3.0E-04	1.5E+00	4.62E-04	2.97E-09
	CHROMIUM III	4.41E+00	3.74E-07	5.34E-09	1.5E+00	NA	2.49E-07	--
	COBALT	3.01E+00	2.55E-07	3.64E-09	3.0E-04	NA	8.50E-04	--
	THALLIUM	9.80E-02	8.31E-09	1.19E-10	1.0E-05	NA	8.31E-04	--
Cumulative Risk							**2.1E-03**	**3.0E-09**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	1.17E-07	1.67E-09	3.0E-04	1.5E+00	3.90E-04	2.50E-09
	CHROMIUM III	2.81E+00	2.38E-07	3.40E-09	1.5E+00	NA	1.59E-07	--
	COBALT	1.70E+00	1.44E-07	2.06E-09	3.0E-04	NA	4.80E-04	--
	THALLIUM	7.35E-02	6.23E-09	8.90E-11	1.0E-05	NA	6.23E-04	--
Cumulative Risk							**1.5E-03**	**2.5E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	1.22E-07	1.75E-09	3.0E-04	1.5E+00	4.08E-04	2.62E-09
	CHROMIUM III	3.56E+00	3.02E-07	4.32E-09	1.5E+00	NA	2.01E-07	--
	COBALT	2.23E+00	1.89E-07	2.71E-09	3.0E-04	NA	6.31E-04	--
	THALLIUM	7.79E-02	6.60E-09	9.43E-11	1.0E-05	NA	6.60E-04	--
Cumulative Risk							**1.7E-03**	**2.6E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	1.55E-07	2.21E-09	3.0E-04	1.5E+00	5.15E-04	3.31E-09
	CHROMIUM III	4.05E+00	3.44E-07	4.91E-09	1.5E+00	NA	2.29E-07	--
	COBALT	1.95E+00	1.65E-07	2.36E-09	3.0E-04	NA	5.52E-04	--
	THALLIUM	9.70E-02	8.22E-09	1.17E-10	1.0E-05	NA	8.22E-04	--
Cumulative Risk							**1.9E-03**	**3.3E-09**

Table B-8. Estimates of Cancer and Noncancer Risks for Consruction Worker Scenario
RME- Incidental Ingestion of Soil

RME- Incidental Ingestion of Soil

Body Weight = BW	80	kg
Exposure Frequency = EF	30	days/yr
Exposure Duration = ED	3	yr
Averaging Time (Noncancer) = AT	1,095	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	330	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	5.13E-07	2.20E-08	3.0E-04	1.5E+00	1.71E-03	3.30E-08
	CHROMIUM III	4.61E+00	1.56E-06	6.70E-08	1.5E+00	NA	1.04E-06	--
	COBALT	1.91E+00	6.48E-07	2.78E-08	3.0E-04	NA	2.16E-03	--
	THALLIUM	5.22E-02	1.77E-08	7.58E-10	1.0E-05	NA	1.77E-03	--
Cumulative Risk							**5.6E-03**	**3.3E-08**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	5.55E-07	2.38E-08	3.0E-04	1.5E+00	1.85E-03	3.57E-08
	CHROMIUM III	4.41E+00	1.50E-06	6.41E-08	1.5E+00	NA	9.97E-07	--
	COBALT	3.01E+00	1.02E-06	4.37E-08	3.0E-04	NA	3.40E-03	--
	THALLIUM	9.80E-02	3.32E-08	1.42E-09	1.0E-05	NA	3.32E-03	--
Cumulative Risk							**8.6E-03**	**3.6E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	4.68E-07	2.00E-08	3.0E-04	1.5E+00	1.56E-03	3.01E-08
	CHROMIUM III	2.81E+00	9.53E-07	4.09E-08	1.5E+00	NA	6.36E-07	--
	COBALT	1.70E+00	5.76E-07	2.47E-08	3.0E-04	NA	1.92E-03	--
	THALLIUM	7.35E-02	2.49E-08	1.07E-09	1.0E-05	NA	2.49E-03	--
Cumulative Risk							**6.0E-03**	**3.0E-08**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	4.90E-07	2.10E-08	3.0E-04	1.5E+00	1.63E-03	3.15E-08
	CHROMIUM III	3.56E+00	1.21E-06	5.18E-08	1.5E+00	NA	8.06E-07	--
	COBALT	2.23E+00	7.57E-07	3.25E-08	3.0E-04	NA	2.52E-03	--
	THALLIUM	7.79E-02	2.64E-08	1.13E-09	1.0E-05	NA	2.64E-03	--
Cumulative Risk							**6.8E-03**	**3.1E-08**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	6.18E-07	2.65E-08	3.0E-04	1.5E+00	2.06E-03	3.98E-08
	CHROMIUM III	4.05E+00	1.37E-06	5.89E-08	1.5E+00	NA	9.16E-07	--
	COBALT	1.95E+00	6.62E-07	2.84E-08	3.0E-04	NA	2.21E-03	--
	THALLIUM	9.70E-02	3.29E-08	1.41E-09	1.0E-05	NA	3.29E-03	--
Cumulative Risk							**7.6E-03**	**4.0E-08**

Table B-9. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
CTE- Dermal Contact with Soil

CTE- Dermal Contact with Soil

Surface Area for Contact=SA	6,032	cm2/event
Adherence Factor=AF	0.80	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	80	kg
Exposure Frequency = EF	15	days/yr
Exposure Duration = ED	1	yr
Averaging Time (Noncancer) = AT	365	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	1.12E-07	1.61E-09	3.00E-04	1.50E+00	3.75E-04	2.41E-09
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**3.7E-04**	**2.4E-09**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	1.22E-07	1.74E-09	3.0E-04	1.5E+00	4.06E-04	2.61E-09
	CHROMIUM III	4.41E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**4.1E-04**	**2.6E-09**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	1.03E-07	1.47E-09	3.0E-04	1.5E+00	3.42E-04	2.20E-09
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**3.4E-04**	**2.2E-09**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	1.07E-07	1.54E-09	3.0E-04	1.5E+00	3.58E-04	2.30E-09
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**3.6E-04**	**2.3E-09**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	1.36E-07	1.94E-09	3.0E-04	1.5E+00	4.52E-04	2.91E-09
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**4.5E-04**	**2.9E-09**

Table B-10. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
RME- Dermal Contact with Soil

RME- Dermal Contact with Soil

Surface Area for Contact=SA	6,032	cm2/event
Adherence Factor=AF	0.80	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	80	kg
Exposure Frequency = EF	30	days/yr
Exposure Duration = ED	3	yr
Averaging Time (Noncancer) = AT	1,095	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	2.25E-07	9.64E-09	3.00E-04	1.50E+00	7.50E-04	1.45E-08
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**7.5E-04**	**1.4E-08**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	2.43E-07	1.04E-08	3.00E-04	1.50E+00	8.11E-04	1.56E-08
	CHROMIUM III	4.41E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**8.1E-04**	**1.6E-08**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	2.05E-07	8.79E-09	3.0E-04	1.5E+00	6.84E-04	1.32E-08
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**6.8E-04**	**1.3E-08**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	2.15E-07	9.21E-09	3.0E-04	1.5E+00	7.16E-04	1.38E-08
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**7.2E-04**	**1.4E-08**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	2.71E-07	1.16E-08	3.0E-04	1.5E+00	9.04E-04	1.74E-08
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**9.0E-04**	**1.7E-08**

Table B-11. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
CTE- Inhalation of Particles from Soil

CTE- Inhalation of Particles from Soil

Exposure Time = ET	8	hr/day
Exposure Frequency = EF	15	days/yr
Exposure Duration = ED	1	yr
Averaging Time (Noncancer) = AT	8,760	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens
CEC = Exposure Concentration - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NEC / RfD
Cancer Risk = CEC * IUR *CF

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
hr/day - hours per day
day/yr - days per year
yr - year
kg - kilogram
µg/mg -micrograms per milligram
mg/kg-day - milligrams per kilogram-day
mg/m^3 - milligrams per cubic meter
(µg/m^3)$^{-1}$ -per microgram per cubic meter

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) Factor (µg/m^3)$^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	2.07E-08	2.96E-10	1.5E-05	3.3E-03	1.38E-03	9.76E-10
	CHROMIUM III	4.61E-06	6.32E-08	9.02E-10	NA	NA	--	--
	COBALT	1.91E-06	2.62E-08	3.74E-10	6.0E-06	9.0E-03	4.37E-03	3.37E-09
	THALLIUM	5.22E-08	7.15E-10	1.02E-11	NA	NA	--	--
Cumulative Risk							**5.7E-03**	**4.3E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	2.24E-08	3.20E-10	1.5E-05	3.3E-03	1.49E-03	1.06E-09
	CHROMIUM III	4.41E-06	6.04E-08	8.63E-10	NA	NA	--	--
	COBALT	3.01E-06	4.12E-08	5.88E-10	6.0E-06	9.0E-03	6.87E-03	5.30E-09
	THALLIUM	9.80E-08	1.34E-09	1.92E-11	NA	NA	--	--
Cumulative Risk							**8.4E-03**	**6.4E-09**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	1.89E-08	2.70E-10	1.5E-05	3.3E-03	1.26E-03	8.91E-10
	CHROMIUM III	2.81E-06	3.85E-08	5.50E-10	NA	NA	--	--
	COBALT	1.70E-06	2.33E-08	3.33E-10	6.0E-06	9.0E-03	3.88E-03	2.99E-09
	THALLIUM	7.35E-08	1.01E-09	1.44E-11	NA	NA	--	--
Cumulative Risk							**5.1E-03**	**3.9E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	1.98E-08	2.83E-10	1.5E-05	3.3E-03	1.32E-03	9.33E-10
	CHROMIUM III	3.56E-06	4.88E-08	6.97E-10	NA	NA	--	--
	COBALT	2.23E-06	3.06E-08	4.37E-10	6.0E-06	9.0E-03	5.10E-03	3.93E-09
	THALLIUM	7.79E-08	1.07E-09	1.52E-11	NA	NA	--	--
Cumulative Risk							**6.4E-03**	**4.9E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	2.50E-08	3.57E-10	1.5E-05	3.3E-03	1.67E-03	1.18E-09
	CHROMIUM III	4.05E-06	5.55E-08	7.93E-10	NA	NA	--	--
	COBALT	1.95E-06	2.67E-08	3.82E-10	6.0E-06	9.0E-03	4.46E-03	3.44E-09
	THALLIUM	9.70E-08	1.33E-09	1.90E-11	NA	NA	--	--
Cumulative Risk							**6.1E-03**	**4.6E-09**

Table B-12. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
RME- Inhalation of Particles from Soil

RME- Inhalation of Particles from Soil

Exposure Time = ET	10	hr/day
Exposure Frequency = EF	30	days/yr
Exposure Duration = ED	3	yr
Averaging Time (Noncancer) = AT	26,280	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens
CEC = Exposure Concentration - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NEC / RfD
Cancer Risk = CEC * IUR *CF

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
hr/day - hours per day
day/yr - days per year
yr - year
kg - kilogram
µg/mg -micrograms per milligram
mg/kg-day - milligrams per kilogram-day
mg/m^3 - milligrams per cubic meter
$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	5.18E-08	2.22E-09	1.5E-05	3.3E-03	3.45E-03	7.32E-09
	CHROMIUM III	4.61E-06	1.58E-07	6.77E-09	NA	NA	--	--
	COBALT	1.91E-06	6.55E-08	2.81E-09	6.0E-06	9.0E-03	1.09E-02	2.53E-08
	THALLIUM	5.22E-08	1.79E-09	7.66E-11	NA	NA	--	--
Cumulative Risk							**1.4E-02**	**3.3E-08**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	5.60E-08	2.40E-09	1.50E-05	3.3E-03	3.74E-03	7.92E-09
	CHROMIUM III	4.41E-06	1.51E-07	6.47E-09	NA	NA	--	--
	COBALT	3.01E-06	1.03E-07	4.41E-09	6.00E-06	9.0E-03	1.72E-02	3.97E-08
	THALLIUM	9.80E-08	3.36E-09	1.44E-10	NA	NA	--	--
Cumulative Risk							**2.1E-02**	**4.8E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	4.72E-08	2.02E-09	1.50E-05	3.3E-03	3.15E-03	6.68E-09
	CHROMIUM III	2.81E-06	9.63E-08	4.13E-09	NA	NA	--	--
	COBALT	1.70E-06	5.82E-08	2.50E-09	6.00E-06	9.0E-03	9.70E-03	2.25E-08
	THALLIUM	7.35E-08	2.52E-09	1.08E-10	NA	NA	--	--
Cumulative Risk							**1.3E-02**	**2.9E-08**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	4.95E-08	2.12E-09	1.50E-05	3.3E-03	3.30E-03	7.00E-09
	CHROMIUM III	3.56E-06	1.22E-07	5.23E-09	NA	NA	--	--
	COBALT	2.23E-06	7.65E-08	3.28E-09	6.00E-06	9.0E-03	1.28E-02	2.95E-08
	THALLIUM	7.79E-08	2.67E-09	1.14E-10	NA	NA	--	--
Cumulative Risk							**1.6E-02**	**3.7E-08**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	6.25E-08	2.68E-09	1.50E-05	3.3E-03	4.16E-03	8.83E-09
	CHROMIUM III	4.05E-06	1.39E-07	5.95E-09	NA	NA	--	--
	COBALT	1.95E-06	6.68E-08	2.86E-09	6.00E-06	9.0E-03	1.11E-02	2.58E-08
	THALLIUM	9.70E-08	3.32E-09	1.42E-10	NA	NA	--	--
Cumulative Risk							**1.5E-02**	**3.5E-08**

Table B-13. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
CTE- Incidental Ingestion of Subsurface Soil

CTE- Incidental Ingestion of Subsurface Soil

Body Weight = BW	80	kg
Exposure Frequency = EF	15	days/yr
Exposure Duration = ED	1	yr
Averaging Time (Noncancer) = AT	365	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	165	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens

CADD = Average Daily Dose - Carcinogens

HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD

Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	2.32E+00	1.96E-07	2.81E-09	3.0E-04	1.5E+00	6.55E-04	4.21E-09
	CHROMIUM III	5.02E+00	4.25E-07	6.07E-09	1.5E+00	NA	2.83E-07	--
Cumulative Risk							**6.6E-04**	**4.2E-09**

Notes:

NA - Not applicable because toxicity value is not available.

CTE = Central Tendency Exposure

yr - year

kg - kilograms

kg/mg - kilograms per milligrams

mg/kg-day - milligrams per kilogram-day

$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day

mg/kg - milligrams per kilogram

Table B-14. Estimates of Cancer and Noncancer Risks for ConstructionWorker Scenario
RME- Incidental Ingestion of Subsurface Soil

RME- Incidental Ingestion of Subsurface Soil

Body Weight = BW	80	kg
Exposure Frequency = EF	30	days/yr
Exposure Duration = ED	3	yr
Averaging Time (Noncancer) = AT	1,095	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	330	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	2.32E+00	7.86E-07	3.37E-08	3.0E-04	1.5E+00	2.62E-03	5.05E-08
	CHROMIUM III	5.02E+00	1.70E-06	7.29E-08	1.5E+00	NA	1.13E-06	--
Cumulative Risk							**2.6E-03**	**5.1E-08**

Notes:

NA - Not applicable because toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Table B-15. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
CTE- Dermal Contact with Subsurface Soil

CTE- Dermal Contact with Subsurface Soil

Surface Area for Contact=SA	6,032	cm2/event
Adherence Factor=AF	0.80	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	80	kg
Exposure Frequency = EF	15	days/yr
Exposure Duration = ED	1	yr
Averaging Time (Noncancer) = AT	365	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	2.32E+00	3.00E-02	1.72E-07	2.46E-09	3.00E-04	1.50E+00	5.75E-04	3.69E-09
	CHROMIUM III	5.02E+00	NA	--	--	1.95E-02	NA	--	--
Cumulative Risk								**5.7E-04**	**3.7E-09**

Notes:

NA - Not applicable because toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Table B-16. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
RME- Dermal Contact with Subsurface Soil

RME- Dermal Contact with Subsurface Soil

Surface Area for Contact=SA	6,032	cm2/event
Adherence Factor=AF	0.80	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	80	kg
Exposure Frequency = EF	30	days/yr
Exposure Duration = ED	3	yr
Averaging Time (Noncancer) = AT	1,095	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	2.32E+00	3.00E-02	3.45E-07	1.48E-08	3.00E-04	1.50E+00	1.15E-03	2.22E-08
	CHROMIUM III	5.02E+00	NA	--	--	1.95E-02	NA	--	--
Cumulative Risk								**1.1E-03**	**2.2E-08**

Notes:

NA - Not applicable because toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Table B-17. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
CTE- Inhalation of Particles from Subsurface Soil

CTE- Inhalation of Particles from Subsurface Soil

Exposure Time = ET	8	hr/day
Exposure Frequency = EF	15	days/yr
Exposure Duration = ED	1	yr
Averaging Time (Noncancer) = AT	8,760	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens
CEC = Exposure Concentration - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NEC / RfD
Cancer Risk = CEC * IUR *CF

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) Factor $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	2.32E-06	3.18E-08	4.54E-10	1.5E-05	3.3E-03	2.12E-03	1.50E-09
	CHROMIUM III	5.02E-06	6.87E-08	9.81E-10	NA	NA	--	--
Cumulative Risk							**2.1E-03**	**1.5E-09**

<u>**Notes:**</u>
NA - Not applicable because toxicity value is not available.
CTE = Central Tendency Exposure
hr/day - hours per day
day/yr - days per year
yr - year
kg - kilogram
µg/mg -micrograms per milligram
mg/kg-day - milligrams per kilogram-day
mg/m^3 - milligrams per cubic meter
$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Table B-18. Estimates of Cancer and Noncancer Risks for Construction Worker Scenario
RME- Inhalation of Particles from Subsurface Soil

RME- Inhalation of Particles from Subsurface Soil

Exposure Time = ET	10	hr/day
Exposure Frequency = EF	30	days/yr
Exposure Duration = ED	3	yr
Averaging Time (Noncancer) = AT	26,280	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens
CEC = Exposure Concentration - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NEC / RfD
Cancer Risk = CEC * IUR *CF

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	2.32E-06	7.94E-08	3.40E-09	1.5E-05	3.3E-03	5.29E-03	1.12E-08
	CHROMIUM III	5.02E-06	1.72E-07	7.36E-09	NA	NA	--	--
Cumulative Risk							**5.3E-03**	**1.1E-08**

Notes:

NA - Not applicable because toxicity value is not available.
RME = Reasonable Maximum Exposure
hr/day - hours per day
day/yr - days per year
yr - year
kg - kilogram
µg/mg -micrograms per milligram
mg/kg-day - milligrams per kilogram-day
mg/m^3 - milligrams per cubic meter
$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Table B-19. Estimates of Cancer and Noncancer Risks for Adult Visitor Scenario
CTE- Incidental Ingestion of Soil

CTE- Incidental Ingestion of Soil

Body Weight = BW	80	kg
Exposure Frequency = EF	5	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	1,825	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	50	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	1.29E-08	9.25E-10	3.0E-04	1.5E+00	4.32E-05	1.39E-09
	CHROMIUM III	4.61E+00	3.95E-08	2.82E-09	1.5E+00	NA	2.63E-08	--
	COBALT	1.91E+00	1.64E-08	1.17E-09	3.0E-04	NA	5.46E-05	--
	THALLIUM	5.22E-02	4.47E-10	3.19E-11	1.0E-05	NA	4.47E-05	--
Cumulative Risk							**1.4E-04**	**1.4E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	1.40E-08	1.00E-09	3.0E-04	1.5E+00	4.67E-05	1.50E-09
	CHROMIUM III	4.41E+00	3.78E-08	2.70E-09	1.5E+00	NA	2.52E-08	--
	COBALT	3.01E+00	2.57E-08	1.84E-09	3.0E-04	NA	8.58E-05	--
	THALLIUM	9.80E-02	8.39E-10	5.99E-11	1.0E-05	NA	8.39E-05	--
Cumulative Risk							**2.2E-04**	**1.5E-09**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	1.18E-08	8.43E-10	3.0E-04	1.5E+00	3.94E-05	1.26E-09
	CHROMIUM III	2.81E+00	2.41E-08	1.72E-09	1.5E+00	NA	1.61E-08	--
	COBALT	1.70E+00	1.46E-08	1.04E-09	3.0E-04	NA	4.85E-05	--
	THALLIUM	7.35E-02	6.29E-10	4.49E-11	1.0E-05	NA	6.29E-05	--
Cumulative Risk							**1.5E-04**	**1.3E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	1.24E-08	8.84E-10	3.0E-04	1.5E+00	4.12E-05	1.33E-09
	CHROMIUM III	3.56E+00	3.05E-08	2.18E-09	1.5E+00	NA	2.03E-08	--
	COBALT	2.23E+00	1.91E-08	1.37E-09	3.0E-04	NA	6.38E-05	--
	THALLIUM	7.79E-02	6.67E-10	4.76E-11	1.0E-05	NA	6.67E-05	--
Cumulative Risk							**1.7E-04**	**1.3E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	1.56E-08	1.12E-09	3.0E-04	1.5E+00	5.21E-05	1.67E-09
	CHROMIUM III	4.05E+00	3.47E-08	2.48E-09	1.5E+00	NA	2.31E-08	--
	COBALT	1.95E+00	1.67E-08	1.19E-09	3.0E-04	NA	5.57E-05	--
	THALLIUM	9.70E-02	8.30E-10	5.93E-11	1.0E-05	NA	8.30E-05	--
Cumulative Risk							**1.9E-04**	**1.7E-09**

Table B-20. Estimates of Cancer and Noncancer Risks for Adult Visitor Scenario
RME- Incidental Ingestion of Soil

RME- Incidental Ingestion of Soil

Body Weight = BW	80	kg
Exposure Frequency = EF	10	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	3,650	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	100	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	5.18E-08	7.40E-09	3.0E-04	1.5E+00	1.73E-04	1.11E-08
	CHROMIUM III	4.61E+00	1.58E-07	2.26E-08	1.5E+00	NA	1.05E-07	--
	COBALT	1.91E+00	6.55E-08	9.35E-09	3.0E-04	NA	2.18E-04	--
	THALLIUM	5.22E-02	1.79E-09	2.55E-10	1.0E-05	NA	1.79E-04	--
Cumulative Risk							**5.7E-04**	**1.1E-08**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	5.60E-08	8.00E-09	3.0E-04	1.5E+00	1.87E-04	1.20E-08
	CHROMIUM III	4.41E+00	1.51E-07	2.16E-08	1.5E+00	NA	1.01E-07	--
	COBALT	3.01E+00	1.03E-07	1.47E-08	3.0E-04	NA	3.43E-04	--
	THALLIUM	9.80E-02	3.36E-09	4.79E-10	1.0E-05	NA	3.36E-04	--
Cumulative Risk							**8.7E-04**	**1.2E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	4.72E-08	6.75E-09	3.0E-04	1.5E+00	1.57E-04	1.01E-08
	CHROMIUM III	2.81E+00	9.63E-08	1.38E-08	1.5E+00	NA	6.42E-08	--
	COBALT	1.70E+00	5.82E-08	8.32E-09	3.0E-04	NA	1.94E-04	--
	THALLIUM	7.35E-02	2.52E-09	3.60E-10	1.0E-05	NA	2.52E-04	--
Cumulative Risk							**6.0E-04**	**1.0E-08**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	4.95E-08	7.07E-09	3.0E-04	1.5E+00	1.65E-04	1.06E-08
	CHROMIUM III	3.56E+00	1.22E-07	1.74E-08	1.5E+00	NA	8.14E-08	--
	COBALT	2.23E+00	7.65E-08	1.09E-08	3.0E-04	NA	2.55E-04	--
	THALLIUM	7.79E-02	2.67E-09	3.81E-10	1.0E-05	NA	2.67E-04	--
Cumulative Risk							**6.9E-04**	**1.1E-08**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	6.25E-08	8.92E-09	3.0E-04	1.5E+00	2.08E-04	1.34E-08
	CHROMIUM III	4.05E+00	1.39E-07	1.98E-08	1.5E+00	NA	9.25E-08	--
	COBALT	1.95E+00	6.68E-08	9.55E-09	3.0E-04	NA	2.23E-04	--
	THALLIUM	9.70E-02	3.32E-09	4.75E-10	1.0E-05	NA	3.32E-04	--
Cumulative Risk							**7.6E-04**	**1.3E-08**

Table B-21. Estimates of Cancer and Noncancer Risks for Adult Visitor Scenario
CTE- Dermal Contact with Soil

CTE- Dermal Contact with Soil

Surface Area for Contact=SA	2,479	cm2/event
Adherence Factor=AF	0.07	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	80	kg
Exposure Frequency = EF	5	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	1,825	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	1.35E-09	9.63E-11	3.00E-04	1.50E+00	4.49E-06	1.44E-10
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**4.5E-06**	**1.4E-10**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	1.46E-09	1.04E-10	3.0E-04	1.5E+00	4.86E-06	1.56E-10
	CHROMIUM III	4.41E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**4.9E-06**	**1.6E-10**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	1.23E-09	8.78E-11	3.0E-04	1.5E+00	4.10E-06	1.32E-10
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**4.1E-06**	**1.3E-10**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	1.29E-09	9.20E-11	3.0E-04	1.5E+00	4.29E-06	1.38E-10
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**4.3E-06**	**1.4E-10**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	1.63E-09	1.16E-10	3.0E-04	1.5E+00	5.42E-06	1.74E-10
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**5.4E-06**	**1.7E-10**

Table B-22. Estimates of Cancer and Noncancer Risks for Adult Visitor Scenario
RME- Dermal Contact with Soil

RME- Dermal Contact with Soil

Surface Area for Contact=SA	4,849	cm2/event
Adherence Factor=AF	0.07	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	80	kg
Exposure Frequency = EF	10	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	3,650	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	5.27E-09	7.53E-10	3.00E-04	1.50E+00	1.76E-05	1.13E-09
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**1.8E-05**	**1.1E-09**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	5.71E-09	8.15E-10	3.00E-04	1.50E+00	1.90E-05	1.22E-09
	CHROMIUM III	4.41E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**1.9E-05**	**1.2E-09**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	4.81E-09	6.87E-10	3.0E-04	1.5E+00	1.60E-05	1.03E-09
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**1.6E-05**	**1.0E-09**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	5.04E-09	7.20E-10	3.0E-04	1.5E+00	1.68E-05	1.08E-09
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**1.7E-05**	**1.1E-09**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	6.36E-09	9.09E-10	3.0E-04	1.5E+00	2.12E-05	1.36E-09
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**2.1E-05**	**1.4E-09**

Table B-23. Estimates of Cancer and Noncancer Risks for Adult Visitor Scenario
CTE- Inhalation of Particles from Soil

CTE- Inhalation of Particles from Soil

Exposure Time = ET	0.5	hr/day
Exposure Frequency = EF	5	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	43,800	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens
CEC = Exposure Concentration - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NEC / RfD
Cancer Risk = CEC * IUR *CF

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
hr/day - hours per day
day/yr - days per year
yr - year
kg - kilogram
µg/mg -micrograms per milligram
mg/kg-day - milligrams per kilogram-day
mg/m^3 - milligrams per cubic meter
$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) Factor $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	4.32E-10	3.08E-11	1.5E-05	3.3E-03	2.88E-05	1.02E-10
	CHROMIUM III	4.61E-06	1.32E-09	9.40E-11	NA	NA	--	--
	COBALT	1.91E-06	5.46E-10	3.90E-11	6.0E-06	9.0E-03	9.09E-05	3.51E-10
	THALLIUM	5.22E-08	1.49E-11	1.06E-12	NA	NA	--	--
Cumulative Risk							**1.2E-04**	**4.5E-10**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	4.67E-10	3.33E-11	1.5E-05	3.3E-03	3.11E-05	1.10E-10
	CHROMIUM III	4.41E-06	1.26E-09	8.99E-11	NA	NA	--	--
	COBALT	3.01E-06	8.58E-10	6.13E-11	6.0E-06	9.0E-03	1.43E-04	5.52E-10
	THALLIUM	9.80E-08	2.80E-11	2.00E-12	NA	NA	--	--
Cumulative Risk							**1.7E-04**	**6.6E-10**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	3.94E-10	2.81E-11	1.5E-05	3.3E-03	2.62E-05	9.28E-11
	CHROMIUM III	2.81E-06	8.03E-10	5.73E-11	NA	NA	--	--
	COBALT	1.70E-06	4.85E-10	3.47E-11	6.0E-06	9.0E-03	8.09E-05	3.12E-10
	THALLIUM	7.35E-08	2.10E-11	1.50E-12	NA	NA	--	--
Cumulative Risk							**1.1E-04**	**4.0E-10**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	4.12E-10	2.95E-11	1.5E-05	3.3E-03	2.75E-05	9.72E-11
	CHROMIUM III	3.56E-06	1.02E-09	7.27E-11	NA	NA	--	--
	COBALT	2.23E-06	6.38E-10	4.55E-11	6.0E-06	9.0E-03	1.06E-04	4.10E-10
	THALLIUM	7.79E-08	2.22E-11	1.59E-12	NA	NA	--	--
Cumulative Risk							**1.3E-04**	**5.1E-10**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	5.21E-10	3.72E-11	1.5E-05	3.3E-03	3.47E-05	1.23E-10
	CHROMIUM III	4.05E-06	1.16E-09	8.26E-11	NA	NA	--	--
	COBALT	1.95E-06	5.57E-10	3.98E-11	6.0E-06	9.0E-03	9.28E-05	3.58E-10
	THALLIUM	9.70E-08	2.77E-11	1.98E-12	NA	NA	--	--
Cumulative Risk							**1.3E-04**	**4.8E-10**

Table B-24. Estimates of Cancer and Noncancer Risks for Adult Visitor Scenario
RME- Inhalation of Particles from Soil

RME- Inhalation of Particles from Soil

Exposure Time = ET	2.0	hr/day
Exposure Frequency = EF	10	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	87,600	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens

CEC = Exposure Concentration - Carcinogens

HQ = Hazard Quotient, Noncarcinogens = NEC / RfD

Cancer Risk = CEC * IUR *CF

Notes:

NA - Toxicity value is not available.

RME = Reasonable Maximum Exposure

hr/day - hours per day

day/yr - days per year

yr - year

kg - kilogram

µg/mg -micrograms per milligram

mg/kg-day - milligrams per kilogram-day

mg/m^3 - milligrams per cubic meter

$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	3.45E-09	4.93E-10	1.5E-05	3.3E-03	2.30E-04	1.63E-09
	CHROMIUM III	4.61E-06	1.05E-08	1.50E-09	NA	NA	--	--
	COBALT	1.91E-06	4.37E-09	6.24E-10	6.0E-06	9.0E-03	7.28E-04	5.61E-09
	THALLIUM	5.22E-08	1.19E-10	1.70E-11	NA	NA	--	--
Cumulative Risk							**9.6E-04**	**7.2E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	3.74E-09	5.34E-10	1.50E-05	3.3E-03	2.49E-04	1.76E-09
	CHROMIUM III	4.41E-06	1.01E-08	1.44E-09	NA	NA	--	--
	COBALT	3.01E-06	6.87E-09	9.81E-10	6.00E-06	9.0E-03	1.14E-03	8.83E-09
	THALLIUM	9.80E-08	2.24E-10	3.20E-11	NA	NA	--	--
Cumulative Risk							**1.4E-03**	**1.1E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	3.15E-09	4.50E-10	1.50E-05	3.3E-03	2.10E-04	1.48E-09
	CHROMIUM III	2.81E-06	6.42E-09	9.17E-10	NA	NA	--	--
	COBALT	1.70E-06	3.88E-09	5.54E-10	6.00E-06	9.0E-03	6.47E-04	4.99E-09
	THALLIUM	7.35E-08	1.68E-10	2.40E-11	NA	NA	--	--
Cumulative Risk							**8.6E-04**	**6.5E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	3.30E-09	4.71E-10	1.50E-05	3.3E-03	2.20E-04	1.56E-09
	CHROMIUM III	3.56E-06	8.14E-09	1.16E-09	NA	NA	--	--
	COBALT	2.23E-06	5.10E-09	7.29E-10	6.00E-06	9.0E-03	8.50E-04	6.56E-09
	THALLIUM	7.79E-08	1.78E-10	2.54E-11	NA	NA	--	--
Cumulative Risk							**1.1E-03**	**8.1E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	4.16E-09	5.95E-10	1.50E-05	3.3E-03	2.78E-04	1.96E-09
	CHROMIUM III	4.05E-06	9.25E-09	1.32E-09	NA	NA	--	--
	COBALT	1.95E-06	4.46E-09	6.37E-10	6.00E-06	9.0E-03	7.43E-04	5.73E-09
	THALLIUM	9.70E-08	2.21E-10	3.16E-11	NA	NA	--	--
Cumulative Risk							**1.0E-03**	**7.7E-09**

Table B-25. Estimates of Cancer and Noncancer Risks for Young Child Visitor Scenario
CTE- Incidental Ingestion of Soil

CTE- Incidental Ingestion of Soil

Body Weight = BW	15	kg
Exposure Frequency = EF	1	days/yr
Exposure Duration = ED	2	yr
Averaging Time (Noncancer) = AT	730	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	100	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	2.76E-08	7.89E-10	3.0E-04	1.5E+00	9.21E-05	1.18E-09
	CHROMIUM III	4.61E+00	8.42E-08	2.41E-09	1.5E+00	NA	5.61E-08	--
	COBALT	1.91E+00	3.49E-08	9.98E-10	3.0E-04	NA	1.16E-04	--
	THALLIUM	5.22E-02	9.53E-10	2.72E-11	1.0E-05	NA	9.53E-05	--
Cumulative Risk							**3.0E-04**	**1.2E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	2.99E-08	8.54E-10	3.0E-04	1.5E+00	9.96E-05	1.28E-09
	CHROMIUM III	4.41E+00	8.05E-08	2.30E-09	1.5E+00	NA	5.37E-08	--
	COBALT	3.01E+00	5.49E-08	1.57E-09	3.0E-04	NA	1.83E-04	--
	THALLIUM	9.80E-02	1.79E-09	5.11E-11	1.0E-05	NA	1.79E-04	--
Cumulative Risk							**4.6E-04**	**1.3E-09**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	2.52E-08	7.20E-10	3.0E-04	1.5E+00	8.40E-05	1.08E-09
	CHROMIUM III	2.81E+00	5.14E-08	1.47E-09	1.5E+00	NA	3.42E-08	--
	COBALT	1.70E+00	3.11E-08	8.87E-10	3.0E-04	NA	1.04E-04	--
	THALLIUM	7.35E-02	1.34E-09	3.84E-11	1.0E-05	NA	1.34E-04	--
Cumulative Risk							**3.2E-04**	**1.1E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	2.64E-08	7.54E-10	3.0E-04	1.5E+00	8.80E-05	1.13E-09
	CHROMIUM III	3.56E+00	6.51E-08	1.86E-09	1.5E+00	NA	4.34E-08	--
	COBALT	2.23E+00	4.08E-08	1.17E-09	3.0E-04	NA	1.36E-04	--
	THALLIUM	7.79E-02	1.42E-09	4.07E-11	1.0E-05	NA	1.42E-04	--
Cumulative Risk							**3.7E-04**	**1.1E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	3.33E-08	9.52E-10	3.0E-04	1.5E+00	1.11E-04	1.43E-09
	CHROMIUM III	4.05E+00	7.40E-08	2.12E-09	1.5E+00	NA	4.94E-08	--
	COBALT	1.95E+00	3.57E-08	1.02E-09	3.0E-04	NA	1.19E-04	--
	THALLIUM	9.70E-02	1.77E-09	5.06E-11	1.0E-05	NA	1.77E-04	--
Cumulative Risk							**4.1E-04**	**1.4E-09**

Table B-26. Estimates of Cancer and Noncancer Risks for Child Visitor Scenario
RME- Incidental Ingestion of Soil

RME- Incidental Ingestion of Soil

Body Weight = BW	15	kg
Exposure Frequency = EF	2	days/yr
Exposure Duration = ED	6	yr
Averaging Time (Noncancer) = AT	2,190	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	200	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	1.10E-07	9.47E-09	3.0E-04	1.5E+00	3.68E-04	1.42E-08
	CHROMIUM III	4.61E+00	3.37E-07	2.89E-08	1.5E+00	NA	2.25E-07	--
	COBALT	1.91E+00	1.40E-07	1.20E-08	3.0E-04	NA	4.66E-04	--
	THALLIUM	5.22E-02	3.81E-09	3.27E-10	1.0E-05	NA	3.81E-04	--
Cumulative Risk							**1.2E-03**	**1.4E-08**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	1.20E-07	1.02E-08	3.0E-04	1.5E+00	3.98E-04	1.54E-08
	CHROMIUM III	4.41E+00	3.22E-07	2.76E-08	1.5E+00	NA	2.15E-07	--
	COBALT	3.01E+00	2.20E-07	1.88E-08	3.0E-04	NA	7.32E-04	--
	THALLIUM	9.80E-02	7.16E-09	6.14E-10	1.0E-05	NA	7.16E-04	--
Cumulative Risk							**1.8E-03**	**1.5E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	1.01E-07	8.64E-09	3.0E-04	1.5E+00	3.36E-04	1.30E-08
	CHROMIUM III	2.81E+00	2.05E-07	1.76E-08	1.5E+00	NA	1.37E-07	--
	COBALT	1.70E+00	1.24E-07	1.06E-08	3.0E-04	NA	4.14E-04	--
	THALLIUM	7.35E-02	5.37E-09	4.60E-10	1.0E-05	NA	5.37E-04	--
Cumulative Risk							**1.3E-03**	**1.3E-08**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	1.06E-07	9.05E-09	3.0E-04	1.5E+00	3.52E-04	1.36E-08
	CHROMIUM III	3.56E+00	2.60E-07	2.23E-08	1.5E+00	NA	1.74E-07	--
	COBALT	2.23E+00	1.63E-07	1.40E-08	3.0E-04	NA	5.44E-04	--
	THALLIUM	7.79E-02	5.69E-09	4.88E-10	1.0E-05	NA	5.69E-04	--
Cumulative Risk							**1.5E-03**	**1.4E-08**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	1.33E-07	1.14E-08	3.0E-04	1.5E+00	4.44E-04	1.71E-08
	CHROMIUM III	4.05E+00	2.96E-07	2.54E-08	1.5E+00	NA	1.97E-07	--
	COBALT	1.95E+00	1.43E-07	1.22E-08	3.0E-04	NA	4.75E-04	--
	THALLIUM	9.70E-02	7.09E-09	6.07E-10	1.0E-05	NA	7.09E-04	--
Cumulative Risk							**1.6E-03**	**1.7E-08**

Table B-27. Estimates of Cancer and Noncancer Risks for Young Child Visitor Scenario
CTE- Dermal Contact with Soil

CTE- Dermal Contact with Soil

Surface Area for Contact=SA	1,558	cm2/event
Adherence Factor=AF	0.20	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	15	kg
Exposure Frequency = EF	1	days/yr
Exposure Duration = ED	2	yr
Averaging Time (Noncancer) = AT	730	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	2.58E-09	7.38E-11	3.00E-04	1.50E+00	8.61E-06	1.11E-10
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**8.6E-06**	**1.1E-10**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	2.79E-09	7.98E-11	3.0E-04	1.5E+00	9.31E-06	1.20E-10
	CHROMIUM III	4.41E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**9.3E-06**	**1.2E-10**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	2.35E-09	6.73E-11	3.0E-04	1.5E+00	7.85E-06	1.01E-10
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**7.8E-06**	**1.0E-10**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	2.47E-09	7.05E-11	3.0E-04	1.5E+00	8.22E-06	1.06E-10
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**8.2E-06**	**1.1E-10**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	3.11E-09	8.90E-11	3.0E-04	1.5E+00	1.04E-05	1.33E-10
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**1.0E-05**	**1.3E-10**

Table B-28. Estimates of Cancer and Noncancer Risks for Young Child Visitor Scenario
RME- Dermal Contact with Soil

RME- Dermal Contact with Soil

Surface Area for Contact=SA	2,208	cm2/event
Adherence Factor=AF	0.20	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	15	kg
Exposure Frequency = EF	2	days/yr
Exposure Duration = ED	6	yr
Averaging Time (Noncancer) = AT	2,190	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	7.32E-09	6.27E-10	3.00E-04	1.50E+00	2.44E-05	9.41E-10
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**2.4E-05**	**9.4E-10**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	7.92E-09	6.79E-10	3.00E-04	1.50E+00	2.64E-05	1.02E-09
	CHROMIUM III	4.41E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**2.6E-05**	**1.0E-09**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	6.67E-09	5.72E-10	3.0E-04	1.5E+00	2.22E-05	8.58E-10
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**2.2E-05**	**8.6E-10**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	6.99E-09	5.99E-10	3.0E-04	1.5E+00	2.33E-05	8.99E-10
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**2.3E-05**	**9.0E-10**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	8.83E-09	7.57E-10	3.0E-04	1.5E+00	2.94E-05	1.13E-09
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**2.9E-05**	**1.1E-09**

Table B-29. Estimates of Cancer and Noncancer Risks for Young Child Visitor Scenario
CTE- Inhalation of Particles from Soil

CTE- Inhalation of Particles from Soil

Exposure Time = ET	0.5	hr/day
Exposure Frequency = EF	1	days/yr
Exposure Duration = ED	2	yr
Averaging Time (Noncancer) = AT	17,520	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens

CEC = Exposure Concentration - Carcinogens

HQ = Hazard Quotient, Noncarcinogens = NEC / RfD

Cancer Risk = CEC * IUR *CF

Notes:

NA - Toxicity value is not available.

CTE = Central Tendency Exposure

hr/day - hours per day

day/yr - days per year

yr - year

kg - kilogram

µg/mg -micrograms per milligram

mg/kg-day - milligrams per kilogram-day

mg/m^3 - milligrams per cubic meter

$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) Factor $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	8.63E-11	2.47E-12	1.5E-05	3.3E-03	5.75E-06	8.14E-12
	CHROMIUM III	4.61E-06	2.63E-10	7.52E-12	NA	NA	--	--
	COBALT	1.91E-06	1.09E-10	3.12E-12	6.0E-06	9.0E-03	1.82E-05	2.81E-11
	THALLIUM	5.22E-08	2.98E-12	8.51E-14	NA	NA	--	--
Cumulative Risk							**2.4E-05**	**3.6E-11**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	9.34E-11	2.67E-12	1.5E-05	3.3E-03	6.23E-06	8.80E-12
	CHROMIUM III	4.41E-06	2.52E-10	7.19E-12	NA	NA	--	--
	COBALT	3.01E-06	1.72E-10	4.90E-12	6.0E-06	9.0E-03	2.86E-05	4.41E-11
	THALLIUM	9.80E-08	5.59E-12	1.60E-13	NA	NA	--	--
Cumulative Risk							**3.5E-05**	**5.3E-11**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	7.87E-11	2.25E-12	1.5E-05	3.3E-03	5.25E-06	7.42E-12
	CHROMIUM III	2.81E-06	1.61E-10	4.59E-12	NA	NA	--	--
	COBALT	1.70E-06	9.70E-11	2.77E-12	6.0E-06	9.0E-03	1.62E-05	2.50E-11
	THALLIUM	7.35E-08	4.20E-12	1.20E-13	NA	NA	--	--
Cumulative Risk							**2.1E-05**	**3.2E-11**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	8.25E-11	2.36E-12	1.5E-05	3.3E-03	5.50E-06	7.78E-12
	CHROMIUM III	3.56E-06	2.03E-10	5.81E-12	NA	NA	--	--
	COBALT	2.23E-06	1.28E-10	3.64E-12	6.0E-06	9.0E-03	2.13E-05	3.28E-11
	THALLIUM	7.79E-08	4.45E-12	1.27E-13	NA	NA	--	--
Cumulative Risk							**2.7E-05**	**4.1E-11**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	1.04E-10	2.97E-12	1.5E-05	3.3E-03	6.94E-06	9.82E-12
	CHROMIUM III	4.05E-06	2.31E-10	6.61E-12	NA	NA	--	--
	COBALT	1.95E-06	1.11E-10	3.18E-12	6.0E-06	9.0E-03	1.86E-05	2.86E-11
	THALLIUM	9.70E-08	5.54E-12	1.58E-13	NA	NA	--	--
Cumulative Risk							**2.6E-05**	**3.8E-11**

Table B-30. Estimates of Cancer and Noncancer Risks for Young Child Visitor Scenario
RME- Inhalation of Particles from Soil

RME- Inhalation of Particles from Soil

Exposure Time = ET	2.0	hr/day
Exposure Frequency = EF	2	days/yr
Exposure Duration = ED	6	yr
Averaging Time (Noncancer) = AT	52,560	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens

CEC = Exposure Concentration - Carcinogens

HQ = Hazard Quotient, Noncarcinogens = NEC / RfD

Cancer Risk = CEC * IUR *CF

Notes:

NA - Toxicity value is not available.

RME = Reasonable Maximum Exposure

hr/day - hours per day

day/yr - days per year

yr - year

kg - kilogram

µg/mg -micrograms per milligram

mg/kg-day - milligrams per kilogram-day

mg/m^3 - milligrams per cubic meter

$(\mu g/m^3)^{-1}$ -per microgram per cubic meter

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	6.90E-10	5.92E-11	1.5E-05	3.3E-03	4.60E-05	1.95E-10
	CHROMIUM III	4.61E-06	2.11E-09	1.80E-10	NA	NA	--	--
	COBALT	1.91E-06	8.73E-10	7.48E-11	6.0E-06	9.0E-03	1.46E-04	6.74E-10
	THALLIUM	5.22E-08	2.38E-11	2.04E-12	NA	NA	--	--
Cumulative Risk							**1.9E-04**	**8.7E-10**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	7.47E-10	6.40E-11	1.50E-05	3.3E-03	4.98E-05	2.11E-10
	CHROMIUM III	4.41E-06	2.01E-09	1.73E-10	NA	NA	--	--
	COBALT	3.01E-06	1.37E-09	1.18E-10	6.00E-06	9.0E-03	2.29E-04	1.06E-09
	THALLIUM	9.80E-08	4.47E-11	3.84E-12	NA	NA	--	--
Cumulative Risk							**2.8E-04**	**1.3E-09**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	6.30E-10	5.40E-11	1.50E-05	3.3E-03	4.20E-05	1.78E-10
	CHROMIUM III	2.81E-06	1.28E-09	1.10E-10	NA	NA	--	--
	COBALT	1.70E-06	7.76E-10	6.65E-11	6.00E-06	9.0E-03	1.29E-04	5.99E-10
	THALLIUM	7.35E-08	3.36E-11	2.88E-12	NA	NA	--	--
Cumulative Risk							**1.7E-04**	**7.8E-10**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	6.60E-10	5.66E-11	1.50E-05	3.3E-03	4.40E-05	1.87E-10
	CHROMIUM III	3.56E-06	1.63E-09	1.39E-10	NA	NA	--	--
	COBALT	2.23E-06	1.02E-09	8.74E-11	6.00E-06	9.0E-03	1.70E-04	7.87E-10
	THALLIUM	7.79E-08	3.56E-11	3.05E-12	NA	NA	--	--
Cumulative Risk							**2.1E-04**	**9.7E-10**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	8.33E-10	7.14E-11	1.50E-05	3.3E-03	5.55E-05	2.36E-10
	CHROMIUM III	4.05E-06	1.85E-09	1.59E-10	NA	NA	--	--
	COBALT	1.95E-06	8.91E-10	7.64E-11	6.00E-06	9.0E-03	1.49E-04	6.88E-10
	THALLIUM	9.70E-08	4.43E-11	3.80E-12	NA	NA	--	--
Cumulative Risk							**2.0E-04**	**9.2E-10**

Table B-31. Estimates of Cancer and Noncancer Risks for Older Child Visitor Scenario
CTE- Incidental Ingestion of Soil

CTE- Incidental Ingestion of Soil

Body Weight = BW	44	kg
Exposure Frequency = EF	5	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	1,825	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	50	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	2.35E-08	1.68E-09	3.0E-04	1.5E+00	7.85E-05	2.52E-09
	CHROMIUM III	4.61E+00	7.18E-08	5.13E-09	1.5E+00	NA	4.78E-08	--
	COBALT	1.91E+00	2.98E-08	2.13E-09	3.0E-04	NA	9.92E-05	--
	THALLIUM	5.22E-02	8.13E-10	5.80E-11	1.0E-05	NA	8.13E-05	--
Cumulative Risk							**2.6E-04**	**2.5E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	2.55E-08	1.82E-09	3.0E-04	1.5E+00	8.49E-05	2.73E-09
	CHROMIUM III	4.41E+00	6.86E-08	4.90E-09	1.5E+00	NA	4.58E-08	--
	COBALT	3.01E+00	4.68E-08	3.34E-09	3.0E-04	NA	1.56E-04	--
	THALLIUM	9.80E-02	1.53E-09	1.09E-10	1.0E-05	NA	1.53E-04	--
Cumulative Risk							**3.9E-04**	**2.7E-09**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	2.15E-08	1.53E-09	3.0E-04	1.5E+00	7.16E-05	2.30E-09
	CHROMIUM III	2.81E+00	4.38E-08	3.13E-09	1.5E+00	NA	2.92E-08	--
	COBALT	1.70E+00	2.65E-08	1.89E-09	3.0E-04	NA	8.82E-05	--
	THALLIUM	7.35E-02	1.14E-09	8.17E-11	1.0E-05	NA	1.14E-04	--
Cumulative Risk							**2.7E-04**	**2.3E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	2.25E-08	1.61E-09	3.0E-04	1.5E+00	7.50E-05	2.41E-09
	CHROMIUM III	3.56E+00	5.55E-08	3.96E-09	1.5E+00	NA	3.70E-08	--
	COBALT	2.23E+00	3.48E-08	2.48E-09	3.0E-04	NA	1.16E-04	--
	THALLIUM	7.79E-02	1.21E-09	8.66E-11	1.0E-05	NA	1.21E-04	--
Cumulative Risk							**3.1E-04**	**2.4E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	2.84E-08	2.03E-09	3.0E-04	1.5E+00	9.46E-05	3.04E-09
	CHROMIUM III	4.05E+00	6.31E-08	4.51E-09	1.5E+00	NA	4.21E-08	--
	COBALT	1.95E+00	3.04E-08	2.17E-09	3.0E-04	NA	1.01E-04	--
	THALLIUM	9.70E-02	1.51E-09	1.08E-10	1.0E-05	NA	1.51E-04	--
Cumulative Risk							**3.5E-04**	**3.0E-09**

Table B-32. Estimates of Cancer and Noncancer Risks for Older Child Visitor Scenario
RME- Incidental Ingestion of Soil

RME- Incidental Ingestion of Soil

Body Weight = BW	44	kg
Exposure Frequency = EF	10	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	3,650	dy
Averaging Time (Cancer) = AT	25,550	dy
Ingestion Rate = IR	100	mg/day
Conversion Factor = CF	1.E-06	kg/mg

Intake (mg/kg-day) = Conc * IR * EF * ED *CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Chemical of Potential Concern		EPC (mg/kg)	NCADD (mg/kg-day)	CADD (mg/kg-day)	Chronic Oral RfD (mg/kg-day)	Oral SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E+00	9.41E-08	1.34E-08	3.0E-04	1.5E+00	3.14E-04	2.02E-08
	CHROMIUM III	4.61E+00	2.87E-07	4.10E-08	1.5E+00	NA	1.91E-07	--
	COBALT	1.91E+00	1.19E-07	1.70E-08	3.0E-04	NA	3.97E-04	--
	THALLIUM	5.22E-02	3.25E-09	4.64E-10	1.0E-05	NA	3.25E-04	--
Cumulative Risk							**1.0E-03**	**2.0E-08**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E+00	1.02E-07	1.46E-08	3.0E-04	1.5E+00	3.40E-04	2.18E-08
	CHROMIUM III	4.41E+00	2.75E-07	3.92E-08	1.5E+00	NA	1.83E-07	--
	COBALT	3.01E+00	1.87E-07	2.67E-08	3.0E-04	NA	6.24E-04	--
	THALLIUM	9.80E-02	6.10E-09	8.72E-10	1.0E-05	NA	6.10E-04	--
Cumulative Risk							**1.6E-03**	**2.2E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E+00	8.59E-08	1.23E-08	3.0E-04	1.5E+00	2.86E-04	1.84E-08
	CHROMIUM III	2.81E+00	1.75E-07	2.50E-08	1.5E+00	NA	1.17E-07	--
	COBALT	1.70E+00	1.06E-07	1.51E-08	3.0E-04	NA	3.53E-04	--
	THALLIUM	7.35E-02	4.58E-09	6.54E-10	1.0E-05	NA	4.58E-04	--
Cumulative Risk							**1.1E-03**	**1.8E-08**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E+00	9.00E-08	1.29E-08	3.0E-04	1.5E+00	3.00E-04	1.93E-08
	CHROMIUM III	3.56E+00	2.22E-07	3.17E-08	1.5E+00	NA	1.48E-07	--
	COBALT	2.23E+00	1.39E-07	1.99E-08	3.0E-04	NA	4.64E-04	--
	THALLIUM	7.79E-02	4.85E-09	6.93E-10	1.0E-05	NA	4.85E-04	--
Cumulative Risk							**1.2E-03**	**1.9E-08**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E+00	1.14E-07	1.62E-08	3.0E-04	1.5E+00	3.79E-04	2.43E-08
	CHROMIUM III	4.05E+00	2.52E-07	3.61E-08	1.5E+00	NA	1.68E-07	--
	COBALT	1.95E+00	1.22E-07	1.74E-08	3.0E-04	NA	4.05E-04	--
	THALLIUM	9.70E-02	6.04E-09	8.63E-10	1.0E-05	NA	6.04E-04	--
Cumulative Risk							**1.4E-03**	**2.4E-08**

Table B-33. Estimates of Cancer and Noncancer Risks for Older Child Visitor Scenario
CTE- Dermal Contact with Soil

CTE- Dermal Contact with Soil

Surface Area for Contact=SA	2,479	cm2/event
Adherence Factor=AF	0.07	mg/cm2 good
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	44	kg
Exposure Frequency = EF	5	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	1,825	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
CTE = Central Tendency Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	2.45E-09	1.75E-10	3.00E-04	1.50E+00	8.17E-06	2.63E-10
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**8.2E-06**	**2.6E-10**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	2.65E-09	1.89E-10	3.0E-04	1.5E+00	8.84E-06	2.84E-10
	CHROMIUM III	4.41E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**8.8E-06**	**2.8E-10**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	2.24E-09	1.60E-10	3.0E-04	1.5E+00	7.45E-06	2.39E-10
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**7.5E-06**	**2.4E-10**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	2.34E-09	1.67E-10	3.0E-04	1.5E+00	7.81E-06	2.51E-10
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**7.8E-06**	**2.5E-10**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	2.96E-09	2.11E-10	3.0E-04	1.5E+00	9.85E-06	3.17E-10
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**9.9E-06**	**3.2E-10**

Table B-34. Estimates of Cancer and Noncancer Risks for Older Child Visitor Scenario
RME- Dermal Contact with Soil

RME- Dermal Contact with Soil

Surface Area for Contact=SA	4,849	cm2/event
Adherence Factor=AF	0.07	mg/cm2
Dermal Absorption Fraction=ABS_d	chemical-specific	
Body Weight = BW	44	kg
Exposure Frequency = EF	10	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	3,650	dy
Averaging Time (Cancer) = AT	25,550	dy
Conversion Factor = CF	1.E-06	kg/mg

Notes:
NA - Toxicity value is not available.
RME = Reasonable Maximum Exposure
yr - year
kg - kilograms
kg/mg - kilograms per milligrams
mg/kg-day - milligrams per kilogram-day
$(mg/kg\text{-}day)^{-1}$ - per milligrams per kilogram-day
mg/kg - milligrams per kilogram

Intake (mg/kg-day) = Conc * SA * AF * ABS_d * EF * ED * CF / (BW * AT)

NCADD = Average Daily Dose - Noncarcinogens
CADD = Average Daily Dose - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NCADD/ RfD
Risk = Cancer Risk = CADD * SF

Chemical of Potential Concern		EPC (mg/kg)	ABS_d	NCADD (mg/kg-day)	CADD (mg/kg-day)	Dermal RfD (mg/kg-day)	Dermal SF $(mg/kg\text{-}day)^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)									
Metals	ARSENIC	1.51E+00	3.00E-02	9.59E-09	1.37E-09	3.00E-04	1.50E+00	3.20E-05	2.05E-09
	CHROMIUM III	4.61E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	1.91E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	5.22E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**3.2E-05**	**2.1E-09**
Decision Unit 2 (DU2)									
Metals	ARSENIC	1.64E+00	3.00E-02	1.04E-08	1.48E-09	3.00E-04	1.50E+00	3.46E-05	2.22E-09
	CHROMIUM III	4.41E+00	NA	--	--	1.95E-02	NA	--	--
	COBALT	3.01E+00	NA	--	--	3.00E-04	NA	--	--
	THALLIUM	9.80E-02	NA	--	--	1.00E-05	NA	--	--
Cumulative Risk								**3.5E-05**	**2.2E-09**
Decision Unit 3 (DU3)									
Metals	ARSENIC	1.38E+00	3.00E-02	8.74E-09	1.25E-09	3.0E-04	1.5E+00	2.91E-05	1.87E-09
	CHROMIUM III	2.81E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.70E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.35E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**2.9E-05**	**1.9E-09**
Decision Units 1-3 (DU1-3) On-Site									
Metals	ARSENIC	1.45E+00	3.00E-02	9.16E-09	1.31E-09	3.0E-04	1.5E+00	3.05E-05	1.96E-09
	CHROMIUM III	3.56E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	2.23E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	7.79E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**3.1E-05**	**2.0E-09**
Decision Unit 4 (DU4) Background									
Metals	ARSENIC	1.82E+00	3.00E-02	1.16E-08	1.65E-09	3.0E-04	1.5E+00	3.86E-05	2.48E-09
	CHROMIUM III	4.05E+00	NA	--	--	2.0E-02	NA	--	--
	COBALT	1.95E+00	NA	--	--	3.0E-04	NA	--	--
	THALLIUM	9.70E-02	NA	--	--	1.0E-05	NA	--	--
Cumulative Risk								**3.9E-05**	**2.5E-09**

Table B-35. Estimates of Cancer and Noncancer Risks for Older Child Visitor Scenario
CTE- Inhalation of Particles from Soil

CTE- Inhalation of Particles from Soil

Exposure Time = ET	0.5	hr/day
Exposure Frequency = EF	5	days/yr
Exposure Duration = ED	5	yr
Averaging Time (Noncancer) = AT	43,800	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens
CEC = Exposure Concentration - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NEC / RfD
Cancer Risk = CEC * IUR *CF

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) Factor (µg/m^3)$^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	4.32E-10	3.08E-11	1.5E-05	3.3E-03	2.88E-05	1.02E-10
	CHROMIUM III	4.61E-06	1.32E-09	9.40E-11	NA	NA	--	--
	COBALT	1.91E-06	5.46E-10	3.90E-11	6.0E-06	9.0E-03	9.09E-05	3.51E-10
	THALLIUM	5.22E-08	1.49E-11	1.06E-12	NA	NA	--	--
Cumulative Risk							**1.2E-04**	**4.5E-10**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	4.67E-10	3.33E-11	1.5E-05	3.3E-03	3.11E-05	1.10E-10
	CHROMIUM III	4.41E-06	1.26E-09	8.99E-11	NA	NA	--	--
	COBALT	3.01E-06	8.58E-10	6.13E-11	6.0E-06	9.0E-03	1.43E-04	5.52E-10
	THALLIUM	9.80E-08	2.80E-11	2.00E-12	NA	NA	--	--
Cumulative Risk							**1.7E-04**	**6.6E-10**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	3.94E-10	2.81E-11	1.5E-05	3.3E-03	2.62E-05	9.28E-11
	CHROMIUM III	2.81E-06	8.03E-10	5.73E-11	NA	NA	--	--
	COBALT	1.70E-06	4.85E-10	3.47E-11	6.0E-06	9.0E-03	8.09E-05	3.12E-10
	THALLIUM	7.35E-08	2.10E-11	1.50E-12	NA	NA	--	--
Cumulative Risk							**1.1E-04**	**4.0E-10**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	4.12E-10	2.95E-11	1.5E-05	3.3E-03	2.75E-05	9.72E-11
	CHROMIUM III	3.56E-06	1.02E-09	7.27E-11	NA	NA	--	--
	COBALT	2.23E-06	6.38E-10	4.55E-11	6.0E-06	9.0E-03	1.06E-04	4.10E-10
	THALLIUM	7.79E-08	2.22E-11	1.59E-12	NA	NA	--	--
Cumulative Risk							**1.3E-04**	**5.1E-10**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	5.21E-10	3.72E-11	1.5E-05	3.3E-03	3.47E-05	1.23E-10
	CHROMIUM III	4.05E-06	1.16E-09	8.26E-11	NA	NA	--	--
	COBALT	1.95E-06	5.57E-10	3.98E-11	6.0E-06	9.0E-03	9.28E-05	3.58E-10
	THALLIUM	9.70E-08	2.77E-11	1.98E-12	NA	NA	--	--
Cumulative Risk							**1.3E-04**	**4.8E-10**

Table B-36. Estimates of Cancer and Noncancer Risks for Older Child Visitor Scenario
RME- Inhalation of Particles from Soil

RME- Inhalation of Particles from Soil

Exposure Time = ET	2.0	hr/day
Exposure Frequency = EF	10	days/yr
Exposure Duration = ED	10	yr
Averaging Time (Noncancer) = AT	87,600	hrs
Averaging Time (Cancer) = AT	613,200	hrs
Conversion Factor = CF	1,000	µg/mg

EC = Exposure concentration (mg/m^3) = EPC * ET * EF * ED / AT

NEC = Exposure Concentration - Noncarcinogens
CEC = Exposure Concentration - Carcinogens
HQ = Hazard Quotient, Noncarcinogens = NEC / RfD
Cancer Risk = CEC * IUR *CF

Chemical of Potential Concern		EPC (mg/m^3)	NEC (mg/m^3)	CEC (mg/m^3)	Inhalation RfC (mg/m^3)	Inhalation Unit Risk (IUR) (µg/m^3)$^{-1}$	HQ	Cancer Risk
Decision Unit 1 (DU1)								
Metals	ARSENIC	1.51E-06	3.45E-09	4.93E-10	1.5E-05	3.3E-03	2.30E-04	1.63E-09
	CHROMIUM III	4.61E-06	1.05E-08	1.50E-09	NA	NA	--	--
	COBALT	1.91E-06	4.37E-09	6.24E-10	6.0E-06	9.0E-03	7.28E-04	5.61E-09
	THALLIUM	5.22E-08	1.19E-10	1.70E-11	NA	NA	--	--
Cumulative Risk							**9.6E-04**	**7.2E-09**
Decision Unit 2 (DU2)								
Metals	ARSENIC	1.64E-06	3.74E-09	5.34E-10	1.50E-05	3.3E-03	2.49E-04	1.76E-09
	CHROMIUM III	4.41E-06	1.01E-08	1.44E-09	NA	NA	--	--
	COBALT	3.01E-06	6.87E-09	9.81E-10	6.00E-06	9.0E-03	1.14E-03	8.83E-09
	THALLIUM	9.80E-08	2.24E-10	3.20E-11	NA	NA	--	--
Cumulative Risk							**1.4E-03**	**1.1E-08**
Decision Unit 3 (DU3)								
Metals	ARSENIC	1.38E-06	3.15E-09	4.50E-10	1.50E-05	3.3E-03	2.10E-04	1.48E-09
	CHROMIUM III	2.81E-06	6.42E-09	9.17E-10	NA	NA	--	--
	COBALT	1.70E-06	3.88E-09	5.54E-10	6.00E-06	9.0E-03	6.47E-04	4.99E-09
	THALLIUM	7.35E-08	1.68E-10	2.40E-11	NA	NA	--	--
Cumulative Risk							**8.6E-04**	**6.5E-09**
Decision Units 1-3 (DU1-3) On-Site								
Metals	ARSENIC	1.45E-06	3.30E-09	4.71E-10	1.50E-05	3.3E-03	2.20E-04	1.56E-09
	CHROMIUM III	3.56E-06	8.14E-09	1.16E-09	NA	NA	--	--
	COBALT	2.23E-06	5.10E-09	7.29E-10	6.00E-06	9.0E-03	8.50E-04	6.56E-09
	THALLIUM	7.79E-08	1.78E-10	2.54E-11	NA	NA	--	--
Cumulative Risk							**1.1E-03**	**8.1E-09**
Decision Unit 4 (DU4) Background								
Metals	ARSENIC	1.82E-06	4.16E-09	5.95E-10	1.50E-05	3.3E-03	2.78E-04	1.96E-09
	CHROMIUM III	4.05E-06	9.25E-09	1.32E-09	NA	NA	--	--
	COBALT	1.95E-06	4.46E-09	6.37E-10	6.00E-06	9.0E-03	7.43E-04	5.73E-09
	THALLIUM	9.70E-08	2.21E-10	3.16E-11	NA	NA	--	--
Cumulative Risk							**1.0E-03**	**7.7E-09**

Attachment C – Selection of Chemicals of Potential Ecological Concern

Table C-1. COPEC Selection - Surface Soil

Preliminary COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	SLERA COPEC ESV Plants/Inverts (mg/kg)	SLERA COPEC ESV Birds/Mammals (mg/kg)	Max/ESV Plants/Inverts	Max/ESV Birds/Mammals	Plants/Inverts COPEC	Birds/Mammals COPEC
Decision Unit 1								
Metals								
Antimony	7440-36-0	1.6	5	0.248	0.3	**6**	--	Antimony
Arsenic	7440-38-2	1.4	6.8	0.25	0.2	**6**	--	Arsenic
Barium	7440-39-3	24.3	110	17.2	0.2	1	--	--
Cadmium	7440-43-9	0.18	4	0.27	0.05	0.7	--	--
Chromium, total	7440-47-3	3.7	0.34	28	**11**	0.1	Chromium, total	--
Cobalt	7440-48-4	1.8	13	96	0.1	0.02	--	--
Copper	7440-50-8	33.3	50	15	0.7	**2**	--	Copper
Lead	7439-92-1	19.1	50	0.94	0.4	**20**	--	Lead
Molybdenum	7439-98-7	10.8	2	0.52	**5**	**21**	Molybdenum	Molybdenum
Nickel	7440-02-0	23.3	30	9.7	0.8	**2**	--	Nickel
Silver	7440-22-4	0.11	2	2.6	0.06	0.04	--	--
Thallium	7440-28-0	0.047	0.05	0.027	0.9	**2**	--	Thallium
Vanadium	7440-62-2	17.8	2	0.714	**9**	**25**	Vanadium	Vanadium
Zinc	7440-66-6	50.2	6.62	12	**8**	**4**	Zinc	Zinc
Metals								
Mercury	7439-97-6	0.02	0.05	0.013	0.42	**2**	--	Mercury
PAHs / PCP								
Pentachlorophenol	87-86-5	0.17	3	0.36	0.06	0.47	--	--
Dioxins/Furan								
TEQ	1746-01-6	3.1E-07	5	2.90E-07	6.3E-08	1	--	--
Decision Unit 2								
Metals								
Antimony	7440-36-0	1.0	5	0.248	0.2	**4**	--	Antimony
Arsenic	7440-38-2	1.3	6.8	0.25	0.2	**5**	--	Arsenic
Barium	7440-39-3	26.1	110	17.2	0.2	**2**	--	Barium
Cadmium	7440-43-9	0.2	4	0.27	0.04	0.6	--	--
Chromium, total	7440-47-3	3.5	0.34	28	**10**	0.1	Chromium, total	--
Cobalt	7440-48-4	2.5	13	96	0.2	0.03	--	--
Copper	7440-50-8	32.2	50	15	0.6	**2**	--	Copper
Lead	7439-92-1	23.0	50	0.94	0.5	**24**	--	Lead
Molybdenum	7439-98-7	15.9	2	0.52	**8**	**31**	Molybdenum	Molybdenum
Nickel	7440-02-0	14.2	30	9.7	0.5	1	--	--
Silver	7440-22-4	0.1	2	2.6	0.06	0.05	--	--
Thallium	7440-28-0	0.1	0.05	0.027	**2**	**3**	Thallium	Thallium
Vanadium	7440-62-2	19.0	2	0.714	**10**	**27**	Vanadium	Vanadium
Zinc	7440-66-6	58.3	6.62	12	**9**	**5**	Zinc	Zinc
Metals								
Mercury	7439-97-6	0.021	0.05	0.013	0.4	**2**	--	Mercury
PAHs / PCP								
Pentachlorophenol	87-86-5	0.54	3	0.36	0.2	**2**	--	Pentachlorophenol
Dioxins/Furan								
TEQ	1746-01-6	1.4E-08	5	2.90E-07	3.E-09	0.05	--	--
Decision Unit 3								
Metals								
Antimony	7440-36-0	0.34	5	0.248	0.07	1	--	--
Arsenic	7440-38-2	1.30	6.8	0.25	0.2	**5**	--	Arsenic
Barium	7440-39-3	18.9	110	17.2	0.2	1	--	--
Cadmium	7440-43-9	0.06	4	0.27	0.02	0.2	--	--
Chromium, total	7440-47-3	2.70	0.34	28	**8**	0.1	Chromium, total	--
Cobalt	7440-48-4	1.70	13	96	0.1	0.02	--	--
Copper	7440-50-8	18.1	50	15	0.4	1	--	--
Lead	7439-92-1	5.40	50	0.94	0.1	**6**	--	Lead
Molybdenum	7439-98-7	25.40	2	0.52	**13**	**49**	Molybdenum	Molybdenum
Nickel	7440-02-0	10.5	30	9.7	0.4	1	--	--
Silver	7440-22-4	0.08	2	2.6	0.04	0.03	--	--
Thallium	7440-28-0	0.07	0.05	0.027	1	**2**	--	Thallium
Vanadium	7440-62-2	20.9	2	0.714	**10**	**29**	Vanadium	Vanadium
Zinc	7440-66-6	27.7	6.62	12	**4**	**2**	Zinc	Zinc
Metals								
Mercury	7439-97-6	0.02	0.05	0.013	0.4	**2**	--	Mercury

Table C-1. COPEC Selection - Surface Soil

Preliminary COPEC	CASRN	Maximum Surface Soil Conc. (mg/kg)	SLERA COPEC ESV Plants/Inverts (mg/kg)	SLERA COPEC ESV Birds/Mammals (mg/kg)	Max/ESV Plants/Inverts	Max/ESV Birds/Mammals	Plants/Inverts COPEC	Birds/Mammals COPEC
PAHs / PCP								
Pentachlorophenol	87-86-5	0.34	3	0.36	0.1	0.9	--	--
Dioxins/Furan								
TEQ	1746-01-6	3.3E-09	5	2.90E-07	6.6E-10	0.01	--	--
Decision Unit 4								
Metals								
Antimony	7440-36-0	0.07	5	0.248	0.01	0.3	--	--
Arsenic	7440-38-2	1.6	6.8	0.25	0.2	**6**	--	Arsenic
Barium	7440-39-3	18	110	17.2	0.2	1	--	--
Cadmium	7440-43-9	0.038	4	0.27	0.01	0.1	--	--
Chromium, total	7440-47-3	3.4	0.34	28	**10**	0.1	Chromium, total	--
Cobalt	7440-48-4	1.8	13	96	0.1	0.02	--	--
Copper	7440-50-8	8.6	50	15	0.2	0.6	--	--
Lead	7439-92-1	5.3	50	0.94	0.1	**6**	--	Lead
Molybdenum	7439-98-7	1.4	2	0.52	0.7	**3**	--	Molybdenum
Nickel	7440-02-0	12.3	30	9.7	0.4	1	--	--
Silver	7440-22-4	0.039	2	2.6	0.02	0.02	--	--
Thallium	7440-28-0	0.083	0.05	0.027	**2**	**3**	Thallium	Thallium
Vanadium	7440-62-2	19	2	0.714	**10**	**27**	Vanadium	Vanadium
Zinc	7440-66-6	21.3	6.62	12	**3**	**2**	Zinc	Zinc
Metals								
Mercury	7439-97-6	0.02	0.05	0.013	0.4	1.5	--	Mercury
PAHs / PCP								
Pentachlorophenol	87-86-5	0.16	3	0.36	0.05	0.4	--	--
Dioxins/Furan								
TEQ	1746-01-6	1.0E-09	5	2.90E-07	2.E-10	0.004	--	--

Notes:

COPEC Selection ESVs from NPS 2018; except molybdenum and dioxin TEQ are from LANL (2017)

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

PAHs/PCP = polycyclic aromatic hydrocarbons/pentachlorophenol

SLERA = Screening level ecological risk assessment

TEQ = toxicity equivalency quotient

Table C-2. COPEC Selection - Subsurface Soil

Preliminary COPEC	CASRN	Maximum Subsurface Soil Conc. (mg/kg)	SLERA COPEC ESV Plants/Inverts (mg/kg)	SLERA COPEC ESV Birds/Mammals (mg/kg)	Max/ESV Plants/Inverts	Max/ESV Birds/Mammals	Plants/Inverts COPEC	Birds/Mammals COPEC
Decision Unit 1								
Metals								
Antimony	7440-36-0	1.8	5	0.248	0.4	**7**	--	Antimony
Arsenic	7440-38-2	2.1	6.8	0.25	0.3	**8**	--	Arsenic
Barium	7440-39-3	21.1	110	17.2	0.2	1	--	--
Cadmium	7440-43-9	0.17	4	0.27	0.04	0.6	--	--
Chromium, total	7440-47-3	4.7	0.34	28	**14**	0.2	Chromium, total	--
Cobalt	7440-48-4	2.0	13	96	0.2	0.02	--	--
Copper	7440-50-8	56.8	50	15	1	**4**	--	Copper
Lead	7439-92-1	29.4	50	0.94	0.6	**31**	--	Lead
Molybdenum	7439-98-7	13.9	2	0.52	**7**	**27**	Molybdenum	Molybdenum
Nickel	7440-02-0	4.1	30	9.7	0.1	0.4	--	--
Silver	7440-22-4	0.11	2	2.6	0.06	0.04	--	--
Thallium	7440-28-0	0.07	0.05	0.027	1	**3**	--	Thallium
Vanadium	7440-62-2	20.9	2	0.714	**10**	**29**	Vanadium	Vanadium
Zinc	7440-66-6	56.2	6.62	12	**8**	**5**	Zinc	Zinc
Metals								
Mercury	7439-97-6	0.02	0.05	0.013	0.4	**2**	--	Mercury
PAHs / PCP								
Pentachlorophenol	87-86-5	0.17	3	0.36	0.06	0.5	--	--
Dioxins/Furan								
TEQ	1746-01-6	1.4E-07	5	2.90E-07	3.E-08	0.5	--	--

Notes:

COPEC Selection ESVs from NPS 2018; except molybdenum and dioxin TEQ are from LANL (2017)

CASRN = Chemical Abstracts Service Registry Number

COPEC = chemical of potential ecological concern

ESV = ecological screening value

mg/kg = millgrams per kilogram

PAHs/PCP = polycyclic aromatic hydrocarbons/pentachlorophenol

SLERA = Screening level ecological risk assessment

TEQ = toxicity equivalency quotient

Attachment D – Risk Calculations for Ecological Receptors

Attachment D

Table D-1. Dose and Risk Calculations - Herbivorous Bird

COPEC	C_{soil} (mg/kg)	C_p (mg/kg dw)	C_e (mg/kg dw)	C_m (mg/kg dw)	Soil Dose (mg/kg-d)	Plant Dose (mg/kg-d)	Earthworm Dose (mg/kg-d)	Small Mammal Dose (mg/kg-d)	Total Dose (mg/kg-d)	NOAEL TRV (mg/kg-d)	LOAEL TRV (mg/kg-d)	Threshold TRV (mg/kg-d)	NOAEL-Based HQ	LOAEL-Based HQ	Threshold-Based HQ
Decision Unit 1															
Metals															
Mercury	0.022	0.05	0.298	0.001	2.03E-04	6.31E-03	0.00E+00	0.00E+00	6.52E-03	0.02	0.19	0.06	0.3	0.03	0.1
Vanadium	20.0	0.15	0.84	0.25	1.86E-01	2.06E-02	0.00E+00	0.00E+00	2.07E-01	0.34	0.69	0.49	0.6	0.3	0.4
Decision Unit 2															
Metals															
Lead	38.5	2.05	15.30	5.42	3.58E-01	2.81E-01	0.00E+00	0.00E+00	6.40E-01	4.40	9.80	6.57	0.1	0.1	0.1
Mercury	0.022	0.05	0.298	0.001	2.03E-04	6.31E-03	0.00E+00	0.00E+00	6.52E-03	0.02	0.19	0.06	0.3	0.03	0.1
Vanadium	25.0	0.19	1.05	0.31	2.32E-01	2.56E-02	0.00E+00	0.00E+00	2.58E-01	0.34	0.69	0.49	0.7	0.4	0.5
Decision Unit 3															
Metals															
Mercury	0.02	0.04	0.289	0.001	1.86E-04	6.02E-03	0.00E+00	0.00E+00	6.21E-03	0.02	0.19	0.06	0.3	0.03	0.1
Molybdenum	32.8	1.04	31.25	1.56	3.05E-01	1.43E-01	0.00E+00	0.00E+00	4.48E-01	3.5	35.0	11.07	0.13	0.01	0.04
Vanadium	23.5	0.18	0.99	0.29	2.18E-01	2.41E-02	0.00E+00	0.00E+00	2.42E-01	0.34	0.69	0.49	0.7	0.4	0.5
Decision Units 1-3															
Metals															
Lead	21.5	1.48	9.57	4.19	2.00E-01	2.03E-01	0.00E+00	0.00E+00	4.03E-01	4.40	9.80	6.57	0.1	0.04	0.1
Mercury	0.021	0.05	0.294	0.001	1.94E-04	6.17E-03	0.00E+00	0.00E+00	6.36E-03	0.02	0.19	0.06	0.3	0.03	0.1
Molybdenum	23.1	0.75	21.98	1.10	2.14E-01	1.03E-01	0.00E+00	0.00E+00	3.17E-01	3.5	35.0	11.07	0.09	0.01	0.03
Vanadium	20.8	0.16	0.87	0.26	1.94E-01	2.14E-02	0.00E+00	0.00E+00	2.15E-01	0.34	0.69	0.49	0.6	0.3	0.4
Decision Unit 4															
Metals															
Lead	6.0	0.73	3.43	2.39	5.61E-02	9.95E-02	0.00E+00	0.00E+00	1.56E-01	4.40	9.80	6.57	0.04	0.02	0.02
Mercury	0.02	0.04	0.289	0.001	1.86E-04	6.02E-03	0.00E+00	0.00E+00	6.21E-03	0.02	0.19	0.06	0.3	0.03	0.1
Molybdenum	1.7	0.06	1.62	0.08	1.58E-02	8.90E-03	0.00E+00	0.00E+00	2.47E-02	3.5	35.0	11.07	0.01	0.001	0.002
Vanadium	21.3	0.16	0.89	0.26	1.98E-01	2.18E-02	0.00E+00	0.00E+00	2.19E-01	0.34	0.69	0.49	0.6	0.3	0.5

Notes:

kg dw - kilograms dry weight

kg ww - kilograms wet weight

kg bw - kilograms body weight (wet weight basis)

mg/kg bw-d - milligrams chemical per kilogram body weight per day

C_s - soil concentration

C_p - plant concentration

C_e - earthworm concentration

C_m = small mammal concentration

NOAEL - no observed adverse effect level

LOAEL - lowest observed adverse effect level

TRV - toxicity reference value

Threshold TRV = Geometric Mean of NOAEL and LOAEL TRVs

HQ - hazard quotient

Soil Dose $= SIR * C_s * AUF$

Plant Dose $= IRp * C_p * AUF$

Invertebrate Dose $= IR_i * C_e * AUF$

Small Mammal Dose $= IR_m * C_m * AUF$

Attachment D

Table D-2. Dose and Risk Calculations - Insectivorous Bird

COPEC	C_{soil} (mg/kg)	C_p (mg/kg dw)	C_e (mg/kg dw)	C_m (mg/kg dw)	Soil Dose (mg/kg-d)	Plant Dose (mg/kg-d)	Earthworm Dose (mg/kg-d)	Small Mammal Dose (mg/kg-d)	Total Dose (mg/kg-d)	NOAEL TRV (mg/kg-d)	LOAEL TRV (mg/kg-d)	Threshold TRV (mg/kg-d)	NOAEL-Based HQ	LOAEL-Based HQ	Threshold-Based HQ
Decision Unit 1															
<u>Metals</u>															
Mercury	0.022	0.05	0.298	0.001	2.32E-04	0.00E+00	4.23E-02	0.00E+00	4.25E-02	0.02	0.19	0.06	2	0.2	0.7
Vanadium	20.0	0.15	0.84	0.25	2.13E-01	0.00E+00	1.20E-01	0.00E+00	3.33E-01	0.34	0.69	0.49	1	0.5	0.7
Decision Unit 2															
<u>Metals</u>															
Lead	38.5	2.05	15.30	5.42	4.10E-01	0.00E+00	2.17E+00	0.00E+00	2.58E+00	4.40	9.80	6.57	1	0.3	0.4
Mercury	0.022	0.05	0.298	0.001	2.32E-04	0.00E+00	4.23E-02	0.00E+00	4.25E-02	0.02	0.19	0.06	2	0.2	0.7
Vanadium	25.0	0.19	1.05	0.31	2.66E-01	0.00E+00	1.49E-01	0.00E+00	4.15E-01	0.34	0.69	0.49	1	0.6	0.9
Decision Unit 3															
<u>Metals</u>															
Mercury	0.02	0.04	0.289	0.001	2.13E-04	0.00E+00	4.11E-02	0.00E+00	4.13E-02	0.02	0.19	0.06	2	0.2	0.7
Molybdenum	32.8	1.04	31.25	1.56	3.49E-01	0.00E+00	4.44E+00	0.00E+00	4.79E+00	3.5	35.0	11.07	1	0.14	0.4
Vanadium	23.5	0.18	0.99	0.29	2.50E-01	0.00E+00	1.40E-01	0.00E+00	3.90E-01	0.34	0.69	0.49	1	0.6	0.8
Decision Units 1-3															
<u>Metals</u>															
Lead	21.5	1.48	9.57	4.19	2.29E-01	0.00E+00	1.36E+00	0.00E+00	1.59E+00	4.40	9.80	6.57	0.4	0.2	0.2
Mercury	0.021	0.05	0.294	0.001	2.23E-04	0.00E+00	4.17E-02	0.00E+00	4.19E-02	0.02	0.19	0.06	2	0.2	0.7
Molybdenum	23.1	0.75	21.98	1.10	2.46E-01	0.00E+00	3.12E+00	0.00E+00	3.37E+00	3.5	35.0	11.07	0.96	0.10	0.30
Vanadium	20.8	0.16	0.87	0.26	2.22E-01	0.00E+00	1.24E-01	0.00E+00	3.46E-01	0.34	0.69	0.49	1	0.5	0.7
Decision Unit 4															
<u>Metals</u>															
Lead	6.0	0.73	3.43	2.39	6.43E-02	0.00E+00	4.87E-01	0.00E+00	5.51E-01	4.40	9.80	6.57	0.1	0.1	0.1
Mercury	0.02	0.04	0.289	0.001	2.13E-04	0.00E+00	4.11E-02	0.00E+00	4.13E-02	0.02	0.19	0.06	2	0.2	0.7
Molybdenum	1.7	0.06	1.62	0.08	1.81E-02	0.00E+00	2.30E-01	0.00E+00	2.49E-01	3.5	35.0	11.07	0.07	0.01	0.02
Vanadium	21.3	0.16	0.89	0.26	2.26E-01	0.00E+00	1.27E-01	0.00E+00	3.53E-01	0.34	0.69	0.49	1	0.5	0.7

Notes:

kg dw - kilograms dry weight
kg ww - kilograms wet weight
kg bw - kilograms body weight (wet weight basis)
mg/kg bw-d - milligrams chemical per kilogram body weight per day
C_s - soil concentration
C_p - plant concentration
C_e - earthworm concentration
C_m = small mammal concentration
NOAEL - no observed adverse effect level
LOAEL - lowest observed adverse effect level
TRV - toxicity reference value
Threshold TRV = Geometric Mean of NOAEL and LOAEL TRVs
HQ - hazard quotient

Soil Dose = SIR * C_s * AUF
Plant Dose = IRp * C_p * AUF
Invertebrate Dose = IR_i * C_e * AUF
Small Mammal Dose = IR_m * C_m * AUF

Attachment D

Table D-3. Dose and Risk Calculations - Carnivorous Bird

COPEC	C_{soil} (mg/kg)	C_p (mg/kg dw)	C_e (mg/kg dw)	C_m (mg/kg dw)	Soil Dose (mg/kg-d)	Plant Dose (mg/kg-d)	Earthworm Dose (mg/kg-d)	Small Mammal Dose (mg/kg-d)	Total Dose (mg/kg-d)	NOAEL TRV (mg/kg-d)	LOAEL TRV (mg/kg-d)	Threshold TRV (mg/kg-d)	NOAEL-Based HQ	LOAEL-Based HQ	Threshold-Based HQ
Decision Unit 1															
Metals															
Mercury	0.022	0.05	0.298	0.001	1.48E-05	0.00E+00	0.00E+00	3.08E-05	4.56E-05	0.02	0.19	0.06	0.002	0.0002	0.0008
Vanadium	20.0	0.15	0.84	0.25	1.36E-02	0.00E+00	0.00E+00	6.41E-03	2.00E-02	0.34	0.69	0.49	0.06	0.03	0.04
Decision Unit 2															
Metals															
Lead	38.5	2.05	15.30	5.42	2.62E-02	0.00E+00	0.00E+00	1.41E-01	1.67E-01	4.4	9.8	6.57	0.04	0.02	0.03
Mercury	0.022	0.05	0.298	0.001	1.48E-05	0.00E+00	0.00E+00	3.08E-05	4.56E-05	0.02	0.19	0.06	0.002	0.0002	0.0008
Vanadium	25.0	0.19	1.05	0.31	1.70E-02	0.00E+00	0.00E+00	7.98E-03	2.50E-02	0.34	0.69	0.49	0.07	0.04	0.05
Decision Unit 3															
Metals															
Mercury	0.02	0.04	0.289	0.001	1.36E-05	0.00E+00	0.00E+00	2.82E-05	4.18E-05	0.02	0.19	0.06	0.002	0.0002	0.0007
Molybdenum	32.8	1.04	31.25	1.56	2.23E-02	0.00E+00	0.00E+00	4.06E-02	6.29E-02	3.5	35.0	11.07	0.02	0.00	0.01
Vanadium	23.5	0.18	0.99	0.29	1.60E-02	0.00E+00	0.00E+00	7.51E-03	2.35E-02	0.34	0.69	0.49	0.07	0.03	0.05
Decision Units 1-3															
Metals															
Lead	21.5	1.48	9.57	4.19	1.46E-02	0.00E+00	0.00E+00	1.09E-01	1.24E-01	4.4	9.8	6.57	0.03	0.01	0.02
Mercury	0.021	0.05	0.294	0.001	1.42E-05	0.00E+00	0.00E+00	2.95E-05	4.37E-05	0.02	0.19	0.06	0.002	0.0002	0.0007
Molybdenum	23.1	0.75	21.98	1.10	1.57E-02	0.00E+00	0.00E+00	2.86E-02	4.42E-02	3.5	35.0	11.07	0.01	0.001	0.004
Vanadium	20.8	0.16	0.87	0.26	1.42E-02	0.00E+00	0.00E+00	6.66E-03	2.08E-02	0.34	0.69	0.49	0.06	0.03	0.04
Decision Unit 4															
Metals															
Lead	6.0	0.73	3.43	2.39	4.10E-03	0.00E+00	0.00E+00	6.21E-02	6.62E-02	4.4	9.8	6.57	0.02	0.01	0.01
Mercury	0.02	0.04	0.289	0.001	1.36E-05	0.00E+00	0.00E+00	2.82E-05	4.18E-05	0.02	0.19	0.06	0.0022	0.0002	0.0007
Molybdenum	1.7	0.06	1.62	0.08	1.16E-03	0.00E+00	0.00E+00	2.11E-03	3.27E-03	3.5	35.0	11.07	0.001	0.0001	0.0003
Vanadium	21.3	0.16	0.89	0.26	1.45E-02	0.00E+00	0.00E+00	6.80E-03	2.12E-02	0.34	0.69	0.49	0.06	0.03	0.04

kg dw - kilograms dry weight

kg ww - kilograms wet weight

kg bw - kilograms body weight (wet weight basis)

Notes:

mg/kg bw-d - milligrams chemical per kilogram body weight per day

C_s - soil concentration

C_p - plant concentration

C_e - earthworm concentration

C_m = small mammal concentration

NOAEL - no observed adverse effect level

LOAEL - lowest observed adverse effect level

TRV - toxicity reference value

Threshold TRV = Geometric Mean of NOAEL and LOAEL TRVs

HQ - hazard quotient

Soil Dose = SIR * C_s * AUF

Plant Dose = IRp * C_p * AUF

Invertebrate Dose = IR_i * C_e * AUF

Small Mammal Dose = IR_m * C_m * AUF

Attachment D

Table D-4. Dose and Risk Calculations - Herbivorous Mammal

COPEC	C_{soil} (mg/kg)	C_p (mg/kg dw)	C_e (mg/kg dw)	C_m (mg/kg dw)	Soil Dose (mg/kg-d)	Plant Dose (mg/kg-d)	Earthworm Dose (mg/kg-d)	Mammal Dose (mg/kg-d)	Total Dose (mg/kg-d)	NOAEL TRV (mg/kg-d)	LOAEL TRV (mg/kg-d)	Threshold TRV (mg/kg-d)	NOAEL-Based HQ	LOAEL-Based HQ	Threshold-Based HQ
Decision Unit 1															
<u>Metals</u>															
Antimony	2.44	0.09	2.44	0.12	2.44E-03	6.92E-03	0.00E+00	0.00E+00	9.36E-03	0.059	0.590	0.187	0.2	0.02	0.05
Molybdenum	12.3	0.42	11.73	0.59	1.23E-02	3.16E-02	0.00E+00	0.00E+00	4.39E-02	0.24	2.40	0.76	0.2	0.02	0.06
Decision Unit 2															
<u>Metals</u>															
Antimony	1.7	0.06	1.68	0.08	1.68E-03	4.87E-03	0.00E+00	0.00E+00	6.55E-03	0.059	0.590	0.187	0.1	0.01	0.04
Molybdenum	24.0	0.78	22.89	1.14	2.40E-02	5.91E-02	0.00E+00	0.00E+00	8.31E-02	0.24	2.40	0.76	0.3	0.03	0.1
Decision Unit 3															
<u>Metals</u>															
Antimony	0.54	0.02	0.54	0.03	5.43E-04	1.69E-03	0.00E+00	0.00E+00	2.23E-03	0.059	0.590	0.187	0.04	0.004	0.01
Molybdenum	32.8	1.04	31.25	1.56	3.28E-02	7.92E-02	0.00E+00	0.00E+00	1.12E-01	0.24	2.40	0.76	0.5	0.05	0.1
Decision Units 1-3															
<u>Metals</u>															
Antimony	1.2	0.05	1.24	0.06	1.24E-03	3.67E-03	0.00E+00	0.00E+00	4.91E-03	0.059	0.590	0.187	0.08	0.01	0.03
Molybdenum	23.1	0.75	21.98	1.10	2.31E-02	5.69E-02	0.00E+00	0.00E+00	8.00E-02	0.24	2.40	0.76	0.3	0.03	0.1
Decision Unit 4															
<u>Metals</u>															
Antimony	0.07	0.003	0.07	0.004	7.00E-05	2.47E-04	0.00E+00	0.00E+00	3.17E-04	0.059	0.590	0.187	0.01	0.001	0.002
Molybdenum	1.7	0.06	1.62	0.08	1.70E-03	4.94E-03	0.00E+00	0.00E+00	6.64E-03	0.24	2.40	0.76	0.03	0.003	0.01

Notes:

kg dw - kilograms dry weight
kg ww - kilograms wet weight
kg bw - kilograms body weight (wet weight basis)
mg/kg bw-d - milligrams chemical per kilogram body weight per day
C_s - soil concentration
C_p - plant concentration
C_e - earthworm concentration
C_m = small mammal concentration
NOAEL - no observed adverse effect level
LOAEL - lowest observed adverse effect level
TRV - toxicity reference value
Threshold TRV = Geometric Mean of NOAEL and LOAEL TRVs
HQ - hazard quotient

Soil Dose = SIR * C_s * AUF
Plant Dose = IRp * C_p * AUF
Invertebrate Dose = IR_i * C_e * AUF
Small Mammal Dose = IR_m * C_m * AUF

Attachment D

Table D-5. Dose and Risk Calculations - Insectivorous Mammal

Analyte	C_{soil} (mg/kg)	C_p (mg/kg dw)	C_e (mg/kg dw)	C_m (mg/kg dw)	Soil Dose (mg/kg-d)	Plant Dose (mg/kg-d)	Earthworm Dose (mg/kg-d)	Mammal Dose (mg/kg-d)	Total Dose (mg/kg-d)	NOAEL TRV (mg/kg-d)	LOAEL TRV (mg/kg-d)	Threshold TRV (mg/kg-d)	NOAEL-Based HQ	LOAEL-Based HQ	Threshold-Based HQ
Decision Unit 1															
Metals															
Antimony	2.44	0.09	2.44	0.12	4.39E-03	0.00E+00	4.07E-01	0.00E+00	4.12E-01	0.059	0.590	0.187	**7**	0.7	**2**
Molybdenum	12.3	0.42	11.73	0.59	2.22E-02	0.00E+00	1.96E+00	0.00E+00	1.98E+00	0.24	2.40	0.76	**8**	0.8	**3**
Decision Unit 2															
Metals															
Antimony	1.7	0.06	1.68	0.08	3.02E-03	0.00E+00	2.80E-01	0.00E+00	2.83E-01	0.059	0.590	0.187	**5**	0.5	**2**
Molybdenum	24.0	0.78	22.89	1.14	4.32E-02	0.00E+00	3.82E+00	0.00E+00	3.87E+00	0.24	2.40	0.76	**16**	**2**	**5**
Decision Unit 3															
Metals															
Antimony	0.54	0.02	0.54	0.03	9.77E-04	0.00E+00	9.07E-02	0.00E+00	9.17E-02	0.059	0.590	0.187	**2**	0.2	0.5
Molybdenum	32.8	1.04	31.25	1.56	5.90E-02	0.00E+00	5.22E+00	0.00E+00	5.28E+00	0.24	2.40	0.76	**22**	**2**	**7**
Decision Units 1-3															
Metals															
Antimony	1.2	0.05	1.24	0.06	2.23E-03	0.00E+00	2.07E-01	0.00E+00	2.09E-01	0.059	0.590	0.187	**4**	0.4	1
Molybdenum	23.1	0.75	21.98	1.10	4.15E-02	0.00E+00	3.67E+00	0.00E+00	3.71E+00	0.24	2.40	0.76	**15**	**2**	**5**
Decision Unit 4															
Metals															
Antimony	0.1	0.00	0.07	0.00	1.26E-04	0.00E+00	1.17E-02	0.00E+00	1.18E-02	0.059	0.590	0.187	0.2	0.02	0.06
Molybdenum	1.7	0.06	1.62	0.08	3.07E-03	0.00E+00	2.71E-01	0.00E+00	2.74E-01	0.24	2.40	0.76	1	0.1	0.4

Notes:

kg dw - kilograms dry weight

kg ww - kilograms wet weight

kg bw - kilograms body weight (wet weight basis)

mg/kg bw-d - milligrams chemical per kilogram body weight per day

C_s - soil concentration

C_p - plant concentration

C_e - earthworm concentration

C_m = small mammal concentration

NOAEL - no observed adverse effect level

LOAEL - lowest observed adverse effect level

TRV - toxicity reference value

Threshold TRV = Geometric Mean of NOAEL and LOAEL TRVs

HQ - hazard quotient

Soil Dose $= SIR * C_s * AUF$

Plant Dose $= IRp * C_p * AUF$

Invertebrate Dose $= IR_i * C_e * AUF$

Small Mammal Dose $= IR_m * C_m * AUF$

Attachment D

Table D-6. Dose and Risk Calculations - Insectivorous Mammal, Subsurface Soil

COPEC	C_{soil} (mg/kg)	C_p (mg/kg dw)	C_e (mg/kg dw)	C_m (mg/kg dw)	Soil Dose (mg/kg-d)	Plant Dose (mg/kg-d)	Earthworm Dose (mg/kg-d)	Mammal Dose (mg/kg-d)	Total Dose (mg/kg-d)	NOAEL TRV (mg/kg-d)	LOAEL TRV (mg/kg-d)	Threshold TRV (mg/kg-d)	NOAEL-Based HQ	LOAEL-Based HQ	Threshold-Based HQ
Decision Unit 1															
Metals															
Antimony	2.8	0.10	2.78	0.14	5.01E-03	0.00E+00	4.65E-01	0.00E+00	4.70E-01	0.059	0.590	0.187	**8**	0.8	**3**
Molybdenum	17.5	0.58	16.72	0.84	3.16E-02	0.00E+00	2.79E+00	0.00E+00	2.82E+00	0.24	2.40	0.76	**12**	1	**4**

Notes:

kg dw - kilograms dry weight

kg ww - kilograms wet weight

kg bw - kilograms body weight (wet weight basis)

mg/kg bw-d - milligrams chemical per kilogram body weight per day

C_s - soil concentration

C_p - plant concentration

C_e - earthworm concentration

C_m = small mammal concentration

NOAEL - no observed adverse effect level

LOAEL - lowest observed adverse effect level

TRV - toxicity reference value

Threshold TRV = Geometric Mean of NOAEL and LOAEL TRVs

HQ - hazard quotient

Soil Dose $= SIR * C_s * AUF$

Plant Dose $= IRp * C_p * AUF$

Invertebrate Dose $= IR_i * C_e * AUF$

Small Mammal Dose $= IR_m * C_m * AUF$

Attachment D

Table D-7. Dose and Risk Calculations - Carnivorous Mammal

COPEC	C_{soil} (mg/kg)	C_p (mg/kg dw)	C_e (mg/kg dw)	C_m (mg/kg dw)	Soil Dose (mg/kg-d)	Plant Dose (mg/kg-d)	Earthworm Dose (mg/kg-d)	Mammal Dose (mg/kg-d)	Total Dose (mg/kg-d)	NOAEL TRV (mg/kg-d)	LOAEL TRV (mg/kg-d)	Threshold TRV (mg/kg-d)	NOAEL-Based HQ	LOAEL-Based HQ	Threshold-Based HQ
Decision Unit 1															
Metals															
Antimony	2.44	0.09	2.44	0.12	2.68E-03	0.00E+00	0.00E+00	8.66E-03	1.13E-02	0.059	0.590	0.187	0.2	0.02	0.06
Molybdenum	12.3	0.42	11.73	0.59	1.35E-02	0.00E+00	0.00E+00	4.16E-02	5.52E-02	0.24	2.40	0.76	0.2	0.02	0.07
Decision Unit 2															
Metals															
Antimony	1.7	0.06	1.68	0.08	1.84E-03	0.00E+00	0.00E+00	5.95E-03	7.80E-03	0.059	0.590	0.187	0.1	0.01	0.04
Molybdenum	24.0	0.78	22.89	1.14	2.64E-02	0.00E+00	0.00E+00	8.13E-02	1.08E-01	0.24	2.40	0.76	0.4	0.04	0.1
Decision Unit 3															
Metals															
Antimony	0.54	0.02	0.54	0.03	5.97E-04	0.00E+00	0.00E+00	1.93E-03	2.52E-03	0.059	0.590	0.187	0.04	0.004	0.01
Molybdenum	32.8	1.04	31.25	1.56	3.61E-02	0.00E+00	0.00E+00	1.11E-01	1.47E-01	0.24	2.40	0.76	0.6	0.06	0.2
Decision Units 1-3															
Metals															
Antimony	1.2	0.05	1.24	0.06	1.37E-03	0.00E+00	0.00E+00	4.41E-03	5.77E-03	0.059	0.590	0.187	0.1	0.01	0.03
Molybdenum	23.1	0.75	21.98	1.10	2.54E-02	0.00E+00	0.00E+00	7.80E-02	1.03E-01	0.24	2.40	0.76	0.4	0.04	0.1
Decision Unit 4															
Metals															
Antimony	0.1	0.00	0.07	0.00	7.70E-05	0.00E+00	0.00E+00	2.49E-04	3.26E-04	0.059	0.590	0.187	0.01	0.001	0.002
Molybdenum	1.7	0.06	1.62	0.08	1.87E-03	0.00E+00	0.00E+00	5.76E-03	7.63E-03	0.24	2.40	0.76	0.03	0.003	0.01

Notes:

kg dw - kilograms dry weight

kg ww - kilograms wet weight

kg bw - kilograms body weight (wet weight basis)

mg/kg bw-d - milligrams chemical per kilogram body weight per day

C_s - soil concentration

C_p - plant concentration

C_e - earthworm concentration

C_m = small mammal concentration

NOAEL - no observed adverse effect level

LOAEL - lowest observed adverse effect level

TRV - toxicity reference value

Threshold TRV = Geometric Mean of NOAEL and LOAEL TRVs

HQ - hazard quotient

Soil Dose $= SIR * C_s * AUF$

Plant Dose $= IRp * C_p * AUF$

Invertebrate Dose $= IR_i * C_e * AUF$

Small Mammal Dose $= IR_m * C_m * AUF$

Appendix D – Previous Report

DRAFT FINAL REPORT

FOCUSED SITE INSPECTION
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

SACRAMENTO TERC II
USACE CONTRACT NO. DACW05-96-D-0011
CTO NO. 08 - WAD NO. 02

Document Control Number : ACE08-199-H

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LIST OF ACRONYMS AND ABBREVIATIONS

AUF	Area Use Factor
BAF/BCF	Bioaccumulation/Bioconcentration Factor
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPEC	Constituent of Potential Ecological Concern
DDD	4,4'-Dichlorodiphenyldichloroethane
DDE	4,4'-Dichlorodiphenyldichloroethylene
DDT	4,4'-Dichlorodiphenyltrichloroethane
DTSC	[California Environmental Protection Agency] Department of Toxic Substances Control
EPC	Exposure Point Concentration
ESV	Ecological Screening Values
IT	IT Corporation
LOAEL	Lowest Observable Adverse Effects Level
MADEP	Massachusetts Department of Environmental Protection
µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NOAEL	No Observable Adverse Effects Level
NPS	National Park Service
PA/SI	Preliminary Assessment/Site Inspection
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
pg/g	picograms per gram
PQL	Practical Quantitation Limit
PRG	[USEPA] Preliminary Remediation Goal
QC	Quality Control
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RWQCB	Regional Water Quality Control Board
SVOC	Semivolatile Organic Compounds
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEF	Toxicity Equivalency Factor
TEQ	Toxic Equivalency
TERC	Total Environmental Restoration Contract
TPH-d/mo	Total Petroleum Hydrocarbons as diesel/motor oil
UCL	Upper Confidence Limit
USACE	U.S. Army Corps of Engineers, Sacramento District
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds
WAA	Waste Accumulation Area

EXECUTIVE SUMMARY

In August 2001, IT Corporation (IT) conducted a focused site inspection of the Vogelsang waste accumulation area (WAA) in the Cathedral Range south of Tuolumne Meadows in Yosemite National Park, California. The WAA is located adjacent to the Vogelsang High Sierra Camp and comprises a surface area of approximately 19,500 square feet. The National Park Service (NPS) estimates that the WAA served as a dump site for the High Sierra Camp from the early 1930s to the late 1960s or early 1970s. Debris observed at the site consisted of domestic waste including crushed, rusted metal cans and metal household objects; broken glass; and broken china.

For this inspection, four test pits were located approximately 50 feet from one-another within the boundary of the WAA. Three test pits were also located approximately 120 feet up-slope of the WAA site for up-slope background sample collection, and three test pits were located down slope of the WAA for down-slope sample collection. Soil samples were collected and analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH) as diesel and motor oil, pesticides, polychlorinated biphenyls (PCBs), metals, and hexavalent chromium. In addition, selected samples were analyzed for dioxins and furans.

Of 12 metals detected in test pit samples, six (cadmium, copper, lead, molybdenum, nickel, and zinc) had one or more detections that exceeded their Yosemite upper tolerance limit UTL background statistics. Of these, cadmium concentrations were found to be significantly different (greater) than the background Yosemite data set, and also greater than the human health residential preliminary residential goals (PRG), but less than the industrial PRG.

Several organic compounds exceeded their site-specific background values; however, all VOC, SVOC, PAH, pesticide, and PCB results were below their respective human health PRGs. All diesel and most motor oil detections exceeded the site-specific background values; however, all were less than screening criteria.

Based on the information presented in the screening level ecological risk assessment, localized populations of Montane or Trowbridge Shrew may be adversely impacted by soil concentrations of cadmium, molybdenum, and 2,3,7,8-TCDD toxic equivalency (TEQ) and localized populations of American Robin may be adversely impacted by soil concentrations of cadmium, lead, molybdenum, and 2,3,7,8-TCDD TEQ in WAA soils if these constituents of potential ecological concerns (COPECs) are bioaccumulating in earthworms and are subsequently being consumed by shrews and robins feeding exclusively in this area. However, this conclusion is based on conservative assumptions and actual conditions probably reduce the estimated impact to wildlife receptors.

Assessment of the nature and extent of chemical detections in soil samples from the Vogelsang WAA indicate that no further action is required at this site for human health concerns, assuming residential use of the site does not occur. The estimated effects on wildlife receptors are based on conservative assumptions; actual conditions probably reduce the estimated impact.

1.0 INTRODUCTION

In August 2001, IT Corporation (IT) conducted a focused site inspection of the Vogelsang waste accumulation area (WAA) located in the Cathedral Range south of Tuolumne Meadows, Yosemite National Park, California. The WAA is located adjacent to the Vogelsang High Sierra Camp. This investigation was conducted to determine the nature and extent of chemicals in the soil as a result of waste accumulation from the High Sierra Camp from the early 1930s to the late 1960s or early 1970s. Previous soil sampling was conducted by the National Park Service (NPS) at the Vogelsang WAA in 1998. Laboratory analysis of these samples indicated the presence of polychlorinated biphenyls (PCBs), minor hydrocarbon compounds within the motor oil range, and metals.

The present work was performed for the NPS under the Total Environmental Restoration Contract (TERC) II, Contract Number DACW05-96-D-0011, Contract Task Order Number 8, Work Authorization Directive Number 2, for the U.S. Army Corps of Engineers (USACE), Sacramento District. The field investigation consisted of visual observation of waste type, the collection of soil samples from test pits hand-excavated at the site, and shipment of the samples to an analytical laboratory.

1.1 PROJECT OBJECTIVES AND SCOPE OF WORK

The primary objectives of the Vogelsang WAA investigation were to:

- Determine the lateral and vertical extent of debris within the WAA;
- Make visual observations of the types of waste present; and
- Obtain initial samples from subsurface soil within the WAA for laboratory analysis.

IT performed this focused site inspection to determine the nature and extent of the waste and to evaluate whether certain chemicals may be present in soil at the Vogelsang WAA. The analytical sample results are used in this report to evaluate whether the Vogelsang WAA may contain hazardous substances, pollutants, or contaminants that require further investigation or remediation pursuant to NPS responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), or other federal, state, and local requirements.

The scope of this project required hand-excavation of test pits to observe waste distribution within the Vogelsang WAA. The scope of work included the following tasks:

- Preparation of the Work Plan/Sampling and Analysis Plan;
- Procurement of field personnel and supplies;
- Hand excavation of test pits;
- Logging soil types and trash debris in test pit sidewalls;
- Collection and analysis of soil samples from test pits within the WAA;
- Backfilling the test pits with excavated soils;
- Restoration of the WAA surface and access routes as needed; and
- Preparation of this report.

NPS archeologists observed the excavation and backfilling of the test pits by IT site personnel, and catalogued items found during test pit excavation. The IT site geologist described the soil observed in each test pit and IT sampling personnel collected the samples and shipped them to the laboratory for analysis.

1.2 PROJECT GUIDANCE

This investigation was conducted in accordance with the *Work Plan & Sampling and Analysis Plan for Focused Site Inspection/Initial RCRA Facility Investigation of Vogelsang, Baseline, and Mather Waste Accumulation Areas, Yosemite National Park, California* (Plan) (IT, 2001). The Plan presented the objectives, methods, and procedures for the implementation of the initial site subsurface inspection activities. Specific tasks were performed as directed in the standard operating procedures (SOPs) presented in the Plan.

1.3 REPORT OBJECTIVES

This report presents the investigation methods and results. It also presents conclusions and recommendations based on the investigation results. Specifically, the objectives of this report are to:

- Present site background information including historical data provided by NPS;
- Document the investigation field procedures and methods;
- Present the investigation data and evaluate the quality and completeness of the data;
- Delineate the nature and extent of chemicals detected in soil samples in this investigation;
- Use the background information in a preliminary assessment of the Vogelsang WAA as a potential hazardous waste site; and
- Evaluate the risks posed to human health and the environment by site-related chemicals.

This report presents an assessment of the site data obtained by this investigation.

1.4 REPORT ORGANIZATION

Section 2.0 of this report describes the site's physical characteristics and presents the known history of waste accumulation activities. Section 3.0 describes field activities and observations during this investigation. Section 4.0 presents analytical data, summarizes the detections, and provides the comparison to risk-based screening criteria for soil. Section 5.0 presents the screening level ecological risk assessment. Section 6.0 presents conclusions and recommendations. References are listed in Section 7.0.

The U.S. Environmental Protection Agency (USEPA) Potential Hazardous Waste Site Preliminary Assessment Form is contained in Appendix A to this report. Test pit logs are contained in Appendix B. The laboratory analytical reports and completed chain-of-custody forms are presented in Appendix C. Appendices D and E present the background evaluations (Appendix D - Background Assessment Using Upper Tolerance Limit Approach and Appendix E - Refined Background Assessment Using Mann Whitney U Test Approach). Appendix F presents the derivation of site-specific risk-based ecological preliminary remediation goals (PRGs).

2.0 SITE DESCRIPTION

Figure 2-1 shows the location of Vogelsang WAA in Yosemite National Park, California. This section describes the site and its history. Information presented in this section is included in the USEPA Potential Hazardous Waste Site Preliminary Assessment Form (Appendix A).

2.1 PHYSICAL SETTING

The Vogelsang WAA is located in the Cathedral Range south of Tuolumne Meadows at an elevation of approximately 10,100 feet above mean sea level. The site is located within a sparsely vegetated subalpine pine forest and is accessed from Tuolumne Meadows via a 7.5-mile horse and hiking trail along Rafferty Creek (Figure 2-1). The WAA is located adjacent to the Vogelsang High Sierra Camp approximately 200 feet southwest of the tent cabins.

2.2 GEOLOGY AND HYDROLOGY

The Vogelsang WAA is located within the Sierra Nevada granitic batholith. The native soil at the site consists mostly of sand and silt with minor clay and gravel. The soil materials are primarily granitic in origin with lesser amounts derived from local metamorphic rocks. The depth to bedrock within the main portion of the WAA varied between 2.5 and 3.5 feet below ground surface (bgs).

No evidence of surface drainage or ponding was observed on the Vogelsang WAA during this focused site inspection. The nearest down-slope surface water occurrence is Fletcher Creek, approximately 350 feet southwest of the WAA. Fletcher Creek flows southwest into the Merced River drainage.

No groundwater monitoring wells exist within or near the boundary of the WAA, and groundwater was not encountered in any of the test pits that were excavated; therefore, depth to groundwater is unknown at the site. The nearest drinking water well is located at the Tuolumne Meadows Ranger Station, 7.5 miles north of Vogelsang in the Tuolumne River drainage system. The nearest drinking water wells in the Merced River drainage are at Yosemite Lodge, approximately 16 miles from the WAA.

2.3 SITE HISTORY

The Vogelsang High Sierra Camp, which consists of several tent cabins, a kitchen and dining tent, and stable facilities, was established in the 1930s as a refuge for backpackers and hikers. The NPS estimates that the Vogelsang WAA served as a dump site for household debris from the High Sierra Camp until the late 1960s or early 1970s.

2.4 PREVIOUS INVESTIGATION

No site-specific hydrologic investigations have been conducted at the Vogelsang WAA. The NPS conducted a field investigation of soils at the Vogelsang WAA in August 1998 (*Yosemite National Park Landfill Inventory Report Form,* NPS, 1998). Soil core samples from depths of two feet or less at four locations were combined into one composite soil sample that was analyzed for extractable petroleum hydrocarbons, volatile organic compounds (VOCs), organochlorine pesticides, PCBs, and metals. The results are shown in Table 2-1. All detections were less than PRGs except arsenic, which exceeded its residential soil PRG but was less than its industrial soil PRG. The laboratory indicated the detection of motor oil range hydrocarbons contained "additional compounds uncharacteristic of common fuels and lubricants."

3.0 SITE INSPECTION

The following sections describe the sampling objectives, field activities, and quality assurance activities involved in the August 2001 site inspection.

3.1 INSPECTION OBJECTIVES

The site inspection was intended to

- Assess the lateral and vertical extent of waste debris;
- Determine if chemicals are present in subsurface soils at the site; and
- Evaluate potential health risks posed by site-related chemicals.

The objectives were developed through application of the data quality objectives process. The data quality objectives are presented in the Plan.

3.2 INSPECTION ACTIVITIES

IT personnel hand-excavated four test pits within the main debris area at the Vogelsang WAA at locations agreed upon at the site by representatives of the NPS, IT, and the Department of Toxic Substance Control (DTSC). When each of the test pit excavations was completed, the IT sampling crew then collected soil samples from the test pit sidewalls. Following completion of the sample collection activities, and with permission of the on-site NPS archeologists, IT personnel backfilled the test pits. Three additional test pits were hand-excavated up-slope of the WAA for background sample collection, and three test pits were excavated down-slope of the WAA for down-slope sample collection.

3.2.1 Pre-Inspection Activities

Due to the isolated wilderness location of the Vogelsang WAA, a utility clearance was not required or conducted at the site.

3.2.2 Site Access and Restoration

All site personnel hiked to the site via the Rafferty Creek trail, and supplies were carried in by mules. No heavy equipment or mechanized tools were used at the Vogelsang site. Upon completion of the site inspection, the surface was restored to its original grade and condition, and all samples, supplies, and trash were packed out on mules.

3.2.3 Sample Location Selection

Four test pits were located within the boundary of the Vogelsang WAA, approximately 50 feet apart. The three up-slope background test pits were located approximately 120 to 140 feet northeast of the WAA boundary. Three additional test pits were located down-slope of the WAA and adjacent to the WAA boundary. All test pit locations are shown on Figure 2-2.

3.2.4 Excavation and Backfilling of Test Pits

The test pits at the Vogelsang WAA were hand-excavated by IT personnel using hand tools. Debris items were catalogued as they were removed from the excavations by archeologists from the Western Archeological Center of the NPS. Each test pit was backfilled by the IT crew following completion of soil logging, soil sampling, and debris cataloging. The soil and debris excavated from the pits were returned to their original depth in the test pit.

3.2.5 Site Monitoring

The NPS archeologists observed excavation of each test pit at the Vogelsang WAA and were present during soil sample collection activities. While the test pits were open, the archeologists maintained custody of the debris items removed from the test pit excavations. IT personnel did not become involved in archeological monitoring at the site. The results of the archeological monitoring will be produced in a separate report by the NPS.

3.3 FIELD OBSERVATIONS

As each test pit was excavated, the site geologist described the soil exposed in the test pit sidewall on a test pit log. Copies of the logs are presented in Appendix B. The native soil was composed mainly of medium to dark red-brown sand with varying amounts of silt and/or clay and scattered pebbles. The soil commonly exhibited a slight cohesion due to a small moisture content. The soil matrix within the debris layer was composed of unconsolidated sand and silty sand, ranging from light tan to yellow in color. Test pits TP02, TP03, and TP04 were terminated on bedrock at 2.6 feet, 2.6 feet, and 3.6 feet bgs, respectively. Bedrock was not encountered in TP01, nor in any up-slope or down-slope test pits, all of which were terminated at one foot bgs because they contained no debris. Ash layers were observed at shallow depths (six to eight inches bgs) in two of the test pits within the main WAA area. No discolored or odorous soil was observed in any of the test pits at the Vogelsang site.

During this site inspection, the boundary of the Vogelsang WAA was designated as the limits of surface debris occurrences (Figure 2-2). The lateral extent of surface debris at Vogelsang WAA is approximately 19,500 square feet. Except at the test pit locations, there is no information about the existence or depth of subsurface debris across the remainder of the site. Four test pits were excavated within the WAA boundary. Three of the test pits encountered waste debris extending continuously from the surface to depths ranging from 2.5 to 3.5 feet bgs. Test pit TP01 did not encounter subsurface debris and therefore was only excavated to 1 foot bgs. Test pits TP02, TP03, and TP04, which contained subsurface debris, define a roughly triangular surface area. Assuming the subsurface debris is continuous between these three test pits and extends several feet beyond their localized area, then the estimated lateral extent of subsurface debris in this occurrence is approximately 1,800 square feet. Using an average depth of debris of 3 feet bgs, the estimated debris volume of this localized area is 200 cubic yards.

3.4 SAMPLING METHODS

Subsurface debris was observed in test pits TP02, TP03, and TP04, but not in TP01 and not in any up-slope or down-slope test pits. In the three test pits with subsurface debris, the debris layer extended from the ground surface to the bedrock surface.

Discrete soil samples were collected at two different depths from each of the test pits with trash present in the sidewall: one was collected at the midpoint and one at the lowest extent of the exposed debris layer. Test pits with no debris in the sidewall were sampled at one location at the bottom of the sidewall. Field quality control (QC) samples including field duplicate, equipment rinse, source blank, and trip blank samples were also collected at the Vogelsang site.

3.4.1 Soil Sample Collection

IT site personnel, working under the direction of the IT site supervisor, collected discrete soil samples from the exposed sidewalls of each test pit. Soil samples from the test pits located up-slope and down-slope of the WAA were collected from one sidewall sample location at approximately 1 foot bgs. Soil samples from test pits TP02, TP03, and TP04 within the WAA were collected at two different depths: at the midpoint of the debris layer and at the base of the debris layer within the test pit sidewall. Debris was not encountered in WAA test pit TP01; therefore, samples were collected from only one depth within that test pit, at approximately 1 foot bgs.

Sampling began at each location by first collecting soil for VOC analysis using EnCore™ samplers. Following completion of EnCore™ sampling activities, soil samples were then collected at the same sidewall location using 2-inch diameter by 6-inch long stainless steel sleeves. These samples were analyzed for semi-volatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH)-d/mo, pesticides, PCBs, metals, and hexavalent chromium. Discrete samples were also collected within an ash layer exposed in the sidewalls of test pits TP03 and TP04 at 6 inches and 8 inches bgs, respectively; these samples were analyzed for dioxins and furans only.

Because the remote location of the Vogelsang site prohibited daily sample shipment, all soil and EnCore™ samples were stored on dry ice upon collection. Freezing the volatile samples extended the holding time to seven days as proposed in the USEPA Region 9 memorandum *Regional Interim Policy for Determination of Volatile Organic Concentrations in Soil and Solid Matrices*, *Attachment A* (USEPA, 1999). Upon arrival at the laboratory, the EnCore™ samples were extruded from the sampler, placed in a vial containing distilled water, and analyzed immediately.

3.4.2 Aqueous Sample Collection

In order to provide for reliability of field sampling procedures and materials, QC samples were collected for each medium sampled, sample shipment, and sampling event. QC samples included a laboratory-prepared trip blank, a field-collected source blank, an equipment rinse sample, a field duplicate, and an increased sample volume for a matrix spike/matrix spike duplicate (MS/MSD). The field duplicate and equipment rinse results are discussed in Section 3.6.1.

A source blank was collected from the lot of distilled water used for the final rinse during decontamination. The source blank was poured directly from a newly-opened bottle of distilled water into laboratory-prepared containers. The source blank sample was then analyzed for the same parameters as the associated soil samples.

MS/MSD analyses were performed on the field samples selected by the laboratory at a frequency of five percent of the field samples collected and at least one MS/MSD sample per analytical batch.

Field duplicate samples were collected at a rate of ten percent of the field samples collected. Field duplicate samples were collected beginning with the first normal investigative sample and thereafter for every ten normal samples that were collected. All field duplicate samples were collocated with a normal sample and analyzed for the same parameters.

3.4.3 Sample Labeling

Samples were labeled in accordance with the system defined in the Plan: YW (Yosemite Waste Accumulation Area) V (Vogelsang) – TP01 (test pit number 1) – SO (soil sample) – 1033 (unique identification number). Up-gradient and down-gradient locations are indicated as "UG" and "DG," respectively. For ease of comparison, only sample locations (e.g., TP01; UG02) are used in the text, although complete sample numbers appear in the data tables and analytical reports.

3.4.4 Sample Handling and Shipping

Because of the remote location of the Vogelsang WAA, all soil samples were stored at the site on dry ice upon collection and shipped on the same day they were transported by horseback from the site to Tuolumne Meadows. Immediately following collection, each sample was labeled, placed in a resealable plastic bag, and then stored on dry ice in a sample cooler. The completed chain-of-custody form was placed in the cooler prior to shipment.

3.5 ANALYTICAL STRATEGY

In August 2001, soil samples were collected and analyzed for chemicals that may be present within the Vogelsang WAA based on the analytical results of soil samples collected at the site during the previous investigation (NPS, 1998), and visual observation of surface debris at the site in 1998.

There are no written records of a disposal history or types of waste materials within the site. Debris observed on the surface and in test pits included crushed and rusted metal, broken glass, and broken household china.

Soil samples collected from test pits at the Vogelsang WAA were analyzed for the following parameters (also shown on Table 3-1). The up-slope and down-slope test pits were also analyzed for the same parameters.

- VOCs by USEPA Method 8260B;
- SVOCs by USEPA Method 8270C;
- PAHs by USEPA Method 8310;
- TPH as diesel and motor oil by USEPA Method 8015B;
- Pesticides by USEPA Method 8081A;
- PCBs by USEPA Method 8082;
- Metals by USEPA Method 6010B/7471A;
- Hexavalent Chromium by USEPA 7196A; and
- Dioxins/Furans by USEPA Method 8290.

A field duplicate sample was analyzed for the same parameters as the collocated primary sample.

The analytical methods are all described in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846, Update II) (USEPA, 1998).

3.6 QUALITY CONTROL

3.6.1 Field Quality Control Samples

In order to provide for reliability of field sampling procedures and materials, QC samples were collected for each medium sampled, sample shipment, and sampling event. QC samples included a laboratory-prepared trip blank, a field-collected source blank, an equipment rinse sample, a field duplicate, and an increased sample volume for a MS/MSD.

A source blank was collected from the lot of distilled water used for the final rinse during decontamination. The source blank was poured directly from a newly-opened bottle of distilled water into laboratory-prepared containers. The source blank sample was then analyzed for the same parameters as the associated soil samples.

MS/MSD analyses were performed on the field samples selected by the laboratory at a frequency of five percent of the field samples collected and at least one MS/MSD sample per analytical batch.

Field duplicate samples were collected at a rate of ten percent of the field samples collected. Field duplicate samples were collected beginning with the first normal investigative sample and thereafter for every ten normal samples that were collected. All field duplicate samples were collocated with a normal sample and analyzed for the same parameters.

Field aqueous QC samples included one equipment rinse sample and one trip blank sample. The equipment rinse sample was analyzed for the same parameters as the field investigative samples. In the equipment rinse, antimony, barium, chromium, copper, lead, mercury, diesel, and motor oil were reported at estimated values well below their respective practical quantitation limit (PQL). Chromium, lead, mercury, and diesel were also detected in the source water at approximately the same concentration found in the equipment rinse sample. Zinc was reported above the PQL at 22.2 micrograms per liter (μg/L), but zinc was also detected in the source water at a concentration of 9.8 μg/L. In general, zinc may be considered to be a laboratory contaminant. As a result, chromium, lead, mercury, zinc, and diesel in the equipment rinse sample are considered to be non-detected. No other parameters were detected in the equipment rinse, indicating acceptable equipment decontamination. No detections of VOCs were reported in the trip blank sample.

One field duplicate sample was collected in test pit TP01. The data from the duplicate pair were compared using relative percent difference (RPD) calculations. Results of the calculations are presented in Table 3-2. The RPD acceptance limit specified in the plan for precision between duplicate soil samples is 50 percent. All of the RPDs for Vogelsang duplicate samples were within the acceptance limit except for the following: toluene (127 percent); diesel without silica gel cleanup (100 percent) and with silica gel cleanup (57 percent); motor oil without silica gel cleanup (79 percent) and with silica gel cleanup (58 percent); and mercury (56 percent). Data are not qualified based on the field duplicate RPD results. Field duplicate imprecision may be due to sample non-homogeneity and matrix effects. Since the majority of the field duplicate results were within the acceptance limit, the non-compliant field duplicate results have minimal impact on data quality and usability.

3.6.2 Laboratory Data Quality Assessment

A Level III data review was performed on all analytical results. The review was conducted in accordance with the guidelines and control criteria specified in the following documents:

- *National Functional Guidelines for Organic Data Review*, (USEPA, 1999);
- *National Functional Guidelines for Inorganic Data Review*, (USEPA, 1994b); and
- *Work Plan & Sampling and Analysis Plan, For Focused Site Inspection/Initial RCRA Facility Investigation of Vogelsang, Baseline, and Mather Waste Accumulation Areas at Yosemite National Park, California* (IT, 2001).

The following QC elements were included in the Level III data review:

- Sample holding times;
- Surrogate recoveries;
- Laboratory Control Sample/Laboratory Control Sample Duplicate recoveries;
- MS/MSD recoveries;
- Relative Percent Differences;
- Internal Standard Recoveries;
- Initial calibrations;
- Continuing calibrations;
- Laboratory Method Blanks; and
- Field Blanks.

The following sections provide a discussion of the review. The discussion focuses on the QC analytical results that were outside their respective control criteria and the potential impact of non-compliant issues on the data usability. The discussion does not include sample results associated with acceptable control limits. Qualified data and their associated sampling locations are identified in Table 3-3.

- **Method Blank Contamination, Reason Code B.** Detected results for methylene chloride in all of the soil samples and for beryllium in one soil sample were qualified as non-detected (U) because these analytes were also detected in the associated method blank. Sample results with concentrations less than ten times the blank concentration for methylene chloride and five times the blank concentration for beryllium were qualified as non-detected (U). Qualified sample results less than the reporting limit were raised to the laboratory reporting limit. Laboratory blank contamination did not significantly affect data quality and usability;

- **Continuing Calibration Verification, Reason Code C.** Detected results for acetone in six soil samples and the quantitation limits for 2,4-dinitrophenol in four soil samples were qualified as estimated (J/UJ) because the percent deviations for acetone and 2,4-dinitrophenol in the continuing calibrations did not meet the percent recovery acceptance criteria. Qualified data for acetone have the potential to be biased high, while qualified data for 2,4-dinitrophenol have the potential to be biased low. The non-compliant continuing calibrations have minimal impact on data quality and usability;

- **Holding Time, Reason Code H.** Results for hexavalent chromium and pH in all of the soil samples and for dioxins/furans in two soil samples were qualified as estimated (J/UJ) because of holding time violations. Qualified data for hexavalent chromium in all of the soil samples have the potential to be biased low, and qualified data for pH in all of the soil samples have the potential to be quantitatively inaccurate. Since the two soil samples for dioxins/furans marginally exceeded the preparation holding time by one day, these preparation holding time deviations have no significant impact on the dioxins/furans data quality and usability. Overall, the holding time deviations have minimal impact on data quality and usability;

- **Trip Blank, Reason Code K.** TPH as gasoline result was qualified as not detected (U) in source blank YWV-MB-WH-1018 because of contamination in the associated trip blank. There is no effect on data usability;

- **Laboratory Control Sample, Reason Code L.** The recovery of bromomethane was 68 percent in the laboratory control sample associated with source blank YWV-MB-WH-1018. The bromomethane quantitation limit in this sample was qualified as estimated (UJ). The recovery of bromomethane is slightly less than the 75 percent lower control limit and there is no negative effect on data usability;

- **Matrix Spike, Reason Code M.** The detected result for 1,2-dichlorobenzene and the quantitation limits for 1,3-dichlorobenzene, 1,4-dichlorobenzene, and vinyl acetate in the unspiked QC soil sample were qualified as estimated (J/UJ) because the percent recoveries for these analytes in the matrix spike sample did not meet the acceptance criteria for accuracy. Qualified data for the affected spiked analytes have the potential to be biased low. Since the percent recoveries for the non-compliant spiked analytes were marginally below the lower control limit, the matrix spike deviations have minimal impact on data quality and usability; and

- **Surrogate, Reason Code S.** The quantitation limits for all of the base/neutral semivolatile analytes in one soil sample were qualified as estimated (UJ) because the percent recoveries of two base/neutral surrogates did not meet the acceptance criteria for accuracy. Detected results and quantitation limits for pesticides in six soil samples and one equipment blank and for PCBs in one equipment blank were qualified as estimated (J/UJ) because one of the surrogates did not meet the acceptance criteria for accuracy. Qualified data for the affected analytes have the potential to be biased low. Since the outlying surrogate recoveries for semivolatiles and pesticides were marginally below the lower control limit and the other surrogates were acceptable, the non-compliant surrogates have no significant impact on data quality and usability.

The laboratory data quality for the sampling event met the quality assurance objectives and project goals specified in the Plan.

3.7 Deviations from the Plan

There were no deviations from the Plan during the focused site inspection of the Vogelsang WAA.

4.0 ANALYTICAL DATA SUMMARY AND EVALUATION

This section presents the analytical results for soil samples collected at the Vogelsang WAA. The samples were analyzed for metals (including hexavalent chromium), TPH as diesel and motor oil, and organic compounds (VOCs, PAHs, pesticides, and PCBs); selected samples were also analyzed for dioxins/furans. Chemical detections in soil samples are summarized on Tables 4-1 through 4-4. The laboratory analytical reports and chain of custody records are presented in Appendix C. All results are reported on a dry weight basis. The PQLs indicated in the laboratory reports are adjusted for percent moisture and dilutions as appropriate.

To assist in distinguishing site-related chemical contamination from constituents occurring in native soil, three background sample were collected from native soil up-slope of the Vogelsang WAA site. The three background locations (UG01, UG02, and UG03) shown on Figure 2-2 are approximately 120 to 140 feet northeast of the WAA boundary. Each background sample was analyzed for the same parameters as the WAA test pit samples.

A more robust background assessment of metals was performed using background soil samples collected up-slope from ten WAAs (including Vogelsang) at Yosemite National Park, to calculate an upper tolerance limit (UTL) background statistic (Appendix D). Metals with maximum soil concentrations greater than the (1) UTL statistic; and (2) available PRGs, were further evaluated in a more refined background assessment using the Mann Whitney U Test statistical approach (Appendix E).

4.1 NATURE AND EXTENT OF CHEMICAL DETECTIONS

The following sections summarize the detections of metals, petroleum hydrocarbons, organic compounds, and dioxins/furans in Vogelsang WAA test pit samples. The metal detections are compared with Yosemite background UTL statistics; all other results are compared to the site-specific background sample values.

4.1.1 Metals

Soil samples were analyzed for CAM-17 metals and for hexavalent chromium. All eight WAA test pit soil samples contained twelve metals (arsenic, barium, cadmium, total chromium, cobalt, copper, lead, mercury, molybdenum, nickel, vanadium, and zinc). One metal, beryllium, was detected in one up-slope background soil sample, but was not detected in any of the WAA test pit or down-slope soil samples. Hexavalent chromium was not detected in any sample.

Of the twelve metals detected in soil samples, six (cadmium, copper, lead, molybdenum, nickel, and zinc) exceeded their Yosemite UTL background statistics in one or more test pit. All up-slope detections were less than UTLs. Molybdenum exceeded its background UTL in all down-slope samples, and two down-slope detections were higher than any test pit results. All other metals were less than UTLs in down-slope samples.

4.1.2 Total Petroleum Hydrocarbons

All soil samples were analyzed for TPH as diesel and motor oil. Separate aliquots of each sample were analyzed with and without silica gel cleanup. Silica gel cleanup is routinely used to remove naturally-occurring hydrocarbons with signatures in the diesel and motor oil chromatogram ranges. In all but one sample from this site (diesel in UG01) the use of silica gel cleanup resulted in a lower concentration, indicating that naturally-occurring hydrocarbons are present in site soils. All up-slope diesel results, with and without silca gel cleanup, are estimated values below the PQL. The results discussed in this section are all for analyses performed with silica gel cleanup.

Diesel was detected below the PQL in all three background samples, with a maximum concentration of 6 milligrams per kilogram (mg/kg). Diesel was reported in all but one of the WAA test pit and down-slope samples at concentrations ranging from 5 to 38 mg/kg. Of these detections, the highest concentrations were from samples collected from WAA test pits TP02 and TP03.

Motor oil was found in the upslope samples from 21 to 56 mg/kg. Motor oil was also found in all of the WAA test pit and downslope samples at concentrations ranging from 13 to 110 mg/kg. Of these detections, the highest concentration was reported from test pit TP02.

4.1.3 Organic Compounds

Soil samples from the Vogelsang WAA were analyzed for organic compounds, including VOCs, SVOCs, PAHs, pesticides, and PCBs (Table 3-1). Detections are presented in Table 4-3.

One VOC, toluene, was detected in one of the background samples (UG01). One or more of five VOCs (1,2-dichlorobenzene, acetone, methyl ethyl ketone, methyl isobutyl ketone, and toluene) were detected in the WAA test pit soil samples. The greatest number of compounds, and highest detections of those compounds, were found in test pit TP02. Acetone was detected in one down-slope sample.

No SVOCs were detected in any of the background samples collected at the Vogelsang site. One SVOC (bis[2-ethylhexy] phthalate) was detected in test pit TP02 and in down-slope location DG01. No other SVOCs were found in any Vogelsang soil samples.

One PAH compound (chrysene) was detected in up-slope location UG03, in six of the eight WAA test pit soil samples, and in all three down-slope samples. No other PAHs were detected in any Vogelsang WAA samples.

No pesticide compounds were detected in any of the up-slope or down-slope soil samples collected at the Vogelsang WAA. However, five pesticide compounds (DDD, DDE, DDT, dieldrin, and heptachlor epoxide) were detected in one or more WAA test pit soil samples. Four of the five pesticide compounds were detected in test pit TP02, which also had the highest concentration of each compound detected.

No PCBs were detected in any of the up-slope background or down-slope samples collected at the Vogelsang WAA. One PCB compound, Aroclor-1260, was detected at 11 to 45 micrograms per kilogram (μg/kg) in soil samples collected from three of the four WAA test pits.

4.1.4 Dioxins/Furans

An ash layer was observed in the sidewall of test pits TP03 and TP04 at approximately 6 and 8 inches bgs, respectively. A biased sample of the ash layer in each of these test pits was collected and analyzed for dioxins and furans. Since chlorinated pesticides and PCBs were detected in the soil sample from test pit TP02, this sample was also analyzed for dioxins and furans. In addition, one background soil sample from up-slope test pit UG03 was analyzed for dioxins and furans.

Table 4-4 presents the analytical results for dioxins and furans in the four soil samples. The results show no dioxin or furan target compounds in the up-slope background sample. Various dioxin and furan congeners were detected in the three WAA test pit soil samples.

Table 4-4 also shows the results of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) Toxic Equivalency (TEQ) calculation to obtain the total concentration of chlorinated dioxins and furans expressed as an equivalent concentration of 2,3,7,8-TCDD TEQ. In the 2,3,7,8-TCDD TEQ method, each dioxin and furan is assigned a toxicity equivalency factor (TEF) based on its toxicity relative to the most toxic chlorinated dioxin congener, 2,3,7,8-TCDD. The concentration of each congener is then multiplied by its respective TEF to obtain the 2,3,7,8-TCDD TEQ. The sum of the TEQ concentrations for the individual congeners detected in the sample is the 2,3,7,8-TCDD TEQ. The 2,3,7,8-TCDD TEQs for Vogelsang test pit samples ranged from 0.094 to 12.5 picograms per gram (pg/g).

4.2 IDENTIFICATION OF POTENTIAL SITE-RELATED CHEMICALS

Chemicals are considered to be potentially site-related if they are detected in test pit samples at concentrations above their respective background values.

Six metals (cadmium, copper, lead, molybdenum, nickel, and zinc) exceeded their respective Yosemite UTL background statistics in test pit samples, and one metal (molybdenum) exceeded its UTL in down-slope samples.

Most diesel and motor oil detections in test pit samples exceeded their respective site-specific background values.

Five VOCs (1,2-dichlorobenzene, acetone, methyl ethyl ketone, methyl isobutyl ketone, and toluene) were detected in the WAA test pit soil samples but not up-slope samples (except for toluene and chrysene).

One SVOC (bis[2-ethylhexy] phthalate), one PAH (chrysene), one PCB (Aroclor-1260), and five pesticide compounds (DDD, DDE, DDT, dieldrin, and heptachlor epoxide) were detected in Vogelsang WAA soil samples at concentrations above background.

These results suggest that a number of chemicals are potentially site-related, although the majority of site-related detections do not exceed background values in down-slope samples.

4.3 COMPARISON OF DATA TO SCREENING CRITERIA

Detections of potentially site-related chemicals were compared to the appropriate screening criteria, as described in this section.

4.3.1 Preliminary Remediation Goals

Chemical-specific USEPA Region 9 PRGs are risk-based tools for evaluating contaminated sites in relation to human health risks. The Region 9 PRG table combines current USEPA toxicity values with standard default exposure factors to estimate chemical concentrations in environmental media that correspond to a cancer risk of 1E-06 for carcinogens or a hazard index of 1 for non-carcinogenic effects.

The derivation of soil PRGs assumes exposure to particulates in soil via incidental ingestion, dermal contact, or inhalation. Exposure in an industrial scenario assumes that a worker is exposed for 265 days a year for 25 years. Exposure in a residential scenario assumes that a resident is exposed for 365 days a year for 30 years. Since the Vogelsang WAA site is located in a remote area away from residential development, industrial PRGs for soil could be considered appropriate and conservative for risk screening purposes; however, residential PRGs for soil are more protective of human health and the environment.

Accordingly, the data presented in this report are compared to both residential and industrial PRGs. Any actual exposure of NPS workers or visitors to the chemical concentrations detected in site soils would be expected to occur much less frequently than the exposure assumptions used in the derivation of both industrial and residential soil PRGs.

All of the potentially site-related metals (Section 4.2) were less than their respective residential and industrial PRGs (Table 4-1) except one detection of cadmium in TP03. All diesel, motor oil, VOCs, SVOCs, PAHs, pesticides, and PCBs were less than both residential and industrial PRGs.

Although the 2,3,7,8-TCDD TEQ in TP04 exceeded its residential PRG, it was less than its industrial PRG. All other 2,3,7,8-TCDD TEQs were less than both the residential and industrial PRGs.

4.3.2 Risk-Based Screening Levels for Petroleum Hydrocarbons

Because there are no PRGs for TPH, diesel and motor oil detections were compared to risk-based screening levels (RBSLs), described in this section. The Massachusetts Department of Environmental Protection (MADEP) has established a soil cleanup standard of 5,000 mg/kg for TPH in isolated subsurface soils that may experience a groundwater discharge to surface water. The California Regional Water Quality Control Board (RWQCB) has set forth RBSLs for TPH in soil that are based on ceiling concentrations from MADEP and modified (i.e., lowered) by RWQCB based on odor and general nuisance concerns (Section 4 of Appendix 1 of RWQCB, 2000). The RWQCB RBSLs are 500 mg/kg for diesel and 1,000 mg/kg for motor oil. All diesel and motor oil detections at Vogelsang WAA are below both the RWQCB RBSLs and the MADEP soil cleanup standard.

4.4 CHEMICAL FATE AND TRANSPORT

Detections of potentially site-related chemicals that exceeded screening criteria included cadmium in one sample and 2,3,7,8-TCDD TEQ in one sample. Metals are insoluble and tend to adsorb very strongly to soil particles thus they experience little or no leaching into groundwater.

5.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

This section presents the results of a screening level ecological risk assessment conducted to determine whether potential unacceptable ecological risks may occur at the Vogelsang WAA as a result of previous site activities.

5.1 SELECTION OF COPECS

Constituents of potential ecological concern (COPECs) were initially selected by comparing the maximum detected soil concentrations with ecological screening values (ESVs). The ESVs were selected using the following hierarchy of sources: (1) PRGs from Efroymson et al. (1997); and (2) Ecological Data Quality Levels (USEPA Region 5, 1999). Based on this comparison (Tables 4-4, 5-1, and 5-2), the following nine COPECs were selected:

- Cadmium
- Chromium (total)
- Copper
- Lead
- Mercury
- Molybdenum
- Vanadium
- Zinc
- 2,3,7,8-TCDD TEQ

Of these, three (chromium, mercury, vanadium) were determined not to be significantly greater than background, as they had maximum concentrations less than their associated UTL background statistic (Appendix D). The five remaining inorganic COPECs (cadmium, copper, lead, molybdenum, and zinc) were carried forward to the refined background evaluation, and concentrations of all but zinc were determined to be significantly different (greater) than background using the Mann Whitney U Test (Appendix E).

Therefore, cadmium, copper, lead, molybdenum, and 2,3,7,8-TCDD TEQ were carried forward in the screening level ecological risk assessment.

5.2 SELECTION OF ASSESSMENT ENDPOINT AND REPRESENTATIVE SENSITIVE RECEPTORS

In order to assess whether or not there are potential unacceptable ecological risks at the WAA, a simple food-chain modeling approach was employed to estimate potential hazards to representative sensitive terrestrial wildlife receptors. The assessment endpoint selected for this screening level ecological risk assessment was “protection of long-term survival and reproductive capabilities for vermivorous (earthworm consuming) mammal and bird populations.” The measurement endpoint selected to evaluate this assessment endpoint included the calculation of site-specific and COPEC-specific PRGs based on a simple food-chain model using the hazard quotient method (Section 5.3).

Based on Yosemite National Park wildlife species information provided by Thompson (2002), two sensitive representative species[1] were selected for use in this screening level ecological risk assessment - the Short-tailed Shrew (*Blarina brevicauda*) as a surrogate for the Montane Shrew (*Sorex monticolus*) or Trowbridge Shrew (*Sorex trowbridgii*) and the American Robin (*Turdus migratorius*). Both the Montane or Trowbridge Shrew and the American Robin are found in the Park, and may be present at the WAA if suitable habitat exists. Both the shrew and the robin have small home ranges, relatively high metabolisms and thus elevated food intake per unit body weight, and prey on earthworms that are expected to bioaccumulate some of the chemicals detected in WAA soils. Given the low water solubility of the chemicals of concern at the WAAs, uptake by plants is not as great a concern compared with potential uptake by earthworms, therefore the selection of herbivores as receptors is not warranted at this time. The selection of mammalian and avian receptor species is expected to provide an estimate of potential hazards to both these classes of wildlife. Although there are some differences between the surrogate Short-tailed Shrew and the Montane or Trowbridge Shrew, such as the Short-tailed Shrew being approximately 50 percent heavier (15 g vs. 6 – 9 g, respectively), these differences are expected to be relatively minor. It is conservative and health-protective to use a heavier wildlife receptor (such as the Short-tailed Shrew, instead of the Montane or Trowbridge Shrew) in the food-chain model because mammals with a greater body weight have a slower metabolism and are therefore expected to process and excrete contaminants at a slower rate, making them more susceptible to potential adverse effects from the ingestion of COPECs.

5.3 EXPOSURE ASSESSMENT

Routes of exposure by which the two selected sensitive wildlife receptors may be exposed to COPECs in soil include incidental soil ingestion, dermal absorption, inhalation of soil particulates and vapors, and ingestion of COPECs that may have bioaccumulated in prey items such as plants and animals. The most significant exposure pathway is assumed to be the ingestion of earthworms that have bioaccumulated soil COPECs in their tissues. Incidental soil ingestion is possible, but is assumed for purposes of this screening level ecological risk assessment to be a minor contributor to total exposure. Dermal absorption is also possible, but fur and/or feathers act to limit the dermal transfer of COPECs from soil through the skin of a wildlife receptor, and the dermal exposure pathway is rarely quantified in ecological risk assessments. Inhalation of wind-mobilized soil particulates or VOCs that have off-gassed from soil is also possible, but this route of exposure is assumed to be a minor contributor to total exposure, and the inhalation exposure pathway is also rarely quantified in ecological risk assessments. Bioaccumulation of soil COPECs in plant tissue is possible, but is generally insignificant for relatively insoluble chemicals such as the COPECs identified at this WAA.

In order to estimate soil COPEC concentrations in earthworm tissue, bioaccumulation/bioconcentration factors (BAF/BCF) are required. These factors, and the approaches recommended to obtain these factors, are presented in Table 5-3. The molybdenum BAF/BCF value recommended is 1.3, which represents the average of 13 inorganic median values from USEPA (2000) (Table 5-3). For cadmium, copper, lead and 2,3,7,8-TCDD TEQ, chemical-specific regression equations are recommended to estimate the BAF/BCF values, as uptake has been shown to be related to COPEC soil concentration (Table 5-3).

To use the BAF/BCF regression equations, an exposure point concentration (EPC) for the soil COPEC is required. A typical EPC used in risk assessment is the 95 percent upper confidence limit (95% UCL) of the mean, as it represents a conservative high-end exposure value. The calculation of the 95% UCL is dependent on the data distribution of the COPEC concentrations. Data sets were tested for normality and lognormality with the Shapiro-Wilk test (USEPA, 1992). Either a normal or lognormal UCL was

[1] The list of available wildlife receptors for use in this screening level ecological risk assessment was limited to the 20 receptors listed in Sample et al. (1996). Selection of a receptor species from this list avoided the need to calculate toxicological benchmarks, as they are already provided by Sample et al. (1996) (Section 5.4).

calculated, whichever provided the better fit in the Shapiro-Wilk test. A nonparametric 95% UCL was used when the data fit neither a normal or lognormal distribution (i.e., the data distribution was undefined). These three EPC approaches are presented in the following section. It should be noted that in the calculation of UCLs, sample and sample duplicate results have been averaged, and when results were non-detect, one-half of the analytical detection limit (i.e., the PQL) was used.

The UCL is calculated for a normal distribution as follows (USEPA, 1992):

$$UCL = \overline{x} + t_{1-\alpha,n-1}\, x\,(s/\sqrt{n}\,)$$

where:

- $\overline{x}$ = sample arithmetic mean
- t_1 = critical value for student's plus distribution
- α = 0.05 (95 percent confidence limit for a one-tailed test)
- n = number of samples in the set
- s = sample standard deviation.

The UCL is calculated for a lognormal distribution as follows (Gilbert, 1987):

$$UCL = e^{\left(\overline{y} + (0.5 \bullet s_y^2) + \left[H_{0.95} \bullet \frac{s_y}{(n-1)^{0.5}}\right]\right)}$$

where:

- $\overline{y}$ = $\sum y/n$ = sample arithmetic mean of the log-transformed data, y = ln x
- s_y = sample standard deviation of the log-transformed data
- n = number of samples in the data set
- $H_{0.95}$ = value for computing the one-sided 95 percent UCL on a lognormal mean from standard statistical tables (Land, 1975).

The UCL is calculated for an undefined chemical concentration statistical distribution using a nonparametric statistical approach as follows:

The data point selected as the nonparametric UCL is the 95 percent UCL rank order on the median (or 50^{th} percentile) of the data set. It is estimated by ranking the data observations from smallest to largest. The rank order of the data point selected as the UCL is estimated from the following equation (Equation 13.22 in Gilbert, 1987). If the calculated rank is greater than the sample size, the maximum detected value is reported. If a fractional rank is calculated, the rank equivalent value is interpolated.

$$u = [(n+1)/2] + \{[Z_{1-\alpha}\sqrt{n}]/2\}$$

where:

- u = rank order of value selected as upper confidence limit, calculated
- n = number of samples in the data set
- α = confidence limit (95 percent)
- $Z_{1-\alpha}$ = normal deviate variable (one-sided) (1.645).

For the four COPECs for which an EPC is required for the BAF/BCF regression equation (i.e., cadmium, copper, lead and 2,3,7,8-TCDD TEQ), the following information is presented, along with the estimated earthworm BAF/BCF value, using the recommended regression equation in Table 5-3. An EPC is also presented for molybdenum, to assist in PRG comparisons (Section 5.6). Where the estimated 95% UCL was greater than the maximum detected concentration (e.g., copper), the EPC defaulted to the maximum concentration. As only four samples were analyzed for dioxins and furans, no data distribution was determined and the EPC defaulted to the maximum concentration.

Soil COPEC	Data Distribution	Maximum (mg/kg)	95% UCL (mg/kg)	EPC (mg/kg)	Earthworm Concentration (mg/kg)	BAF/BCF
Cadmium	undefined	14.8	14.8	14.8	74	5.0
Copper	lognormal	373	538	373	25	0.067
Lead	lognormal	91.5	81.4	81.4	29	0.36
Molybdenum	lognormal	88.6	63.6	63.6	-	-
2,3,7,8-TCDD TEQ	-	12.5E-6	-	12.5E-6	5.6E-5	4.5

Another factor related to potential exposure of wildlife to soil COPECs is the area use factor (AUF). The AUF accounts for the fact that wildlife receptors such as the shrew and the American Robin will not feed exclusively at the WAA, but will forage throughout their home range.

Estimation of an AUF was performed as follows:

$$AUF = \frac{\text{Area of potential wildlife exposure at the WAA (acres)}}{\text{Receptor Home Range (acres)}}$$

For the selected representative wildlife receptors, the estimated home ranges are 1.0 acre for the Short-tailed Shrew and 1.2 acres for the American Robin (USEPA, 1993).

5.4 EFFECTS ASSESSMENT

Appropriate toxicological benchmarks have been selected for the COPECs at this WAA. These benchmarks focus on the growth, survival, and reproduction of species and/or populations. Both no observable adverse effects level (NOAEL) and lowest observable adverse effects level (LOAEL) derived benchmarks are used, from Sample et al. (1996). The NOAEL is a dose of each COPEC that will produce no known adverse effects in the selected receptor species. The NOAEL was judged to be an appropriate toxicological endpoint since it would provide the greatest degree of protection to the receptor species. In addition, the LOAEL is used as a point of comparison for decision-making for risk management purposes. In instances where data were unavailable for a COPEC, toxicological information for an appropriate surrogate chemical was used.

Dietary toxicological benchmarks (for food) are presented in Table 5-4 for the selected representative wildlife receptors – the Short-tailed Shrew and the American Robin. These benchmarks represent the concentration in food items, such as earthworms, that are expected to be associated with no adverse effects and lowest observed adverse effects. Because NOAELs and LOAELs for the selected wildlife receptor species are based on NOAELs and LOAELs from test species, the latter have been converted to NOAELs and LOAELs by Sample et al. (1996). The conversion used by Sample et al. (1996) is specific to the shrew and robin and is based on the use of a power function of the ratio of body weights, as shown below. A body weight scaling factor of 0.25 was used by Sample et al. (1996) for mammals, whereas a body weight scaling factor of 0 was used for birds.

$$NOAEL_W = NOAEL_T \left(\frac{BW_T}{BW_W} \right)^s$$

where:

$NOAEL_W$	=	the No Observed Adverse Effect Level for the wildlife indicator species (mg/kg-day)
$NOAEL_T$	=	the No Observed Adverse Effect Level for the test species (mg/kg-day)
BW_T	=	the body weight of the test species (kg)
BW_W	=	the body weight of the wildlife indicator species (kg)
s	=	a body weight scaling factor (s = 0.25 for mammals and s = 0 for birds).

5.5 DERIVATION OF SITE-SPECIFIC RISK-BASED ECOLOGICAL PRGS

Site-specific ecological PRGs (ePRGs) for Vogelsang WAA were estimated for cadmium, copper, lead, molybdenum, and 2,3,7,8-TCDD TEQ as follows, using the selected sensitive wildlife receptors, the Short-tailed Shrew and the American Robin (Section 5.2), COPEC- and WAA-specific information (Section 5.3), and toxicity benchmarks for these five COPECs (from Sample et. al., [1996]) (Section 5.4), as follows:

$ePRG_{COPEC}$ = (Receptor $Benchmark_{COPEC}$ in food)/[(soil-to-earthworm BAF/BCF)(Area Use Factor)]

The calculations are presented in Appendix F.

5.6 COMPARISON OF COPEC CONCENTRATIONS TO SITE-SPECIFIC ECOLOGICAL PRGS

Soil COPEC concentrations at the Vogelsang WAA (expressed as 95% UCL EPCs) are compared with the derived site-specific ePRGs (Appendix F) in the following table:

COPECs	Site-Specific Ecological PRGs (mg/kg)				WAA Exposure Point Concentration (mg/kg)	Exceedences?
	Short-tailed Shrew		American Robin			
	NOAEL	LOAEL	NOAEL	LOAEL		
Cadmium	1.4	14	0.6	7.9	14.8	Yes, 4/4 PRGs
Copper	1,663	2,188	1,382	1,816	373	No
Lead	163	1,628	6.2	62	81.4	Yes, 2/4 PRGs
Molybdenum	0.8	7.9	5.3	54	63.6	Yes, 4/4 PRGs
2,3,7,8-TCDD TEQ	1.6E-6	1.6E-5	6.1E-6	6.1E-5	12.5E-6	Yes, 2/4 PRGs

This comparison suggests that localized populations of Montane or Trowbridge Shrew may be adversely impacted by concentrations of cadmium, molybdenum, and 2,3,7,8-TCDD TEQ and that localized populations of American Robin may be adversely impacted by concentrations of cadmium, lead, molybdenum, and 2,3,7,8-TCDD TEQ in WAA soils if these COPECs are bioaccumulating in earthworms and are subsequently being consumed by shrews and robins feeding exclusively in this area.

5.7 UNCERTAINTY ANALYSIS

There are many uncertainties inherent in the approach used for this screening level ecological risk assessment. Most of the uncertainties are biased toward heath protectiveness, in order to overestimate, rather than underestimate hazards. Some of the more important uncertainties and/or assumptions are listed as follows:

1. It is assumed that the selected representative wildlife receptors are the most sensitive to the WAA COPECs. It is possible that other species (such as plants or amphibians) may be more sensitive to these COPECs, but it is likely many others would be less sensitive.

2. It is assumed that the selected representative wildlife receptors will actually forage at the WAA. Habitat conditions at the WAA, however, may be suboptimal, and the selected receptors may not be present, or may only be present for short periods of time. For example, as a migratory species, the robin would not be expected to be at the WAA year-round.

3. It is assumed that the selected assessment endpoint (protection of long-term survival and reproductive capabilities for vermivorous [earthworm consuming] mammal and bird populations) is adequate for this ecological assessment. Many other assessment endpoints could have been selected, however, it is assumed that screening-level decisions may be based on the selected assessment endpoint.

4. It is assumed that the selected measurement endpoint (i.e., calculation of site-specific and COPEC-specific PRGs based on a simple food-chain model using the hazard quotient method) to evaluate the assessment endpoint is adequate for this ecological assessment. Many other measurement endpoints could have been selected, however, it is assumed that screening-level decisions may be based on the selected measurement endpoint.

5. It is assumed that the BAF/BCF values used to estimate earthworm COPEC concentrations are accurate. Actual bioaccumulation at the WAA may be significantly less than estimated by the model. A variety of factors could result in lower COPEC tissue concentrations in earthworms, such as low COPEC bioavailability.

6. The calculated COPEC EPCs in soil, using the 95% UCL approach, may overestimate exposure due to (1) small sample sizes resulting in elevated variability and/or the need to default to the maximum measured concentration; (2) poor estimating capability of the lognormal UCL equation for certain data sets; and (3) a biased soil sampling program that focused on collecting samples from areas where contamination was expected.

7. It is conservatively assumed that all soil samples collected at the WAA are equally available for exposure to earthworms and subsequent exposure to earthworm-consuming shrews and robins. Deeper subsurface soil samples (e.g., below 30 cm) may actually be outside the depth range of either earthworms or burrowing mammals like the shrew. Thus, 95% UCL EPCs that are significantly influenced by elevated COPEC concentrations at depth will overestimate exposure.

8. It is conservatively assumed that the wildlife receptors' diet is 100 percent earthworms. The proportion of the diet that is actually other items (such as plants or insects), and the degree to which these other food items bioaccumulate lower concentrations of COPECs from soil, would tend to reduce the modeled exposure.

9. It is possible that the toxicological benchmarks available from the literature overestimate hazards for the COPECs measured in soils collected from this WAA. For example, if copper oxide is the basis for the avian benchmark, the actual form of copper at the WAA may be copper sulfate or some other form of copper that is less toxic.

10. The mammalian toxicological benchmarks used are based on a body-weight scaling factor. As the Montane or Trowbridge Shrew is lighter than the Short-tailed Shrew that was used as a surrogate species, and smaller mammals are expected to be less sensitive to toxicants, hazards are likely overestimated for the Montane or Trowbridge Shrew.

11. It is assumed that NOAEL and/or LOAEL toxicological endpoints have biological significance at the species population level. This is unlikely true for the NOAEL endpoint, and may or may not be true for the LOAEL endpoint.

5.8 CONCLUSIONS

Based on the information presented in this screening level ecological risk assessment, localized populations of Montane or Trowbridge Shrew may be adversely impacted by soil concentrations of cadmium, molybdenum, and 2,3,7,8-TCDD TEQ and that localized populations of American Robin may be adversely impacted by soil concentrations of cadmium, lead, molybdenum, and 2,3,7,8-TCDD TEQ in WAA soils if these COPECs are bioaccumulating in earthworms and are subsequently being consumed by shrews and robins feeding exclusively in this area.

6.0 CONCLUSIONS

This section summarizes the results of this inspection and makes recommendations based on those results.

6.1 RECONCILIATION WITH INSPECTION OBJECTIVES

The inspection met the project objectives of collecting soil samples from test pits and obtaining laboratory analytical data for the samples. The field inspection and sample collection activities were conducted in accordance with the plan and SOPs. The inspection also met the objective of observing the nature of the waste present in the WAA.

The inspection met the objective of determining the vertical extent of waste. A minimum subsurface debris volume of 200 cubic yards was estimated using measurements of vertical extent in test pits. Waste was observed on the surface over a lateral extent of approximately 19,500 square feet.

6.2 NATURE AND EXTENT OF CHEMICAL DETECTIONS

Of the inorganic analytes detected in soil samples from the Vogelsang WAA test pits, six metals (cadmium, copper, lead, molybdenum, nickel, and zinc) were detected at concentrations above their Yosemite UTL background statistics. All of these detections except one occurrence of cadmium were below their human health PRGs. Cadmium detections were found to be significantly different (greater) than the background Yosemite data set, and one detection was also greater than the human health residential PRG, but less than the industrial PRG. The results of the inorganic analytes detected in soil samples from the Vogelsang WAA test pits are consistent with the nature of the waste debris observed (rusted metal, metal cans, etc.) during test pit trenching activities.

Of the organic constituents, 1,2-dichlorobenzene, acetone, methyl ethyl ketone, methyl isobutyl ketone, bis(2-ethylhexyl) phthalate, DDD, DDE, DDT, dieldrin, heptachlor epoxide, and Aroclor 1260 were detected in test pit soils and not in the background soil samples. Chlorinated dioxins and furans were detected in ash layers in the test pits at concentrations greater than those encountered in the background samples. Chrysene was detected in several test pits as well as one background sample. However, all detections of organic constituents were below their respective human health PRGs, except for concentrations of dioxins in one sample that were found to be above the residential PRG, but not the industrial PRG.

Based on these results, none of the constituents detected would be expected to potentially impact surrounding soil or other environmental media at the site. The direct comparison of the potentially site-related chemicals to human health risk-based soil screening criteria indicates that the constituents detected in Vogelsang WAA soils would not pose unacceptable risks to human receptors visiting the site. Based on these results, a quantitative human health risk assessment was not conducted, because only residential PRGs were exceeded, not industrial PRGs, and residential exposure is not expected at this site.

Based on the information presented in the screening level ecological risk assessment, localized populations of Montane or Trowbridge Shrew may be adversely impacted by soil concentrations of cadmium, molybdenum, and 2,3,7,8-TCDD TEQ, and that localized populations of American Robin may be adversely impacted by soil concentrations of cadmium, lead, molybdenum, and 2,3,7,8-TCDD TEQ in WAA soils if these COPECs are bioaccumulating in earthworms and are subsequently being consumed by shrews and robins feeding exclusively in this area. This conclusion is based on conservative assumptions; actual conditions probably reduce the estimated impact to wildlife receptors.

6.3 RECOMMENDATIONS

Based on the assessment of the nature and extent of chemical detections in soil samples from the Vogelsang WAA, this report recommends that no further action is required at this site for potential human health concerns, assuming residential use of the site does not occur. The estimated ecological risk is likely mitigated by actual conditions.

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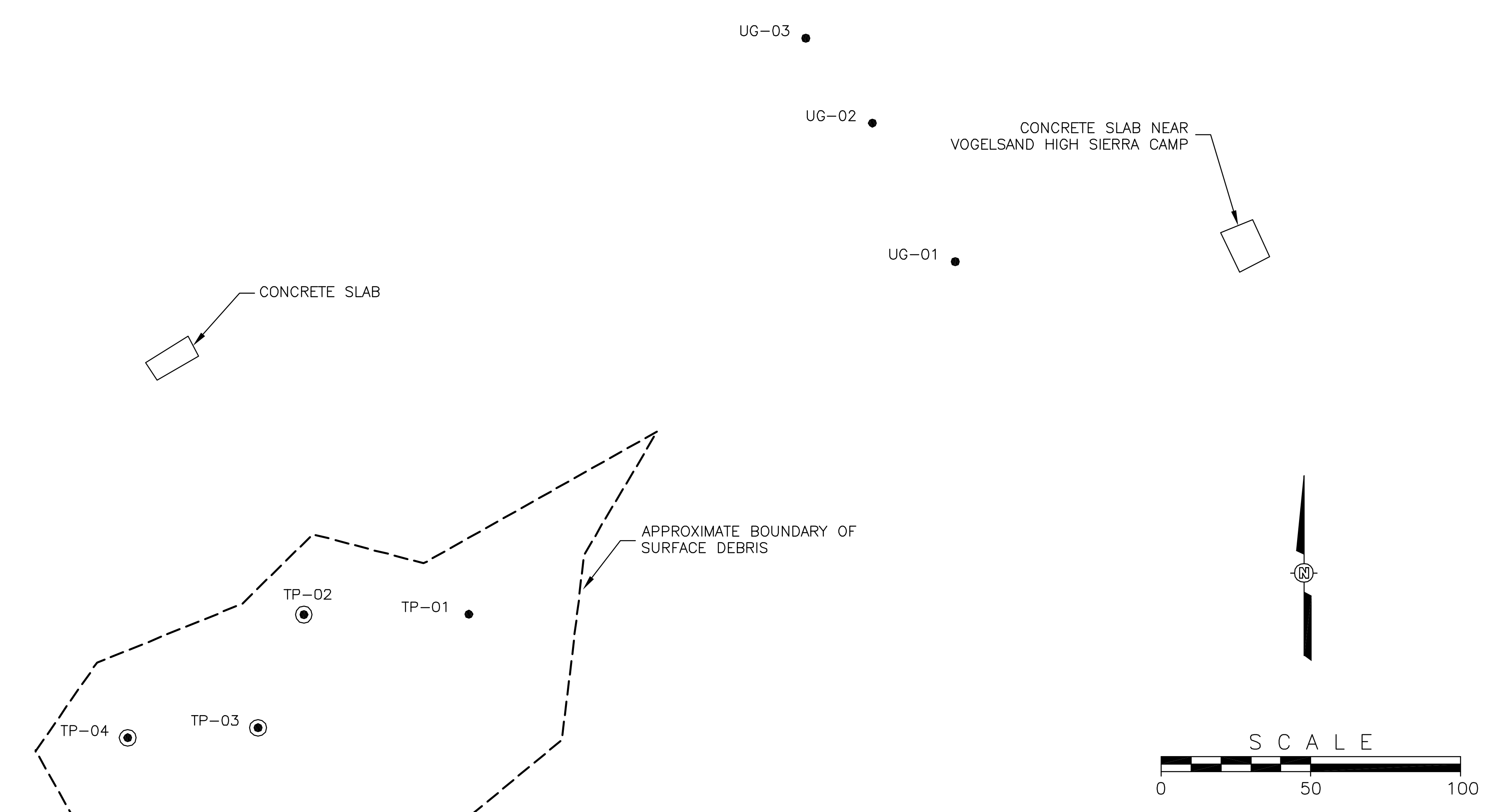
FIGURE 2-1
LOCATION OF VOGELSANG
WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK
CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER 870508-A49
---	---	Concord	RB	11/28/01					



LEGEND:

UG-01	UPGRADIENT SAMPLE LOCATION
DG-02	DOWNGRADIENT SAMPLE LOCATION
TP-01	TEST PIT SAMPLE LOCATION
•	TEST PIT WITH NO DEBRIS
⦿	TEST PIT WITH SUBSURFACE DEBRIS

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FIGURE 2-2

SITE MAP OF VOGELSANG WAA
WITH TEST PIT SAMPLE LOCATIONS
YOSEMITE NATIONAL PARK CALIFORNIA

TABLE 2-1: COMPOUNDS DETECTED IN PREVIOUS INVESTIGATION
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

All data in mg/kg

		Preliminary Remediation Goals	
Compound	**Result**	**Residential**	**Industrial**
Metals			
Antimony	0.6	31	820
Arsenic	1.6	0.39	2.7
Barium	17	5,400	100,000
Total Chromium	4.4	100,000	100,000
Cobalt	2.0	4,700	100,000
Copper	63	2,900	76,000
Lead	50	400	750
Mercury	1.3	23	610
Molybdenum	10	390	10,000
Nickel	4.8	1,600	41,000
Vanadium	16	550	14,000
Zinc	83	23,000	100,000
PCBs			
Aroclor-1260	0.120	0.22	1.0
Petroleum Hydrocarbons		**RWQCB RBSL**	**MADEP Standard**
Motor Oil [a]	27	1,000	5,000

[a] Components in the range of motor oil contain additional compounds uncharacteristic of common fuels and lubricants.

TABLE 3-1: SUMMARY OF ANALYSES PERFORMED
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Matrix	Sample Type	VOCs 8260B	SVOCs 8270C	PAHs 8310	TPH-extractable 8015E	OCPs 8081A	PCBs 8082	Metals 6010B/7470A	Hexavalent Chromium 7196A	Dioxins/ Furans 8290
Up-slope												
YWV-UG01-SO-1019	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-UG02-SO-1020	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-UG03-SO-1021	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	x
Test Pit												
YWV-TP01-SO-1033	8/22/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP01-SO-1034	8/22/2001	Soil	Field Duplicate	x	x	x	x	x	x	x	x	
YWV-TP02-SO-1031	8/22/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	x
YWV-TP02-SO-1032	8/22/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP03-SO-1025	8/21/2001	Soil	Biased Sample									x
YWV-TP03-SO-1026	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP03-SO-1027	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP04-SO-1029	8/22/2001	Soil	Biased Sample									x
YWV-TP04-SO-1030	8/22/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-TP04-SO-1028	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
Down-slope												
YWV-DG01-SO-1022	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-DG02-SO-1023	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
YWV-DG03-SO-1024	8/21/2001	Soil	Primary Sample	x	x	x	x	x	x	x	x	
Quality Control Sample												
YWV-MB-WH-1018	8/16/2001	Aqueous	Source Blank	x	x	x	x	x	x	x	x	
YWV-TB-WT-1017	8/16/2001	Aqueous	Trip Blank	x								
YWV-EB-WH-1035	8/23/2001	Aqueous	Rinse Blank	x	x	x	x	x	x	x	x	
YWV-TB-WT-1036	8/23/2001	Aqueous	Trip Blank	x								

x indicates analysis performed

TABLE 3-2: RELATIVE PERCENT DIFFERENCE BETWEEN FIELD DUPLICATE PAIRS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Depth (feet)	Analyte Name	NS	FD	RPD %
YWV-TP01	**0.5-1**				
VOCs (µg/kg)		Methylene chloride	13	9	36
		Toluene	4	0.9	**127**
TPH as Diesel (mg/kg)		Diesel fuel	24	8	**100**
		Diesel fuel (with silica gel cleanup)	9	5	**57**
		Motor Oils	160	69	**79**
		Motor Oils (with silica gel cleanup)	87	48	**58**
Total Metals (mg/kg)		Arsenic	2.9	3.2	10
		Barium	13.5	13	4
		Chromium	3.1	2.9	7
		Cobalt	2.9	2.8	4
		Copper	16	16.1	1
		Lead	4.3	4.2	2
		Molybdenum	19.6	21.3	8
		Nickel	1.9	1.6	17
		Vanadium	31.9	35	9
		Zinc	24	21.9	9
Mercury (mg/kg)		Total Mercury	0.13	0.23	**56**
pH		pH	6.36	6.15	3

Notes

Field duplicate RPD goal is 50.
FD = Field Duplicate
NS = Normal Sample

RPD = Relative Percent Difference = { (NS - FD) / (NS + FD) / 2 } x 100
RPD is calculated and shown only when both NS and FD are detected

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-UG01-SO-1019							
	01-5474-15	Chromium, hexavalent	<0.52	mg/kg	0.52	UJ	H
	01-5474-15	Methylene chloride	<12	µg/kg	12	U	B
	01-5474-15	pH	5.88		0.01	J	H
YWV-UG02-SO-1020							
	01-5474-16	Chromium, hexavalent	<0.53	mg/kg	0.53	UJ	H
	01-5474-16	Methylene chloride	<13	µg/kg	13	U	B
	01-5474-16	pH	5.44		0.01	J	H
YWV-UG03-SO-1021							
	G1I190244001	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	<0.65	pg/g	0.65	UJ	H
	G1I190244001	1,2,3,4,6,7,8-heptachlorodibenzofuran	<0.36	pg/g	0.36	UJ	H
	G1I190244001	1,2,3,4,7,8,9-heptachlorodibenzofuran	<0.44	pg/g	0.44	UJ	H
	G1I190244001	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	<0.79	pg/g	0.79	UJ	H
	G1I190244001	1,2,3,4,7,8-hexachlorodibenzofuran	<0.76	pg/g	0.76	UJ	H
	G1I190244001	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	<0.86	pg/g	0.86	UJ	H
	G1I190244001	1,2,3,6,7,8-hexachlorodibenzofuran	<0.76	pg/g	0.76	UJ	H
	G1I190244001	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	<0.76	pg/g	0.76	UJ	H
	G1I190244001	1,2,3,7,8,9-hexachlorodibenzofuran	<0.89	pg/g	0.89	UJ	H
	G1I190244001	1,2,3,7,8-pentachlorodibenzo-p-dioxin	<0.7	pg/g	0.7	UJ	H
	G1I190244001	1,2,3,7,8-pentachlorodibenzofuran	<0.6	pg/g	0.6	UJ	H
	G1I190244001	2,3,4,6,7,8-hexachlorodibenzofuran	<0.82	pg/g	0.82	UJ	H
	G1I190244001	2,3,4,7,8-pentachlorodibenzofuran	<0.6	pg/g	0.6	UJ	H
	G1I190244001	2,3,7,8-tetrachlorodibenzo-p-dioxin	<0.48	pg/g	0.48	UJ	H
	G1I190244001	2,3,7,8-tetrachlorodibenzofuran	<0.44	pg/g	0.44	UJ	H
	01-5474-17	4,4'-DDD	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	4,4'-DDE	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	4,4'-DDT	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Aldrin	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	alpha-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	alpha-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	beta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-17	delta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Dieldrin	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endosulfan I	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Endosulfan II	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endosulfan sulfate	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endrin	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endrin aldehyde	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	Endrin ketone	<2.2	µg/kg	2.2	UJ	S
	01-5474-17	gamma-BHC	<1.1	µg/kg	1.1	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-UG03-SO-1021							
	01-5474-17	gamma-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Heptachlor	<1.1	µg/kg	1.1	UJ	S
	01-5474-17	Heptachlor epoxide	<1.1	µg/kg	1.1	UJ	S
	G1I190244001	Heptachlorinated dibenzo-p-dioxins, (total)	<0.65	pg/g	0.65	UJ	H
	G1I190244001	Heptachlorinated dibenzofurans, (total)	<0.44	pg/g	0.44	UJ	H
	G1I190244001	Hexachlorinated dibenzo-p-dioxins, (total)	<0.86	pg/g	0.86	UJ	H
	G1I190244001	Hexachlorinated dibenzofurans, (total)	<0.89	pg/g	0.89	UJ	H
	01-5474-17	Methoxychlor	<11	µg/kg	11	UJ	S
	G1I190244001	Octachlorodibenzo-p-Dioxin	<1.1	pg/g	1.1	UJ	H
	G1I190244001	Octachlorodibenzofuran	<0.82	pg/g	0.82	UJ	H
	G1I190244001	Pentachlorinated dibenzo-p-dioxins, (total)	<0.7	pg/g	0.7	UJ	H
	G1I190244001	Pentachlorinated dibenzofurans, (total)	<0.6	pg/g	0.6	UJ	H
	G1I190244001	Tetrachlorinated dibenzo-p-dioxins, (total)	<0.48	pg/g	0.48	UJ	H
	01-5474-17	Toxaphene	<110	µg/kg	110	UJ	S
	01-5474-17	Methylene chloride	<15	µg/kg	15	U	B
	01-5474-17	pH	5.48		0.01	J	H
	G1I190244001	Tetrachlorinated dibenzofurans, (total)	37	pg/g	1.1	J -	H
YWV-TP01-SO-1033							
	01-5474-6	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-6	Methylene chloride	<23	µg/kg	23	U	B
	01-5474-6	pH	6.36		0.01	J	H
YWV-TP01-SO-1034							
	01-5474-7	2,4-Dinitrophenol	<1800	µg/kg	1800	UJ	C
	01-5474-7	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-7	Methylene chloride	<15	µg/kg	15	U	B
	01-5474-7	Acetone	51	µg/kg	76	J	CTr
	01-5474-7	pH	6.15		0.01	J	H
YWV-TP02-SO-1031							
	G1I190244002	1,2,3,4,7,8,9-heptachlorodibenzofuran	<0.66	pg/g	0.66	UJ	H
	G1I190244002	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	<0.98	pg/g	0.98	UJ	H
	G1I190244002	1,2,3,4,7,8-hexachlorodibenzofuran	<0.75	pg/g	0.75	UJ	H
	G1I190244002	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	<2.4	pg/g	2.4	UJ	H
	G1I190244002	1,2,3,6,7,8-hexachlorodibenzofuran	<0.75	pg/g	0.75	UJ	H
	G1I190244002	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	<1.6	pg/g	1.6	UJ	H
	G1I190244002	1,2,3,7,8,9-hexachlorodibenzofuran	<0.88	pg/g	0.88	UJ	H
	G1I190244002	1,2,3,7,8-pentachlorodibenzo-p-dioxin	<1	pg/g	1	UJ	H
	G1I190244002	1,2,3,7,8-pentachlorodibenzofuran	<0.73	pg/g	0.73	UJ	H
	G1I190244002	2,3,4,6,7,8-hexachlorodibenzofuran	<0.8	pg/g	0.8	UJ	H
	G1I190244002	2,3,4,7,8-pentachlorodibenzofuran	<0.73	pg/g	0.73	UJ	H
	G1I190244002	2,3,7,8-tetrachlorodibenzo-p-dioxin	<0.52	pg/g	0.52	UJ	H

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-TP02-SO-1031							
	01-5474-8	2,4-Dinitrophenol	<1900	µg/kg	1900	UJ	C
	01-5474-8	4,4'-DDT	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Aldrin	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	alpha-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	alpha-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	beta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Chromium, hexavalent	<0.57	mg/kg	0.57	UJ	H
	01-5474-8	delta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Endosulfan I	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Endosulfan II	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Endosulfan sulfate	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Endrin	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Endrin aldehyde	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	Endrin ketone	<2.3	µg/kg	2.3	UJ	S
	01-5474-8	gamma-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	gamma-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Heptachlor	<1.1	µg/kg	1.1	UJ	S
	01-5474-8	Methoxychlor	<11	µg/kg	11	UJ	S
	G1I190244002	Pentachlorinated dibenzo-p-dioxins, (total)	<1	pg/g	1	UJ	H
	G1I190244002	Pentachlorinated dibenzofurans, (total)	<1.6	pg/g	1.6	UJ	H
	01-5474-8	Toxaphene	<110	µg/kg	110	UJ	S
	01-5474-8	Methylene chloride	<16	µg/kg	16	U	B
	G1I190244002	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	42	pg/g	5.3	J -	H
	G1I190244002	1,2,3,4,6,7,8-heptachlorodibenzofuran	5.3	pg/g	5.3	J -	H
	G1I190244002	2,3,7,8-tetrachlorodibenzofuran	1.8	pg/g	1.1	J -	H
	01-5474-8	4,4'-DDD	31	µg/kg	2.3	J -	S
	01-5474-8	4,4'-DDE	22	µg/kg	2.3	J -	S
	01-5474-8	Acetone	370	µg/kg	79	J	C
	01-5474-8	Dieldrin	2	µg/kg	2.3	J -	S
	01-5474-8	Heptachlor epoxide	0.7	µg/kg	1.1	J -	S
	G1I190244002	Heptachlorinated dibenzo-p-dioxins, (total)	71	pg/g	5.3	J -	H
	G1I190244002	Heptachlorinated dibenzofurans, (total)	19	pg/g	5.3	J -	H
	G1I190244002	Hexachlorinated dibenzo-p-dioxins, (total)	4.9	pg/g	5.3	J -	H
	G1I190244002	Hexachlorinated dibenzofurans, (total)	4.4	pg/g	5.3	J -	H
	G1I190244002	Octachlorodibenzo-p-Dioxin	320	pg/g	11	J -	H
	G1I190244002	Octachlorodibenzofuran	11	pg/g	11	J -	H
	01-5474-8	pH	5.97		0.01	J	H
	G1I190244002	Tetrachlorinated dibenzo-p-dioxins, (total)	1.8	pg/g	1.1	J -	H
	G1I190244002	Tetrachlorinated dibenzofurans, (total)	5	pg/g	1.1	J -	H

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-TP02-SO-1032							
	01-5474-9	2,4-Dinitrophenol	<1800	µg/kg	1800	UJ	C
	01-5474-9	Chromium, hexavalent	<0.53	mg/kg	0.53	UJ	H
	01-5474-9	Methylene chloride	<12	µg/kg	12	U	B
	01-5474-9	pH	6.36		0.01	J	H
YWV-TP03-SO-1026							
	01-5474-11	2,4-Dinitrophenol	<1800	µg/kg	1800	UJ	C
	01-5474-11	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-11	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-11	Acetone	110	µg/kg	70	J	C
	01-5474-11	pH	6.2		0.01	J	H
YWV-TP03-SO-1027							
	01-5474-12	1,2,4-Trichlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	1,2-Dichlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	1,3-Dichlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	1,4-Dichlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	2,4-Dinitrotoluene	<360	µg/kg	360	UJ	S
	01-5474-12	2,6-Dinitrotoluene	<360	µg/kg	360	UJ	S
	01-5474-12	2-Chloronaphthalene	<360	µg/kg	360	UJ	S
	01-5474-12	2-Methylnaphthalene	<360	µg/kg	360	UJ	S
	01-5474-12	2-Nitroaniline	<1800	µg/kg	1800	UJ	S
	01-5474-12	3,3'-Dichlorobenzidine	<720	µg/kg	720	UJ	S
	01-5474-12	3-Nitroaniline	<1800	µg/kg	1800	UJ	S
	01-5474-12	4-Bromophenylphenyl ether	<360	µg/kg	360	UJ	S
	01-5474-12	4-Chloroaniline	<810	µg/kg	810	UJ	S
	01-5474-12	4-Chlorophenylphenyl ether	<360	µg/kg	360	UJ	S
	01-5474-12	4-Nitroaniline	<1800	µg/kg	1800	UJ	S
	01-5474-12	Acenaphthene	<360	µg/kg	360	UJ	S
	01-5474-12	Acenaphthylene	<360	µg/kg	360	UJ	S
	01-5474-12	Anthracene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(a)anthracene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(a)pyrene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(b)fluoranthene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(g,h,i)perylene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzo(k)fluoranthene	<360	µg/kg	360	UJ	S
	01-5474-12	Benzyl alcohol	<360	µg/kg	360	UJ	S
	01-5474-12	Benzyl butyl phthalate	<360	µg/kg	360	UJ	S
	01-5474-12	bis(2-Chloroethoxy)methane	<360	µg/kg	360	UJ	S
	01-5474-12	bis(2-Chloroethyl)ether	<360	µg/kg	360	UJ	S
	01-5474-12	bis(2-chloroisopropyl) ether	<360	µg/kg	360	UJ	S
	01-5474-12	bis(2-Ethylhexyl)phthalate	<360	µg/kg	360	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-TP03-SO-1027							
	01-5474-12	Chromium, hexavalent	<0.54	mg/kg	0.54	UJ	H
	01-5474-12	Chrysene	<360	µg/kg	360	UJ	S
	01-5474-12	Di-n-butyl phthalate	<360	µg/kg	360	UJ	S
	01-5474-12	Di-n-octyl phthalate	<360	µg/kg	360	UJ	S
	01-5474-12	Dibenz(a,h)anthracene	<360	µg/kg	360	UJ	S
	01-5474-12	Dibenzofuran	<360	µg/kg	360	UJ	S
	01-5474-12	Diethylphthalate	<360	µg/kg	360	UJ	S
	01-5474-12	Dimethylphthalate	<360	µg/kg	360	UJ	S
	01-5474-12	Fluoranthene	<360	µg/kg	360	UJ	S
	01-5474-12	Fluorene	<360	µg/kg	360	UJ	S
	01-5474-12	Hexachlorobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	Hexachlorobutadiene	<360	µg/kg	360	UJ	S
	01-5474-12	Hexachlorocyclopentadiene	<1800	µg/kg	1800	UJ	S
	01-5474-12	Hexachloroethane	<360	µg/kg	360	UJ	S
	01-5474-12	Indeno(1,2,3-c,d)pyrene	<360	µg/kg	360	UJ	S
	01-5474-12	Isophorone	<360	µg/kg	360	UJ	S
	01-5474-12	N-Nitrosodi-n-propylamine	<360	µg/kg	360	UJ	S
	01-5474-12	N-Nitrosodiphenylamine	<360	µg/kg	360	UJ	S
	01-5474-12	Naphthalene	<360	µg/kg	360	UJ	S
	01-5474-12	Nitrobenzene	<360	µg/kg	360	UJ	S
	01-5474-12	Phenanthrene	<360	µg/kg	360	UJ	S
	01-5474-12	Pyrene	<360	µg/kg	360	UJ	S
	01-5474-12	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-12	Acetone	79	µg/kg	68	J	C
	01-5474-12	pH	6.13		0.01	J	H
YWV-TP04-SO-1030							
	01-5474-14	1,3-Dichlorobenzene	<7.1	µg/kg	7.1	UJ	M
	01-5474-14	1,4-Dichlorobenzene	<7.1	µg/kg	7.1	UJ	M
	01-5474-14	4,4'-DDD	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	4,4'-DDT	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	Aldrin	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	alpha-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	alpha-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	beta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Chromium, hexavalent	<0.57	mg/kg	0.57	UJ	H
	01-5474-14	delta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Endosulfan I	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Endosulfan II	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	Endosulfan sulfate	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	Endrin	<2.3	µg/kg	2.3	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-TP04-SO-1030							
	01-5474-14	Endrin aldehyde	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	Endrin ketone	<2.3	µg/kg	2.3	UJ	S
	01-5474-14	gamma-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	gamma-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Heptachlor	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Heptachlor epoxide	<1.1	µg/kg	1.1	UJ	S
	01-5474-14	Methoxychlor	<11	µg/kg	11	UJ	S
	01-5474-14	Toxaphene	<110	µg/kg	110	UJ	S
	01-5474-14	Vinyl acetate	<14	µg/kg	14	UJ	M
	01-5474-14	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-14	1,2-Dichlorobenzene	1	µg/kg	7.1	J -	MTr
	01-5474-14	4,4'-DDE	0.5	µg/kg	2.3	J -	S
	01-5474-14	Dieldrin	0.5	µg/kg	2.3	J -	S
	01-5474-14	pH	6.03		0.01	J	H
YWV-TP04-SO-1028							
	01-5474-13	4,4'-DDD	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	4,4'-DDE	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	4,4'-DDT	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Aldrin	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	alpha-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	alpha-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	beta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Chromium, hexavalent	<0.56	mg/kg	0.56	UJ	H
	01-5474-13	delta-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Dieldrin	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endosulfan I	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Endosulfan II	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endosulfan sulfate	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endrin	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endrin aldehyde	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	Endrin ketone	<2.2	µg/kg	2.2	UJ	S
	01-5474-13	gamma-BHC	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	gamma-Chlordane	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Heptachlor	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Heptachlor epoxide	<1.1	µg/kg	1.1	UJ	S
	01-5474-13	Methoxychlor	<11	µg/kg	11	UJ	S
	01-5474-13	Toxaphene	<110	µg/kg	110	UJ	S
	01-5474-13	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-13	Acetone	61	µg/kg	70	J	C
	01-5474-13	pH	6.07		0.01	J	H

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-DG01-SO-1022							
	01-5474-3	4,4'-DDD	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	4,4'-DDE	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	4,4'-DDT	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Aldrin	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	alpha-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	alpha-Chlordane	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	beta-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Chromium, hexavalent	<0.61	mg/kg	0.61	UJ	H
	01-5474-3	delta-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Dieldrin	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endosulfan I	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Endosulfan II	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endosulfan sulfate	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endrin	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endrin aldehyde	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	Endrin ketone	<2.4	µg/kg	2.4	UJ	S
	01-5474-3	gamma-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	gamma-Chlordane	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Heptachlor	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Heptachlor epoxide	<1.2	µg/kg	1.2	UJ	S
	01-5474-3	Methoxychlor	<12	µg/kg	12	UJ	S
	01-5474-3	Toxaphene	<120	µg/kg	120	UJ	S
	01-5474-3	Methylene chloride	<14	µg/kg	14	U	B
	01-5474-3	pH	7.38		0.01	J	H
YWV-DG02-SO-1023							
	01-5474-4	4,4'-DDD	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	4,4'-DDE	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	4,4'-DDT	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Aldrin	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	alpha-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	alpha-Chlordane	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	beta-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Chromium, hexavalent	<0.58	mg/kg	0.58	UJ	H
	01-5474-4	delta-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Dieldrin	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Endosulfan I	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Endosulfan II	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Endosulfan sulfate	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Endrin	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	Endrin aldehyde	<2.3	µg/kg	2.3	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-DG02-SO-1023							
	01-5474-4	Endrin ketone	<2.3	µg/kg	2.3	UJ	S
	01-5474-4	gamma-BHC	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	gamma-Chlordane	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Heptachlor	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Heptachlor epoxide	<1.2	µg/kg	1.2	UJ	S
	01-5474-4	Methoxychlor	<12	µg/kg	12	UJ	S
	01-5474-4	Toxaphene	<120	µg/kg	120	UJ	S
	01-5474-4	Methylene chloride	<16	µg/kg	16	U	B
	01-5474-4	Acetone	31	µg/kg	81	J	CTr
	01-5474-4	pH	7.08		0.01	J	H
YWV-DG03-SO-1024							
	01-5474-5	Chromium, hexavalent	<0.53	mg/kg	0.53	UJ	H
	01-5474-5	Beryllium	<0.85	mg/kg	0.85	U	B
	01-5474-5	Methylene chloride	<18	µg/kg	18	U	B
	01-5474-5	pH	6.74		0.01	J	H
YWV-MB-WH-1018							
	01-5321-2	2,4-Dinitrophenol	<50	µg/L	50	UJ	C
	01-5321-2	Bromomethane	<0.5	µg/L	0.5	UJ	CLM
	01-5321-2	TPH, as gasoline	<0.05	mg/L	0.05	U	K
YWV-TB-WT-1017							
	01-5321-1	Bromomethane	<0.5	µg/L	0.5	UJ	C
YWV-EB-WH-1035							
	01-5474-1	4,4'-DDD	<0.1	µg/L	0.1	UJ	S
	01-5474-1	4,4'-DDE	<0.1	µg/L	0.1	UJ	S
	01-5474-1	4,4'-DDT	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Aldrin	<0.05	µg/L	0.05	UJ	S
	01-5474-1	alpha-BHC	<0.05	µg/L	0.05	UJ	S
	01-5474-1	alpha-Chlordane	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Aroclor-1016	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1221	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1232	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1242	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1248	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1254	<1	µg/L	1	UJ	S
	01-5474-1	Aroclor-1260	<1	µg/L	1	UJ	S
	01-5474-1	beta-BHC	<0.05	µg/L	0.05	UJ	S
	01-5474-1	delta-BHC	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Dieldrin	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Endosulfan I	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Endosulfan II	<0.1	µg/L	0.1	UJ	S

TABLE 3-3: QUALIFIED RESULTS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Field Sample ID	Lab ID	Parameter	Result	Units	Reporting Limit	Qualifiers	Reason Code
YWV-EB-WH-1035							
	01-5474-1	Endosulfan sulfate	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Endrin	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Endrin aldehyde	<0.1	µg/L	0.1	UJ	S
	01-5474-1	Endrin ketone	<0.1	µg/L	0.1	UJ	S
	01-5474-1	gamma-BHC	<0.05	µg/L	0.05	UJ	S
	01-5474-1	gamma-Chlordane	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Heptachlor	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Heptachlor epoxide	<0.05	µg/L	0.05	UJ	S
	01-5474-1	Methoxychlor	<2	µg/L	2	UJ	S
	01-5474-1	Toxaphene	<5	µg/L	5	UJ	S

Note:

Qualifiers

-	Bias low
J	The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U	The analyte was analyzed for, but was not detected above the reporting limit.
UJ	The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Reason Codes

B	Laboratory Blank Contamination
C	The continuing calibration statistic outside acceptance criteria
H	Holding time violation
K	Field Blank Contamination
L	Compound recovered outside the laboratory control sample acceptance criteria
M	Compound recovered outside the matrix spike/spike duplicate acceptance criteria
S	Surrogate recovery outside control limit.
Tr	Value reported detected between the MDL and PQL

TABLE 4-1: INORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO PRELIMINARY REMEDIATION GOALS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	CAM 17 Metals by EPA Methods 6010B and 7470A (mg/kg)																	EPA Method 7196 (mg/kg)
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Hexavalent Chromium
YWV-UG01-SO-1019	08/21/2001	0.5	<5.2	2.2	21.4	<0.21	0.0096 J^	1.6	3.3	11.8	3.5	0.075 J^	0.61	1.8	<0.52	<0.52	<0.52	15.5	21.8	<0.52 UJ
YWV-UG02-SO-1020	08/21/2001	0.5	<5.3	0.92	4.2	<0.21	<0.11	1.2	1	4	1.4	0.13 J^	0.34	0.59	<0.53	<0.53	<0.53	10.3	11.4	<0.53 UJ
YWV-UG03-SO-1021	08/21/2001	0.5	<22	2.5	43.6	0.59 J^	0.25 J^	6.5	4.6	27.7	8.7	0.13 J^	1.3	5.3	<2.2	<2.2	<2.2	20.7	31.6	<0.54 UJ
YWV-TP01-SO-1033	08/22/2001	0.5	<21	2.9	13.5	<0.86	<0.43	3.1	2.9	16	4.3	0.13 J^	19.6	1.9	<2.1	<2.1	<2.1	31.9	24	<0.54 UJ
YWV-TP01-SO-1034 (FD)	08/22/2001	0.5	<21	3.2	13	<0.86	<0.43	2.9	2.8	16.1	4.2	0.23	21.3	1.6	<2.1	<2.1	<2.1	35	21.9	<0.54 UJ
YWV-TP02-SO-1031	08/22/2001	0.7	<23	6.4	28.1	<0.91	0.3 J^	7.8	8.8	163	64.6	0.25	5.5	26	<2.3	<2.3	<2.3	23.5	233	<0.57 UJ
YWV-TP02-SO-1032	08/22/2001	2	<21	3.6	11.1	<0.85	0.13 J^	4.7	3.4	152	13.4	0.16 J^	25.8	3.5	<2.1	<2.1	<2.1	25.3	80	<0.53 UJ
YWV-TP03-SO-1026	08/21/2001	0.7	<22	2.3	32.6	<0.86	14.8	3.6	8.4	31.4	9.7	0.13 J^	20	10.1	<2.2	<2.2	<2.2	26.2	128	<0.54 UJ
YWV-TP03-SO-1027	08/21/2001	2	<22	3.1	26.3	<0.87	1	3.5	5.9	46.1	91.5	0.66	24.3	8.2	<2.2	<2.2	<2.2	28.9	456	<0.54 UJ
YWV-TP04-SO-1030	08/22/2001	1.1	<5.7	2.9	27.2	<0.23	0.28	4.2	3.8	373	8.9	0.14 J^	10.6	5.4	<0.57	<0.57	<0.57	25.9	102	<0.57 UJ
YWV-TP04-SO-1028	08/21/2001	2.8	<22	1.9	32.9	<0.89	0.45	2.7	3.1	262	29.4	0.15 J^	4	5.2	<2.2	<2.2	<2.2	16	131	<0.56 UJ
YWV-DG01-SO-1022	08/21/2001	0.5	<24	2.7	17.2	<0.98	<0.49	3.2	3.5	23.9	5.3	0.25	88.6	4.5	<2.4	<2.4	<2.4	34.6	61.5	<0.61 UJ
YWV-DG02-SO-1023	08/21/2001	0.5	<23	2.3	15.2	<0.93	<0.46	3.4	3.3	18.3	5	0.11 J^	32.5	2.5	<2.3	<2.3	<2.3	27.9	29.2	<0.58 UJ
YWV-DG03-SO-1024	08/21/2001	0.5	<21	2.9	18.2	<0.85 U	<0.43	4.3	3.1	15.5	5.2	0.24	22.7	2.8	<2.1	<2.1	<2.1	28.1	24.5	<0.53 UJ
Preliminary Remediation Goals (Res. Soil):			31	0.39	5400	150	9	210	4700	2900	400	23	390	150	390	390	5.2	550	23000	0.2
Preliminary Remediation Goals (Ind. Soil):			820	2.7	1E+05	2200	810	450	1E+05	76000	750	610	10000	41000	10000	10000	130	14000	1E+05	64
Yosemite UTL Background Statistic:			28.8	19.4	211	1.12	0.46	13.8	18.5	50.9	33.9	1.2	1.32	8.48	2.93	2.95	2.44	76.1	84.1	0.7

(FD): field duplicate
fbgs: feet below ground surface
Res. Soil: Residential Soil
Ind. Soil: Industrial Soil

J^ Reported between method detection limit and practical quantitation limit
U The analyte was analyzed for, but was not detected above the reporting limit.
UJ The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
Detections shown in bold, circled if above Residential Preliminary Remediation Goals, boxed if above Industrial Preliminary Remediation Goals, and underlined if above UTL Background Statistic.

TABLE 4-2: TOTAL PETROLEUM HYDROCARBONS IN SOIL SAMPLES
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	Moisture Content (%)	EPA METHOD 8015B (mg/kg)			
				TPH-diesel	TPH-diesel (SGC)	TPH-motor oil	TPH-motor oil (SGC)
YWV-UG01-SO-1019	08/21/2001	0.5-1	3.1	**3 J^**	**5 J^**	**24**	**21**
YWV-UG02-SO-1020	08/21/2001	0.5-1	5.4	**7 J^**	**6 J^**	**81**	**56**
YWV-UG03-SO-1021	08/21/2001	0.5-1	7	**6 J^**	**5 J^**	**51**	**41**
YWV-TP01-SO-1033	08/22/2001	0.5-1	6.8	**24**	**9 J^**	**160**	**87**
YWV-TP01-SO-1034 (FD)	08/22/2001	0.5-1	7	**8 J^**	**5 J^**	**69**	**48**
YWV-TP02-SO-1031	08/22/2001	0.7-1.2	12.2	**57**	**38**	**160**	**110**
YWV-TP02-SO-1032	08/22/2001	2-2.5	5.5	<11	<11	**17**	**13**
YWV-TP03-SO-1026	08/21/2001	0.7-1.2	7.4	**16**	**9 J^**	**110**	**73**
YWV-TP03-SO-1027	08/21/2001	2-2.5	7.9	**43**	**29**	**73**	**50**
YWV-TP04-SO-1030	08/22/2001	1.1-1.6	11.7	**11**	**7 J^**	**55**	**34**
YWV-TP04-SO-1028	08/21/2001	2.8-3.3	10.1	**12**	**8 J^**	**56**	**39**
YWV-DG01-SO-1022	08/21/2001	0.5-1	18	**14**	**8 J^**	**62**	**37**
YWV-DG02-SO-1023	08/21/2001	0.5-1	14	**18**	**6 J^**	**83**	**42**
YWV-DG03-SO-1024	08/21/2001	0.5-1	6.3	**12**	**6 J^**	**74**	**37**
MADEP Cleanup Standards for soil:				5,000	5,000	5,000	5,000
RWQCB Risk Based Screening Level:				500	500	1,000	1,000

(FD): field duplicate
fbgs: feet below ground surface
SGC: with silica gel cleanup
MADEP: Massachusetts Department of Environmental Protection
RWQCB: Regional Water Quality Control Board

J The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U The analyte was analyzed for, but was not detected above the reporting limit.

TABLE 4-3: ORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO PRELIMINARY REMEDIATION GOALS
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

			VOCs (µg/kg) EPA Method 8260						SVOCs (µg/kg) EPA Method 8270	PAHS (µg/kg) EPA Method 8310	Pesticides/PCBs (µg/kg) EPA Method 8081					
Location ID	**Sample Date**	**Sample Depth (fbgs)**	1,2-Dichlorobenzene	Acetone	Methyl ethyl ketone	Methyl isobutyl ketone	Methylene chloride	Toluene	Bis(2-ethylhexyl) phthalate	Chyrsene	DDD44	DDE44	DDT44	Dieldrin	Heptachlor epoxide	PCB-1260 (Aroclor 1260)
YWV-UG01-SO-1019	8/21/2001	0.5-1	<5.8	<58	<58	<5.8	<12 U	**0.8 J^**	<340	<340	<2.1	<2.1	<2.1	<2.1	<1	<26
YWV-UG02-SO-1020	8/21/2001	0.5-1	<6.5	<65	<65	<6.5	<13 U	<6.5	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<26
YWV-UG03-SO-1021	8/21/2001	0.5-1	<7.6	<76	<76	<7.6	<15 U	<7.6	<350	**6.7**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	<27
YWV-TP01-SO-1033	8/22/2001	0.5-1	<350	<110	<110	<11	<23 U	**4 J^**	<350	**6.2**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP01-SO-1034 (FD)	8/22/2001	0.5-1	<7.6	**51 J**	**9 J^**	<7.6	<15 U	**0.9 J^**	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP02-SO-1031	8/22/2001	0.7-1.2	<7.9	**370 J**	**18 J^**	**1 J^**	<16 U	<7.9	**85 J^**	**4**	**31 J-**	**22 J-**	<2.3 UJ	**2 J-**	**0.7 J-**	**45**
YWV-TP02-SO-1032	8/22/2001	2-2.5	<6	<60	<60	<6	<12 U	<6	<350	<350	<2.1	**0.4 J^**	<2.1	<2.1	<1.1	**11 J^**
YWV-TP03-SO-1026	8/21/2001	0.7-1.2	<7	**110 J**	<70	<7	<14 U	<7	<360	**12**	<2.2	<2.2	<2.2	<2.2	<1.1	<27
YWV-TP03-SO-1027	8/21/2001	2-2.5	<6.8	**79 J**	<68	<6.8	<14 U	<6.8	<360 UJ	**5.3**	<2.2	<2.2	**2 J^**	<2.2	<1.1	**13 J^**
YWV-TP04-SO-1030	8/22/2001	1.1-1.6	**1 J-**	<71	<71	<7.1	<14 U	<7.1	<370	**5.2**	<2.3 UJ	**0.5 J-**	<2.3 UJ	**0.5 J-**	<1.1 UJ	<28
YWV-TP04-SO-1028	8/21/2001	2.8-3.3	<7	**61 J**	**8 J^**	<7	<14 U	**1 J^**	<370	**4**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	**17 J^**
YWV-DG01-SO-1022	8/21/2001	0.5-1	<7.1	<71	<71	<7.1	<14 U	<7.1	**240 J^**	**52**	<2.4 UJ	<2.4 UJ	<2.4 UJ	<2.4 UJ	<1.2 UJ	<30
YWV-DG02-SO-1023	8/21/2001	0.5-1	<8.1	**31 J**	<81	<8.1	<16 U	<8.1	<380	**25**	<2.3 UJ	<2.3 UJ	<2.3 UJ	<2.3 UJ	<1.2 UJ	<29
YWV-DG03-SO-1024	8/21/2001	0.5-1	<8.8	<88	<88	<8.8	<18 U	<8.8	<350	**16**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
Preliminary Remediation Goals: (Res. Soil):			2E+06	370000	7E+06	790000	8900	520000	35000	6100	2400	1700	1700	30	53	220
Preliminary Remediation Goals: (Ind. Soil):			6E+06	370000	3E+07	3E+06	21000	520000	180000	290000	17000	12000	12000	150	270	1000

(FD): field duplicate
fbgs: feet below ground surface
Res. Soil Residential Soil
Ind. Soil Industrial Soil

J^: Reported between method detection limit and practical quantitation limit
J: The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U: The analyte was analyzed for, but was not detected above the reporting limit.
UJ: The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
\- Bias low
Detections shown in bold.

TABLE 4-4: DIOXINS AND FURANS IN SOIL SAMPLES AND 2,3,7,8-TCDD TOXIC EQUIVALENCE CALCULATIONS VOGELSANG WASTE ACCUMULATION AREA YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Analyte Group	Compound	Result		TEQ Factor	TEQ Result	Units
YWV-UG03-SO-1021	**8/21/2001**							
		Dioxins	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzo-p-dioxin	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzo-p-dioxin	0	ND	1	0	PG/G
			Octachlorodibenzo-p-Dioxin	0	ND	0.001	0	PG/G
						Dioxins SubTotal:	0	PG/G
		Furans	1,2,3,4,6,7,8-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8,9-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzofuran	0	ND	0.05	0	PG/G
			2,3,4,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			2,3,4,7,8-pentachlorodibenzofuran	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzofuran	0	ND	0.1	0	PG/G
			Octachlorodibenzofuran	0	ND	0.001	0	PG/G
						Furans SubTotal:	0	PG/G
						YWV-UG03-SO-1021 TEQ:	**0**	**PG/G**
Residential Soil Preliminary Remediation Goal:				**2,3,7,8-tetrachlorodibenzo-p-dioxin:**			**3.9**	**PG/G**
Industrial Soil Preliminary Remediation Goal:				**2,3,7,8-tetrachlorodibenzo-p-dioxin:**			**27**	**PG/G**
Ecological Soil Preliminary Remediation Goal:				**2,3,7,8-tetrachlorodibenzo-p-dioxin:**			**3.15**	**PG/G**

TABLE 4-4: DIOXINS AND FURANS IN SOIL SAMPLES AND 2,3,7,8-TCDD TOXIC EQUIVALENCE CALCULATIONS VOGELSANG WASTE ACCUMULATION AREA YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Analyte Group	Compound	Result		TEQ Factor	TEQ Result	Units
YWV-TP02-SO-1031	**8/22/2001**							
		Dioxins	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	42		0.01	0.42	PG/G
			1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzo-p-dioxin	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzo-p-dioxin	0	ND	1	0	PG/G
			Octachlorodibenzo-p-Dioxin	320		0.001	0.32	PG/G
						Dioxins SubTotal:	0.74	PG/G
		Furans	1,2,3,4,6,7,8-heptachlorodibenzofuran	5.3		0.01	0.053	PG/G
			1,2,3,4,7,8,9-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzofuran	0	ND	0.05	0	PG/G
			2,3,4,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			2,3,4,7,8-pentachlorodibenzofuran	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzofuran	1.8		0.1	0.18	PG/G
			Octachlorodibenzofuran	11		0.001	0.011	PG/G
						Furans SubTotal:	0.244	PG/G
						YWV-TP02-SO-1031 TEQ:	**0.984**	**PG/G**
Residential Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.9**	**PG/G**
Industrial Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**27**	**PG/G**
Ecological Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.15**	**PG/G**

TABLE 4-4: DIOXINS AND FURANS IN SOIL SAMPLES AND 2,3,7,8-TCDD TOXIC EQUIVALENCE CALCULATIONS VOGELSANG WASTE ACCUMULATION AREA YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Analyte Group	Compound	Result		TEQ Factor	TEQ Result	Units
YWV-TP03-SO-1025	**8/21/2001**							
		Dioxins	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	6.3		0.01	0.063	PG/G
			1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzo-p-dioxin	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzo-p-dioxin	0	ND	1	0	PG/G
			Octachlorodibenzo-p-Dioxin	31		0.001	0.031	PG/G
						Dioxins SubTotal:	0.094	PG/G
		Furans	1,2,3,4,6,7,8-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8,9-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8,9-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzofuran	0	ND	0.05	0	PG/G
			2,3,4,6,7,8-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			2,3,4,7,8-pentachlorodibenzofuran	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzofuran	0	ND	0.1	0	PG/G
			Octachlorodibenzofuran	0	ND	0.001	0	PG/G
						Furans SubTotal:	0	PG/G
						YWV-TP03-SO-1025 TEQ:	**0.094**	**PG/G**

Residential Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.9**	**PG/G**
Industrial Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**27**	**PG/G**
Ecological Soil Preliminary Remediation Goal:	**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.15**	**PG/G**

TABLE 4-4: DIOXINS AND FURANS IN SOIL SAMPLES AND 2,3,7,8-TCDD TOXIC EQUIVALENCE CALCULATIONS VOGELSANG WASTE ACCUMULATION AREA YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Analyte Group	Compound	Result		TEQ Factor	TEQ Result	Units
YWV-TP04-SO-1029	**8/22/2001**							
		Dioxins	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	26		0.01	0.26	PG/G
			1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0	ND	0.1	0	PG/G
			1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	3.5		0.1	0.35	PG/G
			1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	3.3		0.1	0.33	PG/G
			1,2,3,7,8-pentachlorodibenzo-p-dioxin	0	ND	0.5	0	PG/G
			2,3,7,8-tetrachlorodibenzo-p-dioxin	6.5		1	6.5	PG/G
			Octachlorodibenzo-p-Dioxin	69		0.001	0.069	PG/G
						Dioxins SubTotal:	7.509	PG/G
		Furans	1,2,3,4,6,7,8-heptachlorodibenzofuran	9.9		0.01	0.099	PG/G
			1,2,3,4,7,8,9-heptachlorodibenzofuran	0	ND	0.01	0	PG/G
			1,2,3,4,7,8-hexachlorodibenzofuran	3.8		0.1	0.38	PG/G
			1,2,3,6,7,8-hexachlorodibenzofuran	3.2		0.1	0.32	PG/G
			1,2,3,7,8,9-hexachlorodibenzofuran	0	ND	0.1	0	PG/G
			1,2,3,7,8-pentachlorodibenzofuran	3.1		0.05	0.155	PG/G
			2,3,4,6,7,8-hexachlorodibenzofuran	4.4		0.1	0.44	PG/G
			2,3,4,7,8-pentachlorodibenzofuran	6.1		0.5	3.05	PG/G
			2,3,7,8-tetrachlorodibenzofuran	5.6		0.1	0.56	PG/G
			Octachlorodibenzofuran	0	ND	0.001	0	PG/G
						Furans SubTotal:	5.004	PG/G
						YWV-TP04-SO-1029 TEQ:	**12.513**	**PG/G**
Residential Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.9**	**PG/G**
Industrial Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**27**	**PG/G**
Ecological Soil Preliminary Remediation Goal:						**2,3,7,8-tetrachlorodibenzo-p-dioxin:**	**3.15**	**PG/G**

NOTES:

PG/G: picograms per gram
ND: Non-detect result
TEQ: Toxicity Equivalence (Risk Based). See Reference (Cancer Potency Factor Update DTSC/Sacramento CalEPA, 1997)

TABLE 5-1: INORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO ECOLOGICAL SCREENING VALUES
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

Location ID	Sample Date	Sample Depth (fbgs)	CAM 17 Metals by EPA Methods 6010B and 7470A (mg/kg)																	EPA Method 7196 (mg/kg)
			Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Hexavalent Chromium
YWV-UG01-SO-1019	8/21/2001	0.5	<5.2	**2.2**	**21.4**	<0.21	**0.0096 J^**	**1.6**	**3.3**	**11.8**	**3.5**	**0.075 J^**	**0.61**	**1.8**	<0.52	<0.52	<0.52	**15.5**	**21.8**	<0.52 UJ
YWV-UG02-SO-1020	8/21/2001	0.5	<5.3	**0.92**	**4.2**	<0.21	<0.11	**1.2**	**1**	**4**	**1.4**	**0.13 J^**	**0.34**	**0.59**	<0.53	<0.53	<0.53	**10.3**	**11.4**	<0.53 UJ
YWV-UG03-SO-1021	8/21/2001	0.5	<22	**2.5**	**43.6**	**0.59 J^**	**0.25 J^**	**6.5**	**4.6**	**27.7**	**8.7**	**0.13 J^**	**1.3**	**5.3**	<2.2	<2.2	<2.2	**20.7**	**31.6**	<0.54 UJ
YWV-TP01-SO-1033	8/22/2001	0.5	<21	**2.9**	**13.5**	<0.86	<0.43	**3.1**	**2.9**	**16**	**4.3**	**0.13 J^**	**19.6**	**1.9**	<2.1	<2.1	<2.1	**31.9**	**24**	<0.54 UJ
YWV-TP01-SO-1034 (FD)	8/22/2001	0.5	<21	**3.2**	**13**	<0.86	<0.43	**2.9**	**2.8**	**16.1**	**4.2**	**0.23**	**21.3**	**1.6**	<2.1	<2.1	<2.1	**35**	**21.9**	<0.54 UJ
YWV-TP02-SO-1031	8/22/2001	0.7	<23	**6.4**	**28.1**	<0.91	**0.3 J^**	**7.8**	**8.8**	**163**	**64.6**	**0.25**	**5.5**	**26**	<2.3	<2.3	<2.3	**23.5**	**233**	<0.57 UJ
YWV-TP02-SO-1032	8/22/2001	2	<21	**3.6**	**11.1**	<0.85	**0.13 J^**	**4.7**	**3.4**	**152**	**13.4**	**0.16 J^**	**25.8**	**3.5**	<2.1	<2.1	<2.1	**25.3**	**80**	<0.53 UJ
YWV-TP03-SO-1026	8/21/2001	0.7	<22	**2.3**	**32.6**	<0.86	**14.8**	**3.6**	**8.4**	**31.4**	**9.7**	**0.13 J^**	**20**	**10.1**	<2.2	<2.2	<2.2	**26.2**	**128**	<0.54 UJ
YWV-TP03-SO-1027	8/21/2001	2	<22	**3.1**	**26.3**	<0.87	**1**	**3.5**	**5.9**	**46.1**	**91.5**	**0.66**	**24.3**	**8.2**	<2.2	<2.2	<2.2	**28.9**	**456**	<0.54 UJ
YWV-TP04-SO-1030	8/22/2001	1.1	<5.7	**2.9**	**27.2**	<0.23	**0.28**	**4.2**	**3.8**	**373**	**8.9**	**0.14 J^**	**10.6**	**5.4**	<0.57	<0.57	<0.57	**25.9**	**102**	<0.57 UJ
YWV-TP04-SO-1028	8/21/2001	2.8	<22	**1.9**	**32.9**	<0.89	**0.45**	**2.7**	**3.1**	**262**	**29.4**	**0.15 J^**	**4**	**5.2**	<2.2	<2.2	<2.2	**16**	**131**	<0.56 UJ
YWV-DG01-SO-1022	8/21/2001	0.5	<24	**2.7**	**17.2**	<0.98	<0.49	**3.2**	**3.5**	**23.9**	**5.3**	**0.25**	**88.6**	**4.5**	<2.4	<2.4	<2.4	**34.6**	**61.5**	<0.61 UJ
YWV-DG02-SO-1023	8/21/2001	0.5	<23	**2.3**	**15.2**	<0.93	<0.46	**3.4**	**3.3**	**18.3**	**5**	**0.11 J^**	**32.5**	**2.5**	<2.3	<2.3	<2.3	**27.9**	**29.2**	<0.58 UJ
YWV-DG03-SO-1024	8/21/2001	0.5	<21	**2.9**	**18.2**	<0.85 U	<0.43	**4.3**	**3.1**	**15.5**	**5.2**	**0.24**	**22.7**	**2.8**	<2.1	<2.1	<2.1	**28.1**	**24.5**	<0.53 UJ
Ecological Screening Values:			5	9.9	280	10	4	0.4	20	60	41	0.00051	2	30	0.21	2	1	2	8.5	NA

(FD): field duplicate
fbgs: feet below ground surface

J^ Reported between method detection limit and practical quantitation limit
U The analyte was analyzed for, but was not detected above the reporting limit.
UJ The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
Detections shown in bold, detections above Ecological Screening Values are circled.

TABLE 5-2: ORGANIC ANALYTICAL RESULTS FOR SOIL SAMPLES COMPARED TO ECOLOGICAL SCREENING VALUES
VOGELSANG WASTE ACCUMULATION AREA
YOSEMITE NATIONAL PARK, CALIFORNIA

			VOCs (µg/kg) EPA Method 8260						SVOCs (µg/kg) EPA Method 8270	PAHS (µg/kg) EPA Method 8310	Pesticides/PCBs (µg/kg) EPA Method 8081					
Location ID	**Sample Date**	**Sample Depth (fbgs)**	1,2-Dichlorobenzene	Acetone	Methyl ethyl ketone	Methyl isobutyl ketone	Methylene chloride	Toluene	Bis(2-ethylhexyl) phthalate	Chyrsene	DDD44	DDE44	DDT44	Dieldrin	Heptachlor epoxide	PCB-1260 (Aroclor 1260)
YWV-UG01-SO-1019	8/21/2001	0.5-1	<5.8	<58	<58	<5.8	<12 U	**0.8 J^**	<340	<340	<2.1	<2.1	<2.1	<2.1	<1	<26
YWV-UG02-SO-1020	8/21/2001	0.5-1	<6.5	<65	<65	<6.5	<13 U	<6.5	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<26
YWV-UG03-SO-1021	8/21/2001	0.5-1	<7.6	<76	<76	<7.6	<15 U	<7.6	<350	**6.7**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	<27
YWV-TP01-SO-1033	8/22/2001	0.5-1	<350	<110	<110	<11	<23 U	**4 J^**	<350	**6.2**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP01-SO-1034 (FD)	8/22/2001	0.5-1	<7.6	**51 J**	**9 J^**	<7.6	<15 U	**0.9 J^**	<350	<350	<2.1	<2.1	<2.1	<2.1	<1.1	<27
YWV-TP02-SO-1031	8/22/2001	0.7-1.2	<7.9	**370 J**	**18 J^**	**1 J^**	<16 U	<7.9	**85 J^**	**4**	**31 J-**	**22 J-**	<2.3 UJ	**2 J-**	**0.7 J-**	**45**
YWV-TP02-SO-1032	8/22/2001	2-2.5	<6	<60	<60	<6	<12 U	<6	<350	<350	<2.1	**0.4 J^**	<2.1	<2.1	<1.1	**11 J^**
YWV-TP03-SO-1026	8/21/2001	0.7-1.2	<7	**110 J**	<70	<7	<14 U	<7	<360	**12**	<2.2	<2.2	<2.2	<2.2	<1.1	<27
YWV-TP03-SO-1027	8/21/2001	2-2.5	<6.8	**79 J**	<68	<6.8	<14 U	<6.8	<360 UJ	**5.3**	<2.2	<2.2	**2 J^**	<2.2	<1.1	**13 J^**
YWV-TP04-SO-1030	8/22/2001	1.1-1.6	**1 J-**	<71	<71	<7.1	<14 U	<7.1	<370	**5.2**	<2.3 UJ	**0.5 J-**	<2.3 UJ	**0.5 J-**	<1.1 UJ	<28
YWV-TP04-SO-1028	8/21/2001	2.8-3.3	<7	**61 J**	**8 J^**	<7	<14 U	**1 J^**	<370	**4**	<2.2 UJ	<2.2 UJ	<2.2 UJ	<2.2 UJ	<1.1 UJ	**17 J^**
YWV-DG01-SO-1022	8/21/2001	0.5-1	<7.1	<71	<71	<7.1	<14 U	<7.1	**240 J^**	**52**	<2.4 UJ	<2.4 UJ	<2.4 UJ	<2.4 UJ	<1.2 UJ	<30
YWV-DG02-SO-1023	8/21/2001	0.5-1	<8.1	**31 J**	<81	<8.1	<16 U	<8.1	<380	**25**	<2.3 UJ	<2.3 UJ	<2.3 UJ	<2.3 UJ	<1.2 UJ	<29
YWV-DG03-SO-1024	8/21/2001	0.5-1	<8.8	<88	<88	<8.8	<18 U	<8.8	<350	**16**	<2.1	<2.1	<2.1	<2.1	<1.1	<27
Ecological Screening Values:			2500	3000	90000	440000	4100	200000	930	4700	760	600	18	2.4	150	370

(FD): field duplicate
fbgs: feet below ground surface

J^: Reported between method detection limit and practical quantitation limit
J: The analyte was positively identified; associated numerical value is its approximate concentration in the sample.
U: The analyte was analyzed for, but was not detected above the reporting limit.
UJ: The analyte was not detected above the reporting limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
\- Bias low
Detections shown in bold.

TABLE 5-3: RECOMMENDED BIOACCUMULATION/BIOCONCENTRATION FACTORS
SOIL-TO-EARTHWORM PATHWAY
VOGELSANG WASTE ACCUMULATION AREA, YOSEMITE NATIONAL PARK, CALIFORNIA

	Sample, et. al.[a]					
Constituent	**Median BAF/BCF**	**90th Percentile BAF/BCF**	**Maximum BAF/BCF**	**Regression Equation [b]**	**Recommended BAF/BCF**	**Rationale for Recommended BAF/BCF**
Cadmium	7.708	40.69	190	ln (EW)=0.55(ln[soil])+2.82	Regression Equation	Chemical-specific Regression Eq.
Copper	0.515	1.531	5.492	ln (EW)=0.24(ln[soil])+1.80	Regression Equation	Chemical-specific Regression Eq.
Lead	0.266	1.522	228.261	ln (EW)=0.81(ln[soil])-0.21	Regression Equation	Chemical-specific Regression Eq.
Molybdenum	--[c]	--	--		1.3	Average of 13 inorganic BAF median values from USEPA (2000)
TCDD, 2,3,7,8	11.01	22.23	42.07	ln (EW)=1.18(ln[soil])+3.53	Regression Equation	Chemical-specific Regression Eq.

NOTES:

[a] Sample, B. E, et. al., 1998. Development and Validation of Bioaccumulation Models for Earthworms, ES/ER/TM-220.

[b] Sample, B.E, et. al., 1999, Literature-Derived Bioaccumulation Models for Earthworms: Development and Validation, Environ. Toxicol. Chem., 18:9, 2,110-2,120. (models from Table 3 of publication). EW = earthworm tissue concentration.

[c] -- indicates that a BAF/BCF is not available.

TABLE 5-4: TOXICOLOGICAL BENCHMARKS FOR SELECTED WILDLIFE RECEPTORS
VOGELSANG WASTE ACCUMULATION AREA, YOSEMITE NATIONAL PARK, CALIFORNIA

	Food (mg/kg) [b]				
	Short-Tailed Shrew		American Robin		
Constituent [a]	**NOAEL**	**LOAEL**	**NOAEL**	**LOAEL**	**Comments**
Cadmium	3.533	35.33	1.2	16.56	For cadmium chloride.
Copper	55.7	73.3	38.9	51.1	Copper sulfate used for shrew, copper oxide used for robin.
Lead	29.3	293.04	0.94	9.36	For lead acetate.
Molybdenum	0.52	5.15	2.9	29.23	For MnO_4.
TCDD, 2,3,7,8	0.0000037	0.0000366	0.0000116	0.0001159	

NOTES:

[a] Constituents presented are those with (1) maximum soil concentrations greater than the selected ecological preliminary remediation goals (PRGs); and (2) not related to background (using the upper tolerance limit and/or Mann Whitney U Test statistical approach).

[b] Toxicological benchmarks are from Table 12 of Sample et al. (1996).

NOAEL = no observed adverse effect level.

LOAEL = lowest observed adverse effect level.

Appendix E – Compliance with ARARs Analysis

Compliance with ARARs is one of the evaluation criteria for removal actions pursuant to CERCLA section 106 as required by NCP Section 300.415. Section 4 of the Engineering Evaluation/Cost Analysis (EE/CA) summarizes the potential chemical-, location-, and action-specific ARARs identified for the removal action. This appendix provides a detailed alternative analysis of the compliance with ARARs for each retained removal alternative in the EE/CA. The purpose of this appendix to supplement the analysis of compliance with ARARs that is summarized in Section 6 of the EE/CA.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements

ARAR	Citation	Description	Alternative Alternative 1 No Action
Permissible Exposure Limits	8 CCR 5155 [29 CFR 1910.1001]	Standards for worker exposure to airborne contaminants.	Because this alternativewould involve no action, worker exposure standards from this ARAR would not be pertinent to this alternative.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
ARAR	Citation	Description	Alternative Alternative 1 No Action
Air Basins and Air Quality Standards	17 CCR Div. 3, Chapter 1, Subchapter 1.5	Establishes California Air Basins and sets limits for air emissions and air quality levels that protect public health.	Compliance would be attained because this alternative would involve no action and would not result in newsources of emissions, therefore it would achieve emission standards from this ARAR.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Hazardous Waste Determination - General	22 CCR Div. 4.5, Chapter 11, Article 1, §66261.2 §66261.3	A waste is classified as a Resource Conservation and Recovery Act (RCRA) hazardous waste if appears on a list and originates from a either a non-specific or specific source. Defines a waste and outlines the process for determining whether a waste is also a hazardous waste.	Because this alternativewould involve no action, waste classifications from this ARAR would not be pertinent to this alternative.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Hazardous Waste Determination - Characteristic of Toxicity	22 CCR Div. 4.5, Chapter 11, Article 4, §66261.24(a)(1) §66261.24(a)(2)	A waste is classified as a RCRA hazardous waste if the extract produced by the Toxicity Characteristic Leaching Procedure (TCLP) exceeds specified levels. A waste is classified as a non-RCRA, State-only hazardous wastes if the total concentration exceeds the Total Threshold Limit Concentration (TTLC) or if the extract produced by application of the Waste Extraction Test (WET) exceeds the Soluble Threshold Limit Concentration (STLC).	Because this alternative would involve no action, waste classifications from this ARAR would not be pertinent to this alternative.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
RCRA Hazardous Waste Determination - Listed Wastes	22 CCR Div. 4.5, Chapter 11, Article 4, §66261.30 §66261.31 §66261.32	A waste is classified as a RCRA hazardous waste if it appears on a list and originates from a either a non-specific or specific source.	Because this alternative would involve no action, waste classifications from this ARAR would not be pertinent to this alternative.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
RCRA Hazardous Waste Determination	22 CCR Div. 4.5, Chapter 11, Article 4.1, §66261.100 §66261.101	Criteria for determining whether a waste is a RCRA, or non-RCRA California, hazardous waste. In order to be characterized as a non-RCRA California hazardous waste it must first be established that the waste is not a RCRA waste.	Because this alternative would involve no action, waste classifications from this ARAR would not be pertinent to this alternative.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
California Land Disposal Restrictions	22 CCR Div. 4.5, Chapter 18, Article 4, §66268.40 §66268.48	Treatment standards that must be attained prior to land disposal of certain wastes. Establishes numerical universal treatment standards by chemical constituent that may not be exceeded under the land disposal restrictions (LDRs). Following excavation, contaminated soil determined to be a hazardous waste may be subject to LDRs if placed on land in a waste management unit outside the Area of Contamination from where the waste was generated.	Because this alternative would involve no action, waste classifications from this ARAR would not be pertinent to this alternative.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	**Citation**	**Description**	**Alternative 1 No Action**
Waste Classification	27 CCR Div. 2, Sub-division 1, Chapter 3, Sub-chapter 2, Article 2	Definitions of designated waste, non-hazardous waste, and inert waste.	Because this alternative would involve no action, waste classifications from this ARAR would not be pertinent to this alternative.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Risk Assessment Standards	H&SC 25356.1.5(b)	In addition to meeting NCP requirements, risk assessments must include the most current sound scientific methods, knowledge, and practices of public health and environmental professionals.	Because this alternative would involve no action, implementation of risk assessment standards from this ARAR would not be pertinent to this alternative.

Table E-1 Compliance with Chemical-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Mariposa County Air Pollution Control Standards	Mariposa County Air Pollution Control District (APCD) Rules 202, 205, 207, 209, 210, 413, 414 APCD Regulation IV	Establishes rules for visible and/or nuisance emissions. Establishes emission standards for NO_x, CO, and particulate matter. Establishes emissions standards for toxic air contaminants.	Compliance would be attained because this alternative would involve no action and would not result in newsources of emissions, therefore it would achieve emission standards from this ARAR.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	**Citation**	**Description**	**Alternative 1** **No Action**
NPS mandate to ensure non-impairment of national park resources for the enjoyment of future generations and the non-degradation of national park values and purposes	National Park Service Organic Act of 1916 16 U.S.C. §§ 1 *et seq.* 36 CFR Part 1 General Authorities Act, as amended 16 U.S.C § 1a-1	The Organic Act directs the National Park Service "to promote and regulate the use of … national parks … by such means and measures as conform to the fundamental purpose of the said parks … which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."	Compliance would be attained since there are no risks posed by the Site to human health or ecological receptors. No action is required and therefore this alternative allows for the full enjoyment and utilization of park resources.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Yosemite National Park enabling legislation	16 U.S.C. §§ 47-1 *et seq*.	"The Secretary of the Interior shall make and publish such general rules and regulations as he may deem necessaryand proper for the management and care of the park and for the protection of the property therein, especially for the preservation from injury or spoliation of all timber, mineral deposits other than those legally located prior to the date of passage of the respective Acts creating and establishing said parks, natural curiosities or wonderful objects within said parks, and for the protection of the animals in the park from capture or destruction, and to prevent their being frightened or driven from the said parks."	Compliance would be attained since no response measures would be undertaken and timber, mineral deposits, and animals are not anticipated to be further injured or spoiled by the presence of the Site beneath the existing parking lot.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Restrictions on solid waste disposal sites in National Parks	16 U.S.C. § 460*l*-22(c) 36 CFR Part 6	Prohibits operation of any solid waste disposal site that was not in operation on September 1, 1984, except for sites used only for disposal of wastes generated within the park unit, so long as such site will not degrade any natural or cultural resources of the park unit. Prohibits the operation of any solid waste disposal site, except as specifically provided	Compliance would be attained since no response measures would be undertaken and the Site is no longer used for placement of wastes or any other waste operations.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Restrictions on solid waste disposal sites in National Parks	16 U.S.C. § 460*l*-22(c) 36 CFR Part 6	Prohibits operation of any solid waste disposal site that was not in operation on September1, 1984, except for sitesused only for disposal of wastes generated within the park unit, so long as such site will not degrade any natural or cultural resources of the park unit. Prohibits the operation of any solid waste disposal site, except as specifically provided or by the regulations. 36 CFR § 6.4 specifies 12 conditions that must be met before a new solid waste disposal sitemay be authorized in a National Park, including the condition that there will be no disposal of the site of solid waste containing hazardous waste, polychlorinated biphenyls (PCBs), or radioactive materials.	Compliance would be attained since no response measures would be undertaken and the Site is no longer used for placement of wastes or any other waste operations.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
ARAR	Citation	Description	Alternative Alternative 1 No Action
NPS restrictions of public use and recreation activities to protect national park resources	36 CFR Part 2: Resource Protection, Public Use and Recreation 36 CFR Part 7	Prohibits specific public use and recreational activities in national parks in order to protect park resources. For example, 36 CFR § 2.1(a) prohibits " (1) Possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state: (i) wildlife or fish (ii) Plants or the parts or products thereof [or] (2) Introducing plants into a park area ecosystem." 36 CFR § 2.2(a)(2) prohibits "feeding, touching, teasing, frightening or intentional disturbing ofwildlife nesting, breeding or other activities." 36 CFR § 2.14(a) prohibits "(1) Disposing of refuse in other than refuse receptacles (6) Polluting or contaminating park area waters or water courses." Park-specific public use and recreational rules.	Because this alternative would involve no action, prohibitions on park uses and activities from this ARAR would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	**Citation**	**Description**	**Alternative 1 No Action**
Restrictions on solid waste disposal sites in National Parks	16 U.S.C. § 460*l*-22(c) 36 CFR Part 6	Prohibits operation of any solid waste disposal site that was not in operation on September 1, 1984, except for sites used only for disposal of wastes generated within the park unit, so long as such site will not degrade any natural or cultural resources of the park unit. Prohibits the operation of any solid waste disposal site, except as specifically provided	Compliance would be attained since no response measures would be undertaken and the Site is no longer used for placement of wastes or any other waste operations.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
NPS restrictions of commercial and private operations in national parks, including the prohibition of nuisances	36 CFR Part 5 36 CFR § 5.13	Regulates commercial use of national parks and the resources therein (e.g., commercial notices, advertisements, photography, business operations). Prohibits the creation or maintenance of a nuisance upon federal or private lands within a park area.	Because this alternative would involve no action, prohibitions on nuisances and regulations on commercial or private use of a park unit from this ARAR would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
National Historic Preservation Act	16 U.S.C. §§ 470 *et seq.* 36 CFR Part 800	Requires federal agencies to consider the effect of any federally assisted undertaking on any district, site building, structure, or object that is included in, or eligible for, the Register of Historic Places and to minimize or mitigate reasonably unavoidable effects. Indian cultural and historical resources must be evaluated, and effects avoided, minimized, or mitigated.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any existing historic or cultural resources would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Historic Sites, Buildings, and Antiquities Act	16 U.S.C. §§ 461 *et seq*.	Requires federal agencies to consider the existence and location of historic or prehistoric sites, buildings, objects,and properties of national historical or archaeological significance when evaluating removal alternatives.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any existing areas of historic or archaeological significance would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Archaeological and Historic Preservation Act	16 U.S.C. §§ 469 *et seq*.	Establishes requirements for evaluation and preservation of historical and archaeological data, including Indian cultural and historic data, which may be destroyed through alteration of terrain as a result of federal construction projects, *inter alia*. If eligible scientific, pre-historical,or archaeological data are discovered during site activities, such data must be preserved in accordance with these requirements.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any existing archaeological or historical resources would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	**Citation**	**Description**	**Alternative 1 No Action**
Archaeological Resources Protection Act	16 U.S.C. §§ 470 aa-ii *et seq*. 43 CFR §§ 7.1 *et seq*.	Provides for the protection of archeological resources located on public and tribal lands. Establishes criteria that must be metfor the land manager's approval of any excavation or removal of archaeological resources if a proposed activity involves soil disturbances.	Because this alternativewould involve no action, requirements from this ARAR for identification and protection of any existing archaeological resources would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Native American Graves Protection and Repatriation Act (NAGPRA)	25 U.S.C. § 3001 25 U.S.C. § 3002(d) 43 CFR §§ 10.1 – 10.17	Provides for the disposition of Native American remains and objects inadvertently discovered on federal or tribal lands after November 1990. If the response activities result in the discovery of Native American human remains or related objects, the activity must stop while the head of the federal land management agency (in this case, NPS) and appropriate Indian tribes are notified of the discovery. After the discovery, the response activity must cease and a reasonable effort must be made to protect the Native American human remains or related objects. The response activity may later resume (43 CFR Section 10.4).	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any existing Native American remains and objects would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Endangered Species Act	16 U.S.C. §§ 1531 – 1544 50 CFR Part 402	No federal activity or federally authorized activity may jeopardize the continued existence of any threatened or endangered species known to live or to havelived in the affected environment; nor may any federal activity destroy or adversely modify a critical habitat. This ARAR requires NPS to ensure that the selected remedy is sufficiently protective of the environment containing the threatened or endangered species, with an emphasis on reducing the risks from the contaminants of concern to the listed species described in the ecological risk assessment to an acceptable level, with consideration given to the special status of the listed or threatened species. Also requires that NPS ensure that the selected remedy is implemented in a manner such that effects on any existing threatened or endangered species are avoided or mitigated.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any threatened or endangered species would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Wilderness Act	16 U.S.C. §§ 1131 – 1136	Requires that federally-owned, designated Wilderness Areas be administered in such manner as will leave them unimpaired for future use and enjoyment, and to protect and preserve the wilderness character of these areas. Requires that there shall be no commercial enterprise or permanent road within designated wilderness areas, and, except as necessary to meet minimum requirements for the administration of the wilderness area for the purpose of the Act (including emergency measures to protect public health and safety), no temporary roads, use of motorized equipment, landing of aircraft, mechanical transport, or installation of any structures should be used or constructed in these areas.	Because this alternative would involve no action, limitations on uses and activities from this ARAR would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
STATE			
Rare or Endangered Native Plants	FGC 1908 (Added by Stats. 1977, c. 1181, p. 3869, section 8) / 14 CCR §670.2	No person shall take, possess, or sell any native plant or any part of product thereof, which the California Fish and Game Commission (commission) determines to be an endangered native plant or rare native plant.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any rare or endangered plants would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Endangered Species	FGC 2080 (Added by Stats. 1984, c. 1240, section 2)	This section prohibits the take, possession, purchase or sale within the state, any species (including rare native plant species), or any product thereof, that the commission determines to be an endangered or threatened species, or the attempt of any of these acts. This section prohibits releases and/or actions that would have a deleterious effect on species or their habitat.	Because this alternativewould involve no action, requirements from this ARAR for identification and protection of any threatened or endangered species would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Areas used by Endangered or Threatened Species	FGC 2081(b)	The Department may authorize, by permit, the take of endangered or threatened species, and candidate species if the take is incidental to an otherwise lawful activity and the impacts are minimized and fully mitigated.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any endangered, threatened or candidate species would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	**Citation**	**Description**	**Alternative 1 No Action**
Wildlife Species	FGC 3005 (Stats. 1957, c. 456, p. 1353 section 3005)	This code section prohibits the taking of birds and mammals, including taking by poison.	Because this alternativewould involve no action, prohibitions on the “taking” or “poisoning” of wildlife from this ARAR wouldnot be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Birds	FGC 3503	This section prohibits the take, possession, or needless destruction of the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of nests or eggs of any bird would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements

ARAR	Citation	Description	Alternative Alternative 1 No Action
Birds of Prey	FGC 3503.5 (Added by Stats. 1985, c. 1334, section 6)	This section prohibits the take, possession, or destruction of any birds in the orders of Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any birds of prey would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Migratory Birds	FGC 3513	This section makes it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any rare or endangered plants would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Fully protected bird species / habitat	FGC 3511 (Added by Stats. 1970, c. 1036, p. 1848 section 4)	It is unlawful to take or possess California fully protected birds, the following of which have been identified within the Park and therefore may be located on or near the Site: American Peregrine Falcon Golden Eagle Southern Bald Eagle	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any fully protected birds would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Fully protected Mammals	FGC 4700 (Added by Stats. 1970, c. 1036, p. 1848 section 6)	This section prohibits the take or possession of California fully protected mammals or their parts. The following fully protected mammals have been identified within the Park: Ring-tailed Cat Sierra Nevada Bighorn Sheep	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any fully protected mammals would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Specially Protected Mountain Lion	FGC 4800 et. seq.	Mountain lions are specially protected mammals in California. It is unlawful to take, injure, possess, transport, or sell any mountain lion or any part or product thereof.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of specially protected mountain lions would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Fully protected Reptiles and Amphibians	FGC 5050	Prohibits the take or possession of California fully protected species of reptiles and amphibians.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any fully protected reptiles and amphibians would not be pertinent to this alternative.

Table E-2 Compliance with Location-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Furbearing Mammals	14 CCR Div. 1, Sub-division 2, Chapter 5, §460	Regulation makes it unlawful to take fisher, marten, river otter, desert kit fox, or red fox.	Because this alternative would involve no action, requirements from this ARAR for identification and protection of any furbearing mammals would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
FEDERAL			
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	40 CFR 264 Subpart I (§264.170 - §264.179)	Provides requirements for use and management of containers for storage of RCRA hazardous waste.	Because this alternative would involve no action, requirements from this ARAR for use and management ofcontainers for storage of RCRA hazardous waste would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
General Hazardous Waste Disposal Facility Standards	22 CCR, Division 4.5, Chapter 14, Article 2: §66264.15 and §66264.19(c)(1 and 2)	§66264.15 provides substantive general inspection requirements applying to all hazardous waste facilities. §66264.19(c)(1 and2) provides substantive requirements for a Construction Quality Assurance (CQA) program including inspection and testing.	The Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility. Because this alternative would involve no action, requirements from this ARAR related to inspections and CQA during construction would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Post-closure Care and Use of Property	22 CCR, Division 4.5, Chapter 14, Article 7 §66264.117 (b through d)	Provides requirements for hazardous waste management units pertaining to post-closure care, security requirements, and restriction on disturbance for facilities,where contaminated materials and contaminated soils are left in place during closure.	The Site is not by definition a hazardous waste transfer, treatment, storage, anddisposal facility. Because this alternative would involve no action, requirements from this ARAR related to post-closure care of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Use and Management of Containers	22 CCR, Division 4.5, Chapter 14, Article 9 §66264.178	Provides requirements for decontamination of remaining containers.	Because this alternative would involve no action, requirements from this ARAR for use and management of containers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	**Citation**	**Description**	**Alternative 1 No Action**
Monitoring and Inspection of Landfill	22 CCR, Division 4.5, Chapter 14, Article 14 §66264. 303 (a) (1 through 2)	Provides requirements for monitoring and inspection of landfill during installation and operation	The Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility. Because this alternative would involve no action, requirements from this ARAR related to monitoring and inspections of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Closure and Post-Closure Care for Landfill	22 CCR, Division 4.5, Chapter 14, Article 14 §66264. 310 (a) (2 through 5) and (b) (1, 4 through 5)	Provides requirements for closure and post-closure care of landfill.	The Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility. Because this alternative would involve no action, requirements from this ARAR related to closure of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Temporary Units	22 CCR Div. 4.5, Chapter 14, Article 15.5 §66264.553 (b)	Provides requirements for use of temporary units and storage of hazardous remediation waste during corrective action activities.	Because this alternative would involve no action, requirements from this ARAR for use of temporary units and storage for hazardous waste wouldnot be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
General Closure and Post-Closure Maintenance Standards Applicable to Waste Management Units (Units) forSolid Waste	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 1, §20950 (d through e)	Provides performance standards and requirements for closure of waste management units for solid waste, including surveying, monuments, and vegetation.	The Site is not by definition a classified waste management unit. Because this alternative would involve no action, requirements fromthis ARAR related to surveying, monumentation, and vegetation of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Construction Quality Assurance Requirements	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 2, Article 4, §20324 (e through i)	§20324 (e through i) provides substantive requirements for a CQA program including inspection and testing.	The Site is not by definition a solid waste management unit. Because this alternative would involve no action, requirements from this ARAR related to inspections and CQA during construction of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Precipitation and Drainage Controls	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 2, Article 4, §20365 (c through d and f)	Provides requirements for precipitation and drainage controls for waste management unitsand containment structures.	The Site is not by definition a solid wastemanagement unit. Because this alternative would involve no action, requirements from this ARAR related to performance standards for precipitation and drainage controls for covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Seismic Design	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 2, Article 4, §20370	Provides criteria for seismic design structures within solid waste management units.	The Site is not by definition a solid waste management unit. Because this alternative would involve no action, requirements from this ARAR related to seismic performance standards for covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Closure and Post-Closure Maintenance Requirements for Solid Waste Landfills	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21090 (a(1); a(3)(A); a(4)(B)1. through 2.,4. through 7.; a(4)(D); (b); c(1) and(4) through (5); e)	Provides closure and post-closure maintenance requirements for solid waste landfill.	The Site is not by definition a solid waste landfill. Because this alternative would involve no action, requirements from this ARAR related to post-closure care of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Closure and Post-Closure Care for Landfill	22 CCR, Division 4.5, Chapter 14, Article 14 §66264. 310 (a) (2 through 5) and (b) (1, 4 through 5)	Provides requirements for closure and post-closure care of landfill.	The Site is not by definition a hazardous waste transfer, treatment, storage, and disposal facility. Because this alternative would involve no action, requirements from this ARAR related to closure of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Final Cover	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21140(a)	Provides requirements for final cover for disposal site and landfill	The Site is not by definition a solid waste landfill. Because this alternative would involve no action, requirements from this ARAR related to final covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Final Grading	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21142(a)	Provides requirements for final grading for disposal site and landfill.	The Site is not by definition a solid waste landfill. Because this alternative would involve no action, requirements from this ARAR related to final grading of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Slope Stability	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21145(a)	Provides requirements for slope stability for disposal site and landfill	The Site is not by definition a solid waste landfill. Because this alternative would involve no action, requirements from this ARAR related to slope stability of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Drainage and Erosion Control	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21150(a and c)	Provides requirements for drainage and erosioncontrol for disposal site and landfill	The Site is not by definition a solid waste landfill. Because this alternative would involve no action, requirements from this ARAR related to performance standardsfor drainage and erosion controls of covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Post-closure Maintenance	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21180(b)	Provides that non-liquid waste exposed during post-closure maintenance may be returned to the landfill provided the integrity of the final cover is maintained	The Site is not by definition a solid waste landfill. Because this alternative would involve no action, requirements from this ARAR related to return of non-liquid wastes to beneath covers would not be pertinent to this alternative.

Table E-3 Compliance with Action-Specific Applicable or Relevant and Appropriate Requirements			
			Alternative
ARAR	Citation	Description	Alternative 1 No Action
Post-closure Land Use	27 CCR Div. 2, Sub-div. 1, Chapter 3, Sub-chpt. 5, Article 2, §21190 (a (1 and 2) and e (2 and 4 through 7))	Provides requirements for post-closure use of land where the disposal site and landfill are located	The Site is not by definition a solid waste landfill. Because this alternative would involve no action, requirements from this ARAR related to installation of structural improvements within covers would not be pertinent to this alternative.