Department of the Interior
National Park Service
Devils Postpile National Monument
Madera County, California

Engineering Evaluation/Cost Analysis Report

Devils Postpile National Monument
Lead Impacted Surface Soil at Potable Water Tank
Madera County, CA

February 14, 2014

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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
AUF	Area Use Factor
bgs	below ground surface
CAMU	Corrective Action Management Unit
CCR	California Code of Regulations
CE	Common Era
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
COC	contaminant of concern
COPC	constituent of potential concern
CSM	conceptual site model
cy	cubic yard
DTSC	Department of Toxic Substances Control
ECM	Environmental Cost Management, Inc.
ED	exposure dose
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
EPC	exposure point concentration
°F	Degrees Fahrenheit
IC	Institutional Control
HI	Hazard Index
HQ	Hazard Quotient
ISM	Incremental Sampling Methodology
MCL	maximum contaminant levels
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MI	multi-increment
MOU	Memorandum of Understanding
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NTCRA	non-time critical removal action
OM&M	operation, maintenance, and monitoring
PA	Preliminary Assessment
PRG	Preliminary Remediation Goal
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RAO	Removal Action Objectives

RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
RSV	risk screening value
RWQCB	Regional Water Quality Control Board
sq ft	square feet
SSSL	site specific screening level
STLC	soluble threshold limits concentrations
TRV	Toxicity Reference Value
TTLC	Total Threshold Limit Concentrations
U.S.C.	United States Code
USDA	Unites States Department of Agriculture
USFS	United States Department of Agriculture Forest Service
USGS	United States Geologic Survey

EXECUTIVE SUMMARY

The Department of Interior, National Park Service (NPS) retained Environmental Cost Management, Inc. (ECM) to prepare an Engineering Evaluation/Cost Analysis (EE/CA) Report for the lead impacted surficial soil around the potable water tank at Devils Postpile National Monument (DEPO) in Madera County, California (**Figure 1**). NPS is engaging in a non-time critical removal action (NTCRA) process at DEPO, using their authority under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

In 2005, lead-based paint chips were released around a 100,000 gallons potable water tank located within DEPO boundaries, referred herein as "the Site", during sandblasting maintenance activities performed as part of the lead abatement of old paint and repainting of the tank's exterior. In 2008, Provost and Pritchard Consulting Group (P&P, 2008)[1] conducted a preliminary assessment (PA) for potential lead impacts to surficial soil at the Site. NPS concluded that additional work was necessary to address lead contamination at the Site. In 2013, ECM reviewed the data from the PA report and prepared a *Work Plan for Soil Sampling*[2] (Work Plan) to perform surficial soil sampling using incremental sampling methodology (ISM) to facilitate the preparation of an EE/CA Report for the Site. ECM implemented the Work Plan activities in July 2013 and the results are presented in **Section 2.4** below in this EE/CA.

Using the additional collected data, ECM completed a streamlined risk assessment (**Section 2.6**) for human and ecological receptors that indicates a risk to ecological receptors from potential exposure to concentrations of lead in surficial soils exists at the Site. The hazard quotient (HQ) for potential exposure to lead impacted surficial soil at the Site is estimated at 0.64 for human health and 2.64 for ecological receptors. By definition, a HQ value of one or less is considered "safe" with regard to the effect of a chemical of potential concern (COPCs) to human health or the environment. Therefore, it is concluded that the lead impacted surficial soil at the Site poses a potential risk to the environment (ecological receptors), justifying a non-time critical removal action (NTCRA). ECM considered ecological soil screening benchmarks and area use factors in the refined streamlined risk assessment to calculate the Site Specific Screening Level of 193 mg/kg lead in soil (**Section 2.6**).

The scope of removal action evaluated in this EE/CA Report focuses on the following removal action objectives (RAO):

- Prevent or reduce potential for human and ecological exposure (through inhalation, ingestion, and dermal contact) to lead in surficial soil; and,

[1] Provost and Pritchard Engineering Group, Inc. *Preliminary Assessment for the National Park Service, Devils Postpile National Monument*, prepared for Sequoia and Kings Canyon National Park, Three Rivers, California. October 2008.

[2] Environmental Cost Management, Inc., *Work Plan for Soil Sampling Lead Impacted Soil near Potable Water Tank at Devils Postpile National Monument, Madera County, California*. June 17, 2013.

- Prevent or reduce potential migration of lead impacted surficial soil via surface runoff, erosion, and wind dispersion.

Eight removal action technologies were reviewed (**Section 4**) to develop the following four removal action alternatives:

1. Alternative 1 – No action
2. Alternative 2 – Engineering and institutional controls (ICs)
3. Alternative 3 – Excavation and on-site consolidation with ICs
4. Alternative 4 – Excavation and off-site disposal

The four removal action alternatives were evaluated based on the following overall criteria (**Section 5**):

1) Effectiveness
   a) Protectiveness
   b) Level of treatment and/or containment
   c) Reduction or elimination of contaminants of concern
2) Implementability
   a) Technical feasibility
   b) Administrative and legal feasibility
   c) Ease of Implementation
3) Cost
   a) Capital cost
   b) Post removal site controls cost
   c) Present worth value / present cost
   d) Long-term operation, maintenance and monitoring (OM&M) costs

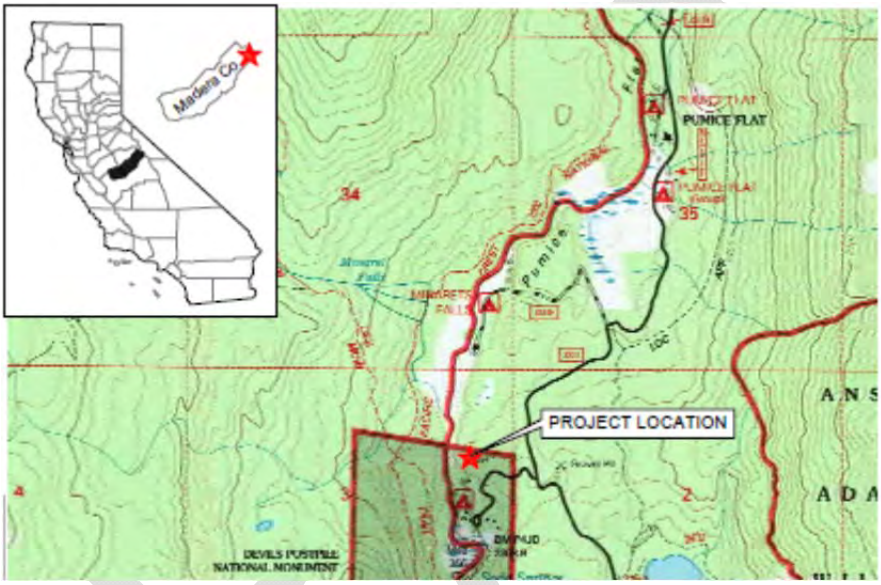
Effectiveness and implementability have been evaluated in detail in subsections presented for each alternative in **Section 5**. **Figures 7, 8 and 9** illustrate Alternatives 2, 3 and 4, respectively, and **Table 8** presents a comparative analysis for each of the four removal alternatives. The costs have been evaluated in detail and a complete break-out of estimated costs is provided in **Attachment D**.

Table 9 presents a summary for the recommended Alternative 4. Alternative 2 is the least protective and would leave the lead impacted soil exposed to the elements and to any humans or animals that can cross the proposed fence surrounding the Site. Alternative 3 would isolate and contain the lead impacted surficial soil in a Corrective Action Management Unit (CAMU), thus eliminating exposure to human and ecological receptors; however, CAMUs require ongoing OM&M to remain effective. Alternative 4, excavation and off-site disposal, will best meet the evaluation criteria for the Site. Alternative 4 is the most protective of human health and ecological receptors and is less costly than Alternative 2 and Alternative 3, both of which provide lower levels of protection and require long-term OM&M commitments.

1.0 INTRODUCTION

On behalf of the Department of the Interior, National Park Service (NPS), Environmental Cost Management, Inc. (ECM) prepared this Engineering Evaluation/Cost Analysis (EE/CA) Report for the Devils Postpile National Monument (DEPO) in Madera County, California **(Figure 1).** This EE/CA Report addresses lead-based paint debris released during maintenance activities in 2005 at the potable water tank, referred herein as "the Site", located within DEPO park boundaries.

Figure 1: Site Vicinity Map



1.1 AUTHORITY

This EE/CA Report has been prepared in accordance with the criteria established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as well as sections of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) as applicable to removal actions (40 Code of Federal Regulations [CFR] §300.415 [b][4][I]). NPS has been delegated CERCLA lead agency authority by the President of the United States and the Secretary of the Interior, and is exercising this authority at the Site. This EE/CA is consistent with the United States Environmental Protection Agency (EPA) Guidance on Conducting Non-Time-Critical Removal Actions under CERCLA, EPA/540-R-93-057, Publication 9360.0.32, PB93-963402, August 1993.

1.2 PURPOSE AND OBJECTIVES

This EE/CA provides an engineering evaluation to support the selection of a Non-Time-Critical Removal Action (NTCRA) for the Site. Environmental investigations at the Site have identified conditions that correspond to factors in Section 300.415(b)(2) of NCP (40 C.F.R. 300.415).

These conditions indicate that a NTCRA may be necessary to abate, prevent, minimize, stabilize, mitigate, or eliminate threats to human health and the environment.

National Oil and Hazardous Substance Pollution Contingency Plan (NCP) discusses three types of removal actions: emergency, time critical, and non-time-critical. These designations are based on the urgency with which cleanup must be initiated to respond to a threat to human health and the environment posed by a release or potential release of hazardous substances. Emergency and time-critical removal actions are initiated to respond to a release or potential release where less than six months are available for planning the response. A NTCRA may be implemented at DEPO potable water tank site, because the *Preliminary Assessment*[3] indicated that no immediate threat to human health or the environment exists at the Site, therefore NPS determined that more than six months are available for planning a response for the identified release.

An Approval Memorandum (**Attachment A**) authorized the preparation of this EE/CA Report. The Approval Memorandum is the first step in NTCRA process. Section 300.415(b)(4)(I) of NCP requires the development of an EE/CA with a public comment period, prior to the signing of the Action Memorandum to initiate the selected alternative for NTCRA.

The EE/CA identifies removal action objectives for protection of human health and the environment, identifies removal action alternatives, and assesses the effectiveness, implementability, and cost of the alternatives that satisfy the removal action objectives.

The EE/CA considers the nature of the contamination, any potential risks to human health and the environment, and how the alternatives fit into the strategy for Site remediation.

The goals of the EE/CA include:

- Conduct a Streamlined Risk Assessment to determine the potential threats posed by contamination originating from the Site;
- Prepare an EE/CA Report to propose removal action to address contamination;
- Provide a framework for the evaluation and selection of potential response actions and applicable technologies consistent with the NCP and EPA Guidance.

1.3 BACKGROUND/SITE HISTORY

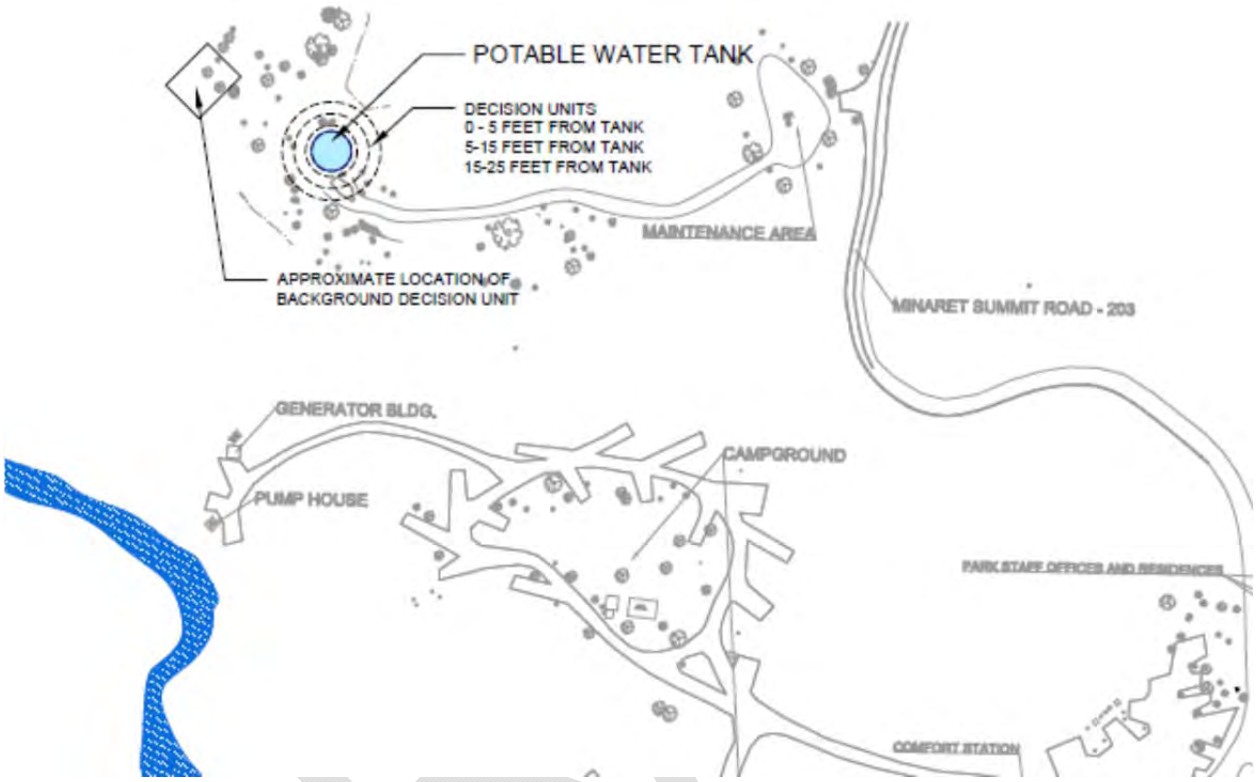
In 2008, P&P[4] conducted a Preliminary Assessment (PA) of a historical release of lead-based paint chips and sandblasting debris at the 100,000-gallon aboveground potable water tank at DEPO. The tank site is located on a slope north of the campground (**Figure 2**). NPS reviewed all available site information and concluded that PA did not completely characterize the nature

[3] Provost and Pritchard Engineering Group, Inc. *Preliminary Assessment for the National Park Service, Devils Postpile National Monument*, prepared for Sequoia and Kings Canyon National Park, Three Rivers, California. October 2008.

[4] *Ibid*.

and extent of lead contamination at the Site. In 2013, ECM reviewed the data from PA report and prepared a *Work Plan for Soil Sampling*[5] (Work Plan) to perform surficial soil sampling using incremental sampling methodology (ISM) to facilitate the preparation of an EE/CA for the Site. ECM implemented the Work Plan activities in July 2013 (**Section 2.4** below).

Figure 2: Site Features



2.0 SITE CHARACTERIZATION

This section gives a general site description and an overview of site investigations that have been completed to characterize the nature and extent of lead impact to soils at the Site.

2.1 SITE DESCRIPTION

Located on the western slope of the Sierra Nevada range, between 7,200 and 8,200 feet above mean sea level, DEPO contains an interesting assemblage of flora, fauna and geology, for which the monument was set aside. The highlight of the monument is a sheer wall of

[5] Environmental Cost Management, Inc., *Work Plan for Soil Sampling Lead Impacted Soil near Potable Water Tank at Devils Postpile National Monument, Madera County, California*. June 17, 2013.

symmetrical basaltic columns more than 60 feet high. The formation is a remnant of a basalt flow worn smooth on top by glacial erosion.

DEPO is located along the Middle Fork of the San Joaquin River, which drops more than 100 feet at Rainbow Falls, located two miles by trail from the Devils Postpile formation. DEPO covers approximately 798 acres administered under the jurisdiction of NPS. The Ansel Adams Wilderness encompasses 687 acres and 85 percent of DEPO, and the monument provides a portal to High Sierra backcountry.

DEPO is located in northeastern Madera County and closely borders Mono County, California. The monument is located approximately two miles southwest of Mammoth Mountain ski resort at 119.0847 W Longitude and 37.629 N Latitude. DEPO features a ranger station, a 21-site campground, and 5.3 miles of established trails.

The closest community to DEPO is Mammoth Lakes, located nine miles to the east in Mono County. Other nearby communities along Highway 395 include Bishop, Crowley's Lake, June, Lake, and Lee Vining. Access to DEPO from Lee Vining is 25 miles on Highway 395 to State Route 203.

The monument also protects several historic and prehistoric archeological and cultural sites. These consist of trade and travel routes, ancient living and activity areas, evidence of herding and other uses and remains of early federal land management activities. The monument encompasses part of the ancestral homelands of several American Indian tribes and groups from both the east and west sides of the Sierra Nevada. The majority of the Devils Postpile archeological sites likely represent seasonal American Indian use. Ten of the eleven sites contain debris from manufacturing flaked stone tools or tool blanks. Interestingly, at least seven of these sites have basalt as well as obsidian waste flakes, possibly a sign of quarrying from the exposed basalt outcroppings. One site contains what appears to be a cache of stone tool blanks, artifacts which likely represent the important trans-Sierran trade of toolstone obsidian. No food procurement or processing features have been documented.

NPS initiated tribal outreach during the monuments GMP to tribes in Madera, Mono, and Inyo Counties. For this project NPS sent letters to Benton Paiute Reservation, Big Pine Paiute Tribe, Bishop Paiute Indian, Reservation, Bridgeport Paiute Indian Colony, Fort Independence Indian Reservation, Lone Pine Paiute-Shoshone Indian Reservation, Mono Lake Kutzadika'a Paiute Indian Community, North Fork Mono Tribe, and North Fork Rancheria of Mono Indians.

2.1.1 Geology and Geohydrology

DEPO is located high on the western slope of the Sierra Nevada in eastern California. The Sierra Nevada is the largest single mountain range in the contiguous United States and is bounded on the west by California's Central Valley and on the east by the Basin and Range Province. Physiographically, the Sierra Nevada is a section of the Cascade-Sierra Mountains province, which in turn is part of the larger Pacific Mountain System physiographic division. The core of this north-northwest trending range is an enormous intrusion of granitic rock, the Sierra

Nevada batholith[6]. Within the monument, there are both extensive outcrops of granite and volcanic rock including basalts and dacites.

Geology/Geologic History

DEPO sits in the heart of the Sierra Nevada - the "snowy mountain range"- of California. The Devils Postpile and surrounding landscape gained early recognition as an excellent example of the volcanic and glacial processes that shaped the Sierra Nevada. In the early 1900s, observers including University of California Professor Joseph N. LeConte and U.S. Forest Service engineer Walter Huber recognized the significance of Devils Postpile as a "wonderful natural curiosity"[7], warranting future scientific study that ultimately led to the establishment of the monument in 1911.

Although the geology of the monument is integrally linked to that of the Sierra Nevada, it exhibits locally-distinct features, which are evidence of the monument's unusual geologic history within the range. These distinct geologic features include the Devils Postpile, Rainbow Falls, granitic domes, and other evidence of volcanism.

The Devils Postpile geologic feature is a small part of a single lava flow which cooled in a way that promoted column formation. Columns would have started forming at the flow surface and extended progressively inward as the interior cooled and solidified over about two decades. The formation as we see it today was exposed by the scouring action of glaciers plucking into the hardened flow to reveal the buried columns, unveiling a polished mosaic of polygons on the surface and majestic columns as the glacier melted away. Glaciers are also responsible for the brilliant polish and dome shape that makes the Devils Postpile so unique among the world's other outcroppings of columnar rock.

Analyses and interpretation of the data to determine the age of the Postpile have evolved over time. The most recent studies, which used more precise Argon isotope techniques, found that the Postpile formed about 82,000 years ago[8]. This date places the Postpile flow within an interglacial period between the Tahoe and Tioga glaciations as suggested by many, including Huber and Eckhardt[9].

Most columnar rock formations around the world occur in basaltic or andesitic rock, though the process of columnar jointing can occur in other mediums besides lava such as mud, saltpans, and frost. Understanding of the actual type of lava that formed the Devils Postpile has changed in recent years. Traditionally the rock which forms the Devils Postpile has been referred to as

[6] USGS, "Geology in the Parks – Geology and Geophysics - Sierra Nevada", last updated 01/13/04, accessed 05/29/2013. geomaps.wr.usgs.gov/parks/province/pacifmt.html.

[7] LeConte, J.N. Letter to President Wm. H. Taft, Berkeley Water Resources Library, Walter Huber Papers. March 29, 1911.

[8] Mahood, G., J. Ring, S. Manganelli and M. McWilliams. *New 40Ar/39Ar Ages Reveal Contemporaneous Mafic and Silicic Eruptions During the Past 160,000 Years at Mammoth Mountain and Long Valley Caldera, California*. Geological Society of America Bulletin 122(3-4): 396. 2010.

[9] Huber, N. K. and W. W. Eckhardt. *The Story of Devils Postpile: A Land of Volcanic Fire, Glacial Ice, and an Ancient River*. The Sequoia Natural History Association, Three Rivers, CA. 2001.

basalt[10,11,12]. Recently, classification has been refined and the formal petrologic name is basaltic trachyandesite. Today, for general references the geologic units of the monument are referred to as basalt, dacite, and andesite

The exposed columns of the Postpile formation are the most spectacular and symmetrical attributes of a larger sheet of basaltic lava that evidences glaciation, evidencing the combined artistry of "Fire and Ice working together in the making of beauty" (John Muir). This glacially eroded sheet of silicon rich lava (53.9 - 54.4% SiO_2) is preserved discontinuously along the floor of the Middle Fork San Joaquin River canyon in two major remnants and several small ones, distributed for 4.3 miles downstream from near Upper Soda Springs Campground. The eroded scoria cone and dikes opposite the modern day campground represent the eroded vent of an older crystal-poor lava flow that erupted about 121,000 years ago. This flow directly underlies the crystal-rich Postpile basalt, and both flows can be observed along the trail above the river's west bank. Despite wide search, the vent for the Postpile basalt has not been found[13].

The crown jewel of the lava flow is the Postpile formation that reveals the interior of the lava flow with columns rising above a remarkable field of postglacial talus of fallen columns totaling 196 feet in depth above the contact zone of lava and granite at the river. The highpoint of the lava flow is 1,700 feet east, just outside the monument boundary for a total estimated depth of the flow at 360 feet.

The lava is widely striated and plucked, eroded into knolls, ridges, and sidewall benches; surviving exposures are nearly all massive and have only sparse scattered vesicles. Slender columns at the iconic Postpile rise to 60 feet high, polygonal, typically 2 to 3.5 feet thick, and variously vertical, curved, inclined, or subhorizontal[14]; elsewhere in the unit sets of stouter or less regular columns are widespread, but hackly and block jointing is common too.

One aspect of the Devils Postpile that sets it apart from the other columnar formations is the presence of glacial polish and glacial striations. Such features exhibit the power of glaciers to erode rock and thus the exact mechanism by which the columns of the Postpile were revealed. Another dramatic factor is the erosion of the San Joaquin River downstream from the Postpile, that helped to cut the gorge showcasing dramatic basalt columns plunging into the river on the east bank contrasted with the granite wall on the west bank.

Soil quality and productivity depend on climate, inherent soil type, and soil condition. High elevation restricts the growing season and maintains cold soil temperatures for most of the year

[10] LeConte, J. N. *The Devil's Postpile*. Sierra Club Bulletin, (8):170-173. 1912.
[11] Dalrymple, G. B. *Potassium-Argon Dates of Three Pleistocene Interglacial Basalt Flows from the Sierra Nevada, California*. Geologic Society of America Bulletin 75(8): 753-758. 1964.
[12] Clow, D. W. and K. R. Collum. *Geology of the Volcanic Rocks at Devils Postpile, California*. Journal of Natural Sciences 1: 18-21. 1986.
[13] Hildreth, W. and J. Fierstein. Eruptive History of Mammoth Mountain and Its Mafic Periphery, California: USGS Professional Paper; 250 ms. pp., 43 Figures, 3 Tables; Appendices; geologic map scale 1:24,000. 2014.
[14] Huber, N.K. and C. D. Rinehart. Geologic Map of the Devils Postpile Quadrangle, Sierra Nevada, California: USGS Map GQ-437; scale 1:62,500. 1965.

in all but the southern, lower elevation areas. This limits the activity of plants, burrowing animals, soil insects, and microorganisms. Essential plant nutrients, such as nitrogen, phosphorus, potassium, calcium, and magnesium are severely limited[15].

It is difficult to locate an area within the 798 acres of DEPO that is not covered by pumice. The pumice within the monument indicates post-glacial volcanic activity from the chain of craters to the NE from the Inyo Craters to Mono Craters. The pumice at the monument plays an important role in the area's phytogeography and vegetation development. Most of the pumice found in the monument is less than 0.4 inches in diameter suggesting that it traveled some distance before falling. The Inyo Craters eruptions in 1350 Common Era (CE) are considered the source of the monument's pumice[16]. Three vents were active, all fed by a common rhyolite dike. The combined thickness of these layers can extend up to 3 feet deep. In most areas of the monument it is less than six inches in depth. In flatter areas (meadow areas and "tables") the pumice accumulation averages near 0.5 to 1.5 feet deep. Little soil formation probably occurred before the present pumice cover appeared, probably due to the facts that:

1) glaciated volcanic rock-surfaces are very slow to decompose;
2) slopes did not allow particle accumulation;
3) montane and sub-alpine climates do not foster rapid development of pioneer plant communities; and
4) snowpack and rainfall contribute to rapid soil erosion.

Primary parent material at the Site include areas of volcanics, including andesite, basalt, and rhyolite, and pyroclastic deposits. Andesitic tuffs, ash, and pumice soils were observed near the tank during ECM's site reconnaissance. Most of the high elevation meadows are rich in volcanic ash. Soils formed in tephra and ash tend to be richer in nutrients and organic matter, but when exposed can also be exceptionally dusty.

The technical description, based on a general Natural Resource Conservation Service mapping effort in 1995[17], most soils in the monument are classified as vitrandic xerochrepts, typic cryorthents and rocky outcrops. These soils are typically coarse, sandy and very well to excessively drained and are predominately rocky and dry (xeric).

[15] USDA, Forest Service, *Final Wilderness Plan and Environmental Impact Statement, Inyo and Sierra National Forests, John Muir/Ansel Adams and Dinkey Lakes*, July, 2012.
[16] Millar, C.I., J. C. King, R. D. Westfall, H. A. Alden, D. L. Delany. *Late Holocene Forest Dynamics, Volcanism, and Climate Change at Whitewing Mountain and San Joaquin Ridge, Mono County, Sierra Nevada, CA, USA*. Volume 66, Issue 2, September 2006, Pages 273–287. 2006.
[17] National Resource Conservation Service (NRCS). *Soil Mapping of Devils Postpile National Monument*. 1995.

Hydrology

The hydrological force of the Upper Middle Fork of the San Joaquin River and its tributaries is the dominant geomorphic process (and important resource) acting today in DEPO[18] . This river flows within the monument from north to south near the eastern boundary. In the northern portion of the monument, it meanders through meadows, then begins to descend more rapidly in the southern portion and includes scattered pools, quickly flowing rapids, cascades, and the 101 foot high Rainbow Falls.

There is no long-term hydrology gauging station upstream of the monument on the Upper Middle Fork of the San Joaquin River[19] . A recently-installed gage within the monument provides stream flow data from October 2009 through the present. During that period runoff peaked at 1,520 cubic feet per second on June 23, 2011, and reached its minimum of 7.5 cubic feet per second on September 21, 2013. For Sierra Nevada streams, the annual high water event typically occurs in late spring or early summer and is fed by seasonal snowmelt. High water events may also be caused by runoff from late summer thunderstorms. However, many of the highest magnitude floods occur during winter months due to rain on snowpack. The United States Geologic Survey (USGS) stream gaging station is important for detecting the change in seasonality of spring run-off, in addition to high/low/extreme discharge events.

As with other Sierra high-elevation rivers and streams, the majority of the Upper Middle Fork San Joaquin water originates as snow during the months of October through March each year[20] . Accordingly, river runoff varies greatly throughout the year, with the greatest stream flow volume in warm summer months (59% of total annual flow in May through July), and next-greatest stream flow in early spring (29% of total annual flow in February through April)[21] . However, some of the highest flows occur in winter months from rain-on-snow events. There is no long term groundwater gauging for the monument. Instrumentation was installed in a new well in 2009 to begin data collection on groundwater.

As one of the twelve primary rivers originating in the Sierra Nevada[22], the San Joaquin River is one of California's most important sources of water for human uses in the state[23]. It is part of the Sacramento-San Joaquin River watershed, which is under jurisdiction of California's Central Valley Regional Water Quality Control Board.

[18] Mutch, L. S., M. G. Rose, A. M. Heard, R. R. Cook and G. L. Entsminger. *Sierra Nevada Network Vital Signs Monitoring Plan*. DOI National Park Service, Fort Collins, CO. Natural Resources Report NPS/SIEN/NRR-2008/072. 2008.
[19] Andrews, E. D. *Hydrology of the Sierra Nevada Network National Parks: Status and Trends.* Natural Resource Report NPS/SIEN/NRR—2012/500. National Park Service. Fort Collins, CO. 2012.
[20] Kattlemann, R. *Hydrology and Water Resources*. In Sierra Nevada Ecosystem Project: Final Report to Congress, vol. III. University of California, Centers for Water and Wildland Resources. Davis, CA. 1996.
[21] Cayan, D.R. and L.G. Riddle. *A Multi-basin Seasonal Streamflow Model for the Sierra Nevada*. In Proceedings of the Ninth Pacific Climate Workshop, edited by K.T. Redmond and V.L. Tharp. 141-52. 1993.
[22] Mount, J. *California Rivers and Streams*. University of California Press. Berkeley, CA. 1997.
[23] California Department of Water Resources. Interagency Ecological Studies Program. Sacramento, CA 2009.

2.1.2 Climate, Vegetation and Wildlife

Climate within DEPO varies greatly by season. During the months of September and October, daytime temperatures can range from the mid-70's to mid-80's degree Fahrenheit (°F), and evening temperatures can drop into the low 30's and 40's °F. Winter day and evening temperatures often remain below freezing for extended periods of time. Precipitation usually occurs year round with sub-tropical thunderstorms in the spring and autumn and significant rain and snow events in the winter. Average rainfall is about 30 inches per year. Snowfall typically exceeds 400 inches per year[24].

The Inyo National Forest surrounds DEPO and 85% of the Monument are included within the Ansel Adams Wilderness. DEPO's vegetation is a montane forest dominated by red fir and lodgepole pine of the east slope of the Sierra Nevada. Though technically a west slope location, the monument's proximity to both west and east sides of the Sierra Nevada results in biological communities that have east-slope as well as west-slope affinities[25]. Western slope flora includes mountain hemlock, red fir, alder, and gooseberry.

Recent plant inventories documented 380 plant species in the monument. Along the San Joaquin River and the few creeks that flow into it, typical montane riparian vegetation can be found, such as quaking aspen, black cottonwood, alder, and willows. Both wet and dry meadows dot the monument, and during the spring and early summer when water is available, wildflowers such as cinquefoil and alpine shooting star can be found.

The unique geography of the area fosters relatively high species diversity concentrated in a small area. The Monument contains animals such as black bears, mule deer, and coyotes. Soda Springs Meadow, near the Ranger Station, harbors an abundance of songbirds. Dark-eyed juncos and white-crowned sparrows are common in the summer. The talus at the base of Devils Postpile is home to many squirrels and chipmunks and the pine martens, which hunt them. Another asset in terms of biodiversity is the burned area near Rainbow Falls, which is habitat for many plants and animals that will not live in heavily forested areas.

A total of 135 plant species in the Sierra Nevada have status as Threatened, Endangered, or Sensitive. Plants that are federal species of concern (former Category 2 species) under the Federal Endangered Species Act include:

1. Three-bracted Onion,
2. Yosemite Woolly Sunflower,
3. Congdon's Lomatium,
4. Tiehm's Rock-cress,
5. Slender-stemmed Monkeyflower, and
6. Bolander's Clover.

[24] National Park Service, www.nps.gov/depo/naturescience, accessed 05/29/2013.
[25] *Ibid*.

None of these plants are found at or near the Site (see **Table C-1** of **Attachment C** for a list a species in DEPO provided by NPS).

Although Category 2 was abolished in 1996, species of concern is an informal term that refers to those species that might be declining or be in need of concentrated conservation actions to prevent decline. Therefore, these six species continue to be evaluated and managed by NPS.

Four state-listed rare plant species are considered restricted and limited throughout all or a significant portion of their range, and may represent disjunct populations at the extreme end of their range:

1. Yosemite Onion,
2. Tompkin's Sedge,
3. Congdon's Woolly Sunflower, and
4. Congdon's Lewisia.

None of these plants are found at or near the Site (see **Table C-1** of **Attachment C** for a list a species in DEPO provided by NPS).Endangered or threatened species of animals that occur in the Sierra Nevada include:

1. Sierra Nevada Bighorn Sheep
2. California Condor
3. Southwestern Willow Flycatcher
4. Paiute Cutthroat Trout
5. Lahontan Cutthroat Trout
6. Owens Tui chub

None of these animals are found at or near the Site (see **Table C-1** of **Attachment C** for a list a species in DEPO provided by NPS).

Sierra Nevada mid and high elevations provide the only habitat for the Sierra Nevada mountain yellow-legged frog, the Yosemite toad, and the Sierra Nevada bighorn sheep

2.1.3 Land Uses

DEPO hosted 87,845 visitors in 2012, with an average of 103,258[26] visitors annually from 2009 to 2012[27]. Recreational activities vary with the season and include wildflower and wildlife viewing, sightseeing and photography, hiking, horseback riding, camping, fishing, skiing, and snowshoeing[28] and 85 percent of DEPO is wilderness. Some NPS employees live within DEPO during the open season (April/May to October/November) and a small residential area exists within the park. The Site addressed by this EE/CA only encompasses the 25 feet around the

[26] National Park Service, "Devils Postpile Park Statistics", accessed 01/27/2014, www.nps.gov/depo/parkmgmt
[27] *Ibid*.
[28] National Park Service, "Devils Postpile Outdoor Activities", accessed 01/27/2014, www.nps.gov/depo/planyourvisit/outdooractivities.htm

potable water tank and only employees access the area during routine park maintenance activities.

2.2 SITE HISTORY

The Devils Postpile feature was known locally in the 1890's as the Devils Woodpile. It was first documented as the Devils Postpile in 1901 on various maps. The Postpile was part of Yosemite National Park in the late 1800's, when Congress designated its boundaries. Congress removed 500 square miles, including DEPO, from Yosemite National Park in 1905 under pressure from mining and lumber lobbying interests. By 1910, a proposal was made to dynamite the Postpile and use it to dam the San Joaquin River. Members of the Sierra Club and University of California professor Joseph LeConte, who was also a mountaineer, successfully campaigned against the project.[29].

On July 6, 1911, President William Howard Taft proclaimed the area a national monument and extended full protection of the federal government to the Devils Postpile formation and Rainbow Falls. The monument was originally administered by the United States Department of Agriculture Forest Service (USFS), and then transferred to the national park system in 1934. After the transfer, DEPO was first managed by Yosemite and then by Sequoia and Kings Canyon National Parks before becoming an independent unit of NPS. Congress also included 747 acres of the monument in the Ansel Adams Wilderness in 1984; consequently, 85 percent of the monument is designated as wilderness.

NPS oversees the 687-acre Devils Postpile National Monument, while the USFS manages the lands surrounding the monument. Together these two federal agencies work as partners to manage public lands in this area. In 2009, USFS and NPS entered into a Memorandum of Understanding (MOU) to collaborate on the preparation of the Devils Postpile National Monument General Management Plan (GMP) and create a foundation for future cooperation in management and planning. Under the MOU, USFS and DEPO are key participants in the development of desired valley-wide conditions for facilities, transportation, and the overall visitor experience, as well as resource management issues[30].

2.2.1 Water Tank Operational History

The lead-impacted soils addressed in this EE/CA surround an aboveground steel tank that is the sole potable water storage facility for DEPO[31]. The 100,000-gallon tank was installed in

[29] Sherpa Guides, Grossi, Mark, "Longstreet Highroad Guide to the California Sierra Nevada – Devils Postpile National Monument", www.sherpaguides.com/california/mountains/eastern_sierra/devils_postpile_national_monument.html.

[30] National Park Service, Devils Postpile National Monument General Management Plan. Preliminary Alternatives. Newsletter #3, Summer 2011.

[31] Provost and Pritchard Engineering Group, Inc., *Preliminary Assessment for the National Park Service, Devils Postpile National Monument*, prepared for Sequoia and Kings Canyon National Park, Three Rivers, California. October 2008.

1964 and has been in seasonal use since its installation. The tank is drained at the end of each season in October and is refilled at the beginning of each spring season in May. The tank sits on a slope north of the campground in the northern part of the monument grounds. The campgrounds, ranger station, and facilities are located within 1,000 feet south and 125 feet in elevation below the tank site. The Site is accessible via a walking uphill trail from the campgrounds and an unpaved access road from the southeast. The site is designated as "employees only" and is generally not visible or accessible to visitors.

By 2005, the tank's outer surface had weathered to the point that the original paint was pealing and flaking. In September 2005, a painting contractor (AA-1 Services of Paramount, California) was retained to remove the lead based paint and recoat the exterior of the water tank. The contractor constructed a negative pressure containment system by wrapping scaffolding surrounding the tank with a plastic material extending 5 feet from the external tank wall. After recoating operations were completed, Mr. John Fernandes, Maintenance Mechanic, noted that lead-based paint chips and sandblasting material had been left by the tank, accessible to the public and wildlife. The paint chips and blast material were not removed within 24 hours as required by contract, but remained on the ground for approximately two weeks.

2.3 SUMMARY OF PREVIOUS INVESTIGATIONS

In November 2005, due to a contract violation in which the painting contractor collected confirmation samples without oversight by NPS staff, DEPO Maintenance Mechanic John Fernandes collected soil samples at ten locations within the sand-blasting containment area to verify the cleanup procedures. The exact location from which these ten soil samples were collected is not mapped; however, notes included in the file and discussions with the supervisory ranger suggest that the samples were collected from within the footprint of the former containment area at approximately 15-foot centers[32].

Laboratory results for samples collected by Mr. Fernandes in 2005 showed that:

- Lead was present in all 10 samples collected above the method detection limit.
- The average lead concentration was 1,049 mg/kg; sample-specific lead concentrations ranged from 20 mg/kg to 2,100 mg/kg. These concentrations of lead in site soils are below the California Human Health Screening Levels (CHHLS) of 3,500 mg/kg for commercial/industrial use.
- The average lead concentrations slightly exceed the Total Threshold Limit Concentration (TTLC) of 1,000 mg/kg, as defined in Title 22, California Code of Regulations (CCR).

[32] Provost and Pritchard Engineering Group, Inc., *Preliminary Assessment for the National Park Service, Devils Postpile National Monument*, prepared for Sequoia and Kings Canyon National Park, Three Rivers, California. October 2008.

- The concentrations also exceed the EPA regional screening levels (RSLs) for soil (400 mg/kg [residential] and 800 mg/kg [industrial]).

In 2008 P&P[33] conducted a PA in general accordance with CERCLA guidance manual for the 2005 release of lead-based paint chips and sandblasting debris at the Site. The objective of PA was to identify past and present practices related to the historic release and to evaluate the Site's Hazard Ranking System Score.

The scope of the investigation included review of available records, a site reconnaissance and interviews with DEPO personnel. The investigation focused on the 2005 water tank sandblasting operation activities intended to remove the lead-based paint from the exterior of the tank.

The PA resulted in the following findings:

- The primary type of waste generated on-site was a one-time release of lead-based paint chips related to the sandblasting operations for external tank cleaning in preparation for recoating. Some amount of the blasting material was also released to the soil during the blasting operations; however, the sandblasting (quartz sand) material is not considered a human health or environmental hazard.
- Based on the PA, groundwater and surface water targets are not within sufficient distance of the Site for there to be a migratory pathway to these resources. Restrictive air flow due to the hilly forested terrain between the source and potential targets make it unlikely that an airborne pathway exists. However, if soils were to be excavated in the future, the quantity of hazardous substances should be identified.

2.4 2013 EE/CA FIELD INVESTIGATIONS

The specific locations of the samples collected in 2005 are unknown, and therefore the extent of contamination undetermined, which represented a gap in Site characterization. The exceedances of RSLs for lead at the Site indicate that additional information was necessary to determine background concentrations for comparison and, if appropriate, to develop proposed action levels for the Site. To address gaps in the characterization of contamination and to develop and evaluate removal action alternatives in accordance with CERCLA, NPS issued an EE/CA Approval Memorandum on October 11, 2012.

ECM prepared a Work Plan[34], including a Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan[35] (QAPP) to address the remaining data need for Site characterization. In July 2013, ECM collected additional Site data to characterize the nature and extent of

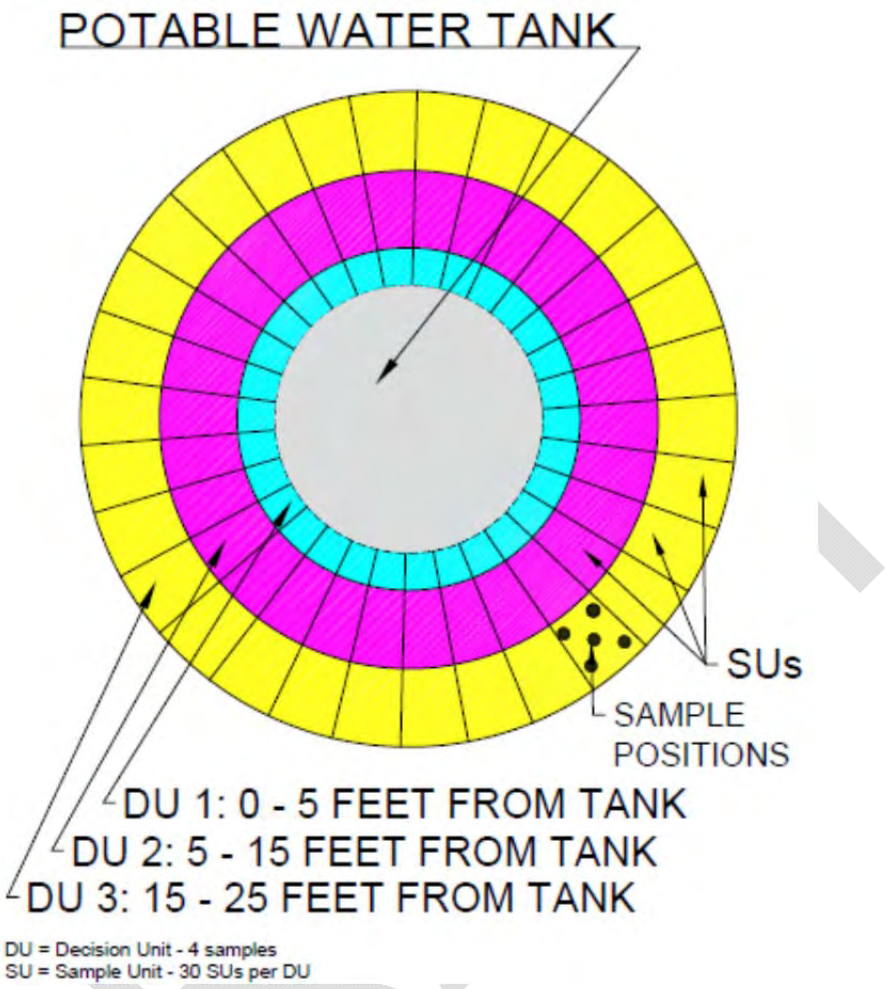
[33] *Ibid*.
[34] ECM, 2013. *Work Plan for Soil Sampling, Lead Impacted Soil Near Potable Water Tank at Devils Postpile National Monument, Madera County*, CA. July 17.
[35] ECM, 2013. *Sampling and Analysis Plan and Quality Assurance Project Plan for Site Characterization near Potable Water Tank Devils Postpile National Monument*, Madera County, California. July 17.

potential lead contamination in surface soils near the potable water tank. ECM used ISM to characterize the naturally occurring background lead concentrations and the nature and extent of lead contamination at the Site in three intervals (decision units) to 25 feet from the tank. Beyond 25 feet from the tank, bedrock outcrops create a natural topographic boundary. Surface soil is not available on rock outcrops. ISM provides a representative and reproducible estimate of the mean concentration of analytes in a specific area of interest, known as a *decision unit* (DU). ECM collected samples from the following approximate decision units at the Site (**Figure 3**):

1. DU-1: Surface soils within 5 feet of the water tank footing;
2. DU-2: Surface soils between 5 feet and 15 feet from the water tank footing;
3. DU-3: Surface soils between 15 feet and 25 feet from the water tank footing; and,
4. DU-4: Background surface soils at approximately 150 feet upgradient (north-northwest) from the water tank footing.

ECM used ISM to collect 4 aggregate soil samples for each DU, each sample consisting of 30 incremental subsamples collected across each DU, to characterize each DU at the Site. A total of four multi-increment (MI) samples were collected at each decision unit per the Work Plan and SAP/QAPP. As required by NPS, one additional QA/QC sample was collected at DU-1 (DEPO-DP-100) with a reported lead concentration of 490 mg/kg, which is consistent with results from other samples collected in DU-1.

Figure 3: Decision Unit Layout



MI soil samples were analyzed for total lead content by a California certified laboratory using EPA method 6010B. Additionally, the sample with the highest reported lead concentration (DEPO-01-102) was analyzed for soluble threshold limits concentrations (STLC) Citrate (citric acid) and DI (deionized water). A summary of laboratory results for samples collected by ECM in July 2013 showed that:

- Lead was present in all 16 MI samples collected above the method detection limit.
- Average lead concentration at DU-1 was 507.5 mg/kg; sample-specific lead concentrations at DU-1 ranged from 400 mg/kg to 650 mg/kg. STLC Citrate and DI for sample DEPO-01-102, with a reported total lead concentration of 650 mg/kg, were

reported as 40 B[36] milligrams per liter (mg/L) and 0.088 J[37] B mg/L, respectively.

- Average lead concentration at DU-2 was 177.5 mg/kg; sample-specific lead concentrations at DU-2 ranged from 120 mg/kg to 240 mg/kg.
- Average lead concentration at DU-3 was 68.3 mg/kg; sample-specific lead concentrations at DU-3 ranged from 61 mg/kg to 80 mg/kg.
- Average lead concentration at DU-4 (background) was 4.9 mg/kg; sample-specific lead concentrations at DU-4 ranged from 4.30 mg/kg to 5.50 mg/kg.
- Concentrations of lead in surface soils at DU-1, DU-2 and DU-3 exceeded background concentration of 5.55 mg/kg (95% Student's upper confidence limit [UCL]) estimated from samples collected at DU-4.

Laboratory reports for samples collected in July 2013 are presented in **Attachment** B and **Attachment C, Tables C-3a, C-3b, and C-3c** summarize these results.

2.4.1 Site-Specific Background Data

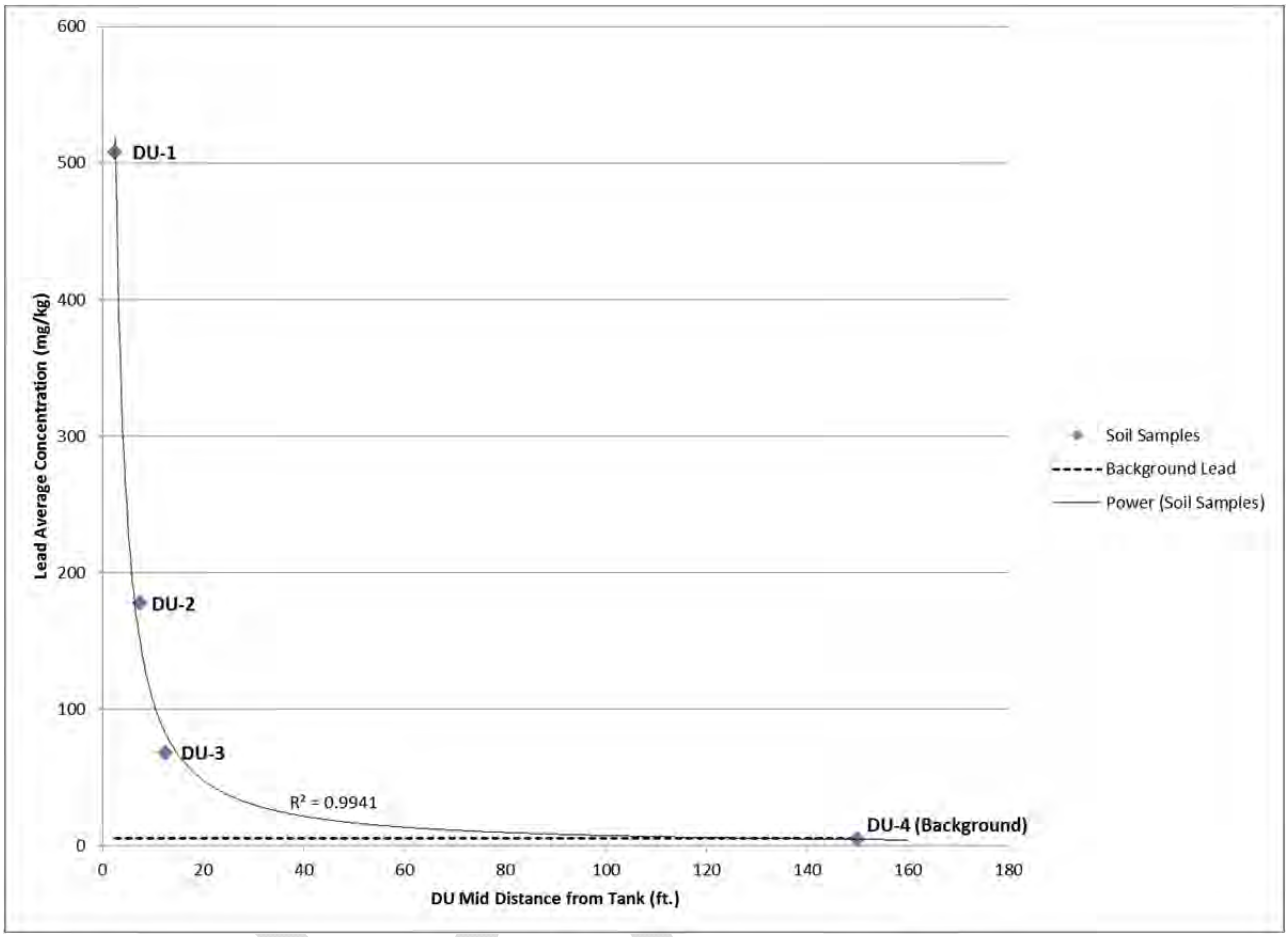
Under CERCLA[38], concentrations of contaminants of concern below the naturally occurring background levels are not generally subject to removal action. A Site Specific Background concentration for lead in surface soils, determined within the 95 percent upper confidence limit (95% UCL) using a Student's distribution curve, was estimated at 5.55 mg/kg from laboratory results of four MI samples collected at DU-4 in July 2013 (**Table C-2**).

2.5 NATURE AND EXTENT OF CONTAMINATION

Surface soils surrounding the potable water tank, extending to at least 25 feet from the tank footing; indicate surface soil lead concentrations exceed background lead concentrations. These data indicate lead from the tank's lead-based paint coating migrated to surrounding soils. Lead concentrations decrease exponentially (power trendline) with distance from the tank footing (**Figure 4**).

[36] Compound was found in the blank and sample.
[37] Result is less than the reporting limit (RL) but greater than or equal to the method detection limit (MDL) and the reported concentration is an approximate value.
[38] EPA, Role of Background in the CERCLA Cleanup Program, OSWER 9285.6-07P, April 26, 2002.

Figure 4: Lead Concentration Trend (Power Trendline)



2.5.1 Constituents of Potential Concern

Lead is the only constituent of potential concern (COPC) related to this investigation for lead-based chips during sandblasting activities for aboveground potable water tank reconditioning. Sandblasting material is not considered a COPC.

Since lead exceeded the site-specific background concentration, it was considered as a COPC for the Streamlined Risk Assessment in **Section 2.6**.

2.5.2 Extent and Volume of Impacted Soils

The volume of soil assessed was estimated and used as a baseline for this EE/CA Report. Sample collection of surface soil was performed in an area that extended 25 feet from the potable water tank footing. Sample area extended to 25 feet from the base of the tank to a natural topographic boundary. Assuming only the top 4 inches of soil are impacted with lead due to surface source, the estimated volume of impacted soil around the tank is approximately:

1. DU-1: Area 5 feet around tank footing. 613 square feet (sq ft), 7.6 cubic yards (cy).
2. DU-2: Area 5 feet to 15 feet around tank footing. 1,696 sq ft, 20.9 cy.

3. DU-3: Area 15 feet to 25 feet around tank footing. 2,325 sq ft, 28.7 cy.
4. Total: Area 25 feet around tank footing. 4,634 sq ft, 57.2 cy.

Pending of the results of the Streamlined Risk Assessment in **Section 2.6**, it will be determined if the assessment is complete and what DU need removal action.

2.6 STREAMLINED RISK ASSESSMENT

As described in EE/CA Guidance[39], a streamlined risk assessment is intermediate in scope between the limited risk assessment conducted for emergency removal actions and the conventional baseline assessment conducted for remedial actions. The purpose of a streamlined risk assessment is to justify a removal action. Consistent with EE/CA guidance[40], the streamlined risk assessment will identify the potential for risk, if no removal action is taken within the removal action boundary.

The streamlined risk assessment approach identifies and addresses exposure pathways by evaluating potential ecological and human health risks. The assessment focuses on the human health and ecological risks associated with elevated COPC concentrations and focuses on the media that the removal action is intended to address, which is limited to surface soils (top 4 inches) around (25 feet) the potable water tank.

2.6.1 Preliminary Exposure Pathways

The risk assessment is designed to identify risk from potential exposure pathways if no action is taken. An exposure pathway is considered complete if a chemical can travel from a source to a human or ecological receptor and is available to the receptor via one or more exposure routes[41]. **Figures 5 and 6** depict the various exposure pathways in the form of a Human Health Risk Conceptual Model and an Ecological Risk Conceptual Model, respectively.

2.6.2 Human Risk Screening Criteria

The preliminary COPC identification process was integrated with streamlined risk assessment for a protective, risk-based approach, which compares contaminant concentrations to regulatory screening criteria that are considered protective of human health. A conceptual site model (CSM) is used to evaluate the possible lead exposure pathways and receptors for the impacted soil via relevant transport mechanisms.

As shown in the presented Human Health Risk Conceptual Model, NPS eliminated the following receptors from consideration in the CSM:

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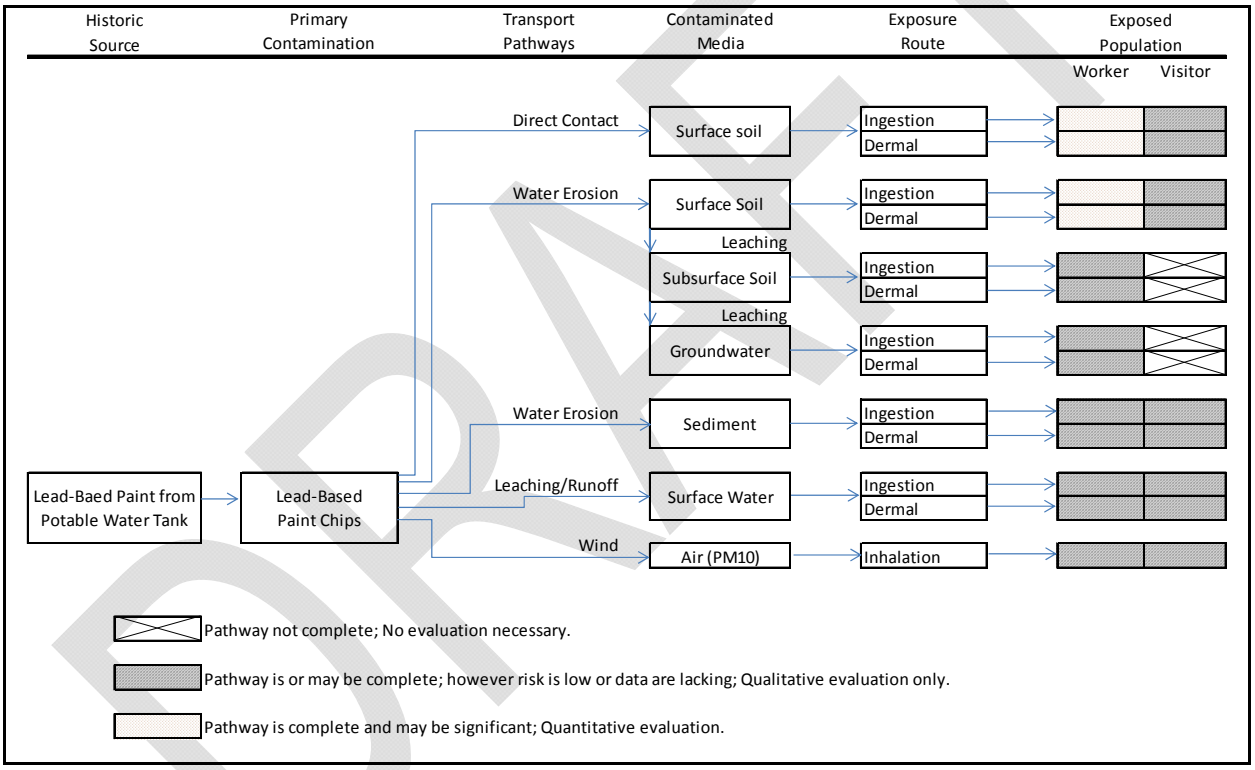
[39] EPA, 1993. *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*. EPA/540-F-93-048. September 1993
[40] *Ibid*.
[41] EPA, 1989. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual*. EPA/540/1-89/002. December 1989.

- Residents
- Subsurface soil for visitors
- Groundwater for visitors

No residents live at the location of the potable water tank at DEPO. Workers will be instructed to avoid contact with surface water (temporary institutional control).

Sediment is naturally occurring material that is broken down by processes of weathering and erosion, and is subsequently transported by the action of wind, water, or ice, and/or by the force of gravity acting on particles. No sediment samples were collected during EE/CA Field Investigation, as there is no sediment material present at the Site.

Figure 5: Human Health Risk Conceptual Model



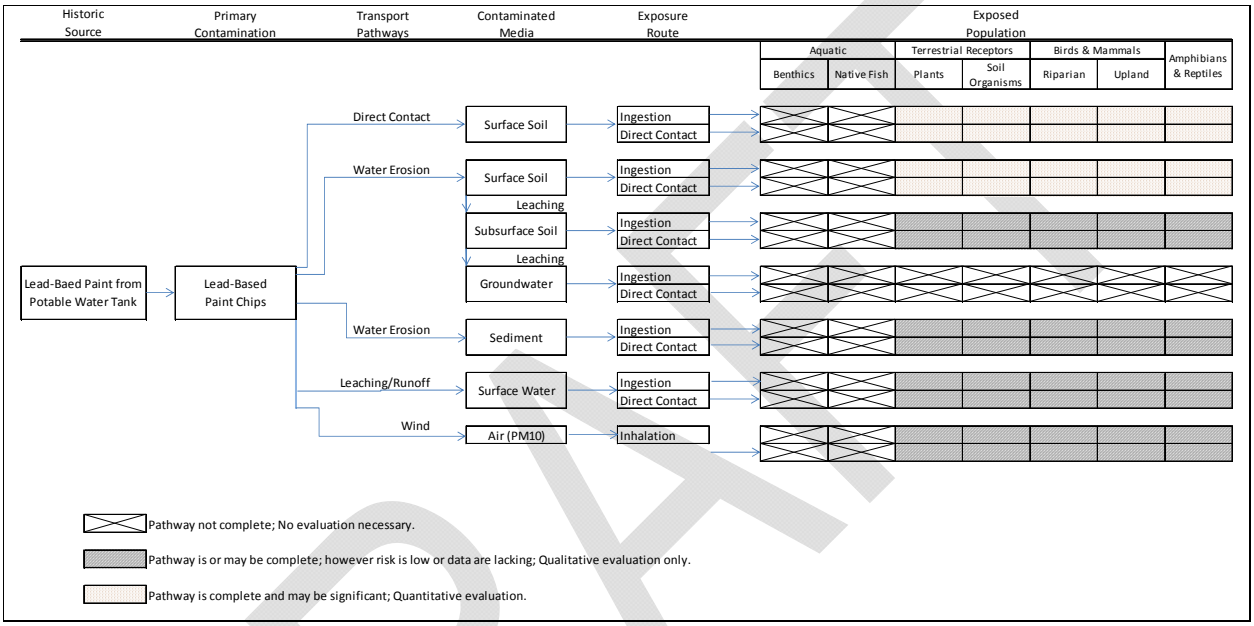
All human health screening levels considered in the streamlined risk assessment are presented in **Attachment C, Table C-3**. A human health risk screening value of 800 mg/kg of lead was selected for the Site as this is the lowest level that applies for the Site CSM and current land use[42].

[42] EPA Region 9 Screening Levels for Soil - November 2011

2.6.3 Ecological Risk Screening Criteria

The preliminary COPC identification process was integrated with streamlined risk assessment for a protective, risk-based approach, which compares contaminant concentrations to regulatory screening criteria that are considered protective of ecological receptors. A conceptual site model (CSM) is used to evaluate the possible lead exposure pathways and receptors for the impacted soil via relevant transport mechanisms.

Figure 6: Ecological Risk Conceptual Model



Based on **Figure 6**, NPS eliminated the following receptor from consideration in the CSM:

- Aquatic organisms

Aquatic screening levels were removed because the exposure pathway is not complete based on the location of surface bodies of water relative to the transport pathways from the source.

All ecological screening levels considered in the streamlined risk assessment are presented in **Attachment C, Table C-3**. The minimum ecological risk screening value for lead is 11 mg/kg[43].

2.6.4 Site Specific Screening Level

A Site Specific Screening Level (SSSL) value for lead in surface soil was determined by evaluating all published screening levels for soil for wildlife species at the Site. Plants were not considered as they are not allowed to grow in the impacted area in order to maintain a clear area around the tank perimeter. The risk screening value (RSV) of 11 mg/kg for avian potential

[43] Risk Assessment Information System ecological benchmark tool at http://rais.ornl.gov/tools/eco_search.php

receptors was selected as for the calculation of the SSSL because it is the lowest Eco-SSL for avian species at the Site. Similarly, the RSV of 56 mg/kg for mammalian potential receptors was selected for the calculation of the SSSL because it is the lowest Eco-SSL for mammalian species at the Site.

These values were adjusted based on the area use factor (AUF) for the avian and mammalian species[44] with the smallest home range (most conservative) at the Site to estimate their Toxicity Reference Value (TRV) as presented in **Attachment C, Table C-1**. The AUF for the Audubon's Warbler at the Site was estimated at approximately 0.05 and the AUF for the California Deermouse at the Site was estimated at approximately 0.29. By dividing the avian RSV of 11 mg/kg by the AUF of 0.05, we obtain an estimated TRV value of approximately 220 mg/kg of lead in soil. By dividing the mammalian RSV of 56 mg/kg by the AUF of 0.29, we obtain an estimated TRV value of approximately 193 mg/kg of lead in soil as presented in **Attachment C, Table C-4**. The smallest value of 193 mg/kg was selected as the ecological SSSL.

Surface water in the vicinity of the Site is ephemeral and only occurs for hours or days following rainfall or snowmelt. No surface water was present during site assessment activities; therefore no surface water samples were collected.

2.6.5 Contaminant of Concern for Removal Action

Mean concentrations of lead at the three DUs, estimated as the Chevyshev 95% UCL, were compared to the human health and ecological SSSL to establish if lead should be a contaminant of concern (COC) for the Site (**Table 1** and **Attachment C, Table C-2**). Sample concentrations for lead of 737.03 mg/kg and 322.48 mg/kg exceeded the ecological SSSL at DU-1 and DU-2, respectively. Therefore, lead shall be considered a COC at the Site.

Table 1: Contaminant of Concern

Sample DU Area (Units)	**DU-1** (mg/kg)	**DU-2** (mg/kg)	**DU-3** (mg/kg)
Replicate 1	400	120	61
Replicate 2	470	120	64
Replicate 3	510	230	68
Replicate 4	650	240	80
Mean Concentration	737.03	322.48	86.43
Human Health SSSL	800	800	800
Ecological SSSL	193	193	193

[44] California Department of Fish and Wild Life - CWHR Life History Accounts and Range Maps at http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx

2.6.6 Risk Summary

Section 2.6 explains that this EE/CA must evaluate whether there is potential risk to human health or to the environment, if no action were to occur. These risks are represented by the following:

- Hazard quotient – human health
- Hazard quotient – ecological receptors
- Hazard index – human health
- Hazard index – ecological receptors

Hazard quotients (HQ) are used to estimate COC non-cancer risk by dividing the estimated exposure point concentration (EPC) by TRV for human health risk evaluation. For ecological receptors, when AUF are taken into consideration, the HQ is estimated by dividing the exposure dose (ED) by TRV for non-cancer risk evaluation for ecological receptors[45]. Lead is not a carcinogenic chemical and cancer risk evaluation is not needed.

The EPC can be either the maximum detection or the 95% UCL of samples collected. ISM recommends estimating EPC as Chevyshev 95% UCL when data variability is unknown, as it is for DU-1, DU-2 and DU-3. The ED is estimated as the EPC multiplied by the AUF. In summary, EPC = 95% UCL for Human Health; ED = 95% UCL x AUF for Ecological Receptors.

For the purpose of HQ calculations based on potential removal action of individual DU, the DUs were combined in three different groups as follows:

Area 1: DU-1, DU-2 and DU-3, with a total area of 4,634 sq ft.

Area 2: DU-2 and DU-3, with a total area of 4,021 sq ft.

Area 3: DU-3, with an area of 2,325 sq ft.

The areas are used to calculate risk exposure by including all three impacted intervals (Area 1), then by removing the most impacted interval to calculate the risk exposure to the remaining two intervals (Area 2), and finally calculate exposure risk for the least impacted area by itself (Area 3). The Human Health EPC for lead was estimated as 510 mg/kg for Area 1, 235 mg/kg for Area 2 and 86 mg/kg for Area 3. The ecological receptors ED for lead was estimated as 148 mg/kg for Area 1, 59 mg/kg for Area 2 and 12 mg/kg for Area 3. Area 1, Area 2 and Area 3 estimates are presented in **Table C-5a**, **Table C-5b** and **Table C-5c** of **Attachment C**, respectively.

The HQ were defined as: EPC divided by TRV of 800 mg/kg (Industrial EPA Region 9 SSL) for human health risk and ED divided by EcoSSL of 56 mg/kg (Mammalian Eco-SSL Benchmark) for ecological receptors risk. A HQ of 1 or less generally means that a particular COPC does not pose a significant risk to human health or ecological receptors.

[45] EPA, 2005. *Guidance for Developing Ecological Soil Screening Levels.* February.

When more than one COPC is present, the hazard index (HI) is the cumulative non-cancer hazard of all detected compounds based on non-carcinogenic effects. Lead is the only COPC for the Site and the HQ is equal to the HI. For the calculation of ecological HQs for each Area, an Area specific AUF was used in estimating its ED to estimate an Area specific ecological HQ.

The HQ for human health was estimated as 0.64 for Area 1, 0.29 for Area 2 and 0.11 for Area 3; indicating that lead does not pose a significant risk for human health.

For ecological receptors, the HQs were estimated as 2.64 for Area 1, 1.05 for Area 2 and 0.22 for Area 3; indicating that lead does pose a significant ecological risk for Area 1 and Area 2.

The estimated HI greater than 1 (one) for ecological receptors for Area 1 and Area 2 indicates that leaving the surface lead impacted soil associated with the potable water tank lead-based paint chips in place at DU-1 and DU-2 poses an unacceptable risk to the environment. Therefore it is recommended to perform removal action activities at DU-1 and DU-2.

3.0 REMOVAL ACTION OBJECTIVES & APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

3.1 REMOVAL ACTION OBJECTIVES

Removal action objectives (RAOs) have been developed based on analysis of sources of contamination, nature and extent of contamination, results of human health and ecological risk evaluations, and ARARs that have been identified for the Site. RAOs have been developed to control contamination sources and reduce potential for exposure of human and ecological receptors to Site contamination.

RAOs for the Site are:

- Prevent or reduce potential for human and ecological exposure (through inhalation, ingestion, and dermal contact) to lead in surficial soil; and,
- Prevent or reduce potential migration of lead impacted soil via surface runoff, erosion, and wind dispersion.

3.2 REMOVAL ACTION JUSTIFICATION

According to 40 CFR 300.415(b), a removal action is justified, if there is a threat to human health or the environment based on one or a combination of any of the eight factors listed below:

Table 2: Removal Action Justification

Factor	Site Condition	Justified
(1) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants, or contaminants.	Public access to soil containing concentrations of lead not allowed. Park employee access is infrequent. Animal populations have access to the Site. The Hazard Index for exposure to lead is 0.64 for human health and 2.62 for ecological receptors.	Yes
(2) Actual or potential contamination of drinking water supplies or sensitive ecosystems.	No known population centers near the Site derive potable water from site surface water sources. Drinking water aquifers do not appear impacted by site contaminants.	No
(3) Hazardous substances, pollutants, or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release.	No drums, barrels, tanks, or bulk hazardous substances storage containers exist at the Site.	No
(4) High levels of hazardous substances, pollutants, or contaminants in soils largely at, or near, the surface, that may migrate.	Concentrations of lead in surficial soils subject to erosion and migration.	Yes
(5) Weather conditions that may cause hazardous substances, pollutants, or contaminants to migrate or be released.	Surficial impacted soil subject to erosion during wind, high flows, rain events, and snowmelt could cause migration.	Yes
(6) Threat of fire or explosion.	No flammable materials exist at the Site.	No
(7) The availability of other appropriate federal or state response mechanisms to respond to the release.	The site is on NPS-administered land and is being addressed under NPS CERCLA authority.	Yes
(8) Other situations or factors that may pose threats to public health or the environment.	None.	No

3.3 IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

NPS is responsible for the identification of potential Applicable or Relevant and Appropriate Requirements (ARARs) that pertain to any CERCLA removal action proposed for Site. Section 121(d) of CERCLA requires that on-site remedial actions attain or waive Federal environmental ARARs, or more stringent State environmental ARARs, upon completion of the remedial action. NCP also requires compliance with ARARs during remedial actions and during removal actions to the extent practicable. ARARs are identified on a site-by-site basis for all on-site response actions where CERCLA authority is the basis for cleanup.

ARARs are presented in three general categories in the following sections:

1. Chemical-specific: ARARs that pertain to handling or control of certain chemicals based on health concerns or risks.
2. Location-specific: ARARs that control activities based on the location such as wetlands, historic sites, or sensitive ecosystems
3. Action-specific: ARARs that govern discrete actions which may include the use of certain technologies for remedial actions or use of certain types of equipment during remedial actions.

The ARARs are ranked as either: 1) Applicable 2) Relevant and Appropriate 3) To Be Considered, or 4) Not an ARAR. Substantive portions of an ARAR may be Applicable or Relevant and Appropriate.

1. **Applicable** requirements are cleanup standards, standards of control, and other substantive requirements, criteria or limitations that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances found at a CERCLA site.
2. **Relevant and Appropriate** requirements are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular site.
3. **To Be Considered** requirements are non-promulgated advisories or guidance[46] regarding: 1) health effects information with a high degree of credibility; 2) technical information on how to perform or evaluate site investigations or response actions; or 3) policy.

3.3.1 Chemical-Specific ARARs

Table 3: Chemical-Specific ARARs

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
CHEMICAL-SPECIFIC: FEDERAL			
EPA Ecological Soil Screening Levels (Eco-SSL)	www.epa.gov/ecotox/ecossl	Ecological Soil Screening Levels (Eco-SSLs) represent the collaborative effort of a workgroup consisting of federal, state, consulting, industry and academic participants led by the EPA.	**Applicable**

[46] If a guidance document ties directly to a requirement in a statute or rule, it should be elevated to "Relevant and Appropriate" on a state-by-state/case-by-case level.

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
EPA Region 9 Regional Screening Levels (Formerly PRGs) - "Industrial Soil Supporting"	EPA Region 9 Regional Screening Levels (Formerly 2004 PRGs) (November 2010) www.epa.gov/region9/ superfund/prg/	Combine current EPA toxicity values with standard exposure factors to estimate acceptable contaminant concentrations in different environmental media (soil, air, and water) that are protective of human health."	**Applicable**
EPA Region 9 Regional Screening Levels (Formerly PRGs) - "Residential Soil Supporting"	EPA Region 9 Regional Screening Levels (Formerly 2004 PRGs) (November 2010) www.epa.gov/region9/ superfund/prg/	Combine current EPA toxicity values with standard exposure factors to estimate acceptable contaminant concentrations in different environmental media (soil, air, and water) that are protective of human health."	**Applicable**
Clean Water Act Water Quality Standards	33 U.S.C. 1251-1387, Section 303(c)(2)(B) 40 CFR Section 440.40-440.45 40 CFR Part 131, Quality Criteria for Water 1976, 1980, 1986	Chapter 26, Water Pollution Prevention and Control, sets criteria for water quality based on toxicity to aquatic organisms and human health.	**Applicable**
Safe Drinking Water Act National Primary Drinking Water Regulations Maximum Contamination Levels National Secondary Drinking Water Regulations	40 U.S.C. 300 40 CFR Part 141, Subpart B, pursuant to 42 U.S.C. 300(g)(1) and 300(j)(9) 40 CFR Part 141, Subpart F, pursuant to 42 U.S.C. 300(g)(1) 40 CFR Part 143, Subpart B pursuant to 42 U.S.C. 300(g)(1) and 300(j)(9)	Establishes health-based standards for public water systems (maximum contaminant levels) and sets goals for contaminants.	**Applicable**
EPA Ambient Water Quality Criteria (AWQC)	water.epa.gov/scitech/swguidance/standards/current/ index.cfm Human Health Criteria Table Aquatic Life Criteria Table	EPA's compilation of national recommended water quality criteria for the protection of aquatic life and human health in surface water for approximately 150 pollutants.	**Applicable**
EPA Region 3 Biological Technical Assistance Group (BTAG) Freshwater Screening Benchmarks and Freshwater Sediment Screening Benchmarks	EPA Region 3, Oak Ridge National Laboratory (ORNL) Toxicological Benchmarks for Screening Contaminants of Potential Concern (ORNL, 1997)	The Region III BTAG Screening Benchmarks are values to be used for the evaluation of sampling data at Superfund sites. These values facilitate consistency in screening level ecological risk assessments.	**Applicable**
CHEMICAL-SPECIFIC: STATE			
California Categories of Hazardous Waste	Title 22 California Code of Regulations (CCR), Div 4.5, Ch 11, Sections: 66261.2, 66261.3 66261.2	Criteria for identifying a waste as hazardous.	**Applicable**
CalTOX	eetd.lbl.gov/ied/era/caltox/ index.html	A spreadsheet risk assessment model for multimedia exposure.	**Applicable**

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
Department of Toxic Substance Control (DTSC) 1999 Preliminary Endangerment Assessment Manual	www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/SMP_REP_PEA_CH1.pdf	The human health screening evaluation process discussed in the manual can be used to assess risk associated with existing conditions or calculate health based cleanup levels for unrestricted land use.	**Applicable**
California Human Health Screening Levels (CHHSLs)	www.calepa.ca.gov/Brownfields/documents/2005/CHHSLsGuide.pdf	Used in evaluation of contaminated properties to calculate health based cleanup levels.	**Applicable**
California Safe Drinking Water Act	Title 22 CCR Sections 64431 and 64449(a)	Primary and secondary MCLs for public drinking water under the California SDWA of 1976.	**Applicable**
Porter-Cologne Water Quality Act	California Water Code, Division 7: Water Quality, Water Code Sections 13000-13002 - Policy	Mandates that the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state. Also mandates each Regional Board to formulate and adopt basin plans.	**Applicable**
California Water Plan	Water Code §10004(a)	Provides for the orderly and coordinated control, protection, conservation, development, and utilization of the water resources of the state.	**To be Considered**
RWQCB (CR) - *Water Quality Control (Basin) Plan*	California Regional Water Quality Control Board - State Water Resources Control Board, *Water Quality Control Plan*, Colorado River Basin, Region 7; Includes Amendments Adopted by the Regional Board through June 2006.	The Basin Plan established location-specific beneficial uses and water quality objectives for surface water and groundwater of the region.	**To be Considered**
AB 3030 Groundwater Management Plan – Madera County	Madera County Engineering and General Services ; Todd Engineers, Emeryville, CA	Establishes water management plans for Madera County groundwater basins: Chowchilla Groundwater Basin, Madera Groundwater Basin, and Delta-Mendota Groundwater Basin, which are all sub-basins of the larger San Joaquin Basin and are hydraulically connected.	**To be Considered**

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
State of California Water Resources Control Board Statement of Policy with Respect to Maintaining High Quality Waters in California	State Water Resources Control Board Resolution 68-18	Resolution 68-16 establishes the policy that high quality waters of the state "shall be maintained to the maximum extent possible" consistent with the "maximum benefit to the people of the state."	**To be Considered**
State of California Water Resources Control Board Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under California Water Code Section 13304	State Water Resources Control Board Resolution 92-49	Section III.G requires attainment of background water quality, or if background cannot be restored, the best water quality that is reasonable.	**To be Considered**
RWQCB (SFB) - Screening levels for groundwater and surface water; Soil screening levels; Industrial/Commercial.	California Regional Water Control Board, San Francisco Bay Region, 2007. *Screening for Environmental Concerns at Sites with Contaminated Soil & Groundwater.* November. November. Updated May 2008.	Guidance for the application of risk-based screening levels and decision making to sites with impacted soil and groundwater	**To Be Considered**
State of California Drinking Water Policy	State Water Resources Control Board No. 88-63 www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/2006/rs2006_0008_rev_rs88_63.pdf	Provides direction indicating that surface water and groundwater is considered a potential drinking water source if the TDS levels are below 3,000 mg/L and the yield is more than 200 gallons per day.	**To Be Considered**
Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities	www.dtsc.ca.gov/AssessingRisk/Supplemental_Guidance.cfm	Provides California methods and default parameters for conducting risk assessment.	**To Be Considered**

3.3.2 Location-Specific ARARs

Table 4: Location-Specific ARARs

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
LOCATION-SPECIFIC: FEDERAL			
Endangered Species Act	316 U.S.C. § 1531 (h) through 1543 40 CFR Part 6.302 50 CFR Part 402	Act to protect habitat of endangered and threatened species. Activities may not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify a critical habitat.	**Applicable**

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
Fish and Wildlife Coordination Act	16 U.S.C. 1251 661 et seq.; 40 CFR 6.302(g)	Requires consultation when Federal agency proposes or authorizes any modification of any stream or other water body to assure adequate protection of fish and wildlife resources.	**Applicable**
Historic Sites, Buildings, and Antiquities Act and Executive Order 11593	16 U.S.C. 461 et seq. 40 CFR Part 6.301	EPA is subject to the requirements of the Historic Sites Act of 1935, 16 U.S.C. 461 et seq., the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq., the Archaeological and Historic Preservation Act of 1974, 16 U.S.C. 469 et seq., and Executive Order 11593, entitled Protection and Enhancement of the Cultural Environment.	**Applicable**
National Environmental Policy Act	7 CFR 799 (1969) www.epa.gov/region9/nepa/	Section (102)(2) of NEPA requires all Federal agencies to give appropriate consideration to the environmental effects of their proposed actions. The Council on Environmental Quality regulations at 40 CFR 1507.3(b) identifies those items which must be addressed in agency procedures.	**Applicable**
The Historic and Archeological Data Preservation Act of 1974	16 U.S.C. 469 40 CFR 6.301	Establishes procedures to provide for preservation of historical and archeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.	**Applicable**
Migratory Bird Treaty Act	16 U.S.C. §§ 703 et seq.	Establishes federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the US Fish and Wildlife Service during remedial design and remedial construction.	**Applicable**
National Park Service – Management Policies 2006	Management Policies – 9 Park Facilities, 9.1.7 Energy Management	This policy requires that all facilities, vehicles, and equipment will be operated and managed to minimize the consumption of energy, water, and nonrenewable fuels.	**Applicable**
Protection of Wetlands Order, Executive Order 11990	40 CFR Part 6	Requires minimizing and avoiding adverse impacts to wetlands	**Applicable**
Native American Graves Protection and Repatriation Act	25 U.S.C. § 3001	Establishes the ownership of cultural items excavated or discovered on federal or tribal land.	**Applicable**

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
Floodplain Management	40 CFR §6.302(b) and 40 CFR Part 6, Appendix A §6(a)(1), (a)(3), and (a)(5)	Federal agencies are required to evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain.	**Applicable**
LOCATION-SPECIFIC: STATE/LOCAL			
California Cultural and Paleontological Resources	Document 33.4	State-level cultural resource protection is regulated through the provisions of Appendix K of the California Environmental Quality Act (CEQA). Paleontological resource protection is regulated through 1906 Antiquities Act.	**Applicable**
California Endangered Species Act (CESA)	Title 14 CCR Section 783 et seq Fish and Game Code - Section 2080;	The CESA Act parallels the main provisions of the Federal ESA. The 'take' of any species the commission has determined to be an endangered or threatened species is prohibited. However, CESA allows incidental take for lawful development projects.	**Applicable**
California Preservation Laws	Administrative Code, Title 14, Section 4307	No person shall remove, injure, deface or destroy any object of paleontological, archaeological, or historical interest or value.	**Applicable**
California Wildlife Conservation Act	Fish and Game Code Section 2050-2068, Section 2080, Section 3005, and Section 5650.	California Department of Fish and Game Habitat Conservation Planning Branch	**Applicable**
Environmental Ordinances of the county of Madera, California	Madera County, California, Code of Ordinances Title 16 - Environmental Impact	Madera County Enforcement of the California Environmental Quality Act (CEQA); Includes environmental determinations, including exemptions, negative declarations, and approval of environmental impact reports.	**Applicable**

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
Madera County Red-Legged Frog Recovery Plan and Madera County Yellow-Legged Frog Conservation Program	Guidelines adopted by the Coarsegold Resource Conservation District and the Madera County Board of Supervisors, December 18, 1996	The U.S. Fish and Wildlife Service listed the Red-Legged Frog, Rana aurora draytonii, as a threatened species under the United States Federal Endangered Species Act of 1973, as amended, in the Federal Register dated May 23, 1996, and effective June 24, 1996. Scientist, professionals, landowners and environmentalists agree this species is believed to be extirpated in Madera County. The California Department of Fish and Game Natural Diversity Data Base surveys indicate no recent sightings of this species in the Sierra Nevada mountains south of Amador County. Populations of two Yellow-legged frogs, Rana boylii [foothill] and Rana muscosa [mountain] are extremely rare and declining in Madera County. No additional governmental regulations or requirements beyond this plan are required for the protection of these species.	**Applicable**
National Park Service Devils Postpile Vehicle Restrictions	Devils Postpile Sets 37-Foot Vehicle Length Restriction	There is currently (in 2013) a vehicle length restriction of 37 feet on the Devils Postpile spur road (the short stretch of road going to the ranger station and campground area). This does not apply to the entirety of the Reds Meadow Road and larger vehicles may still access USFS facilities. Check status at time of removal action and check requirements for “Special Use” permit.	**Applicable**

3.3.3 Action-Specific ARARs

Table 5: Action-Specific ARARs

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
ACTION-SPECIFIC: FEDERAL			
Clean Air Act National Primary and Secondary Ambient Air Quality Standards National Emission Standards for Hazardous Air Pollutants	42 U.S.C. 7409 40 CFR Part 50 40 CFR Part 61, Subparts N, O, P, pursuant to 42 U.S.C. 7412	Establish air quality levels that protect public health, sets standards for air emissions Regulates emissions of hazardous chemicals to the atmosphere	**Applicable**
Closure Criteria for Municipal Solid Waste Landfills	40 CFR Part 258.60 (a)(1-3)	Establishes design for caps.	**Relevant or Appropriate**
Comprehensive Environmental Response, Compensation, and Liability Act	CERCLA Section 121	Requires all remedial actions which result in any hazardous substance, pollutants, or contaminants remaining on the site be subject to Five-Year Review to evaluate the performance of the remedy.	**Applicable**
Hazardous Materials Transportation Act: Standards Applicable to Transport of Hazardous Materials	49 U.S.C. § 1801-1813 49 CFR Parts 10, 171-173 and 177	Requires placing, packaging, documentation for the movement of hazardous materials on public roadways.	**Applicable**
Resource Conservation and Recovery Act	40 CFR Part 261, Subpart D	Defines wastes which are subject to regulation as hazardous wastes under 40 CFR Parts 262-265 and Parts 124, 270, and 271	**Applicable**
Special Provisions for Cleanup - Corrective Action Management Units	40 CFR Part 264, Subpart S, § 264.552 CAMU	Defines the applicability of Corrective Action Management Units (CAMU)	**Applicable**
National Park Resource Protection, Public Use and Recreation	36 CFR Part 2	Provides general park use regulations.	**Relevant or Appropriate**
Solid Waste Disposal In Units of the National Park System	36 CFR Part 6	Regulates the disposal of solid waste within the National Park System.	**Applicable**

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act Standards Applicable to Transporters of Hazardous Waste	42 U.S.C. 6901, et seq. 40 CFR Part 263, pursuant to 42 U.S.C. 6923 40 CFR Part 264, pursuant to 42 U.S.C. 6924, 6925	Establishes standards for persons transporting hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262 Defines acceptable management standards for owners and operators of facilities that treat, store, or dispose of hazardous waste	**Applicable**
ACTION-SPECIFIC : STATE/LOCAL			
California Air Quality Control Act	California Air Resources Board www.arb.ca.gov	Regulates air particulates and general air quality; Administers, controls, and maintains the Statewide Best Available Control Technology (BACT) database for air quality.	**Applicable**
California Hazardous Waste Disposal and Transportation Program	Title 26 CCR, Division 4 - Cal/OSHA, Division 21.5 - Health and Welfare (Prop 65); Title 26 CCR, Division 22 - Department of Health Services; 49 CFR - Parts 100-177 and 350-399 - Department of Transportation.	Regulates transportation and disposal of hazardous waste.	**Applicable**
California Solid Waste Management Regulations	Title 27. Environmental Protection, Division 2. Solid Waste, Subdivision 1. Consolidated Regulations for Treatment, Storage, Processing or Disposal of Solid Waste	Applies to all disposal sites meaning active, inactive closed or abandoned, as defined in §40122 of the Public Resources Code including facilities or equipment used at the disposal sites	**Applicable**
State Water Resources Control Board General Permits for Industrial/ Construction Storm Water Discharges Requirements	www.waterboards.ca.gov/water_issues/programs/stormwater/industrial.shtml	The regulations require that stormwater associated with industrial/construction activity that discharges either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by a NPDES permit.	**To be Considered**
The California Global Warming Solutions Act of 2006	Assembly Bill 32 (AB 32) - Assembly Speaker Fabian Nunez (D-Los Angeles), Statutes of 2006, Chapter 488	Determined the statewide 1990 greenhouse gas emissions level as a statewide aggregate emissions limit to be achieved by 2020.	**Applicable**

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
San Joaquin Valley Unified Air Pollution Control District - San Joaquin Valley Air Basin Program Mulford-Carrell Air Resources Act	Regulation II - Permits Regulation IV - Prohibitions Regulation VI - Air Pollution Emergency Contingency Plan Regulation VII - Toxic Air Pollutants Regulation VIII - Fugitive PM10 Prohibition Regulation IX - Mobile and Indirect Sources	Rules and regulations enacted to achieve and maintain local, state, and federal ambient air quality standards for San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern counties.	**Applicable**
Great Basin Unified Air Pollution Control District Program Mulford-Carrell Air Resources Act	Regulation II - Permits Regulation IV - Prohibitions Regulation X - Emission Standards For Hazardous Air Pollutants Regulation XII - Transportation Conformity Regulation XIII - General Conformity	Rules and regulations enacted to achieve and maintain local, state, and federal ambient air quality standards within Alpine, Mono and Inyo counties.	**Applicable**
California Hazardous Waste Control Act	California Health and Safety Code, Division 20, Chapter 6.5 CCR Title 22 Social Security, Division 4.5, Environmental Health Standards for the Management of Hazardous Waste.	California's Hazardous Waste Control Act (HWCA 1973) regulates generators, transporters and facilities that handle, treat, store or dispose of hazardous waste. Facilities with a permit to handle, transport, treat, store, or dispose of hazardous materials/waste are subject to regulatory oversight by DTSC. They are periodically inspected to ensure compliance.	**Applicable**
Madera County Grading, Drainage and Erosion Control Permit	Madera County Code, Chapter 14.50; California Codes H&S §§ 19825 - 19832	Permit to create, alter, or develop drainage on a property or to alter, modify or create erosion controls. Permit to create, alter, or otherwise change grading and/or stabilization on a property.	**Applicable**

Standard, Requirement, Criteria, or Limitation	Citation	Description	ARAR
Madera County Sediment Removal Permit	Stream Alteration Agreement-Routine Maintenance California Fish and Game Code Section 1602; Stream Alteration Notification Number: 2007-0102-R4; Madera County	Limited to the Chowchilla River, Ash Slough, Berenda Slough and Fresno River in which the County is the Local Maintaining Agency and has easement rights for channel maintenance. The activities permitted are outlined in the Clean Water Act 404 (f) and are therefore exempt from the need to obtain 404 permits. They are also in compliant with, and incorporate, the requirements of 1602 Fish and Game permit.	**Not** Applicable **Nor** Relevant and Appropriate

4.0 IDENTIFICATION AND SCREENING OF REMOVAL ACTION ALTERNATIVES

This section identifies and evaluates diverse, individual *technologies* that can help achieve RAOs. Typically, no single technology will achieve most or all RAOs. Therefore, complimentary technologies are assembled into groups of *alternatives* for a more complete evaluation based on effectiveness, implementability, and cost.

4.1 IDENTIFICATION OF REMOVAL ACTION TECHNOLOGIES

The table below identifies technology types and process options within the technologies generally capable of meeting RAOs to be considered for removal action alternatives.

Table 6: Removal Action Technologies

Removal Action Technology	Description
1. No Action	This action leaves contaminated materials in their current condition and assumes no further intervention will occur. No response activities or monitoring are associated with this technology. All evaluations of technologies must include "No Action" as a baseline for comparison to the other technologies.
2. Institutional Controls	ICs restrict access to or control the use of a site. They include construction of barriers, installation of fences and gates, moats, warning signs, hostile vegetation, and designation of the lands in public records as a repository with use restrictions. Enforcement of such controls would require periodic inspections and patrols, as wells as legal action against violators.
Zoning	*Zoning would be implemented to control present and future land uses on or around waste and source areas consistent with the potential hazards present, the nature of removal action implemented, and future land-use patterns. The objective of zoning would be to prevent public or private misuse of waste and source areas that could jeopardize the effectiveness of removal action or pose an unacceptable potential for human exposure to the contaminants present in the waste and source areas.*
Deed Restrictions	*Restrictions would prevent the transfer of property without notification of limitations on the use of the property or requirements related to preservation and protection of the effectiveness of the implemented removal action alternative.*
Environmental Control Easements	*This is an enforceable easement mechanism for imposing restrictions on the use of a site and requiring performance of operations and maintenance activities that may help protect public health, safety, and welfare, and the environment.*

Removal Action Technology	Description
Access Restrictions	*Access restrictions typically include physical barriers, such as fencing, that could prevent both human and wildlife access to preclude exposure to waste contamination or structures; and to protect the integrity of the action. Fencing can be installed around the perimeter of waste and source areas to prevent human and animal access to the areas. Posted warnings would identify the potential hazards present at the waste and source areas to deter trespass and misuse.*
3. Engineering Controls	Engineering controls are used primarily to reduce the mobility of, and exposure to, contaminants. These goals are accomplished by creating a barrier that prevents direct exposure and transport of waste from the contaminated source to the surrounding media. Engineering controls do not reduce the volume or toxicity of the hazardous material. Typical engineering controls for solid media include surface controls, containment, and on-site and off-site disposal.
Engineering Controls – *Surface Controls*	Surface controls would be appropriate in more remote areas where direct human contact is not a primary concern (*i.e.* human receptors are not living or working directly on or near the site).
Grading	*Grading is the general term for techniques used to reshape the ground surface to reduce slopes, manage surface water infiltration and runoff, restore eroded areas, and aid in erosion control. The spreading and compaction steps used in grading are routine construction practices.*
Re-vegetation	*Re-vegetation means fostering native plant growth to reduce surface erosion. It involves adding soil amendments to the waste surface to provide nutrients, organic material, and neutralizing agents, and to improve the water storage capacity of the contaminated media, as necessary. Re-vegetation can provide an erosion-resistant cover that protects the ground surface from surface water and wind erosion and reduces net infiltration through the contaminated medium and can also reduce the potential for direct contact.*
Erosion Controls	*Erosion control and protection includes using erosion-resistant materials, such as mulch, natural or synthetic fabric mats, gabions, velocity breaks, drainage channels, ditches, trenches, and riprap to reduce the erosion potential at the surface of the contaminated medium. The erosion-resistant materials are placed in areas susceptible to wind or surface water erosion (concentrated flow or overland flow). Surface water diversion controls or stormwater management structures are designed to prevent surface water from contacting contaminated materials and to appropriately manage any water that contacts those materials despite controls.*
Soil Binder	*Application of a chemical soil binder involves adding proprietary soil amendments to the waste surface to bond the individual soil particles together and form a flexible "crust" that strengthens the surface of the soil resulting in enhanced stability to reduce dust and to prevent further erosion. This is normally a temporary measure.*

Removal Action Technology	Description
Engineering Controls – *Surface Containment*	*This technology involves covering the waste material (or consolidated waste material) to limit the potential for human and ecological exposure to the contaminants, and limit the potential for off-site migration via erosion or leaching. The capping configuration would be graded so that drainage would follow the natural contours of the area. Capping would also limit stormwater flow and infiltration and promote runoff away from the contaminated areas, thereby preventing the transport of contaminated sediments to surface water bodies.*
Engineering Controls – *On-Site Disposal (CAMU)*	*This technology involves excavation, relocation, and placement of the waste materials in an on-site consolidation waste pile, cell or repository to minimize its footprint and concentrate its mass in a single, manageable area designated as a Corrective Action Management Unit (CAMU). It is normally implemented in conjunction with other containment technologies. The CAMU would be specifically designed and constructed to contain the waste materials.*
Engineering Controls – *Off-site Disposal*	*This action involves relocation and placement of contaminated materials in an off-site commercial landfill facility in open cells in a manner determined by the facility operator. The facility would be responsible for compliance with all applicable regulations governing solid waste disposal.*
4. Excavation and Treatment	This technology involves removal of contaminated soil and waste and subsequent treatment through processes that chemically, physically, or thermally reduces contaminant toxicity and/or volume. Excavated areas are backfilled with clean soil, returned to original grade, if necessary, and re-vegetated or otherwise stabilized to prevent erosion. In the case of excavating waste piles, backfilling may not be necessary, but restoration should occur.
Excavation/Treatment – *Physical and Chemical Treatments*	Physical treatment processes use physical characteristics to concentrate constituents into a relatively small volume for disposal or further treatment. Chemical treatment processes act through the addition of a chemical reagent that removes or fixates the contaminants.
Soil Washing/Acid Extraction	*Acid extraction applies an acidic solution to the contaminated medium in a heap, vat, or agitated vessel. Depending on temperature, pressure, and acid concentration, varying quantities of the metal constituents present in the contaminated medium would solubilize. This is similar to the heap leaching process used by mills to extract metals from processed ore. It requires the construction of a double-lined impoundment with leachate collection and removal systems.*
Chemical Stabilization	*Fixation and stabilization technologies treat materials by physically encapsulating them in an inert matrix (stabilization) and chemically altering them to reduce the mobility and toxicity of their constituents (fixation). These technologies generally involve mixing materials with binding agents such as Portland cement under prescribed conditions to form a stable matrix.*

Removal Action Technology	Description
Reprocessing	*Reprocessing involves excavating and transporting materials to an existing, off-site, permitted mill facility for processing and economic recovery of target metals.*
Excavation/Treatment – *Thermal Treatment*	*Heat is applied to the contaminated medium to volatilize and oxidize metals and render them amenable to additional processing. Potentially applicable moderate-temperature thermal processes, which volatilize metals and form metallic oxide particulates, include the fluidized bed reactor, the rotary kiln, and the multi-hearth kiln.*
5. *In-Situ* Treatment	Stabilization and fixation of the contamination in-place reduces the mobility of contaminants in soil. The treatment seeks to permanently trap or immobilize the contamination within the soil using non-hazardous chemical binders to prevent erosion.
Physical and Chemical	*In-situ stabilization and solidification are similar to conventional stabilization in that a solidifying agent (or combination of agents) induces a chemical or physical change in the mobility and/or toxicity of the contaminants. . The most common form of in-situ stabilization involves in-place mixing the soil with Portland cement, similar to chemical stabilization.*
Thermal	*In-situ vitrification is an innovative process used to melt contaminated solid media in-situ to immobilize metals into a glass-like, inert, non-leachable solid matrix.*

4.2 SCREENING OF REMOVAL ACTION TECHNOLOGIES

An evaluation of each response technology was performed to determine whether it would meet the RAOs and ARARs.

Table 7: Removal Action Technology Screening

Removal Action	Site Specific Screening Evaluation
1. No Action	Although No Action will not meet the RAOs, it is used as a baseline against other alternatives measured. For this reason, and because a No Action is required according to EPA guidance, it is retained for further evaluation as a Removal Action Alternative.

Removal Action	Site Specific Screening Evaluation
2. Engineering Controls - Surface Controls	Surface controls would have limited effectiveness in meeting the RAOs. Surface controls may prevent potential off-site migration from erosion of contaminated surfaces into the drainage channels present on Site. While surface water at the Site is ephemeral, when present, some runoff from the waste flows directly into adjacent dry washes. Surface water controls alone will not sufficiently address the RAOs but could be beneficial in combination with other technologies. This technology may require access for heavy equipment such as a backhoe. NPS may need to improve access road or consider using a more expensive spider backhoe that can access the site without requiring roads.
3. Engineering Controls - Chemical Stabilization of Existing Surfaces	Chemical stabilization would help to meet the RAOs when employed in conjunction with other removal action technologies. The chemical stabilization process uses non-hazardous chemical binders to reduce the hazard potential of a waste by converting the contaminants into less soluble, mobile, or toxic forms. The treated soils contain stable metal-reagent compounds that eliminate the leaching of metals. The reagent can be applied in a wet or dry form and can be used to stabilize metals *in situ*. For metals, the most comment reagent is Portland cement. The most significant challenge in applying chemical stabilization *in situ* for contaminated soils is achieving complete and uniform mixing of the binder with the contaminated matrix. This technology requires access for large heavy construction equipment. NPS may need to improve access road to allow equipment access to the sites.
4. Institutional Controls	Land use restrictions would be necessary to prevent future activities that are inconsistent with the human health and ecological risk assessment's exposure pathway assumptions. For example, a deed restriction would prevent future residential development, since the cleanup goals will not protect humans residing on the property full-time. Due to the remoteness of the Site, enforcement of ICs would be difficult, but not impossible. Because the Site is located within the boundaries of DEPO, access to the area could be limited. Additional fencing would prevent human trespassers but not ecological exposure or off-site migration of the contamination. Therefore, ICs would likely need to accompany another technology to adequately meet RAOs and ARARs. ICs can augment technologies such as capping and storm water controls to ensure that future construction projects do not disrupt or disturb them.
5. On-Site Consolidation	Relocation of contaminated materials to one or more consolidation areas would eliminate the unchecked migration of contaminants when employed in conjunction with other removal action technologies to meet RAOs and ARARs. An on-site CAMU would reduce the waste volume's area and the potential for exposure to receptors and storm water runoff, and therefore the risk to humans and wildlife. This approach may require access for medium size vehicles and semi-heavy equipment (i.e. bobcat). Access road improvements may be necessary for transport of excavation equipment, backfill materials, and (if necessary) earthen fill/vegetative materials for re-grading and re-vegetating.

Removal Action	Site Specific Screening Evaluation
6. Capping	Capping of contaminated materials (either in place or in a consolidation cell) would meet RAOs and ARARs when employed in conjunction with other removal action technologies to address areas where capping would not be technologically feasible or otherwise cost-effective. This approach requires access for large vehicles and heavy equipment. Access road improvements may be necessary for transport of excavation equipment, backfill materials, and earthen fill/vegetative materials for re-grading and re-vegetating.
7. Excavation/ Backfilling	Excavation/backfilling would meet RAOs and ARARs when applied with another technology to address the end use/disposal of the excavated contaminated materials. This approach may require access for medium size vehicles and semi-heavy equipment (i.e. bobcat). Access road improvements may be necessary for transport of excavation equipment, backfill materials, and (if necessary) earthen fill/vegetative materials for re-grading and re-vegetating.
8. Off-site Disposal	Transportation of contaminated materials to an offsite disposal facility would meet RAOs and ARARs. However, this approach is often costly and simply transfers the problem to another location. It may require five or six truckloads transported over a long distance without a significant carbon footprint based on diesel emissions. This approach may require roadway access to accommodate mid-size dump trucks.

4.3 ASSEMBLY OF REMOVAL ACTION ALTERNATIVES

The removal action technologies described in the preceding sections have been assembled into four Removal Action Alternatives, which have been analyzed with respect to the evaluation criteria (RAOs and ARARs). These alternatives have been developed based on the known nature and extent of soil contamination and results of the risk evaluation.

- Alternative 1 – No Action
- Alternative 2 –Engineering/ICs
- Alternative 3 – Excavation, On-Site Consolidation/ICs
- Alternative 4 – Excavation and Off-Site Disposal

Section 5.0 presents an evaluation of these alternatives.

5.0 EVALUATION OF REMOVAL ACTION ALTERNATIVES

According to the EPA's *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*[47], the efficacy of a removal action should be evaluated based on:

I. Effectiveness:
   1. Protective of Public Health and the Community (Protectiveness)
   2. Protective of Workers During Implementation
   3. Protective of the Environment
   4. Complies with ARARs
   5. Achieves all RAOs
   6. Level of Containment Expected
   7. Reduction or Elimination of Residual Concerns

II. Implementability:
   1. Technical Feasibility
      a. Availability of Equipment
      b. Availability of Services
      c. Site Accessibility
      d. Availability of Laboratory Testing Capacity
      e. Can be Implemented in One Year
   2. Administrative and Legal Feasibility
      a. Acquisition of Permits Required for Off-site Work
      b. Acquisition of Permits Required for On-site Work
      c. Acquisition of Easement or Rights-of-Way Required
      d. Impact on Adjoining Property
      e. Ability to Impose ICs
   3. Ease of Implementation
      a. Regulatory Acceptance
      b. Community Acceptance

III. Cost:
   1. Capital Cost
   2. Post Removal Site Control Cost
   3. Long-Term Operation, Maintenance and Monitoring (OM&M) Costs
   4. Present Worth Cost/Present Value

In accordance with EPA guidance[48], engineering costs are estimates within plus 50 to minus 30 percent of the actual, expected project cost (based on year 2013 dollars). Cost estimates were

[47] United States Environmental Protection Agency, 1993. *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*. EPA/540-F-93-048. September 1993
[48] *Ibid*.

prepared in accordance with EPA guidelines using engineer's estimates, historical costs for similar projects, and vendor quotes. Changes in the cost elements are expected, as new information and data collected during the removal action design become available. The present worth of each removal action alternative provides the basis for the cost comparison. The present worth cost represents the amount of money that, if invested in the initial year of the removal action at a given interest rate (this EE/CA uses a three percent discount rate, the historical average rate for a 30-year treasury bill), would provide the funds required to make future payments to cover all costs associated with the removal action over its planned life. Inflation and depreciation were not considered in preparing the present worth costs. **Table D-1** presents a summary of the cost estimated for the selected alternative, **Tables D-2** through **D-4** contain detailed cost estimate spreadsheets for each selected alternative. Assumptions used in preparing the cost estimate spreadsheets are also provided in **Attachment D** under each alternative.

Estimated costs relied on several assumptions regarding Site conditions and are based on conceptual design only. The estimated costs are intended for alternative comparison only and are not suitable for construction bidding purposes in the absence of an approved design. Assumptions made in preparing the cost estimate include:

- Site access road or trail, reconstruction or improvement, will be conducted with the minimum size and amount of equipment so as to cause the least amount of disturbance.
- Existing data will be sufficient for characterization and profiling wastes for landfill disposal, with minimal additional analyses required.
- A temporary staging area can be established near to the Site.
- An archeological resource specialist may be present during site activities; however, no limitations to excavation, such as artifact removal, have been assumed.
- Post-removal action OM&M of the Site will be required to monitor the removal action effectiveness and compliance with the ARARs.

The following sections present an evaluation of each of the removal action alternatives. A comparative analysis of alternatives addresses finer points at the Site as well as the broader issues presented in **Table 8** (**Section 5.5**).

5.1 ALTERNATIVE 1: NO ACTION

The No Action Alternative leaves the contaminated material at the Site in its current condition and assumes no further intervention will occur. Under the No Action Alternative, no response activities or monitoring would occur at the Site as a baseline for comparison to the other alternatives.

5.1.1 Effectiveness of Alternative 1

The following subsections evaluate the effectiveness of a proposed No Action Alternative, as demonstrated by environmental conditions that would exist, if a removal action were not implemented.

5.1.1.1 Protectiveness

The No Action Alternative would not protect the environment because it would not address lead concentrations in soil which present a risk to ecological receptors. Conditions would not change at the Site, and ecology and wildlife would potentially remain at risk.

5.1.1.2 Compliance with ARARs

The No Action Alternative would not enforce complete compliance with ARARs because it does not address a number of ecological requirements based on the ARARs.

5.1.1.3 Ability to Achieve RAOs

The No Action Alternative would not achieve the RAOs, since it would not prevent or reduce ecological exposure to the lead impacted surface soil. Ecological risks would persist.

5.1.1.4 Level of Treatment/Containment Expected

The No Action Alternative provides no containment or treatment options.

5.1.1.5 Reduction or Elimination of Residual Concerns

The No Action Alternative does not reduce the risk to human health or ecological receptors through ingestion, inhalation, and dermal contact pathways. The toxicity, mobility and volume of contaminants would not be reduced under this alternative.

5.1.2 Feasibility/Implementability of Alternative 1

5.1.2.1 Technical Feasibility

The No Action Alternative is technically implementable. This alternative requires no onsite equipment, onsite personnel or services, nor does it require laboratory testing. However, regulatory agencies are unlikely to accept this alternative, given that surface soils impacted with lead pose an unacceptable risk to human health and the environment.

5.1.2.2 Administrative and Legal Feasibility

The No Action Alternative is administratively feasible, and does not require any resources. Alternative 1 requires no acquisition of permits for off-site work, requires no acquisition of easements or rights-of-way, and requires no ICs.

5.1.2.3 Ease of Implementation

There is no implementation process associated with the No Action Alternative.

Regulatory acceptance is unlikely because this alternative does not achieve RAOs and ARARs. Community acceptance is unknown at this time but will be determined during the EE/CA Report public comment period.

5.1.3 Cost of Alternative 1

There are no capital costs or OM&M costs associated with the No Action Alternative. However, there could be long-term costs associated with future impacts or releases. There may also be non-monetary costs associated with ecological impacts to wildlife.

5.2 ALTERNATIVE 2: ENGINEERING/INSTITUTIONAL CONTROLS

In Alternative 2, access controls and restrictions are implemented as a stand-alone remedy; however, they may be implemented in combination with other alternatives. Alternative 2 consists of the following components.

Documentation

This alternative would require minor engineering designs, construction management, health and safety plans. Contacts with appropriate agencies and tribes regarding historical and cultural resources and potential cultural items, remains, and funerary objects would be required.

A biological and botanical resource inventory report prepared by NPS concluding that the project would not impact sensitive species would be required before design and construction. In addition, a historical and cultural resources survey report prepared by NPS concluding that the project would not impact these resources would be required before design and construction.

Road Improvements

The Site is accessible via a 500 feet long unpaved access road coming from a small maintenance area that may not support large vehicles or heavy equipment.

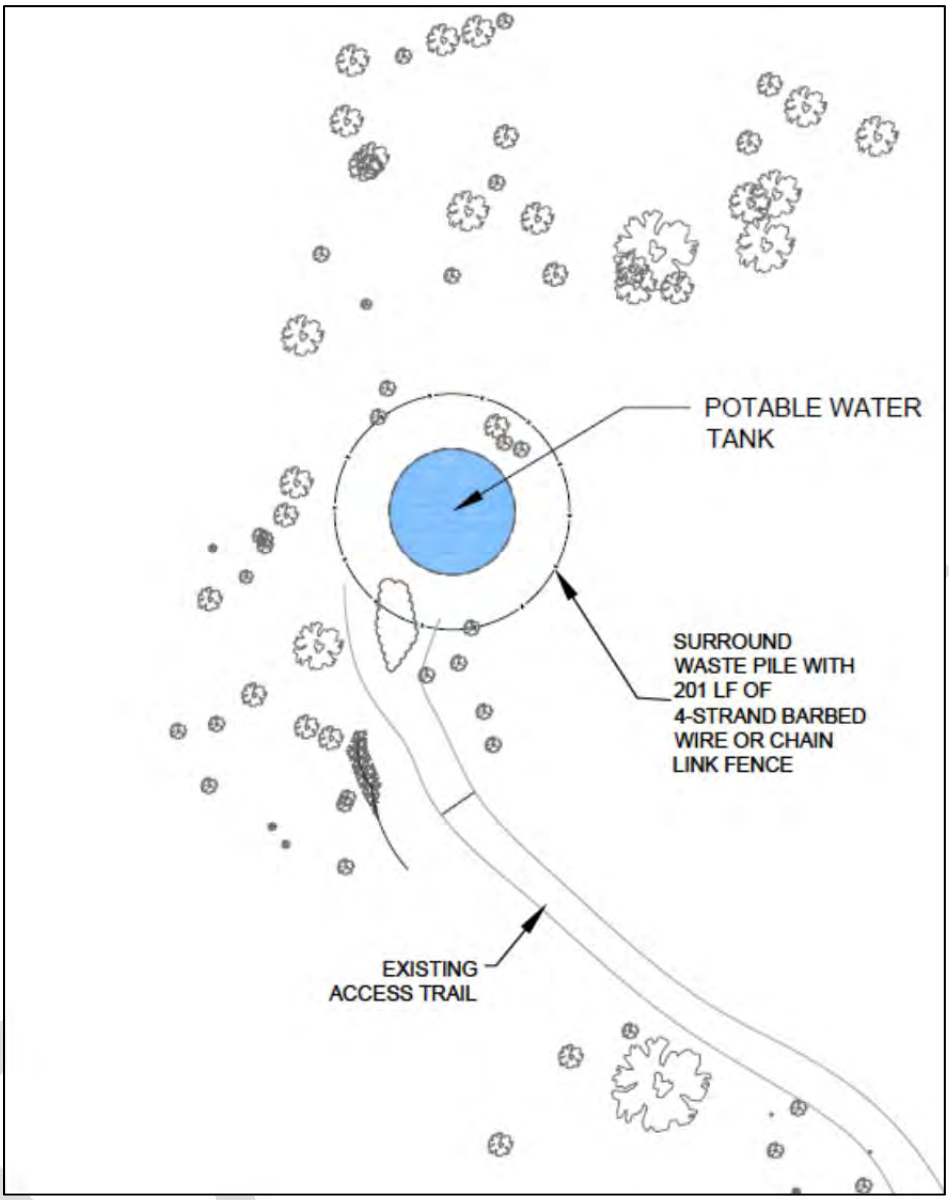
Road work could be required to create sufficient access for equipment. Improvements may include stabilization of washed out surfaces, gravel surfacing, and widening in some areas. Road improvements will be constructed with the minimum footprint necessary to accommodate the most appropriately sized equipment for implementation of the alternative.

Proper vehicle decontamination areas would be necessary to ensure that contamination is not spread outside of the work and loading areas.

Engineering Controls

An area extending to 15 feet from the tank footing (DU-1 and DU-2) will be completely surrounded by permanent fencing.

Figure 7: Alternative 2 – Engineering/Institutional Controls



Institutional Controls

Signs will be placed on the constructed fence to provide appropriate information and to discourage trespass or disturbance of the fenced area. Park workers would be instructed to avoid contact with surface water, when present. Periodic site visits would be conducted to monitor the integrity of the engineering controls and to perform repair and maintenance as necessary.

5.2.1 Effectiveness of Alternative 2

The following sections provide an evaluation of the effectiveness of Alternative 2 as demonstrated by environmental conditions that would exist if such actions and/or controls were implemented.

5.2.1.1 Protectiveness

Alternative 2 would not reduce lead toxicity or volume of impacted soil. However, risk associated with ingestion, dermal adsorption, and inhalation of lead would be reduced primarily through exclusion. Perimeter fencing will prevent human and large animal exposure. Birds, other flying animals, and any other animals that can penetrate the fence would remain exposed.

This alternative does not address transport of contaminated materials most prone to erosion via air, gravity, and surface water.

5.2.1.2 Compliance with ARARs

This alternative may meet some, but not all, ARARs. Contaminated materials are uncovered, and present a risk of direct exposure to humans and ecological receptors. Engineering and ICs alone will not mitigate these risks. Therefore, Alternative 2 would not meet the substantive requirements of a number of the ARARs. Use of the smallest equipment practicable would address NPS stewardship concept for cultural and natural resource protection ethic of employing the most effective concepts, techniques, equipment, and technology to prevent, avoid, or mitigate unacceptable impacts.

5.2.1.3 Ability to Achieve RAOs

Alternative 2 fails to meet the following RAO requirement:

- Prevent or reduce potential migration of COCs in waste materials via erosion and wind dispersion.
- Prevent or reduce ecological exposure (through inhalation, ingestion, and dermal contact) to COCs in waste materials to small size land animals and flying animals.

Alternative 2 meets the RAO requirement to:

- Reduce (does not prevent) human exposure (through inhalation, ingestion, and dermal contact) to COCs in waste materials, because the engineering control measures reduce direct human exposure,
- Reduce (does not prevent) ecological exposure (through inhalation, ingestion, and dermal contact) to COCs in waste materials to large size land animals.

5.2.1.4 Level of Treatment/Containment Expected

No level of treatment or containment would be obtainable with Alternative 2.

5.2.1.5 Reduction or Elimination of Residual Concerns

Alternative 2 would offer no reduction or elimination of residual contaminated materials.

5.2.2 Feasibility/Implementability of Alternative 2

The following sections provide an evaluation of the feasibility and implementability of Alternative 2.

5.2.2.1 Technical Feasibility

This alternative is technically feasible using standard methods and procedures, though it will require improvements to access roads and may result in alterations to nearby landforms (for vehicles and equipment to traverse).

The availability of equipment, personnel and services do not present any foreseeable obstacle to the technical feasibility of this alternative.

5.2.2.2 Administrative and Legal Feasibility

Alternative 2 is both legally and administratively feasible, though it ultimately would not achieve all RAOs and ARARs.

Alternative 2 requires no acquisition of permits for off-site work, requires no acquisition of easements or rights-of-way, and offers implementable engineering and ICs.

5.2.2.3 Ease of Implementation

Alternative 2 is easier to implement than Alternative 3 presented herein, due to the limited machinery and site disturbance required to complete the task.

Regulatory acceptance is not likely because this alternative does not meet all RAOs and ARARs. Community acceptance is unknown at this time but will be determined during the EE/CA Report public comment period.

5.2.3 Cost of Alternative 2

The costs for Alternative 2 have been evaluated in detail. A complete break-out of the associated costs is provided in **Table D-2** in **Attachment D**.

Summary of Alternative 2 associated costs:

- Capital Cost: Approximately $ 106,000
- Long-Term Maintenance and Monitoring Costs: Approximately $ 5,500 per year
- Present Worth Value/Present Cost: Approximately $ 214,000

The capital costs are estimated based on the following general elements:

- Design, including pre- and post-construction submittals, excluding ecological resource inventory and cultural resources survey
- Mobilization
- Construction
- Management

The post-removal maintenance and monitoring costs are calculated based on annual site monitoring and maintenance for 30 years. Present Worth Value/Present Cost is calculated based on the total of the capital costs and long-term maintenance/monitoring costs.

5.3 ALTERNATIVE 3: EXCAVATION, ON-SITE CONSOLIDATION/INSTITUTIONAL CONTROLS

Alternative 3 will consist of the following components.

Documentation

Documentation requirements and limitations described in Alternative 2 are applicable to Alternative 3.

Road Improvements

Road improvements introduced in Alternative 2 (see Section 5.2) are applicable to Alternative 3. Road improvements will be constructed with the minimum footprint necessary to accommodate the most appropriately sized equipment for implementation of the alternative.

Leaching Considerations for Corrective Action Management Unit

The lead detected in contaminated surface soil at the Site does not leach to groundwater.

Onsite Consolidation

Alternative 3 consists of creating a Corrective Action Management Unit (CAMU). Impacted surface soil from DU-1 and DU-2 (approximately 30 cubic yards) will be excavated, transported and consolidated into a single CAMU. The soil would be disposed of into a CAMU located outside areas of rapid geologic change unless designed and constructed to preclude failure, outside the 100-year flood plain, and not within 200 feet of Holocene faults. Because groundwater is not a complete pathway (see the conceptual site model in **Figures 5 and 6**), a geosynthetic clay liner and other cover components required in the regulations[49] may not be necessary.

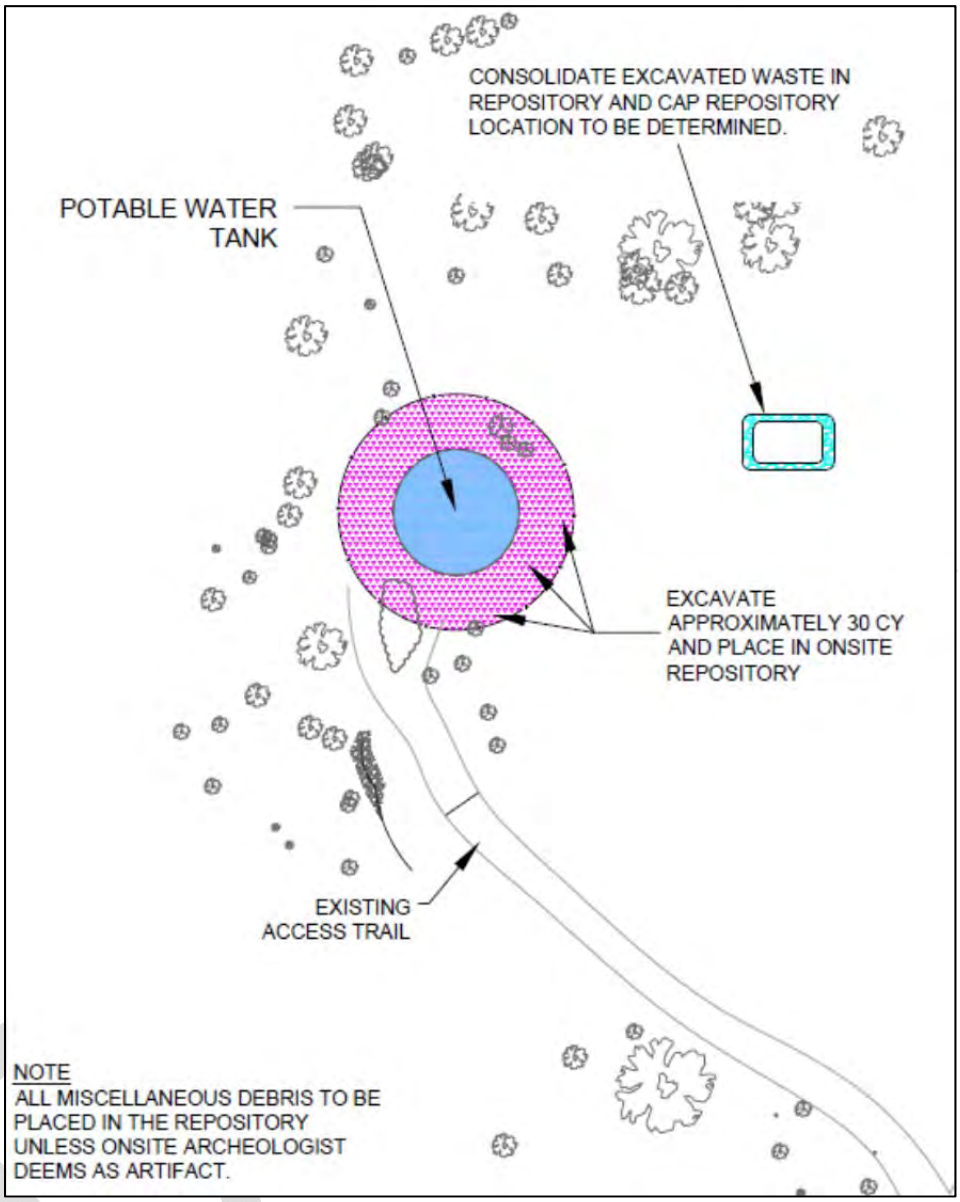
Fugitive dust emissions would be eliminated by laying down water spray during excavation and soil operations, and will conform to the CCR and applicable EPA regulations for earth-moving activities in non-contaminated areas.

Confirmation Sampling

Following the removal and placement of the contaminated material in the CAMU, confirmation sampling would verify removal of COCs to the extent practicable. Confirmation samples would be collected for lead analysis. Once confirmation sampling shows that lead concentrations are below risk criteria designated for the project, capping and restoration activities would be completed.

[49] 27 California Code of Regulations (CCR) § 22470.

Figure 8: Alternative 3 – Excavation, On-site Consolidation/Institutional Controls



Capping and Restoration

Requirements for CAMUs are identified at 40 CFR, Subpart S, § 264.552. The CAMU must include a composite liner and a leachate collection system that is designed and constructed to maintain less than a 12-inch depth of leachate over the liner. The *composite liner s*ystem will consist of two components; the upper component must consist of a minimum 30-mil flexible membrane liner (FML), and the lower component must consist of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec. FML components consisting of high density polyethylene (HDPE) must be at least 60 millimeters thick. The FML component must be installed in direct and uniform contact with the compacted soil component;

The CAMU cap will consist of 2 feet of native or imported clean fill compacted to 90 percent relative density followed by 1 foot of native or imported riprap and well graded gravel to limit erosion of the cover and discourage burrowing animals.

The small depression left by excavated soil will be re-graded to direct surface water into natural channels and drainages. The disturbed area would be re-graded for positive drainage, and then vegetated with native species as soon as practicable to minimize construction-related sediment transport. Post removal site control (operations and maintenance) would consist of minor erosion repair to the channel systems.

Engineering Controls

Alternative 3 requires the majority of the contaminated soil to be consolidated and covered. Engineering controls would involve watershed diversion ditches uphill of the CAMU.

Institutional Controls

Workers would be instructed to avoid contact with surface water, when present. Periodic site visits would be conducted to monitor the integrity of the engineering controls and to perform repair and maintenance as necessary. Park planning and engineering records would require an update. A planning process should be implemented to ensure that no future ground disturbance occurs at the CAMU.

5.3.1 Effectiveness of Alternative 3

The following subsections evaluate the effectiveness of Alternative 3 based on the environmental conditions that would exist, if such actions and/or controls were implemented.

5.3.1.1 Protectiveness

Alternative 3 would remove the majority of lead impacted soil, limit infiltration of precipitation and surface water and prevent human and environmental exposure to contaminated surface soil. This alternative would reduce potential human and ecological exposure to lead-contaminated soil from the Site through consolidation and containment of materials from source area, reducing erosion and transport of lead-contaminated soil down a wash, and preventing wind erosion and dispersion of the lead-contaminated surface soil.

Access restrictions would deter public access to the Site. Periodic inspections would be necessary to ensure CAMU cover, surface controls, access restrictions, and warning signs remain intact over the long term.

This alternative would not reduce lead toxicity or volume of impacted soil. However, risk associated with ingestion, dermal adsorption, and inhalation of lead would be reduced primarily through waste excavation, consolidation, and containment in one area. Although the presence of lead-contaminated soil would remain unchanged, future activities at the Site would be generally unencumbered except in the CAMU area. Protection of ecological receptors would also occur through containment and use of a rip-rap within the cover to discourage burrowing animals.

Alternative 3 protects downstream washes over the short term because lead contaminated soil would be removed. Water quality impacts would be reduced by limiting water contact with contaminated soil and reducing residual soil migration. Surface water is ephemeral and groundwater is not used at the Site, so no change in exposure would occur.

5.3.1.2 Compliance with ARARs

Alternative 3 would comply with chemical and location ARARs but will not comply with action specific ARARs related to 36 CFR condition §6.4(a)(2) that must be met before a new solid waste disposal site may be authorized in a National Park:

> *"There is no reasonable alternative site outside the boundaries of the unit suitable for solid waste disposal"*

Use of the smallest equipment practicable would address NPS stewardship concept for cultural and natural resource protection ethic of employing the most effective concepts, techniques, equipment, and technology to prevent, avoid, or mitigate unacceptable impacts.

5.3.1.3 Ability to Achieve RAOs

Alternative 3 meets all RAOs, with explanations and minor exceptions noted:

- Minimize human and ecological exposure (through inhalation, ingestion, and dermal contact) to lead in surface impacted soil;

  Alternative 3 meets this ARAR by reducing exposure and/or eliminating exposure in the area by blocking exposure to human receptors and reducing exposure to ecological receptors. The potential for ecological exposure is not fully eliminated due to the ability for burrowing animals to enter the consolidation areas. A special precaution will be taken by placing a rip-rap cap to deter burrowing animals. Total protection of ecological receptors is not possible because residual lead levels at the Site exceed the ecological risk-based soil screening level for mammals. Alternative 3 still protects all other ecological receptors better than Alternatives 1 and 2.

- Prevent or reduce potential migration of lead in soil via surface runoff, erosion, and wind dispersion.

  This RAO is achieved through large reduction in migration potential.

5.3.1.4 Level of Treatment/Containment Expected

No treatment is proposed with this alternative. Containment occurs by capping. A high level of containment, with the use of ICs in conjunction with the design of the CAMU, can be expected with proper maintenance.

5.3.1.5 Reduction or Elimination of Residual Concerns

Residual concerns are reduced considerably by excavation of the contaminated material and reducing the areal size of contamination.

5.3.2 Feasibility/Implementability of Alternative 3

The following sections provide an evaluation of the feasibility and implementability of Alternative 3.

5.3.2.1 Technical Feasibility

As with Alternative 2, this alternative could require access road improvements. Grading and construction requires the use of heavy equipment. Controlling fugitive dust emissions and stormwater discharge (if generated) during grading and construction would be required. Long-term monitoring and maintenance would be required, especially inspection and repair of repository cap.

Design methods, construction practices, and engineering requirements for installation of the components of CAMU are well documented and understood. The availability of equipment, personnel and services, and obtaining a laboratory would not present any foreseeable obstacle to the technical feasibility of this alternative.

5.3.2.2 Administrative and Legal Feasibility

Alternative 3 is not legally or administratively feasible as it doesn't comply with 36 CFR condition §6.4(a)(2) which establishes that only if there is no reasonable alternative site outside the boundaries of the unit suitable for solid waste disposal a new solid waste disposal site may be authorized in a National Park.

5.3.2.3 Ease of Implementation

Alternative 3 is more difficult to implement than Alternatives 1 or 2 presented herein, due to the requirement of heavy machinery and site disturbance required to complete the task.

Regulatory acceptance is unlikely with Alternative 3 because it not achieves all ARARs. Community acceptance is unknown at this time but will be determined during the EE/CA Report public comment period.

5.3.3 Cost of Alternative 3

The costs for Alternative 3 have been evaluated in detail based on the evaluation criteria listed in Alternative 2 (**Section 5.2.3**). A complete break-out of costs is provided in **Table D-3** in Attachment D.

Summary of Alternative 3 associated costs:

- Capital Cost: Approximately $ 398,000
- Long-Term Maintenance and Monitoring Costs: Approximately $ 10,500 per year
- Present Worth Cost/Present Value: Approximately $ 604,000

The capital costs are estimated based on the following general elements:

- Design, including pre- and post-construction submittals, excluding ecological resource inventory and cultural resources survey
- Mobilization
- Construction
- Management

The post-removal maintenance and monitoring costs are calculated based on annual site monitoring and maintenance for 30 years. Present Worth/Present Value cost is calculated based on the total of the capital costs and long-term maintenance/monitoring costs.

5.4 ALTERNATIVE 4: EXCAVATION AND OFF-SITE DISPOSAL

Alternative 4 will consist of the following components.

Documentation

Documentation requirements and limitations described in Alternative 2 are applicable to Alternative 4.

Road Improvements

Road improvements introduced in Alternative 2 (see **Section 5.2**) are applicable to Alternative 4. Compared to Alternatives 2 and 3, less extensive road work would be required to create access for waste hauling equipment. As needed, roads will be improved with the minimum footprint necessary to accommodate the most appropriately sized equipment for implementation of the alternative. Haul truck covers and proper vehicle decontamination and tracking control would be necessary to ensure that contamination is not spread outside of the work area as the vehicles leave for off-site disposal.

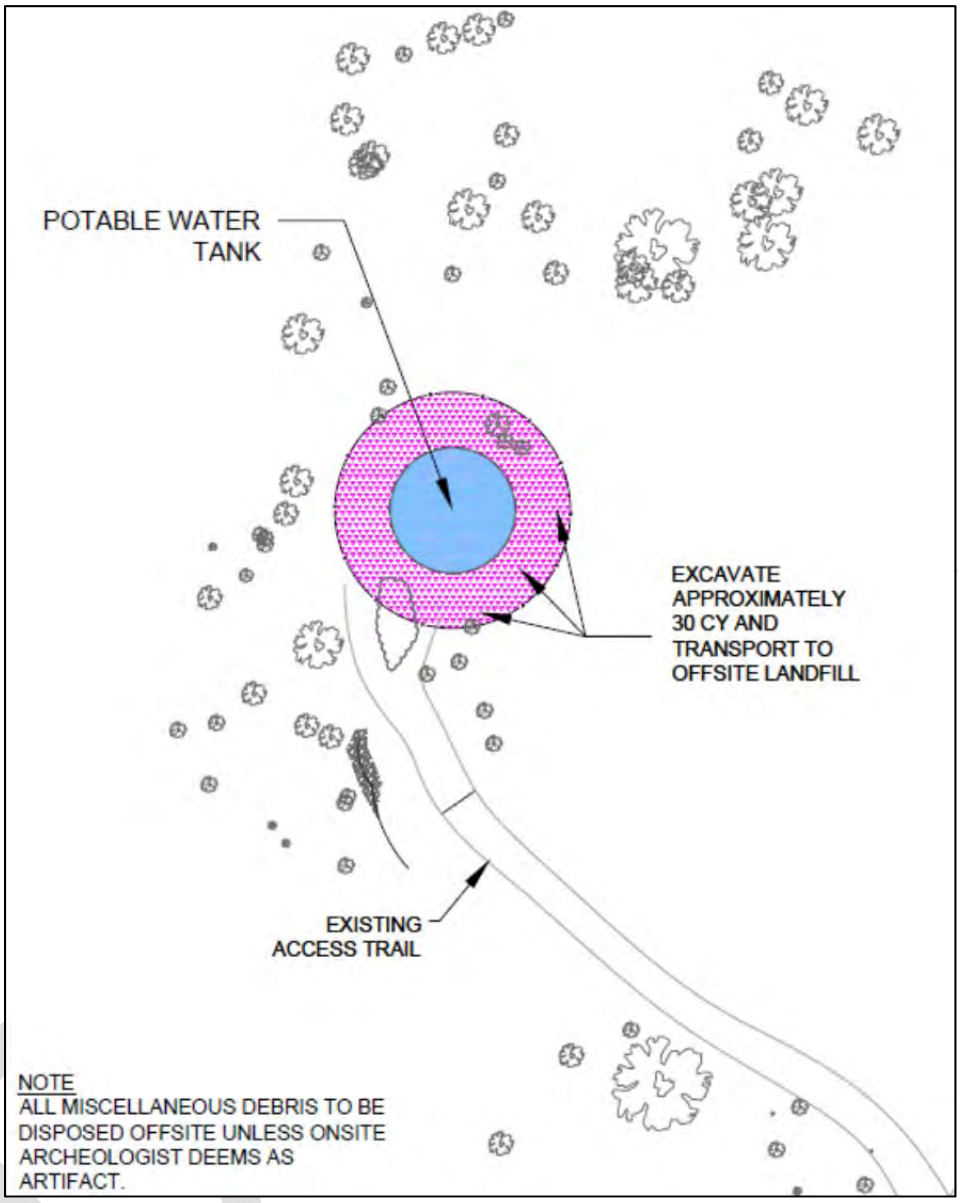
Excavation

Alternative 4 would involve excavating and removing lead impacted surface soil to 4 inches deep, from the area extending to 15 feet from the water tank footing (DU-1 and DU-2, **Figure 9**) followed by minimal backfilling and grading of the excavation area. Appropriate storm water pollution prevention measures such as drainage swales, sediment ponds, or silt fencing will be incorporated into the project to minimize the potential for adverse impacts to water quality during excavation and soil handling activities. Fugitive dust emissions will be eliminated by laying down water spray during excavation and soil operations, and will conform to the CCR and applicable EPA regulations for earth-moving activities in non-contaminated areas.

Off Site Disposal

The California Solid Waste Management Regulations apply to the Site. This is an applicable ARAR which must be addressed if any solid waste is transported away from Site.

Figure 9: Alternative 4 – Excavation/Off-site Disposal



Confirmation Sampling

Following the removal of lead impacted surface soil from area, confirmation sampling would verify that contamination was removed to the extent practicable. Confirmation samples would be collected and analyzed for lead. Once confirmation sampling results indicate lead concentrations in soil meet RAO designated for the Site (i.e. when lead concentrations are below 195 mg/kg per SSSL), restoration activities would be completed.

Restoration Activities

The depressions left by excavated soil will be backfilled with clean native or imported soil and re-graded to match preexisting topographic conditions. Disturbed areas would be vegetated

with native species, to the extent practicable and as soon as practicable to minimize excavation related sediment transport.

5.4.1 Effectiveness of Alternative 4

The following subsections evaluate the effectiveness of Alternative 4 as demonstrated by environmental conditions that would exist, if such actions were implemented.

5.4.1.1 Protectiveness

Alternative 4 provides the highest possible level of environmental protection of the alternatives considered in this EE/CA. The complete removal of lead impacted soil from the currently exposed, uncontrolled environment to a permitted facility or other approved repository outside the park eliminates the on-site potential for human and ecological exposure through inhalation, ingestion, and dermal contact.

The hauling operations would not be confined to NPS property, and the hauling distance to the landfill poses a limited potential exposure to the public. Special care would be taken to assure trucks are decontaminated before leaving the Site and that truck covers prevent wind-blown dust.

The off-site commercial landfill has the highest level of long-term effectiveness, as the landfill would have a post-closure monitoring and maintenance period of 30 years or longer and will have site security, environmental monitoring, maintenance requirements, and other systems required for a commercial facility.

At the global sustainability level, this alternative involves approximately 5 small dump trucks transporting contaminated material to an off-site landfill. It will not congest highways or create significant diesel and greenhouse gas emissions.

5.4.1.2 Compliance with ARARs

Alternative 4 addresses all ARARs. Use of the smallest equipment practicable would address NPS stewardship concept for cultural and natural resource protection ethic of employing the most effective concepts, techniques, equipment, and technology to prevent, avoid, or mitigate unacceptable impacts.

5.4.1.3 Ability to Achieve RAOs

Alternative 4 would meet all site RAOs, as follows:

- Minimize human and ecological exposure (through inhalation, ingestion, and dermal contact) to lead in surface soil.
- Prevention of potential migration of lead in surface soil via surface runoff, erosion, and wind dispersion.

5.4.1.4 Level of Treatment/Containment Expected

Alternative 4 would provide nearly 50 percent removal of lead impacted surface soil above background levels and 100 percent removal of lead impacted surface soil above risk criteria levels through excavation and off-site disposal. An extremely high level of containment can be expected at the CERCLA approved off-site disposal facility.

5.4.1.5 Reduction or Elimination of Residual Concerns

This alternative is considered permanent, and is thus effective in both the short- and long-terms. This alternative will almost completely eliminate residual concerns at the Site.

5.4.2 Feasibility/Implementability of Alternative 4

The following sections provide an evaluation of the feasibility and implementability of Alternative 4.

5.4.2.1 Technical Feasibility

The necessary equipment, personnel, and laboratory services for excavating and transporting the waste are available to support implementation of this removal action.

5.4.2.2 Administrative and Legal Feasibility

Alternative 4 is both legally and administratively feasible. Off-site permits could be required for truck hauling within the park or for traffic control during transportation and disposal. Waste profiling documentation would be required and disposal manifests would accompany waste during transportation.

NPS would conduct a historical and cultural resources survey to identify all resources; resources that cannot be disturbed or that must be restored after construction, and features that are not a resource requiring protection or mitigation.

5.4.2.3 Ease of Implementation

Operational requirements, including excavation, consolidation, grading, and the transportation of soil, would be incurred with Alternative 4. Difficulties could be experienced in carrying out hauling scenario logistics and improving site access roads.

Regulatory acceptance is likely with Alternative 4 because it meets RAOs. Community acceptance is unknown at this time but will be determined during the EE/CA Report public comment period.

5.4.3 Cost of Alternative 4

The costs for Alternative 4 have been evaluated in detail based on the evaluation criteria listed in Alternative 2 (**Section 5.2.3**). A complete break-out of costs is provided in **Table D-4** in Attachment D.

Summary of Alternative 4 associated costs:

- Capital Cost: Approximately $ 160,000
- Long-Term Maintenance and Monitoring Costs: Approximately $ 0 per year
- Present Worth Cost/Present Value: Approximately $ 160,000

The capital costs are estimated based on the following general elements:

- Design, including pre- and post-excavation submittals, excluding ecological resource inventory and cultural resources survey
- Mobilization
- Excavation
- Transportation and off-site disposal
- Management

There are no post-removal maintenance and monitoring costs associated with Alternative 4. Therefore, Present Worth Value/Present Cost is the same as the capital cost.

5.5 Comparative Analysis of Removal Action Alternatives

Table 8 summarizes the removal action alternatives and ranks the alternatives from most likely to least likely to achieve all of the removal action goals.

Table 8: Comparative Analysis of Removal Action Alternatives

EVALUATION CRITERIA	**ALTERNATIVE 1** NO ACTION	**ALTERNATIVE 2** INSTITUTIONAL CONTROLS	**ALTERNATIVE 3** ON-SITE CONSOLIDATION AND CAPPING	**ALTERNATIVE 4** EXCAVATION AND OFF-SITE DISPOSAL
EFFECTIVENESS	Does not achieve any ARARs or any RAOs	Achieves most ARARs and most RAOs	Achieves most ARARs and all RAOs	Achieves all ARARs and all RAOs
Protective of Public Health and Community	No	Yes, with successful implementation of ICs	Yes	Yes
Protective of Workers During Implementation	Not Applicable	Yes, with proper health and safety plan implemented	Yes, with proper health and safety plan implemented	Yes, with proper health and safety plan implemented
Protective of the Environment	No	No; Some ecological risks remain. Birds and other flying animals remain exposed	Yes, with continued maintenance of the cap	Yes

EVALUATION CRITERIA	**ALTERNATIVE 1** NO ACTION	**ALTERNATIVE 2** INSTITUTIONAL CONTROLS	**ALTERNATIVE 3** ON-SITE CONSOLIDATION AND CAPPING	**ALTERNATIVE 4** EXCAVATION AND OFF-SITE DISPOSAL
Complies with All ARARs	No	No	No	Yes
Achieves All RAOs	No	No	Yes	Yes
Level of Containment Expected	None	None	High level of containment requires proper maintenance	High level of containment. Maintenance at landfill only
Reduction or Elimination of Residual Concerns	None	None	Low; Residual concerns remain in maintaining cap	High
IMPLEMENTABILITY	Easily Implemented; Not Administratively Feasible	Moderate to implement; Feasible	Difficult to implement but feasible	Moderate to implement; Feasible
Equipment Availability	None Required	Available	Available	Available
Services Availability	None Required	Available	Available	Available
Site Accessibility	None Required	Minor; Road upgrades for vehicles and equipment access	Moderate; Road widening and grading will be required to access site	Minor; Road upgrades for vehicles and equipment access
Availability of Laboratory Testing Capacity	None Required	Available	Available	Available
Off-site Treatment and Disposal Capacity	None Required	None Required	None Required	Available
Can Be Implemented in One Year	Yes	Yes, barring any significant consultation periods for NPS, CEQA, CESA, or other ARAR-related administration	Yes, barring any significant consultation periods for NPS, CEQA, CESA, or other ARAR-related administration	Yes barring any significant consultation periods for NPS, CEQA, CESA, or other ARAR-related administration

EVALUATION CRITERIA	**ALTERNATIVE 1** NO ACTION	**ALTERNATIVE 2** INSTITUTIONAL CONTROLS	**ALTERNATIVE 3** ON-SITE CONSOLIDATION AND CAPPING	**ALTERNATIVE 4** EXCAVATION AND OFF-SITE DISPOSAL
Administrative and Legal Feasibility: Acquisition of Permits for Off-site Work	Not Applicable	None Required	Grading of potential soil borrow area; Special permits as required for off-site impacts from road repairs	Commercial landfill disposal profile required
Administrative and Legal Feasibility: Acquisition of Permits for Site Work	Not Applicable	Permits not required but substantive ecological; requirements are applicable	Permits not required but substantive ecological; requirements are applicable	Permits not required
Administrative and Legal Feasibility: Acquisition of Easement or Rights-of-Way	Not Applicable	None Required	Onsite road widening and new temporary access roads could be required	Onsite road/trail widening could be required
Administrative and Legal Feasibility: Impact on Adjoining Property	None	Low; Sediment erosion and wind-blown contaminants	Low; Construction activities may impact offsite from truck traffic;	Low; Construction activities may impact offsite from truck traffic;
Administrative and Legal Feasibility: Ability to Impose Institutional Controls	Not Applicable	Recommended ICs are implementable	Recommended ICs are implementable	Not Applicable

EVALUATION CRITERIA	**ALTERNATIVE 1** NO ACTION	**ALTERNATIVE 2** INSTITUTIONAL CONTROLS	**ALTERNATIVE 3** ON-SITE CONSOLIDATION AND CAPPING	**ALTERNATIVE 4** EXCAVATION AND OFF-SITE DISPOSAL
Ease of Implementation: Regulatory Acceptance	Unlikely	Unlikely; Does not remove the impacted soil	Unlikely; Does not meet all ARARs	Likely; Involves little truck hauling
Ease of Implementation: Community Acceptance	Unlikely	Unknown until public comment period	Unknown until public comment period	Likely; Creates insignificant disturbance
COST	No Capital, Monitoring, or Post-Removal Costs	Range below includes Capital, Monitoring, & Post-Removal Costs	Range below includes Capital, Monitoring, & Post-Removal Costs	Range below includes Capital & Monitoring Costs
Present Worth Cost/ Present Value	$0	~$214,000	~$604,000	~$160,000
Present Worth Cost/ Present Value (-30% Estimate)	$0	~$150,000	~$422,000	~$112,000
Present Worth Cost/ Present Value (+50% Estimate)	$0	~$320,000	~$905,000	~$241,000

Notes:
ARARs: Applicable or Relevant and Appropriate Requirements
RAOs = Removal action objectives
ICs = Institutional Controls (i.e.: fencing, signage, deed restriction)
Green = Effective, implementable
Yellow = Effective, difficult to implement
Red = Ineffective, difficult to implement

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 RECOMMENDED REMOVAL ACTION ALTERNATIVE

Alternative 2 is the second least costly and also the least protective for the environment and would leave the lead impacted soil exposed to the elements and to people or animals that can cross the fence surrounding the Site area. Alternative 3 would isolate and contain the lead impacted soil in a CAMU, thus eliminating exposure to human and ecological receptors at the Site area; however, the CAMU would require ongoing OM&M to remain effective. In addition, Alternative 3 does not achieve all ARARs. Alternative 4, excavation and off-site disposal, is the least costly and will best meet the evaluation criteria for the Site. Alternative 4 is the most protective of human health and ecological resources at DEPO.

Table 9: Removal Action Alternative Selection

Recommended Alternative	Effectiveness	Feasibility/ Implementability	Total Value
Alternative 4: Excavation, Transportation and Off-site Disposal	Achieves ARARs Achieves RAOs	Feasible and Implementable	~$160,000

6.2 REMOVAL SCHEDULE

NPS has determined that a non-time-critical removal action is appropriate at the Site. After completion of the EE/CA Report, NPS must complete an Action Memorandum. Following issuance of the Action Memorandum, NPS must secure congressional funding for the removal action. After receipt of funding, NPS will need to prepare a removal design and may need to contract the design implementation separately. A more detailed schedule can be developed once congressional funding has been secured.

Attachment A

Approval Memorandum

United States Department of the Interior

NATIONAL PARK SERVICE
Pacific West Region
333 Bush Street, Suite 500
San Francisco, California 94104-2828

F34(PWR-FM)

Memorandum

To: Christine Lehnertz, Regional Director, National Park Service, Pacific West Region

Through: Patty Neubacher, Administration and Facilities Management

Through: David Kruse, Chief of Facility Management

From: Stephen Mitchell, PE, Operations/Environmental Program Lead

Subject: Engineering Evaluation & Cost Analysis Approval Memorandum Lead Impacted Soil near Potable Water Tank at Devils Postpile National Monument

Request you sign the attached Engineering Evaluation & Cost Analysis Approval Memorandum, Lead Impacted Soil near Potable Water Tank at Devils Postpile National Monument. The Action Memorandum was prepared according to the guidelines proposed in *Superfund Removal Guidance for Preparing Action Memoranda* (U.S. Environmental Protection Agency, E.S. EPA 2009).

The Non-Time-Critical Removal Action is being performed pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). Under the CERCLA, the United States Department of Interior (DOI) National Park Service (NPS) has lead agency responsibility (Title 40 Code of Federal Regulations (CFR) 300.5) for implementing appropriate investigations and removal actions where environmental impacts have or may have occurred from historical activities and where such releases may constitute a residual threat to human health or the environment.

Steve J. Mitchell

Attachment:

October 11, 2012

To: Regional Director, Pacific West Region

From: Superintendent, Devils Postpile National Monument

Through: Steve J. Mitchell, PE, NPS/PWR/FM, Operations/Environmental Program Lead

Subject: Engineering Evaluation & Cost Analysis Approval Memorandum
Lead Impacted Soil near Potable Water Tank at Devils Postpile National Monument

PURPOSE

This memorandum recommends and documents the decision of the National Park Service (NPS) to conduct an Engineering Evaluation/Cost Analysis (EE/CA) pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601 *et seq.*, for lead impacted soils near the potable water tank at Devils Post Pile National Monument (DEPO), California . NPS is the CERCLA lead agency with authority to respond to the release or threatened release of hazardous substances at or from the Site. This Memorandum was prepared in accordance with CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300, and the U.S. Environmental Protection Agency's (EPA) *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*, OSWER Publication 9360.0-32 (August 1993).

BACKGROUND

Located on the western slope of the Sierra Nevada range between 7,200 and 8,200 feet, DEPO contains an interesting assemblage of flora, fauna and geology, for which the monument was set aside. DEPO is located along the Middle Fork of the San Joaquin River Valley in the south eastern Sierra Nevada, approximately 2 miles southwest of Mammoth Mountain ski resort in Madera County, California at 37.629 N Longitude and 119.0847 W Latitude.

DEPO's landscape is a result of eruptions and uniform cooling of basalt lava that created an impressive wall of columns. Later, a glacial event exposed the columns and polished smooth the top of this formation, enhancing the pattern of hexagons that resulted from the mineral composition of the lava.

In 2008, at the request of the NPS, Provost and Pritchard Consulting Group[1] (P&P) conducted a Preliminary Assessment (PA) in general accordance with the CERCLA guidance manual for the 2005 release of lead based paint chips and sand blasting debris, at the 100,000 gallon above-ground potable water tank at DEPO. The objective of the PA was to identify past and present

practices related to the historic release and evaluate the site's Hazard Ranking System score (HRS).

The scope of the investigation included review of available records, a site reconnaissance and interviews with DEPO personnel. The investigation focused on the 2005 water tank sandblasting operations activities intended to remove the lead-based paint from the exterior of the tank. The tank was reportedly installed prior to 1940 and had not been repainted since its installation.

In November of 2005, following sandblasting and painting operations, Mr. John Fernandes[1], DEPO Maintenance Supervisor, collected ten soil samples within the sandblasting containment area to verify the painting contractor's cleanup. The painting contractor violated the contract by sampling without NPS technical representatives present. The exact sampling locations are not known. The analytical results for samples collected by Mr. Fernandes indicated a maximum lead concentration of 2,100 milligrams per kilogram (mg/kg) and a minimum concentration of 20 mg/kg.

On the basis of their historical data review, site visit, and interviews, P&P's calculated an HRS score of 9.14 using the EPA's QuickScore. Generally, sites scoring less than 28.50 receive a no further remedial action planned (NFRAP) recommendation. Concentrations of lead in site soils are below the California Human Health Screening Levels (CCHLS) of 3,500 mg/kg for commercial/industrial use. However, the average lead concentrations slightly exceed the Total Threshold Limit Concentration (TTLC) of 1,000 mg/kg, as defined in Title 22, California Code of Regulations.

Exceedances of TTLC's for lead indicate that additional information is necessary to determined background concentrations and, if appropriate, to develop proposed action levels (PALs) for the Site.

NPS has reviewed all available Site information and concluded that the PA did not completely characterize the nature and extent of contamination for purposes of conducting a Non-Time-Critical Removal Action (NTCRA). Further, NPS has determined that an NTCRA should be undertaken to address the Site's known and potential threats to public health, welfare, and the environment. To address gaps in the characterization of contamination and to develop and to evaluate removal action alternatives in accordance with CERCLA and the NCP, this Memorandum recommends that NPS conduct an EE/CA for the lead-impacted soil near the potable water tank at DEPO.

USE OF REMOVAL ACTION AUTHORITY

Pursuant to Sections 104(a)(1) and (b)(1) of CERCLA, 42 U.S.C. §§ 9604(a)(1) and (b)(1), whenever there is a release or substantial threat of a release of a hazardous substance into the environment, the President is authorized to act, consistent with the NCP, to remove or arrange for the removal of such hazardous substance or take any other response action, including appropriate investigations, deemed necessary to protect public health or welfare or the environment. Section 104(a) and (b) response authority (including the authority to perform an NTCRA, including the EE/CA that is the subject of this Memorandum) has been delegated to the Secretary of the Department of the Interior (DOI) pursuant to Executive Order 12580, 52 Fed. Reg. 2923 (1987), and further delegated to NPS by DOI Departmental Manual Part 207, Chapter 7, with respect to property under the jurisdiction, custody; or control of NPS.

Section 300.415(b)(2) of the NCP establishes the criteria for determining the appropriateness of a removal action. The following are applicable criteria that support the determination to consider a removal action at the Site:

i. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

ii. Actual or potential contamination of drinking water supplies or sensitive ecosystems;

iii. High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate; and

iv. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

As summarized above, the 2008 assessment indicated lead, a CERCLA hazardous substance, was present at elevated concentrations in the surface soils around the potable water tank. Because the locations of the samples collected are unknown, the extent of contamination is unknown, which represents a gap in the characterization.

Units of the National Park System are considered sensitive ecosystems. See, *e.g.*, National Park Service Organic Act, 16 U.S.C. § 1 (National Park System units shall be managed "to conserve the scenery and the natural and historic objects and the wildlife 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.").

Based on the PA, groundwater and surface water targets are not within sufficient distance of the tank site for there to be a migratory pathway to these resources. Restrictive air flow due to the hilly forested terrain between the source and potential targets make it unlikely that an airborne pathway exists. However, if soils were to be excavated in the future, the quantity of hazardous substances should be identified.

Based upon these considerations, NPS has determined that the use of removal action authority at DEPO to investigate, abate, prevent, minimize, stabilize, mitigate, and/or eliminate the release or threat of release of hazardous substances at or from the Site is appropriate. Additionally, NPS has determined that a planning period of at least six months exists before on-Site activities must be initiated. Therefore, NPS is authorized to conduct an EE/CA (or its equivalent) pursuant to and in accordance with Section 300.415(b)(4) of the NCP. An EE/CA is performed to determine the nature and extent of contamination, assess potential risks posed to human and ecological receptors from exposure to such contamination identify and evaluate removal action alternatives to address unacceptable risk, and identify a recommended removal action alternative that best meets the evaluation criteria.

EE/CA IMPLEMENTATION AND FUNDING

NPS has received funding from the DOI Central Hazardous Materials Fund (CHF) to implement the Site EE/CA. Upon approval of the recommendation, the Site EE/CA will be implemented.

APPROVAL

Based upon the information and analysis presented in this memorandum, please indicate your concurrence on non-concurrence with the recommendation to perform an EE/CA as part of a NTCRA at the lead contaminated site identified herein and located within DEPO. If you have any questions, please contact Steve Mitchell at (415) 623-2286.

I Concur

Patricia L. Neubacher Date: 10/11/12

I Do Not Concur

_____ Date: _____

Attachment B

Laboratory Analytical Reports and Chain of Custody Documentation

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-3342-1
TestAmerica Sample Delivery Group: DEPO WAter TAnk
Client Project/Site: NPS-SEPO

For:
Environmental Cost Management, Inc.
3525 Hyland Avenue
Costa Mesa, California 92626

Attn: Ms. Holly Trejo

Authorized for release by:
7/22/2013 11:26:00 AM

David Alltucker, Project Manager I
david.alltucker@testamericainc.com

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-3342-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-3342-1

Receipt
The samples were received on 7/12/2013 11:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Metals
No analytical or quality issues were noted.

Detection Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3342-1
SDG: DEPO WAter TAnk

Client Sample ID: DEPO-EB-bag — Lab Sample ID: 320-3342-1

No Detections.

Client Sample ID: DEPO-EB-cup — Lab Sample ID: 320-3342-2

No Detections.

Client Sample ID: DEPO-EB-trowel — Lab Sample ID: 320-3342-3

No Detections.

Client Sample ID: DEPO-EB-water — Lab Sample ID: 320-3342-4

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3342-1
SDG: DEPO WAter TAnk

Client Sample ID: DEPO-EB-bag

Lab Sample ID: 320-3342-1
Matrix: Water
Date Collected: 07/12/13 10:02
Date Received: 07/12/13 11:35

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0050	0.0023	mg/L		07/16/13 07:45	07/16/13 17:27	1

Client Sample ID: DEPO-EB-cup

Lab Sample ID: 320-3342-2
Matrix: Water
Date Collected: 07/12/13 10:04
Date Received: 07/12/13 11:35

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0050	0.0023	mg/L		07/16/13 07:45	07/16/13 17:31	1

Client Sample ID: DEPO-EB-trowel

Lab Sample ID: 320-3342-3
Matrix: Water
Date Collected: 07/12/13 10:06
Date Received: 07/12/13 11:35

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0050	0.0023	mg/L		07/16/13 07:45	07/16/13 17:36	1

Client Sample ID: DEPO-EB-water

Lab Sample ID: 320-3342-4
Matrix: Water
Date Collected: 07/12/13 10:08
Date Received: 07/12/13 11:35

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0050	0.0023	mg/L		07/16/13 07:47	07/16/13 17:40	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-140177/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 140235 — **Prep Batch: 140177**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.0050	0.0023	mg/L		07/16/13 07:45	07/16/13 16:20	1

Lab Sample ID: LCS 720-140177/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 140235 — **Prep Batch: 140177**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	1.00	1.01		mg/L		101	80 - 120

Lab Sample ID: LCSD 720-140177/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 140235 — **Prep Batch: 140177**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	1.00	1.00		mg/L		100	80 - 120	1	20

Lab Sample ID: 320-3342-4 MS — **Client Sample ID: DEPO-EB-water**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 140241 — **Prep Batch: 140177**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	ND		1.00	1.00		mg/L		100	75 - 125

Lab Sample ID: 320-3342-4 MSD — **Client Sample ID: DEPO-EB-water**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 140241 — **Prep Batch: 140177**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	ND		1.00	1.02		mg/L		102	75 - 125	2	20

Metals

Prep Batch: 140177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3342-1	DEPO-EB-bag	Total/NA	Water	3010A	
320-3342-2	DEPO-EB-cup	Total/NA	Water	3010A	
320-3342-3	DEPO-EB-trowel	Total/NA	Water	3010A	
320-3342-4	DEPO-EB-water	Total/NA	Water	3010A	
320-3342-4 MS	DEPO-EB-water	Total/NA	Water	3010A	
320-3342-4 MSD	DEPO-EB-water	Total/NA	Water	3010A	
LCS 720-140177/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 720-140177/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 720-140177/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 140235

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 720-140177/2-A	Lab Control Sample	Total/NA	Water	6010B	140177
LCSD 720-140177/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	140177
MB 720-140177/1-A	Method Blank	Total/NA	Water	6010B	140177

Analysis Batch: 140241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3342-1	DEPO-EB-bag	Total/NA	Water	6010B	140177
320-3342-2	DEPO-EB-cup	Total/NA	Water	6010B	140177
320-3342-3	DEPO-EB-trowel	Total/NA	Water	6010B	140177
320-3342-4	DEPO-EB-water	Total/NA	Water	6010B	140177
320-3342-4 MS	DEPO-EB-water	Total/NA	Water	6010B	140177
320-3342-4 MSD	DEPO-EB-water	Total/NA	Water	6010B	140177

Lab Chronicle

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3342-1
SDG: DEPO WAter TAnk

Client Sample ID: DEPO-EB-bag

Lab Sample ID: 320-3342-1

Date Collected: 07/12/13 10:02

Matrix: Water

Date Received: 07/12/13 11:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			40 mL	40 mL	140177	07/16/13 07:45	ECT	TAL PLS
Total/NA	Analysis	6010B		1			140241	07/16/13 17:27	SLK	TAL PLS

Client Sample ID: DEPO-EB-cup

Lab Sample ID: 320-3342-2

Date Collected: 07/12/13 10:04

Matrix: Water

Date Received: 07/12/13 11:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			40 mL	40 mL	140177	07/16/13 07:45	ECT	TAL PLS
Total/NA	Analysis	6010B		1			140241	07/16/13 17:31	SLK	TAL PLS

Client Sample ID: DEPO-EB-trowel

Lab Sample ID: 320-3342-3

Date Collected: 07/12/13 10:06

Matrix: Water

Date Received: 07/12/13 11:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			40 mL	40 mL	140177	07/16/13 07:45	ECT	TAL PLS
Total/NA	Analysis	6010B		1			140241	07/16/13 17:36	SLK	TAL PLS

Client Sample ID: DEPO-EB-water

Lab Sample ID: 320-3342-4

Date Collected: 07/12/13 10:08

Matrix: Water

Date Received: 07/12/13 11:35

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			40 mL	40 mL	140177	07/16/13 07:47	ECT	TAL PLS
Total/NA	Analysis	6010B		1			140241	07/16/13 17:40	SLK	TAL PLS

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3342-1
SDG: DEPO WAter TAnk

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-14
Alaska (UST)	State Program	10	UST-055	12-18-13
Arizona	State Program	9	AZ0708	08-11-14
Arkansas DEQ	State Program	6	88-0691	07-30-13 *
California	NELAP	9	1119CA	01-31-14
Colorado	State Program	8	N/A	08-31-13
Connecticut	State Program	1	PH-0691	06-30-15
Florida	NELAP	4	E87570	06-30-14
Guam	State Program	9	N/A	08-31-13
Hawaii	State Program	9	N/A	01-31-14
Illinois	NELAP	5	200060	03-17-14
Kansas	NELAP	7	E-10375	10-31-13
Michigan	State Program	5	9947	01-31-14
Nebraska	State Program	7	NE-OS-22-13	01-31-14
Nevada	State Program	9	CA44	07-31-13
New Jersey	NELAP	2	CA005	06-30-14
New York	NELAP	2	11666	04-01-14
Northern Mariana Islands	State Program	9	MP0007	02-01-14
Oregon	NELAP	10	CA200005	03-28-14
Pennsylvania	NELAP	3	68-01272	03-31-14
South Carolina	State Program	4	87014	06-30-13 *
Texas	NELAP	6	T104704399-08-TX	05-31-14
US Fish & Wildlife	Federal		LE148388-0	12-31-13
USDA	Federal		P330-11-00436	12-30-14
USEPA UCMR	Federal	1	CA00044	11-06-14
Utah	NELAP	8	QUAN1	01-31-14
Washington	State Program	10	C581	05-05-14
West Virginia	State Program	3	9930C	12-31-13
West Virginia DEP	State Program	3	334	07-31-13
Wyoming	State Program	8	8TMS-Q	01-31-14

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-14

* Expired certification is currently pending renewal and is considered valid.

Method Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3342-1
SDG: DEPO WAter TAnk

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PLS

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3342-1
SDG: DEPO WAter TAnk

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-3342-1	DEPO-EB-bag	Water	07/12/13 10:02	07/12/13 11:35
320-3342-2	DEPO-EB-cup	Water	07/12/13 10:04	07/12/13 11:35
320-3342-3	DEPO-EB-trowel	Water	07/12/13 10:06	07/12/13 11:35
320-3342-4	DEPO-EB-water	Water	07/12/13 10:08	07/12/13 11:35

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916 374.4378 fax 916.372.1059

Chain of Custody Record

TestAmerica

147153

TestAmerica Laboratories, Inc.

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/12/13	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	1 of 1 COCs
3525 Hyland Ave, Suite 200	**Analysis Turnaround Time**			Sampler
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			**For Lab Use Only:**
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling:
Project Name: NPS-DEPO	☐ 1 week			
Site: DEPO Water Tank	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B	Sample Specific Notes:
DEPO-EB-bag	mc 7/12/2013	10:02	G	Water	1			X	
DEPO-EB-cup	mc 7/12/2013	10:04	C	Water	1			X	
DEPO-EB-trowel	mc 7/12/2013	10:06	G	Water	1			X	
DEPO-EB-water	mc 7/12/2013	10:08	G	Water	1			X	

320-3342 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com -

2.4C

Custody Seals Intact: ☑ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company: ECM	Date/Time: 7-12-13 1135	Received by:	Company	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by	Company:	Date/Time	Received in Laboratory by:	Company:	Date/Time: 7-12-13 1135

Login Sample Receipt Checklist

Client: Environmental Cost Management, Inc.

Job Number: 320-3342-1
SDG Number: DEPO WAter TAnk

Login Number: 3342
List Number: 1
Creator: Alltucker, David R

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time.		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

Login Sample Receipt Checklist

Client: Environmental Cost Management, Inc.

Job Number: 320-3342-1
SDG Number: DEPO WAter TAnk

Login Number: 3342
List Number: 1
Creator: Mullen, Joan

List Source: TestAmerica Pleasanton
List Creation: 07/12/13 01:47 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-3487-1
TestAmerica Sample Delivery Group: DEPO WaterTank
Client Project/Site: NPS-SEPO

For:
Environmental Cost Management, Inc.
3525 Hyland Avenue
Costa Mesa, California 92626

Attn: Ms. Holly Trejo

Authorized for release by:
8/8/2013 3:50:23 PM

David Alltucker, Project Manager I
david.alltucker@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-3487-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-3487-1

Comments
No additional comments.

Receipt
The samples were received on 7/26/2013 12:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.3º C.

Metals
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

Detection Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-101 — Lab Sample ID: 320-3487-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	400		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-01-102 — Lab Sample ID: 320-3487-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	650		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-01-103 — Lab Sample ID: 320-3487-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	510		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-01-104 — Lab Sample ID: 320-3487-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	470		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-02-105 — Lab Sample ID: 320-3487-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	230		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-02-106 — Lab Sample ID: 320-3487-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	240		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-02-107 — Lab Sample ID: 320-3487-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	120		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-02-108 — Lab Sample ID: 320-3487-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	120		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-03-109 — Lab Sample ID: 320-3487-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	61		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-03-110 — Lab Sample ID: 320-3487-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	64		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-03-111 — Lab Sample ID: 320-3487-11

This Detection Summary does not include radiochemical test results.

Client Sample ID: DEPO-03-111 (Continued) — Lab Sample ID: 320-3487-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	68		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-03-112 — Lab Sample ID: 320-3487-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	80		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-04-113 — Lab Sample ID: 320-3487-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	5.2		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-04-114 — Lab Sample ID: 320-3487-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.4		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-04-115 — Lab Sample ID: 320-3487-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	5.5		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-04-116 — Lab Sample ID: 320-3487-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.3		0.50	0.13	mg/Kg	1		6010B	Total/NA

Client Sample ID: DEPO-DP-100 — Lab Sample ID: 320-3487-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	490		0.50	0.13	mg/Kg	1		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-101 — **Lab Sample ID: 320-3487-1**
Date Collected: 07/25/13 11:10 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	400		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:25	1

Client Sample ID: DEPO-01-102 — **Lab Sample ID: 320-3487-2**
Date Collected: 07/25/13 11:25 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	650		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:27	1

Client Sample ID: DEPO-01-103 — **Lab Sample ID: 320-3487-3**
Date Collected: 07/25/13 10:45 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	510		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:30	1

Client Sample ID: DEPO-01-104 — **Lab Sample ID: 320-3487-4**
Date Collected: 07/25/13 10:30 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	470		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:33	1

Client Sample ID: DEPO-02-105 — **Lab Sample ID: 320-3487-5**
Date Collected: 07/25/13 10:15 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	230		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:41	1

Client Sample ID: DEPO-02-106 — **Lab Sample ID: 320-3487-6**
Date Collected: 07/25/13 10:30 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	240		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:43	1

Client Sample ID: DEPO-02-107 — **Lab Sample ID: 320-3487-7**
Date Collected: 07/25/13 10:00 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	120		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:46	1

Client Sample ID: DEPO-02-108
Lab Sample ID: 320-3487-8

Date Collected: 07/25/13 10:25
Matrix: Solid
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	120		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:49	1

Client Sample ID: DEPO-03-109
Lab Sample ID: 320-3487-9

Date Collected: 07/25/13 09:15
Matrix: Solid
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	61		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:52	1

Client Sample ID: DEPO-03-110
Lab Sample ID: 320-3487-10

Date Collected: 07/25/13 09:25
Matrix: Solid
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	64		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:54	1

Client Sample ID: DEPO-03-111
Lab Sample ID: 320-3487-11

Date Collected: 07/25/13 09:45
Matrix: Solid
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	68		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:57	1

Client Sample ID: DEPO-03-112
Lab Sample ID: 320-3487-12

Date Collected: 07/25/13 09:50
Matrix: Solid
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	80		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 18:00	1

Client Sample ID: DEPO-04-113
Lab Sample ID: 320-3487-13

Date Collected: 07/24/13 15:00
Matrix: Solid
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	5.2		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 17:11	1

Client Sample ID: DEPO-04-114
Lab Sample ID: 320-3487-14

Date Collected: 07/24/13 15:30
Matrix: Solid
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	4.4		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 18:02	1

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Client Sample ID: DEPO-04-115 — **Lab Sample ID: 320-3487-15**
Date Collected: 07/24/13 16:00 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	5.5		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 18:05	1

Client Sample ID: DEPO-04-116 — **Lab Sample ID: 320-3487-16**
Date Collected: 07/24/13 16:30 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	4.3		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 18:13	1

Client Sample ID: DEPO-DP-100 — **Lab Sample ID: 320-3487-17**
Date Collected: 07/24/13 14:00 — **Matrix: Solid**
Date Received: 07/26/13 12:30

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	490		0.50	0.13	mg/Kg		08/05/13 07:00	08/07/13 18:16	1

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 320-22346/1-A
Matrix: Solid
Analysis Batch: 22488

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 22346

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		1.0	0.26	mg/Kg		08/05/13 07:00	08/07/13 17:00	1

Lab Sample ID: LCS 320-22346/2-A
Matrix: Solid
Analysis Batch: 22488

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 22346

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			50.0	47.7		mg/Kg		95	85 - 110		

Lab Sample ID: 320-3487-13 MS
Matrix: Solid
Analysis Batch: 22488

Client Sample ID: DEPO-04-113
Prep Type: Total/NA
Prep Batch: 22346

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead	5.2		25.0	27.5		mg/Kg		89	85 - 110		

Lab Sample ID: 320-3487-13 MSD
Matrix: Solid
Analysis Batch: 22488

Client Sample ID: DEPO-04-113
Prep Type: Total/NA
Prep Batch: 22346

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	5.2		25.0	27.9		mg/Kg		91	85 - 110	1	35

Metals

ISM Prep Batch: 22344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3487-1	DEPO-01-101	Total/NA	Solid	Increment, prep	
320-3487-2	DEPO-01-102	Total/NA	Solid	Increment, prep	
320-3487-3	DEPO-01-103	Total/NA	Solid	Increment, prep	
320-3487-4	DEPO-01-104	Total/NA	Solid	Increment, prep	
320-3487-5	DEPO-02-105	Total/NA	Solid	Increment, prep	
320-3487-6	DEPO-02-106	Total/NA	Solid	Increment, prep	
320-3487-7	DEPO-02-107	Total/NA	Solid	Increment, prep	
320-3487-8	DEPO-02-108	Total/NA	Solid	Increment, prep	
320-3487-9	DEPO-03-109	Total/NA	Solid	Increment, prep	
320-3487-10	DEPO-03-110	Total/NA	Solid	Increment, prep	
320-3487-11	DEPO-03-111	Total/NA	Solid	Increment, prep	
320-3487-12	DEPO-03-112	Total/NA	Solid	Increment, prep	
320-3487-13	DEPO-04-113	Total/NA	Solid	Increment, prep	
320-3487-13 MS	DEPO-04-113	Total/NA	Solid	Increment, prep	
320-3487-13 MSD	DEPO-04-113	Total/NA	Solid	Increment, prep	
320-3487-14	DEPO-04-114	Total/NA	Solid	Increment, prep	
320-3487-15	DEPO-04-115	Total/NA	Solid	Increment, prep	
320-3487-16	DEPO-04-116	Total/NA	Solid	Increment, prep	
320-3487-17	DEPO-DP-100	Total/NA	Solid	Increment, prep	

Prep Batch: 22346

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3487-1	DEPO-01-101	Total/NA	Solid	3050B	22344
320-3487-2	DEPO-01-102	Total/NA	Solid	3050B	22344
320-3487-3	DEPO-01-103	Total/NA	Solid	3050B	22344
320-3487-4	DEPO-01-104	Total/NA	Solid	3050B	22344
320-3487-5	DEPO-02-105	Total/NA	Solid	3050B	22344
320-3487-6	DEPO-02-106	Total/NA	Solid	3050B	22344
320-3487-7	DEPO-02-107	Total/NA	Solid	3050B	22344
320-3487-8	DEPO-02-108	Total/NA	Solid	3050B	22344
320-3487-9	DEPO-03-109	Total/NA	Solid	3050B	22344
320-3487-10	DEPO-03-110	Total/NA	Solid	3050B	22344
320-3487-11	DEPO-03-111	Total/NA	Solid	3050B	22344
320-3487-12	DEPO-03-112	Total/NA	Solid	3050B	22344
320-3487-13	DEPO-04-113	Total/NA	Solid	3050B	22344
320-3487-13 MS	DEPO-04-113	Total/NA	Solid	3050B	22344
320-3487-13 MSD	DEPO-04-113	Total/NA	Solid	3050B	22344
320-3487-14	DEPO-04-114	Total/NA	Solid	3050B	22344
320-3487-15	DEPO-04-115	Total/NA	Solid	3050B	22344
320-3487-16	DEPO-04-116	Total/NA	Solid	3050B	22344
320-3487-17	DEPO-DP-100	Total/NA	Solid	3050B	22344
LCS 320-22346/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 320-22346/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 22488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3487-1	DEPO-01-101	Total/NA	Solid	6010B	22346
320-3487-2	DEPO-01-102	Total/NA	Solid	6010B	22346
320-3487-3	DEPO-01-103	Total/NA	Solid	6010B	22346
320-3487-4	DEPO-01-104	Total/NA	Solid	6010B	22346
320-3487-5	DEPO-02-105	Total/NA	Solid	6010B	22346

Metals (Continued)

Analysis Batch: 22488 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3487-6	DEPO-02-106	Total/NA	Solid	6010B	22346
320-3487-7	DEPO-02-107	Total/NA	Solid	6010B	22346
320-3487-8	DEPO-02-108	Total/NA	Solid	6010B	22346
320-3487-9	DEPO-03-109	Total/NA	Solid	6010B	22346
320-3487-10	DEPO-03-110	Total/NA	Solid	6010B	22346
320-3487-11	DEPO-03-111	Total/NA	Solid	6010B	22346
320-3487-12	DEPO-03-112	Total/NA	Solid	6010B	22346
320-3487-13	DEPO-04-113	Total/NA	Solid	6010B	22346
320-3487-13 MS	DEPO-04-113	Total/NA	Solid	6010B	22346
320-3487-13 MSD	DEPO-04-113	Total/NA	Solid	6010B	22346
320-3487-14	DEPO-04-114	Total/NA	Solid	6010B	22346
320-3487-15	DEPO-04-115	Total/NA	Solid	6010B	22346
320-3487-16	DEPO-04-116	Total/NA	Solid	6010B	22346
320-3487-17	DEPO-DP-100	Total/NA	Solid	6010B	22346
LCS 320-22346/2-A	Lab Control Sample	Total/NA	Solid	6010B	22346
MB 320-22346/1-A	Method Blank	Total/NA	Solid	6010B	22346

Lab Chronicle

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-101

Lab Sample ID: 320-3487-1

Date Collected: 07/25/13 11:10

Matrix: Solid

Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.0 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:25	TTP	TAL SAC

Client Sample ID: DEPO-01-102

Lab Sample ID: 320-3487-2

Date Collected: 07/25/13 11:25

Matrix: Solid

Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.09 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:27	TTP	TAL SAC

Client Sample ID: DEPO-01-103

Lab Sample ID: 320-3487-3

Date Collected: 07/25/13 10:45

Matrix: Solid

Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.03 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:30	TTP	TAL SAC

Client Sample ID: DEPO-01-104

Lab Sample ID: 320-3487-4

Date Collected: 07/25/13 10:30

Matrix: Solid

Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.09 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:33	TTP	TAL SAC

Client Sample ID: DEPO-02-105

Lab Sample ID: 320-3487-5

Date Collected: 07/25/13 10:15

Matrix: Solid

Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.07 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:41	TTP	TAL SAC

Lab Chronicle

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Client Sample ID: DEPO-02-106

Lab Sample ID: 320-3487-6

Date Collected: 07/25/13 10:30
Matrix: Solid
Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.06 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:43	TTP	TAL SAC

Client Sample ID: DEPO-02-107

Lab Sample ID: 320-3487-7

Date Collected: 07/25/13 10:00
Matrix: Solid
Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.02 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:46	TTP	TAL SAC

Client Sample ID: DEPO-02-108

Lab Sample ID: 320-3487-8

Date Collected: 07/25/13 10:25
Matrix: Solid
Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.01 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:49	TTP	TAL SAC

Client Sample ID: DEPO-03-109

Lab Sample ID: 320-3487-9

Date Collected: 07/25/13 09:15
Matrix: Solid
Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.0 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:52	TTP	TAL SAC

Client Sample ID: DEPO-03-110

Lab Sample ID: 320-3487-10

Date Collected: 07/25/13 09:25
Matrix: Solid
Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.0 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:54	TTP	TAL SAC

Lab Chronicle

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Client Sample ID: DEPO-03-111

Date Collected: 07/25/13 09:45
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-11

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.0 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:57	TTP	TAL SAC

Client Sample ID: DEPO-03-112

Date Collected: 07/25/13 09:50
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-12

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.02 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 18:00	TTP	TAL SAC

Client Sample ID: DEPO-04-113

Date Collected: 07/24/13 15:00
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-13

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.05 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 17:11	TTP	TAL SAC

Client Sample ID: DEPO-04-114

Date Collected: 07/24/13 15:30
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-14

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.03 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 18:02	TTP	TAL SAC

Client Sample ID: DEPO-04-115

Date Collected: 07/24/13 16:00
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-15

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.02 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 18:05	TTP	TAL SAC

Lab Chronicle

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Client Sample ID: DEPO-04-116

Lab Sample ID: 320-3487-16

Date Collected: 07/24/13 16:30

Matrix: Solid

Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.02 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 18:13	TTP	TAL SAC

Client Sample ID: DEPO-DP-100

Lab Sample ID: 320-3487-17

Date Collected: 07/24/13 14:00

Matrix: Solid

Date Received: 07/26/13 12:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	ISM Prep	Increment, prep				1.0 g	22344	07/30/13 11:00	AVM	TAL SAC
Total/NA	Prep	3050B			10.03 g	500 mL	22346	08/05/13 07:00	NIM	TAL SAC
Total/NA	Analysis	6010B		1			22488	08/07/13 18:16	TTP	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-14
Alaska (UST)	State Program	10	UST-055	12-18-13
Arizona	State Program	9	AZ0708	08-11-14
Arkansas DEQ	State Program	6	88-0691	07-30-13 *
California	NELAP	9	1119CA	01-31-14
Colorado	State Program	8	N/A	08-31-13
Connecticut	State Program	1	PH-0691	06-30-15
Florida	NELAP	4	E87570	06-30-14
Guam	State Program	9	N/A	08-31-13
Hawaii	State Program	9	N/A	01-31-14
Illinois	NELAP	5	200060	03-17-14
Kansas	NELAP	7	E-10375	10-31-13
Michigan	State Program	5	9947	01-31-14
Nebraska	State Program	7	NE-OS-22-13	01-31-14
New Jersey	NELAP	2	CA005	06-30-14
New York	NELAP	2	11666	04-01-14
Northern Mariana Islands	State Program	9	MP0007	02-01-14
Oregon	NELAP	10	CA200005	03-28-14
Pennsylvania	NELAP	3	68-01272	03-31-14
South Carolina	State Program	4	87014	06-30-14
Texas	NELAP	6	T104704399-08-TX	05-31-14
US Fish & Wildlife	Federal		LE148388-0	12-31-13
USDA	Federal		P330-11-00436	12-30-14
USEPA UCMR	Federal	1	CA00044	11-06-14
Utah	NELAP	8	QUAN1	01-31-14
Washington	State Program	10	C581	05-05-14
West Virginia	State Program	3	9930C	12-31-13
Wyoming	State Program	8	8TMS-Q	01-31-14

* Expired certification is currently pending renewal and is considered valid.

Method Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL SAC

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-1
SDG: DEPO WaterTank

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-3487-1	DEPO-01-101	Solid	07/25/13 11:10	07/26/13 12:30
320-3487-2	DEPO-01-102	Solid	07/25/13 11:25	07/26/13 12:30
320-3487-3	DEPO-01-103	Solid	07/25/13 10:45	07/26/13 12:30
320-3487-4	DEPO-01-104	Solid	07/25/13 10:30	07/26/13 12:30
320-3487-5	DEPO-02-105	Solid	07/25/13 10:15	07/26/13 12:30
320-3487-6	DEPO-02-106	Solid	07/25/13 10:30	07/26/13 12:30
320-3487-7	DEPO-02-107	Solid	07/25/13 10:00	07/26/13 12:30
320-3487-8	DEPO-02-108	Solid	07/25/13 10:25	07/26/13 12:30
320-3487-9	DEPO-03-109	Solid	07/25/13 09:15	07/26/13 12:30
320-3487-10	DEPO-03-110	Solid	07/25/13 09:25	07/26/13 12:30
320-3487-11	DEPO-03-111	Solid	07/25/13 09:45	07/26/13 12:30
320-3487-12	DEPO-03-112	Solid	07/25/13 09:50	07/26/13 12:30
320-3487-13	DEPO-04-113	Solid	07/24/13 15:00	07/26/13 12:30
320-3487-14	DEPO-04-114	Solid	07/24/13 15:30	07/26/13 12:30
320-3487-15	DEPO-04-115	Solid	07/24/13 16:00	07/26/13 12:30
320-3487-16	DEPO-04-116	Solid	07/24/13 16:30	07/26/13 12:30
320-3487-17	DEPO-DP-100	Solid	07/24/13 14:00	07/26/13 12:30

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916.374.4378 fax 916 372.1059

Chain of Custody Record

320-3487 Chain of Custody

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	1 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler:
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling:
Project Name: NPS-DEPO	☐ 1 week			Job / SDG No
Site: DEPO Water Tank	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes:
DEPO-01-101	7/25/13	11:10	C	Soil	1			X	X	
DEPO-01-102	"	11:25	C	Soil	1			X	X	
DEPO-01-103	"	10:45	C	Soil	1			X	X	
DEPO-01-104	"	10:30	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact. ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C) Obs'd:_____ Corr'd:_____ Therm ID No.:_____

Relinquished by:	Company: ECM	Date/Time: 7/25/13 1230	Received by:	Company:	Date/Time: 7-25-13 1230
Relinquished by	Company:	Date/Time:	Received by:	Company	Date/Time:
Relinquished by	Company:	Date/Time:	Received in Laboratory by:	Company	Date/Time

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916 374 4378 fax 916.372 1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No.
Environmental Cost Management, Inc	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	2 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler.
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling.
Project Name: NPS-DEPO	☐ 1 week			
Site: DEPO Water Tank	☐ 2 days			Job / SDG No
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes
DEPO-02-105	7/25/13	10:15	C	Soil	1			X	X	
DEPO-02-106	"	10:30	C	Soil	1			X	X	
DEPO-02-107	"	10:00	C	Soil	1			X	X	
DEPO-02-108	"	10:25	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact ☐ Yes ☐ No	Custody Seal No.		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____		Therm ID No _____
Relinquished by:	Company: ECM	Date/Time: 7/26/13 12:30	Received by:	Company: TAWS	Date/Time: 7-26-13 1230
Relinquished by:	Company	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by	Company:	Date/Time:	Received in Laboratory by	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916.374 4378 fax 916.372 1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	3 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler.
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client.
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling:
Project Name. NPS-DEPO	☐ 1 week			
Site: DEPO Water Tank	☐ 2 days			Job / SDG No.
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes.
DEPO-03-109	7/25/13	09:15	C	Soil	1			X	X	
DEPO-03-110	"	09:25	C	Soil	1			X	X	
DEPO-03-111	"	09:45	C	Soil	1			X	X	
DEPO-03-112	"	09:50	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact ☐ Yes ☐ No	Custody Seal No..		Cooler Temp (°C): Obs'd:_____ Corr'd:_____		Therm ID No _____
Relinquished by: MLH	Company: ECM	Date/Time 7/26/13 12:30	Received by	Company TAMS	Date/Time 7-26-13 1230
Relinquished by:	Company	Date/Time	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time	Received in Laboratory by	Company.	Date/Time

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

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09/06/2013

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other.

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date:	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	4 of 4 COCs
3525 Hyland Ave. Suite 200	Analysis Turnaround Time			Sampler:
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below ____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling
Project Name: NPS-DEPO	☐ 1 week			
Site DEPO Water Tank	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes
DEPO-04-113	7/	15:00	C	Soil	1			X	X	
DEPO-04-114	/24/	15:30	C	Soil	1			X	X	
DEPO-04-115	/	16:00	C	Soil	1			X	X	
DEPO-04-116	/13	16:30	C	Soil	1			X	X	
DEPO-DP-100	↓	14:00	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C) Obs'd:____ Corr'd.____ Therm ID No.:____		
Relinquished by:	Company: ECM	Date/Time: 7/14/13 17:30	Received by:	Company: TAL-SAC	Date/Time: 7-26-13 1250
Relinquished by:	Company	Date/Time:	Received by:	Company	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

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8/8/2013

Login Sample Receipt Checklist

Client: Environmental Cost Management, Inc.

Job Number: 320-3487-1
SDG Number: DEPO WaterTank

Login Number: 3487
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-3487-2
TestAmerica Sample Delivery Group: DEPO WaterTank
Client Project/Site: NPS-DEPO

For:
Environmental Cost Management, Inc.
3525 Hyland Avenue
Costa Mesa, California 92626

Attn: Ms. Holly Trejo

Authorized for release by:
9/27/2013 9:22:20 AM

David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-3487-2

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-3487-2

Receipt
The samples were received on 7/26/2013 12:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.3º C.

Metals
No analytical or quality issues were noted.

Detection Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-2
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-102

Lab Sample ID: 320-3487-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	40	B	0.10	0.012	mg/L	10		6010B	STLC Citrate

This Detection Summary does not include radiochemical test results.

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-2
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-102
Date Collected: 07/25/13 11:25
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-2
Matrix: Solid

Method: 6010B - Metals (ICP) - STLC Citrate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	40	B	0.10	0.012	mg/L			09/21/13 17:03	10

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-2
SDG: DEPO WaterTank

Method: 6010B - Metals (ICP)

Lab Sample ID: LB 320-25219/1-A ^10 LB
Matrix: Solid
Analysis Batch: 25925

Client Sample ID: Method Blank
Prep Type: STLC Citrate

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0297	J	0.10	0.012	mg/L			09/21/13 16:58	10

Lab Sample ID: LCS 320-25219/2-A ^10
Matrix: Solid
Analysis Batch: 25925

Client Sample ID: Lab Control Sample
Prep Type: STLC Citrate

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			5.00	4.80		mg/L		96	75 - 125		

Lab Sample ID: 320-3487-2 MS
Matrix: Solid
Analysis Batch: 25925

Client Sample ID: DEPO-01-102
Prep Type: STLC Citrate

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead	40	B	5.00	45.3	4	mg/L		104	75 - 125		

Lab Sample ID: 320-3487-2 MSD
Matrix: Solid
Analysis Batch: 25925

Client Sample ID: DEPO-01-102
Prep Type: STLC Citrate

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	40	B	5.00	45.7	4	mg/L		112	75 - 125	1	20

QC Association Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-2
SDG: DEPO WaterTank

Metals

Leach Batch: 25219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3487-2	DEPO-01-102	STLC Citrate	Solid	CA WET Citrate	
320-3487-2 MS	DEPO-01-102	STLC Citrate	Solid	CA WET Citrate	
320-3487-2 MSD	DEPO-01-102	STLC Citrate	Solid	CA WET Citrate	
LB 320-25219/1-A ^10 LB	Method Blank	STLC Citrate	Solid	CA WET Citrate	
LCS 320-25219/2-A ^10	Lab Control Sample	STLC Citrate	Solid	CA WET Citrate	

Analysis Batch: 25925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3487-2	DEPO-01-102	STLC Citrate	Solid	6010B	25219
320-3487-2 MS	DEPO-01-102	STLC Citrate	Solid	6010B	25219
320-3487-2 MSD	DEPO-01-102	STLC Citrate	Solid	6010B	25219
LB 320-25219/1-A ^10 LB	Method Blank	STLC Citrate	Solid	6010B	25219
LCS 320-25219/2-A ^10	Lab Control Sample	STLC Citrate	Solid	6010B	25219

Lab Chronicle

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-2
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-102
Date Collected: 07/25/13 11:25
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
STLC Citrate	Leach	CA WET Citrate			50.01 g	500 mL	25219	09/16/13 09:00	NIM	TAL SAC
STLC Citrate	Analysis	6010B		10			25925	09/21/13 17:03	TTP	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-2
SDG: DEPO WaterTank

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NE-OS-22-13	01-31-14
A2LA	DoD ELAP		2928-01	01-31-14
Alaska (UST)	State Program	10	UST-055	12-18-13
Arizona	State Program	9	AZ0708	08-11-14
Arkansas DEQ	State Program	6	88-0691	06-17-14
California	NELAP	9	1119CA	01-31-14
Connecticut	State Program	1	PH-0691	06-30-15
Florida	NELAP	4	E87570	06-30-14
Guam	State Program	9	N/A	08-31-14
Hawaii	State Program	9	N/A	01-31-14
Illinois	NELAP	5	200060	03-17-14
Kansas	NELAP	7	E-10375	10-31-13
Louisiana	NELAP	6	30612	06-30-14
Michigan	State Program	5	9947	01-31-14
Nebraska	State Program	7	NE-OS-22-13	01-31-14
Nevada	State Program	9	CA44	07-31-14
New Jersey	NELAP	2	CA005	06-30-14
New York	NELAP	2	11666	04-01-14
Northern Mariana Islands	State Program	9	MP0007	02-01-14
Oregon	NELAP	10	CA200005	03-28-14
Pennsylvania	NELAP	3	68-01272	03-31-14
South Carolina	State Program	4	87014	06-30-14
Texas	NELAP	6	T104704399-08-TX	05-31-14
US Fish & Wildlife	Federal		LE148388-0	12-31-13
USDA	Federal		P330-11-00436	12-30-14
USEPA UCMR	Federal	1	CA00044	11-06-14
Utah	NELAP	8	QUAN1	01-31-14
Washington	State Program	10	C581	05-05-14
West Virginia	State Program	3	9930C	12-31-13
Wyoming	State Program	8	8TMS-Q	01-31-14

Method Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-2
SDG: DEPO WaterTank

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL SAC

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-SEPO

TestAmerica Job ID: 320-3487-2
SDG: DEPO WaterTank

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-3487-2	DEPO-01-102	Solid	07/25/13 11:25	07/26/13 12:30

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916.374.4378 fax 916 372.1059

Chain of Custody Record

320-3487 Chain of Custody

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	1 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler:
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling:
Project Name: NPS-DEPO	☐ 1 week			Job / SDG No
Site: DEPO Water Tank	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes:
DEPO-01-101	7/25/13	11:10	C	Soil	1			X	X	
DEPO-01-102	"	11:25	C	Soil	1			X	X	
DEPO-01-103	"	10:45	C	Soil	1			X	X	
DEPO-01-104	"	10:30	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact. ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C) Obs'd:_____ Corr'd:_____ Therm ID No.:_____		
Relinquished by:	Company: ECM	Date/Time: 7/25/13 1230	Received by:	Company:	Date/Time: 7-25-13 1230
Relinquished by	Company:	Date/Time:	Received by:	Company	Date/Time:
Relinquished by	Company:	Date/Time:	Received in Laboratory by:	Company	Date/Time

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916 374 4378 fax 916.372 1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No.
Environmental Cost Management, Inc	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	2 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler.
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling.
Project Name: NPS-DEPO	☐ 1 week			
Site: DEPO Water Tank	☐ 2 days			Job / SDG No
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes
DEPO-02-105	7/25/13	10:15	C	Soil	1			X	X	
DEPO-02-106	"	10:30	C	Soil	1			X	X	
DEPO-02-107	"	10:00	C	Soil	1			X	X	
DEPO-02-108	"	10:25	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact ☐ Yes ☐ No	Custody Seal No.		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____		Therm ID No _____
Relinquished by:	Company: ECM	Date/Time: 7/26/13 12:30	Received by:	Company: TAWS	Date/Time: 7/26/13 1230
Relinquished by:	Company	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by	Company:	Date/Time:	Received in Laboratory by	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916.374 4378 fax 916.372 1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	3 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler.
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client.
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling:
Project Name. NPS-DEPO	☐ 1 week			
Site: DEPO Water Tank	☐ 2 days			Job / SDG No.
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes.
DEPO-03-109	7/25/13	09:15	C	Soil	1			X	X	
DEPO-03-110	"	09:25	C	Soil	1			X	X	
DEPO-03-111	"	09:45	C	Soil	1			X	X	
DEPO-03-112	"	09:50	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact ☐ Yes ☐ No | Custody Seal No.. | Cooler Temp (°C): Obs'd:_____ Corr'd:_____ Therm ID No _____

Relinquished by: MLH	Company: ECM	Date/Time 7/26/13 12:30	Received by	Company	Date/Time 7-26-13 1230
Relinquished by:	Company	Date/Time	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time	Received in Laboratory by	Company.	Date/Time

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Page 13 of 14

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other.

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date:	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	4 of 4 COCs
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(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling
Project Name: NPS-DEPO	☐ 1 week			
Site DEPO Water Tank	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes
DEPO-04-113	7/24/13	15:00	C	Soil	1			X	X	
DEPO-04-114		15:30	C	Soil	1			X	X	
DEPO-04-115		16:00	C	Soil	1			X	X	
DEPO-04-116		16:30	C	Soil	1			X	X	
DEPO-DP-100	↓	14:00	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C) Obs'd:_____ Corr'd._____ Therm ID No.:_____		
Relinquished by:	Company: ECM	Date/Time: 7/24/13 12:30	Received by:	Company: TAL-SAC	Date/Time: 7-26-13 1250
Relinquished by:	Company	Date/Time:	Received by:	Company	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Environmental Cost Management, Inc.

Job Number: 320-3487-2
SDG Number: DEPO WaterTank

Login Number: 3487
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-3487-3
TestAmerica Sample Delivery Group: DEPO WaterTank
Client Project/Site: NPS-DEPO

For:
Environmental Cost Management, Inc.
3525 Hyland Avenue
Costa Mesa, California 92626

Attn: Ms. Holly Trejo

Authorized for release by:
11/11/2013 9:14:23 AM

David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

Table of Contents

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 320-3487-3

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-3487-3

Comments
No additional comments.

Receipt
The samples were received on 7/26/2013 12:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 20.3º C.

Metals
STLC DI Wet requested on sample by client.

No analytical or quality issues were noted.

Detection Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-DEPO

TestAmerica Job ID: 320-3487-3
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-102

Lab Sample ID: 320-3487-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.088	J B	0.10	0.012	mg/L	10		6010B	STLC DI

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Environmental Cost Management, Inc.
Project/Site: NPS-DEPO

TestAmerica Job ID: 320-3487-3
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-102
Date Collected: 07/25/13 11:25
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-2
Matrix: Solid

Method: 6010B - Metals (ICP) - STLC DI

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.088	J B	0.10	0.012	mg/L			11/04/13 22:59	10

Client: Environmental Cost Management, Inc.
Project/Site: NPS-DEPO

TestAmerica Job ID: 320-3487-3
SDG: DEPO WaterTank

Method: 6010B - Metals (ICP)

Lab Sample ID: LB 320-28682/1-A ^10 LB
Matrix: Solid
Analysis Batch: 29144

Client Sample ID: Method Blank
Prep Type: STLC DI

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	0.0140	J	0.10	0.012	mg/L			11/04/13 22:48	10

Lab Sample ID: LCS 320-28682/2-A ^10
Matrix: Solid
Analysis Batch: 29144

Client Sample ID: Lab Control Sample
Prep Type: STLC DI

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			5.00	5.02		mg/L		100	75 - 125		

Lab Sample ID: 320-3487-2 MS
Matrix: Solid
Analysis Batch: 29144

Client Sample ID: DEPO-01-102
Prep Type: STLC DI

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead	0.088	J B	5.00	5.13		mg/L		101	75 - 125		

Lab Sample ID: 320-3487-2 MSD
Matrix: Solid
Analysis Batch: 29144

Client Sample ID: DEPO-01-102
Prep Type: STLC DI

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	0.088	J B	5.00	5.17		mg/L		102	75 - 125	1	20

QC Association Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-DEPO

TestAmerica Job ID: 320-3487-3
SDG: DEPO WaterTank

Metals

Leach Batch: 28682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3487-2	DEPO-01-102	STLC DI	Solid	CA WET DI	
320-3487-2 MS	DEPO-01-102	STLC DI	Solid	CA WET DI	
320-3487-2 MSD	DEPO-01-102	STLC DI	Solid	CA WET DI	
LB 320-28682/1-A ^10 LB	Method Blank	STLC DI	Solid	CA WET DI	
LCS 320-28682/2-A ^10	Lab Control Sample	STLC DI	Solid	CA WET DI	

Analysis Batch: 29144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-3487-2	DEPO-01-102	STLC DI	Solid	6010B	28682
320-3487-2 MS	DEPO-01-102	STLC DI	Solid	6010B	28682
320-3487-2 MSD	DEPO-01-102	STLC DI	Solid	6010B	28682
LB 320-28682/1-A ^10 LB	Method Blank	STLC DI	Solid	6010B	28682
LCS 320-28682/2-A ^10	Lab Control Sample	STLC DI	Solid	6010B	28682

Lab Chronicle

Client: Environmental Cost Management, Inc.
Project/Site: NPS-DEPO

TestAmerica Job ID: 320-3487-3
SDG: DEPO WaterTank

Client Sample ID: DEPO-01-102
Date Collected: 07/25/13 11:25
Date Received: 07/26/13 12:30

Lab Sample ID: 320-3487-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
STLC DI	Leach	CA WET DI			50.05 g	500 mL	28682	10/30/13 08:30	NIM	TAL SAC
STLC DI	Analysis	6010B		10			29144	11/04/13 22:59	TTP	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-DEPO

TestAmerica Job ID: 320-3487-3
SDG: DEPO WaterTank

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NE-OS-22-13	01-31-14
A2LA	DoD ELAP		2928-01	01-31-14
Alaska (UST)	State Program	10	UST-055	12-18-13
Arizona	State Program	9	AZ0708	08-11-14
Arkansas DEQ	State Program	6	88-0691	06-17-14
California	NELAP	9	1119CA	01-31-14
Connecticut	State Program	1	PH-0691	06-30-15
Florida	NELAP	4	E87570	06-30-14
Guam	State Program	9	N/A	08-31-14
Hawaii	State Program	9	N/A	01-31-14
Illinois	NELAP	5	200060	03-17-14
Kansas	NELAP	7	E-10375	10-31-14
Louisiana	NELAP	6	30612	06-30-14
Michigan	State Program	5	9947	01-31-14
Nebraska	State Program	7	NE-OS-22-13	01-31-14
Nevada	State Program	9	CA44	07-31-14
New Jersey	NELAP	2	CA005	06-30-14
New York	NELAP	2	11666	04-01-14
Northern Mariana Islands	State Program	9	MP0007	02-01-14
Oregon	NELAP	10	CA200005	03-28-14
Pennsylvania	NELAP	3	68-01272	03-31-14
South Carolina	State Program	4	87014	06-30-14
Texas	NELAP	6	T104704399-08-TX	05-31-14
US Fish & Wildlife	Federal		LE148388-0	12-31-13
USDA	Federal		P330-11-00436	12-30-14
USEPA UCMR	Federal	1	CA00044	11-06-14
Utah	NELAP	8	QUAN1	01-31-14
Washington	State Program	10	C581	05-05-14
West Virginia	State Program	3	9930C	12-31-13
Wyoming	State Program	8	8TMS-Q	01-31-14

Method Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-DEPO

TestAmerica Job ID: 320-3487-3
SDG: DEPO WaterTank

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL SAC

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Environmental Cost Management, Inc.
Project/Site: NPS-DEPO

TestAmerica Job ID: 320-3487-3
SDG: DEPO WaterTank

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-3487-2	DEPO-01-102	Solid	07/25/13 11:25	07/26/13 12:30

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916.374.4378 fax 916 372.1059

Chain of Custody Record

320-3487 Chain of Custody

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	1 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler:
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling:
Project Name: NPS-DEPO	☐ 1 week			Job / SDG No
Site: DEPO Water Tank	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes:
DEPO-01-101	7/25/13	11:10	C	Soil	1			X	X	
DEPO-01-102	"	11:25	C	Soil	1			X	X	
DEPO-01-103	"	10:45	C	Soil	1			X	X	
DEPO-01-104	"	10:30	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact. ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C) Obs'd:_____ Corr'd:_____ Therm ID No.:_____		
Relinquished by:	Company: ECM	Date/Time: 7/25/13 1230	Received by:	Company:	Date/Time: 7-25-13 1230
Relinquished by	Company:	Date/Time:	Received by:	Company	Date/Time:
Relinquished by	Company:	Date/Time:	Received in Laboratory by:	Company	Date/Time

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

11/11/2013

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916 374 4378 fax 916.372 1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No.
Environmental Cost Management, Inc	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	2 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler.
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling.
Project Name: NPS-DEPO	☐ 1 week			
Site: DEPO Water Tank	☐ 2 days			Job / SDG No
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes
DEPO-02-105	7/25/13	10:15	C	Soil	1			X	X	
DEPO-02-106	"	10:30	C	Soil	1			X	X	
DEPO-02-107	"	10:00	C	Soil	1			X	X	
DEPO-02-108	"	10:25	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact ☐ Yes ☐ No	Custody Seal No.		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____		Therm ID No _____
Relinquished by:	Company: ECM	Date/Time: 7/26/13 12:30	Received by:	Company: TALWS	Date/Time: 7-26-13 1230
Relinquished by:	Company	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by	Company:	Date/Time:	Received in Laboratory by	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
phone 916.374 4378 fax 916.372 1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date: 7/25/13	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	3 of 4 COCs
3525 Hyland Ave, Suite 200	Analysis Turnaround Time			Sampler.
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client.
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling:
Project Name. NPS-DEPO	☐ 1 week			
Site: DEPO Water Tank	☐ 2 days			Job / SDG No.
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes.
DEPO-03-109	7/25/13	09:15	C	Soil	1			X	X	
DEPO-03-110	"	09:25	C	Soil	1			X	X	
DEPO-03-111	"	09:45	C	Soil	1			X	X	
DEPO-03-112	"	09:50	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact ☐ Yes ☐ No	Custody Seal No..		Cooler Temp (°C): Obs'd:_____ Corr'd:_____		Therm ID No _____
Relinquished by: MLH	Company: ECM	Date/Time 7/26/13 12:30	Received by	Company TAMS	Date/Time 7-26-13 1230
Relinquished by:	Company	Date/Time	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time	Received in Laboratory by	Company.	Date/Time

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
phone 916.374.4378 fax 916.372.1059

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other.

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Holly Trejo	Site Contact: Holly Trejo	Date:	COC No:
Environmental Cost Management, Inc.	Tel/Fax: 510-964-4399	Lab Contact: David Alltucker	Carrier: ECM	4 of 4 COCs
3525 Hyland Ave. Suite 200	Analysis Turnaround Time			Sampler:
Costa Mesa, CA 92626	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(714) 662-2759 Phone	TAT if different from Below _____			Walk-in Client:
(714) 662-2758 FAX	☑ 2 weeks			Lab Sampling
Project Name: NPS-DEPO	☐ 1 week			Job / SDG No.:
Site DEPO Water Tank	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	Total Lead EPA 6010 B - ISM	6010 lead - STLC (Hold)	Sample Specific Notes
DEPO-04-113	7/24/13	15:00	C	Soil	1			X	X	
DEPO-04-114		15:30	C	Soil	1			X	X	
DEPO-04-115		16:00	C	Soil	1			X	X	
DEPO-04-116		16:30	C	Soil	1			X	X	
DEPO-DP-100	↓	14:00	C	Soil	1			X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	
				Soil				X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for_____ Months

Special Instructions/QC Requirements & Comments: PM: Holly Trejo 510-964-4399, email to htrejo@ecostmanage.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C) Obs'd:_____ Corr'd._____ Therm ID No.:_____		
Relinquished by:	Company: ECM	Date/Time: 7/24/13 12:30	Received by:	Company: TAL-SAC	Date/Time: 7-26-13 1250
Relinquished by:	Company	Date/Time:	Received by:	Company	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.2, dated 04/02/2013

Login Sample Receipt Checklist

Client: Environmental Cost Management, Inc.

Job Number: 320-3487-3
SDG Number: DEPO WaterTank

Login Number: 3487
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Attachment C

Risk Screening Levels and Background Calculations

Attachment C
Table C-1
Habitat Type and Species Inventory
Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

The habitat type around the water tank is on the boundary between Mountain Hemlock-(Western White Pine-Sierra Lodgepole Pine) Forest and Sierra Lodgepole Pine Forest Alliance (NPS 1997 vegetation map)

Mountain Hemlock-(Western White Pine-Sierra Lodgepole Pine) Forest - Upper montain to subalpine. Typically dominated by mountain hemlock with western white pine and sierra lodgepole pine as codominant. Shrub and herbaceous cover is open to sparse.

Sierra Lodgepole Pine Forest Alliance - upper montane to subalpine forest dominated by lodgepole pine *(Pinus contorta ssp. murrayana).* Some shrub species may be present with sparse herbaceous plant cover.

Avian Species						
Common Name	**Scientific Name**	**Subgroup**	**Home Range/Territory Description***	**Area****	**Units**	**Area in acres**
Coopers Hawk	*Accipiter cooperii*	Carnivore	In Michigan, Craighead and Craighead (1956) measured 4 home ranges that averaged 311 ha (768 ac) and varied from 96-401 ha (237-992 ac); they estimated that 17 other home ranges averaged 207 ha (512 ac), and varied from 18-531 ha (45-1312 ac). They reported 1 home range in Wyoming of 205 ha (506 ac)	512	ac	512
Northern Goshawk	*Accipiter gentilis*	Carnivore	Extremely defensive of nest area. Vociferous; will strike intruders, including humans. Territory estimated to be 1.6 to 39 km^2 (0.6 to 15 mi^2) (Brown and Amadon 1968). Averaged 2.1 km^2 (0.8 mi^2) in Wyoming (Craighead and Craighead 1956). Distances of 2.9 to 5.6 km (1.8 to 3.5 mi) have been reported between nesting pairs.	20.3	km^2	5016.2
White Crowned Sparrow	*Zonotrichia leucophrys*	Herbivore	Pairs at Tioga Pass, Mono Co., occupied areas as large as 1.5 to 2.0 ha (3.7 to 4.9 ac) (Morton et al. 1972). Price (1931) reported home ranges of winter flocks of 6.1 to 8.1 ha (15-20 ac) in San Mateo Co. In coastal California, 10 adults had winter home ranges of 0.36 to 0.69 ha (0.9 to 1.7 ac); 12 immatures seldom were recorded more than 183m (600 ft) from hatching site, although one was found 366 m (1200 ft) from its hatching site. One had a winter home range of 0.69 ha (1.7 ac) (Blanchard 1941).	10.45	ac	10.45
Cassins Finch	*Carpodacus cassinii*	Herbivore	No information found. Density was 1.4 to 2.2 individuals per 40 ha (100 ac) in a Wyoming lodgepole pine-spruce-fir forest (Salt 1957), and 6 males per 40 ha (100 ac) in an Oregon study area (Archie and Hudson 1973).	?		
Pine Siskin	*Carduelis pinus*	Herbivore	No information found. Usually nests in a loose colony with nests a few m apart (Bent 1968). One territory in New Hampshire included an area 0.9 to 1.8 m (3-6 ft) in diameter around nest (Weaver and West 1943).	?		
American Robin	*Turdus migratorius*	Insectivore	Home range in Massachusetts averaged about 400 m (1320 ft) around the nest (Hirth et al. 1969). In nonbreeding season, often flies long distances from nightly roost to forage. Gaines (1974a) reported 7-13 males per 40 ha (100 ac) in Central Valley riparian habitat. Haldeman et al. (1973) reported 20 pairs per 40 ha (100 ac) in a ponderosa pine forest, and 2 pairs per 40 ha (100 ac) in a fir-pine-aspen forest in Arizona.	1368478	ft^2	31.4
Red Breasted Sapsucker	*Sphyrapicus ruber*	Insectivore	No information found, but probably same as territory. Howell (1952) reported territory in Modoc Co. of a minimum of 45 m (150 ft) radius around the nest, and up to 6.1 ha (15 ac). Defends sap wells from warblers, hummingbirds, and other species.	7.7	ac	7.7
Western Wood PeeWee	*Contopus sordidulus*	Insectivore	No information found, but probably equal to territory. Density estimates range from 1-10 pairs per 40 ha (100 ac) in Colorado aspen-conifer habitat (Beaver and Baldwin 1975), to 18-33 pairs per 40 ha (100 ac) in Sacramento Valley riparian habitats (Gaines 1974a).	?		

Attachment C
Table C-1
Habitat Type and Species Inventory
Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

Avian Species (continue)						
Common Name	**Scientific Name**	**Subgroup**	**Home Range/Territory Description***	**Area****	**Units**	**Area in acres**
Mountain Chickadee	*Poecile gambeli*	Insectivore	No information found. Bock and Lynch (1970) found breeding density averaged 15.6 pairs per 40 ha (100 ac) in unburned stands, and 5.2 pairs per 40 ha (100 ac) in burned stands, in a pine-fir forest in the Sierra Nevada. Dahlston and Copper (1979), in Modoc and Lassen cos., reported a highest density of 38 pairs per 40 ha (100 ac) in white-fir forests with supplementary nest boxes, and a mean density of 24.4 pairs per 40 ha (100 ac).	?		
Red Breasted Nuthatch	*Sitta canadensis*	Insectivore	No information found. Apparently territorial all year. In Arizona, Carothers et al. (1973) found 6.7 breeding pairs per 40 ha (100 ac) in spruce-fir forest. In Idaho, Johnston (1949) found 20-45 breeders per 40 ha (100 ac) in Douglas-fir forest.	?		
Brown Creeper	*Certhia americana*	Insectivore	No information found. Number of pairs, or individuals, per 40 ha (100 ac) reported as: 4-5 pairs in Great Britain (Jones 1972), 1.7 pairs in burned Jeffrey pine-fir stands and 3.6 in unburned stands in the Sierra Nevada (Bock and Lynch 1970), 24 in a Marin Co.	?		
House wren	*Troglodytes aedon*	Insectivore	In Oregon, averaged 0.9 ha (2.3 ac), range 0.5-1.8 ha (1.1 4.4 ac), in 14 breeding territories (Kroodsma 1973). In Ohio, 178 breeding territories averaged 0.4 ha (1.0 ac), range 0.03 to 1.5 ha (0.08 to 3.6 ac) (Kendeigh 1941b).	2.75	ac	2.75
Golden Crowned Kinglet	*Regulus satrapa*	Insectivore	No information found. In Arizona spruce-fir forests, Carothers et al. (1973) reported 17 pairs per 40 ha (100 ac).	?		
Audubon's Warbler	*Dendroica coronata*	Insectivore	No data found on territory for western, "Audubon" race. For eastern, "myrtle" race, Morse (1976) found territory of about 0.8 ha (2 ac) on an island in Maine; in 40 ha (100 ac) he found 27-39 pairs. Breeding density in other areas, in pairs per 40 ha (100 ac) were: 10 in a Douglas-fir forest in Idaho (Johnston 1949); 6.7-18.3 in coniferous forests in Wyoming (Salt 1957); 13 in coniferous forests in Arizona (Carothers et al. 1973, Haldeman et al. 1973); and 8-10 in mixed conifer subalpine meadows in Oregon (Archie and Hudson 1973).	2	ac	2
Dark Eyed Junco	*Junco hyemalis*	Insectivore	Winter foraging range of "slate-colored" junco in Kansas was 5.8 ha (14 ac) or females, and 10.5 ha (26 ac) for males (Fitch 1958). Individuals probably travelled much farther to roosting cover. In Oregon, Gashwiler (1977) reported 14-20 pairs per 40 ha (100 ac) in lodgepole pine, 3-17 pairs per 40 ha (100 ac) in juniper, and 3 pairs per 40 ha (100 ac) in ponderosa pine stands. In northwestern California, Hagar (1960) found 42-54 pairs per 40 ha (100 ac) in recently logged Douglas-fir.	20	ac	20
Western Tanager	*Piranga ludoviciana*	Insectivore	No information found. Breeding density per 40 ha (100 ac) reported as: 25-30 pairs in Idaho Douglas-fir forests (Johnston 1949), 5-18 individuals in Wyoming coniferous forests (Salt 1957), 21-46 individuals in an Oregon coniferous forest (Wiens and Nussbaum 1975), and 4-30 individuals in coniferous forests in the Sierra Nevada (Beedy 1982).	?		
Steller's Jay	*Cyanocitta stelleri*	Omnivore	No information found. Density in a live oak-eucalyptus picnic area in Alameda Co. was 19 pairs per 40 ha (100 ac) (Brown 1964).	?		
Common raven	*Corvus corax*	Omnivore	In Wyoming, home range averaged 938 ha (2317 ac), varying from 680-1080 ha (1680-2668 ac) (Craighead and Craighead 1956). In Great Britain, breeding density reported as 1 pair per 17-46 km² (6.6 to 17.6 mi²) (Ratcliffe 1962). In Virginia, 1 pair per 29 km² (11 mi²) reported by Hooper et al. (1975)	1680	ac	1680
				Avian Smallest Average Home Range		**2.0**

Attachment C
Table C-1
Habitat Type and Species Inventory
Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

Mammalian Species						
Common Name	**Scientific Name**	**Subgroup**	**Home Range/Territory Description***	**Area****	**Units**	**Area in acres**
Lodgepole Chipmunk	*Neotamias speciosus*	Herbivore	Home ranges of 1.0-2.0 ha (2.5-5.0 ac) were reported by (Roberts 1962).	3.75	ac	3.75
Golden-mantled ground squirrel	*Spermophilus lateralis*	Herbivore Insectivore	Home ranges mostly vary from 0.5 to 1 ha (1 to 2.5 ac). In ponderosa pine habitat in Arizona, Goodwin and Hungerford (1979) estimated densities at 1/1.6 ha (1/4 ac) in denser stands, and at 1/8.1 ha (1 /20 ac) in very open stands.	1.75	ac	1.75
California Deermouse	*Peromyscus californicus*	Herbivore Insectivore	MacMillen (1964) reported home ranges of 0.15 ha (0.37 ac). The home range size of this species may be underestimated if arboreal activity is not considered (Meserve 1977). Merritt (1974) reported densities of 77 and 92/ha (35 and 42/ac) in xeric chaparral-oak woodland and mesic oak-laurel woodland, respectively. Typical densities ranged from 9-27/ha (4-11/ac) (Merritt 1978). Smith (1981) reported that numbers of P. californicus remained at fairly constant low levels over a 9 yr period.	0.37	ac	0.37
Douglas Squirrel	*Tamiasciurus douglasii*	Omnivorous	Home range and territory coincide (Smith 1968). Good habitat supports densities approaching 2/ha (2.5 ac).	2.5	ac	2.5
Mule Deer	Odocoileus hemionus	Herbivore	Typical home ranges of small doe and fawn groups were 1-3 km² (0.4- 1.1 mi²), but varied from 0.5 to 5.0 km² (0.2 to 1.9 mi²) in Lake Co. (Taber and Dasmann 1958). Bucks usually have larger home ranges, and travel longer distances than doe and fawn groups (Brown 1961). Statewide densities of 7-23 deer/km² (18-60/mi²) are typical, varying from 2-40/km² (5-104/mi²) (Longhurst et al. 1952). Home ranges usually are less than 1.6 km (1 mi) in diameter. Dasmann and Taber (1956) and Miller (1970) reported that the home range consists of many small areas from which the deer obtains its life requisites. Individual deer may use parts of the home range only seasonally	2.75	km^2	680
American (Pine) Marten	*Martes americana*	Carnivorous	In Montana, home ranges of males averaged 238 ha (589 ac), and varied from 88-262 ha (218-646 ac). Home ranges of females averaged 70 ha (173 ac), and varied from 8-52 ha (19-128 ac) (Hawley and Newby 1957). Home ranges often coincide with topographical or vegetation features, such as timber stands, ridges, streams, meadows, or burns.	432	ac	432
Black Bear	*Ursus americanus*	Carnivorous	In northwestern California in summer, home ranges of adult males averaged 10.6 km² (4.1 mi²), and varied from 2.6 to 19.7 km² (1.0 to 7.6 mi²). Those of adult females averaged 3.6 km² (1.4 mi²), and varied from 1.8 to 4.4 km² (0.7 to 1.7 mi²) (Kelleyhouse 1975). In the San Bernardino Mts., home ranges of males varied from 7.4 to 53.6 km² (2.8 to 20.6 mi²), and averaged 22.4 km (8.6 mi²) (Novick 1979). In western Washington, home ranges of adult and yearling males averaged 51.5 km2 (19.9 mi2); those of adult and yearling females averaged 5.3 km² (2.0 mi²), and varied from 3.4 to 87 km² (1.3 to 33.6 mi²) (Poelker and Hartwell 1973).	11.15	km^2	2755
Coyote	*Canis latrans*	Carnivorous	Bekoff (1977) reported home ranges of 8-80 km² (3-31 mi²). Home ranges of males overlapped considerably, but those of females did not. In Sierra County, home ranges varied from 10-100 km² (4-39 mi²) (Hawthorne 1971). Movements varied according to season.	44	km^2	10873
				Mammalia Smallest Average Home Range		**0.37**

Notes:
* Data from CWHR Life History Accounts and Range Maps at http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx
** Home Range Area is the reported average or an estimated average unsing the smalles ant largest reported home range.

Attachment C
Table C-2
ISM Calculator for 1-sided UCL for the Mean
Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

Note on Selecting a UCL Method. This worksheet can be used to calculate a 95 UCL from ISM data using both the Chebyshev and Student's-t methods. If you have discrete data or other knowledge that indicates the variability in contaminant concentrations within the DU is low, use the Student's t method. If discrete data or other knowledge suggests that the variability may be high or the variability is unknown, use the Chebyshev method. Because the Chebyshev method tends to yield higher UCL values for the same data set, it's statistical performance is desirable - it achieves the desired 95% coverage of the mean under conditions when the variability of concentrations throughout the DU are moderate or high (See Table 4-4). One drawback of this performance is that the Chebyshev will tend to more severely overestimate the true mean than Student's t. Nevertheless, if no discrete data are available to estimate this variability, then Chebyshev is generally preferred over Student's. Do not mistake the standard deviation (SD) of replicates as a measure of this variability. The SD of replicates is a measure of consistency in estimates of the mean - this is considered a reliable indicator of the laboratory processing steps, but not an indicator of the degree of variability in the distribution of

Replicate Number	Replicate Results				Summary Statistics		Explanation
	DU-1	DU-2	DU-3	DU-4	Stats A	Stats B	
Rep 1	400	120	61	4.30	--	--	If you have replicate ISM results, enter data in the first section "Replicate Results"
Rep 2	470	120	64	4.40	--	--	If you have summary statistics, enter data in the second section "Summary Statistics"
Rep 3	510	230	68	5.20	--	--	
Rep 4	650	240	80	5.50	--	--	
Rep 5					--	--	
arithmetic mean	507.5	177.5	68.3	4.9			sample mean of replicate results
standard deviation	105.3	66.5	8.3	0.6			sample standard deviation of replicate results
CV = SD / mean	0.21	0.37	0.12	0.12			CV gives a measure of spread of the replicates, which is different from CV of underlying distribution
count (r)	4	4	4	4	4	4	For ISM, the sample size in the UCL calculation is the number of replicates, not the number of increments.
alpha (95% = 0.05)	0.05	0.05	0.05	0.05	0.05	0.05	standard choice is alpha = 0.05
$t_{(\alpha, r-1)}$	2.35	2.35	2.35	2.35	2.35	2.35	from Student's t distribution
Student's t UCL	631.42	255.77	78.07	**5.55**			Note that the UCL for these relatively small sample sizes will typically exceed the maximum.
Chebyshev UCL	**737.03**	**322.48**	**86.43**	6.14			The calculated UCL should be used (do not use the maximum).

Notes:
ISM: incremental sampling methodology
UCL: upper confidence limit
CV: coefficient of variation
SD: standard deviation
t(α, df=r-1): $(1-\alpha)^{th}$ quantile of the Student's t distribution
r-1: degrees of freedom equal to count (r) minus one.

Attachment C
Table C-3
ARAR Soil Screening Levels

Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

ARAR	RECEPTOR	**Lead** (mg/kg)
Site Specific Background; 95% Student's UCL for DU-4		*5.55*
Eco-SSL Soil Screening Benchmark*	Avian	11
	Mammals	56
	Invertebrates	500
	Plants	50
USEPA Region 9 Screening Levels for Soil - November 2011	Residential	400
	Industrial	800
California Values for Inorganic Persistent and Bioaccumulative Toxic Substances	Total Threshold Limit Concentration (TTLC)	1,000
California Human Health Screening Levels for Soils	Residential Land Use	150
	Commercial / Industrial Land Use Only	3,500
U.S. DOE, OEM, Oak Ridge National Laboratory (ORNL) Toxicological Benchmarks	Invertebrates	500
	Microbes	900
	Plants	50

NOTES:

* From The Risk Assessment Information System ecological benchmark tool at http://rais.ornl.gov/tools/eco_search.php
UCL: Upper Confidence Limit
NE: Not Established
EPA: Environmental Protection Agency
USEPA: United States Environmental Protection Agency (Federal)

Attachment C
Table C-4
Site Specific Screen Level Calculation
Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

Risk Screening Values	**Lead** (mg/kg)
Human Health Risk Screening Value (Industrial)	800
Ecological Soil Screening Benchmark (EcoSSL - Avian)	11
Ecological Soil Screening Benchmark (EcoSSL - Mammalian)	56
Area Use Factor (AUF) (Avian)	0.05
Area Use Factor (AUF) (Mammalian)	0.29
Toxicity Reference Value (TRV) (Human Health)	800
Toxicity Reference Value (TRV) (Ecological - Avian)	220
Toxicity Reference Value (TRV) (Ecological - Mammalian)	193
Site Specific Screening Level (Lowest Estimated TRV)	**193**

Notes:
mg/kg: milligram per kilogram
EcoSSL: Ecological soil screening level from The Risk Assessment Information System ecological benchmark tool at http://rais.ornl.gov/tools/eco_search.php

AUF for DU-1, DU-2 and DU-3 together

Attachment C
Table C-5a
Decision Unit Hazard Quotient and Hazard Index Calculation
Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

AREA 1 DU-1 + DU-2 + DU-3		
Soil		**Lead**
Sample Date	**Sample Name**	(mg/kg)
07/25/13	DEPO-01-101	400
07/25/13	DEPO-01-102	650
07/25/13	DEPO-01-103	510
07/25/13	DEPO-01-104	470
07/25/13	DEPO-02-105	230
07/25/13	DEPO-02-106	240
07/25/13	DEPO-02-107	120
07/25/13	DEPO-02-108	120
07/25/13	DEPO-03-109	61
07/25/13	DEPO-03-110	64
07/25/13	DEPO-03-111	68
07/25/13	DEPO-03-112	80
Toxicity Reference Value (TRV) (HHRSV - Industrial)		800
Area Use Factor (AUF) (Mammalian)		0.29
Toxicity Reference Value (TRV) (Ecological - Mammalian)		56
Minimum Concentration		61
Maximum Concentration		650
Average Concentration		251
Standard Deviation		206
Number of Detections		12
Exposure Point Concentration*		510
Exposure Dose**		148
Hazard Quotient (HQ) - Human Health		0.64
Hazard Quotient (HQ) - Ecological		2.64

NOTES:
DU-1: Decision unit number one
DU-2: Decision unit number two
DU-3: Decision unit number three
mg/kg: milligrams per kilogram
HHRSV: human health risk screening value
EcoSSL: ecological soil screening level
* Exposure Point Concentration is the 95% Chebyshev UCL concentration.
** Considers area use factor for most sensitive (smallest home range) mammalian species.

Attachment C
Table C-5b
Decision Unit Hazard Quotient and Hazard Index Calculation

Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

AREA 2 DU-2 + DU-3		
Soil		**Lead**
Sample Date	**Sample Name**	(mg/kg)
07/25/13	DEPO-02-105	230
07/25/13	DEPO-02-106	240
07/25/13	DEPO-02-107	120
07/25/13	DEPO-02-108	120
07/25/13	DEPO-03-109	61
07/25/13	DEPO-03-110	64
07/25/13	DEPO-03-111	68
07/25/13	DEPO-03-112	80
Toxicity Reference Value (TRV) (HHRSV - Industrial)		800
Area Use Factor (AUF) (Mammalian)		0.25
Toxicity Reference Value (TRV) (Ecological - Mammalian)		56
Minimum Concentration		61
Maximum Concentration		240
Average Concentration		123
Standard Deviation		73
Number of Detections		8
Exposure Point Concentration*		235
Exposure Dose**		59
Hazard Quotient (HQ) - Human Health		0.29
Hazard Quotient (HQ) - Ecological		1.05

NOTES:
DU-2: Decision unit number two
DU-3: Decision unit number three
mg/kg: milligrams per kilogram
HHRSV: human health risk screening value
EcoSSL: ecological soil screening level
* Exposure Point Concentration is the 95% Chebyshev UCL concentration.
** Considers area use factor for most sensitive (smallest home range) mammalian species.

Attachment C
Table C-5c
Decision Unit Hazard Quotient and Hazard Index Calculation

Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

AREA 3 DU-3		
Soil		**Lead**
Sample Date	**Sample Name**	(mg/kg)
07/25/13	DEPO-03-109	61
07/25/13	DEPO-03-110	64
07/25/13	DEPO-03-111	68
07/25/13	DEPO-03-112	80
Toxicity Reference Value (TRV) (HHRSV - Industrial)		800
Area Use Factor (AUF) (Mammalian)		0.14
Toxicity Reference Value (TRV) (Ecological - Mammalian)		56
Minimum Concentration		61
Maximum Concentration		80
Average Concentration		68
Standard Deviation		8
Number of Detections		4
Exposure Point Concentration*		86
Exposure Dose**		12
Hazard Quotient (HQ) - Human Health		0.11
Hazard Quotient (HQ) - Ecological		0.22

NOTES:
DU-3: Decision unit number three
mg/kg: milligrams per kilogram
HHRSV: human health risk screening value
EcoSSL: ecological soil screening level
* Exposure Point Concentration is the 95% Chebyshev UCL concentration.
** Considers area use factor for most sensitive (smallest home range) mammalian species.

Attachment C
Table C-6
Area Use Factor Calculations
Engineering Evaluation/Cost Analysis Report
Devils Postpile National Monument

Zone ID	Distance from Tank Footing (ft)	Radius (ft)	Dia (ft)	Perimeter (ft)	Area (ft^2)	Area (ac)	Avian		Mammalian	
							Home Range (ac)	AUF	Home Range (ac)	AUF
Tank	0	17	34	107	908	0.02	NA			
DU-1	5	22	44	138	613	0.01	2.00	0.01	0.37	0.04
DU-2	15	32	64	201	1,696	0.04	2.00	0.02	0.37	0.11
DU-3	25	42	84	264	2,325	0.05	2.00	0.03	0.37	0.14
					4,634	**0.11**	2.00	**0.05**	0.37	**0.29**

Notes:
Dia: diameter
AUF: area use factor
NA: not applicable
ft = feet
ft^2 = square feet
ac = acre
in = inch
ft^3= cubic feet
yd^3 = cubic yard

Attachment D

Cost Estimates

U.S. Department of Interior
National Park Service
Devils Postpile National Monument
Engineering Evaluation/Cost Analysis

D-1 - COST ESTIMATE SUMMARY

Devils Postpile National Monument
Location: Madera County, CA
Phase: EE/CA (-30% / +50%)
Base Year: 2013
CAPITAL COSTS:

Site	Design Alternatives								
	Alt 1 No Action	Alt 2 Engineering/ Institutional Controls			Alt 3 Consolidation and Capping/ Institutional Controls			Alt 4 Excavation/ Off-Site Disposal		
		Cost		Cross-reference	Cost		Cross-reference	Cost		Cross-reference
Potable Water Tank	$0	-30%	$149,470	D-2	-30%	$415,762	D-3	-30%	$96,528	D-4
			$213,528			$593,946			$137,897	
		+50%	$320,293		+50%	$890,918		+50%	$206,846	

Notes:
Rough cost estimate and minus 30% and plus 50% range.
Estimated costs include capital costs and annual recurring costs.

U.S. Department of Interior
National Park Service
Devils Postpile National Monument
Engineering Evaluation/Cost Analysis

D-2 - COST ESTIMATE SUMMARY

Site: DEPO
Location: Potable Water Tank
Phase: EE/CA (-30% / +50%)
Base Year: 2013

Description: Alternative 2 consists of constructing institutional controls. Institutional controls consist of installing fence and signs.

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Documentation and Design					
Work Plan/HASP	1	LS	$35,000	$35,000	
Reporting	1	LS	$5,000	$5,000	
DOCUMENTATION/DESIGN SUBTOTAL:				**$40,000**	
Mobilization/Demobilization					
Equipment	2	WK	$1,000	$2,000	
Personnel	2	WK	$1,000	$2,000	Local recruitment
MOB/DEMOB SUBTOTAL:				**$4,000**	
Production (rates include labor, equipment, material, time)					
PPE (Level D)	20	DAY	$20	$400	
Road Improvements (minor)	400	FT	$25	$10,000	Minor road upgrades include minor grading and watering to compact surface for vehicle access
Construct perimeter fence barrier	200	LF	$45	$9,000	cost for material and installation
Install Signage	5	EA	$100	$500	
Contractor Oversight	10	Day	$1,500	$15,000	
PRODUCTION SUBTOTAL:				**$34,900**	
SUBTOTAL:				**$78,900**	
Project Management			20%	$15,780	15% of Capital Costs
Prime Contractor Overhead			10%	$9,468	
Bonding			2%	$1,578	
TOTAL CAPITAL COSTS:				**$105,726**	
Annual Recurring Costs					
Reporting	1	Year	$5,000	$5,000	Annual Report
Incidental repairs	1	Year	$500	$500	
Total Annual Recurring Costs				**$5,500**	

Site: DEPO
Location: Potable Water Tank
Phase: EE/CA (-30% / +50%)
Base Year: 2013

Description: Alternative 2 consists of constructing institutional controls. Institutional controls consist of installing fence and signs.

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	INTEREST Rate (3%)	PRESENT VALUE
Capital Cost	0	$105,726	0%	$105,726
Annual Recurring Costs	30	$5,500	3.0%	$107,802
TOTAL PRESENT VALUE OF ALTERNATIVE NO. 2				**$213,528**

	CURRENT VALUE	- 30% Value	+ 50% Value
EE/CA (-30% / +50%) value	**$213,528**	**$149,470**	**$320,293**

U.S. Department of Interior
National Park Service
Devils Postpile National Monument
Engineering Evaluation/Cost Analysis

D-3 - COST ESTIMATE SUMMARY

Site: DEPO
Location: Potable Water Tank
Phase: EE/CA (-30% / +50%)
Base Year: 2013

Description: Alternative 3 consists of creating an on-site repository. Soil will be excavated, transported and consolidated to a single onsite repository.

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Documentation and Design					
Site Survey	2	LS	$3,500	$7,000	
Project Design	1	LS	$100,000	$100,000	Includes initial Ecological Survey and laboratory analysis
Work Plan/HASP	1	LS	$35,000	$35,000	
	1	LS	$15,000	$15,000	
DOCUMENTATION/DESIGN SUBTOTAL:				**$157,000**	
Mobilization/Demobilization					
Equipment	4.0	WK	$1,000	$4,000	Excavators, loaders
Personnel	4.0	WK	$2,500	$10,000	Local recruitment, set up temporary lodging
MOB/DEMOB SUBTOTAL:				**$14,000**	
Repository Production (rates include labor, equipment, material, time)					
PPE (Level D)	20	DAY	$20	$400	
Road Improvement	1000	FT	$25	$25,000	Minor road upgrades include minor grading and watering to compact surface for vehicle access
Excavate and transport to onsite repository	30	CY	$25	$750	5ft tall with 3:1 max side slopes
Import Fill	42	CY	$50	$2,100	2 ft. over cap
Riprap	26	CY	$100	$2,600	1 ft. over cap fill
Laboratory/Compaction testing	1	LS	$500	$500	
Monitoring Well Installation	4	EACH	$4,500	$18,000	
BMP's	1	LS	$5,000	$5,000	
Repository Survey and As-Built	3	LS	$3,500	$10,500	
Contractor Oversight	20	DAY	$1,500	$30,000	
PRODUCTION SUBTOTAL:				**$94,850**	
SUBTOTAL CAPITAL COSTS:				**$265,850**	

SUBTOTAL:		
Project Management	20%	$53,170.00
Prime Contractor Overhead	10%	$31,902
Profit	10%	$31,902
Bonding	2%	$5,317
TOTAL CAPITAL COSTS:		**$388,141**

D-3 - COST ESTIMATE SUMMARY

Site:	DEPO	**Description:** Alternative 3 consists of creating an on-site repository. Soil will be excavated, transported and consolidated to a single onsite repository.				
Location:	Potable Water Tank					
Phase:	EE/CA (-30% / +50%)					
Base Year:	2013					
Annual Recurring Costs						
OM&M		1	Year	$10,000	$10,000	(5) 8hr days of technician inspection, biological sampling and Laboratory Analysis
Incidental repairs		1	Year	$500	$500	
Total Recuring Costs					**$10,500**	

PRESENT VALUE ANALYSIS:				
COST TYPE	**YEAR**	**TOTAL COST**	**Interest Rate (3%)**	**PRESENT VALUE**
Capital Cost	0	$388,141	0%	$388,141
Annual Recurring Costs	30	$10,500	3.0%	$205,805
TOTAL PRESENT VALUE OF ALTERNATIVE NO. 3				**$593,946**

	CURRENT	**- 30% Value**	**+ 50% Value**
EE/CA (-30% / +50%) value	**$593,946**	**$415,762**	**$890,918**

Site: DEPO
Location: Potable Water Tank
Phase: EE/CA (-30% / +50%)
Base Year: 2013

Description: Alternative 4 consists of excavation of lead impacted soil, transportation and disposal at off-site landfill.

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Documentation					
Work Plan/HASP	1	LS	$35,000	$35,000	
Post construction submittals	1	LS	$15,000	$15,000	
DOCUMENTATION SUBTOTAL:				**$50,000**	
Mobilization/Demobilization					
Equipment	2	WK	$1,000	$2,000	
Personnel	2	WK	$2,500	$5,000	Local recruitment, set up temporary lodging
SUBTOTAL:				**$7,000**	
Production (rates include labor, equipment, material, time)					
PPE (Level D)	10	DAY	$20	$200	
Road Improvement	400	FEET	$25	$10,000	Includes improvement for off-site haul trucks
Excavation, transport and disposal of non-hazardous waste (Class III)	45	TON	$150	$6,750	CY:assumes 1.5 tons per cubic yard of soil (landfill disposal per ton)
Regrade for	0.05	ACRE	$10,000	$500	
BMP's	1	LS	$5,000	$5,000	
Contractor	10	DAY	$1,500	$15,000	
PRODUCTION SUBTOTAL:				**$37.450**	
SUBTOTAL:				**$94,450**	
Project Management			20%	$18,890	20% of Capital Costs
Prime Contractor Overhead			10%	$11,334	
Profit			10%	$11,334	
Bonding			2%	$1,889	
TOTAL CAPITAL COSTS:				**$137,897**	

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	INTEREST RATE (3%)	PRESENT VALUE
Capital Cost	0	$137,897	1.0	$137,897
TOTAL PRESENT VALUE OF ALTERNATIVE NO. 4				**$137,897**

	CURRENT VALUE	- 30% Value	+ 50% Value
EE/CA (-30% / +50%) value	**$137,897**	**$96,528**	**$206,846**