

**FINAL  
ENGINEERING EVALUATION/COST ANALYSIS**

**Stehekin and Newhalem Firing Ranges  
North Cascades National Park Complex  
Stehekin and Newhalem, Washington**

**P13PD01436**

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# Contents

<b>1.0</b>	<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>2.0</b>	<b>SITE CHARACTERIZATION .....</b>	<b>2</b>
2.1	SITE DESCRIPTION AND BACKGROUND INFORMATION .....	2
2.2	PREVIOUS INVESTIGATIONS AND SITE ACTIVITIES .....	3
2.3	SOURCE, NATURE AND EXTENT OF CONTAMINATION .....	3
2.3.1	<i>Multi Increment Sampling and Decision Units</i> .....	4
2.3.2	<i>Stehekin Soil Sampling Results</i> .....	4
2.3.3	<i>Newhalem Soil Sampling Results</i> .....	5
2.3.4	<i>Data Validation</i> .....	6
2.4	PRELIMINARY REMEDIAL GOALS .....	6
2.5	STREAMLINED RISK EVALUATION .....	7
2.5.1	<i>Human Health Risk Evaluation</i> .....	7
2.5.2	<i>Ecological Risk Evaluation</i> .....	8
<b>3.0</b>	<b>IDENTIFICATION OF REMOVAL ACTION OBJECTIVES .....</b>	<b>8</b>
3.1	STATUTORY LIMITS ON REMOVAL ACTIONS .....	9
3.2	SCOPE OF THE REMOVAL FOR THE SITES .....	9
3.3	POTENTIAL SCHEDULES FOR THE REMOVAL AT THE SITE .....	9
3.4	PLANNED REMOVAL/REMEDIAL ACTIVITIES .....	9
3.5	REMOVAL ACTION OBJECTIVES .....	9
3.6	APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS .....	10
3.6.1	<i>Contaminant-Specific, Location-Specific and Action Specific Requirements</i> .....	10
3.6.2	<i>Definitions of “Applicable” and “Relevant and Appropriate”</i> .....	11
3.7	SUMMARY OF POTENTIAL ARARS .....	11
<b>4.0</b>	<b>IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES .....</b>	<b>11</b>
4.1	EVALUATION CRITERIA .....	12
4.2	STEHKIN .....	12
4.2.1	<i>Stehekin Alternative 1 – No Action</i> .....	13
4.2.2	<i>Stehekin Alternative 2 – Onsite Treatment and Soil Cover</i> .....	13
4.2.3	<i>Stehekin Alternative 3 – Full Removal, On-site Treatment and Off-Site Disposal at an Appropriate Facility</i> .....	14
4.2.4	<i>Stehekin Alternative 4 – Full Removal and Off-Site Disposal at an Appropriate Facility</i> .....	15
4.3	NEWHALEM .....	16
4.3.1	<i>Newhalem Alternative 1 – No Action</i> .....	16
4.3.2	<i>Newhalem Alternative 2 – Institutional Controls</i> .....	17
4.3.3	<i>Newhalem Alternative 3 – Full Removal, On-site Treatment and Off-Site Disposal at an Appropriate Facility</i> .....	18
4.3.4	<i>Newhalem Alternative 4 – Full Removal and Offsite Disposal at an Appropriate Disposal Facility</i> .....	19
<b>5.0</b>	<b>COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES .....</b>	<b>19</b>
<b>5.1</b>	<b>EFFECTIVENESS CRITERIA .....</b>	<b>20</b>
5.1.1	<i>Stehekin</i> .....	20
5.1.2	<i>Newhalem</i> .....	20

5.2	IMPLEMENTABILITY CRITERIA.....	21
5.2.1	<i>Stehekin</i> .....	21
5.2.2	<i>Newhalem</i> .....	21
<b>5.3</b>	<b>COSTS CRITERIA</b> .....	<b>22</b>
5.3.1	<i>Stehekin</i> .....	22
5.3.2	<i>Newhalem</i> .....	22
<b>5.4</b>	<b>COMPARISONS</b> .....	<b>22</b>
5.4.1	<i>Stehekin</i> .....	22
5.4.2	<i>Newhalem</i> .....	23
<b>6.0</b>	<b>RECOMMENDED REMOVAL ACTION ALTERNATIVES</b> .....	<b>23</b>
6.1	STEHEKIN .....	23
6.2	NEWHALEM.....	24
<b>7.0</b>	<b>REFERENCES</b> .....	<b>24</b>

**FIGURES**

- Figure 1-1 Stehekin Site Location Map
- Figure 1-2 Newhalem Site Location Map
- Figure 2-1 Stehekin Decision Unit Map
- Figure 2-2 Newhalem Decision Unit Map

**Tables**

- Table 2-1 Site Characterization Soil Sampling Results
- Table 2-2 Site Characterization Decision Unit Physical Descriptions
- Table 2-3 Quality Assurance Sample Results
- Table 3-1 Applicable or Relevant and Appropriate Requirements (ARARs)
- Table 4-1 Stehekin Alternative 2 Costs
- Table 4-2 Stehekin Alternative 3 Costs
- Table 4-3 Stehekin Alternative 4 Costs
- Table 4-4 Newhalem Alternative 2 Costs
- Table 4-5 Newhalem Alternative 3 Costs
- Table 4-6 Newhalem Alternative 4 Costs
- Table 5-1 Stehekin Comparison of Alternatives
- Table 5-2 Newhalem Comparison of Alternatives

**APPENDICES**

- Appendix A Analytical Laboratory Reports
- Appendix B Data Validation Report

## 1.0 EXECUTIVE SUMMARY

This Engineering Evaluation/Cost Analysis (EE/CA) has been prepared by Resource Environmental Management Consultants, Inc. (RMC) to address lead contamination at two firing ranges located in North Cascades National Park Complex (NOCA, Sites):

- Stehekin; and
- Newhalem.

This EE/CA provides supporting documentation for a non-time critical removal action (NTCRA) at the Sites. The EE/CA is being conducted in accordance with Guidance on Conducting Non-Time Critical Removal Actions under CERCLA (EPA, 1993).

The EE/CA is a streamlined focused document that provides site characterization data, assesses ecological and human health risks, evaluates various response alternatives, recommends a preferred response alternative and provides a vehicle for public involvement. This EE/CA was conducted in accordance with the NOCA-approved EE/CA Work Plan (RMC, 2013a).

Site Location Maps for Stehekin and Newhalem are presented in Figures 1-1 and 1-2, respectively.

The sole environmental threat at the Sites is limited to non-industrial lead-impacted soils from use of the Sites as firing ranges. One source of contamination has been identified in the EE/CA:

- Lead in soil.

One Remedial Action Objective (RAO) has been established for the Sites:

- Eliminate the potential for lead impacts to human health and the environment.

The EE/CA analyzed the following removal action alternatives for each Site:

### **Stehekin**

- Alternative 1 – No Action;
- Alternative 2 – On-Site Treatment and Soil Cover;
- Alternative 3 – Full Removal, On-Site Treatment and Off-Site Disposal at an Appropriate Facility; and
- Alternative 4 – Full Removal and Off-Site Disposal at an Appropriate Facility.

Alternative 3 is recommended as the preferred Removal Action Alternative. Alternative 3 consists of excavation of all soils exceeding the Preliminary Remedial Goal (PRG), on-site treatment to ensure that excavated soils meet non-hazardous requirements as determined by the Toxicity Characteristic Leaching Procedure, and off-site disposal.

## **Newhalem**

- Alternative 1 – No Action;
- Alternative 2 – Institutional Controls;
- Alternative 3 – Full Removal, On-Site Treatment and Off-Site Disposal at an Appropriate Facility; and
- Alternative 4 – Full Removal and Offsite Disposal at an Appropriate Disposal Facility.

Alternative 3 is recommended as the preferred Removal Action Alternative. Alternative 3 consists of excavation of all soils exceeding the Preliminary Remedial Goal (PRG), on-site treatment of berm soils to ensure that all excavated soils meet non-hazardous requirements as determined by the Toxicity Characteristic Leaching Procedure, and off-site disposal.

## **2.0 SITE CHARACTERIZATION**

This section describes Site background, characterization of impacts, risk evaluation and the development of Preliminary Remedial Goals (PRGs).

### **2.1 Site Description and Background Information**

The Stehekin Site is located within Lake Chelan National Recreation Area in Chelan County, Washington, in North Cascades National Park Complex. The town of Stehekin lies at the head of Lake Chelan, approximately 55 miles by boat from Chelan, Washington. The area is accessible only by boat, plane, or hiking through extensive wilderness. The firing range is located at the end of a 300-foot access road diverging from the Stehekin Valley Road approximately 7.5 miles from the Stehekin Landing. The firing range is located in a forested area on the extreme lower flank of Rainbow Mountain, adjacent to McGregor Meadows in a former borrow pit. The firing range is about 25 yards in length with four target boards. The target area, backed by a low soil berm to the east and west and located at the foot of a cut bank to the north, is approximately 50 feet wide. The *Superintendent's Compendium Of Designations, Closures, Permit Requirements and Other Restrictions Imposed Under Discretionary Authority* notes that the Stehekin Shooting Range, as described in the 36 CFR 7.62(c), is closed to the discharge of firearms from March 15<sup>th</sup> to June 15<sup>th</sup> for the purpose of protecting the Northern Spotted Owl.

The Newhalem Site is located within Ross Lake National Recreation Area in Whatcom County, Washington, in North Cascades National Park Complex. The firing range is located approximately 2,000 feet northwest of the Skagit River (at river mile 92) to the north of Washington State Route 20 near milepost 119. The firing range was established by Seattle City Light in the 1950s by clearing an opening in a densely forested area of the valley, with a target area approximately 75 feet wide containing eight target structures and backed by a nine-foot-high soil berm to the north built up against a crib wall of cedar logs. A small galvanized metal shack, which was relocated to the site by Seattle City Light personnel after the site's establishment, is located north of the cedar crib wall and contains bullet holes on all sides. The dirt access road cuts perpendicular to a power line and is closed to the public by a locked and galvanized single-bar gate. Since July 2013, the Newhalem Shooting Range is open only to NPS Law Enforcement personnel and other law enforcement personnel authorized by the Chief Ranger.

## **2.2 Previous Investigations and Site Activities**

There has been one previous investigation conducted at each Site as follows:

- Preliminary Assessment of Two Sites, North Cascades NPS Complex, Stehekin, Washington (Kleinfelder, 2003a).
- Preliminary Assessment of Firing Range, North Cascades NPS Complex, Newhalem, Washington (Kleinfelder, 2003b).

The results of both investigations stated that existing data and information do not indicate a threat to human health, the surrounding environment, or local wildlife (Kleinfelder, 2003a and 2003b). No data was collected at the firing ranges.

## **2.3 Source, Nature and Extent of Contamination**

This section presents the results of site characterization activities conducted as part of this EE/CA. All site activities and data analysis were conducted in accordance with the Sampling and Analysis Plan (SAP, RMC, 2013b).

Soil concentrations are compared to State of Washington Model Toxics Control Act (MTCA, 173-340 WAC) Method A regulatory cleanup levels which are summarized as follows:

- Human Health – Unrestricted use: 250 parts per million (ppm)
- Ecological Health – Plants: 50 ppm
- Ecological Health – Soil Biota: 500 ppm
- Ecological Health – Wildlife: 118 ppm

Health risk criteria details are presented in Section 2.5.

### **2.3.1 Multi Increment Sampling and Decision Units**

Site characterization utilized Multi Increment (MI) sampling. MI sampling is based on dividing the project area into a series of Decision Units (DU). A DU is the area and depth of soil (the sampled population) to be characterized by the average concentration of the MI sample. DUs are restricted to actual source zones and must incorporate only areas that are similar as far as background characteristics or impacts as to not dilute contamination.

A DU is a specific area (or volume of soil) about which a decision is to be made. The critical concern is that the entire area of a DU is consistent as far as contamination distribution and future use/exposure scenarios. The sample from each DU consisted of a 0 to 2-inch soil depth increment at thirty locations throughout the DU.

Stehekin sample DU locations are presented in Figure 2-1. Newhalem sample DU locations are presented in Figure 2-2. Site characterization sample results are presented in Table 2-1. DU dimensions are presented in Table 2-2.

Quality Assurance/Quality Control (QA/QC) sampling at each Site consisted of the collection of the following samples:

One DU at each Site was selected for triplicate sampling. Two additional replicate samples were collected from this DU. Subsamples for each triplicate sample were collected by following a unique sample collection path/grid that did not overlap with subset samples collected from either of the other two replicate samples. One QA/QC duplicate sample was selected for each Site by the analytical laboratory. Typically, this is done in the field and submitted “blind” to the laboratory. However, MI samples are processed at the laboratory. The laboratory was instructed to randomly select a post-processed sample for this analysis. QA/QC sample results are presented in Table 2-3.

### **2.3.2 Stehekin Soil Sampling Results**

Stehekin sample DU locations are presented in Figure 2-1. Site characterization sample results are presented in Table 2-1. Stehekin DU dimensions are presented in Table 2-2.

Samples were collected from four DUs. One DU was delineated specifically for the collection of a background sample (DU Background). This background DU was located outside of the range area. The three remaining DUs were delineated on and near the firing range. Descriptions of each DU are presented in Table 2-2.

Lead concentrations at the Stehekin firing range ranged from 10 to 427 ppm. The sample collected for background purposes contained a lead concentration of 10 ppm. These results are comparable to the 90th percentile background concentration of 10.9 ppm as per Table 13 of WaDOE publication #94-115 (WaDOE, 1994). One DU (DU 2) contained lead concentrations above MTCA unrestricted (e.g. residential) land use concentration of 250 ppm. DU 1 and DU 2 contained lead concentrations greater than MTCA ecological soil screening criteria for plants of 50 ppm. One DU (DU 2) contained lead concentrations greater than MTCA ecological wildlife screening criteria of 118 ppm. All three DUs contained lead concentrations below MTCA ecological soil biota screening criteria of 500 ppm.

The triplicate set of samples collected from DU 2 (area behind berm) contained a range of 320 to 427 ppm lead, with a mean of 365.7 ppm and a standard deviation of 45.1 ppm. The laboratory duplicate split sample was taken from the DU 2 sample and contained 285 ppm lead. The range of lead concentrations in the triplicate samples and laboratory duplicate split sample is typical and likely due to the heterogeneous nature of soil samples with dispersed bullet fragments.

### **2.3.3 Newhalem Soil Sampling Results**

Newhalem sample DU locations are presented in Figure 2-2. Site characterization sample results are presented in Table 2-1. Newhalem DU dimensions are presented in Table 2-2.

Samples were collected from five DUs. One DU (DU Background) was delineated specifically for the collection of a background sample. This background DU was located outside of the range area. The four remaining DUs were delineated on and near the firing range. Descriptions of each DU are presented in Table 2-2.

Lead concentrations at the Newhalem firing range ranged from 136 to 2,730 ppm. The sample collected for background purposes contained a lead concentration of 9 ppm. These results are below the background 90th percentile concentration of 11 ppm as per Table 13 of WaDOE publication #94-115 (WaDOE, 1994). Two DUs (DU 2 and DU 3) contained lead concentrations above MTCA unrestricted (e.g. residential) land use concentration of 250 ppm. All four DUs contained lead concentrations greater than MTCA ecological soil screening criteria for plants of 50 ppm. All four DUs outside of the background area contained lead concentrations greater than MTCA ecological wildlife screening criteria of 118 ppm. Two DUs (DU 2 and DU 3) contained lead concentrations above MTCA ecological soil biota screening criteria of 500 ppm.

The triplicate set of samples collected from DU 4 (target and meadow area) contained a range of 136 to 181 ppm lead, with a mean of 151.7 ppm and a standard deviation of 20.8 ppm. The laboratory duplicate split sample was taken from the DU 2 sample. The original sample and

laboratory duplicate split sample contained 586 ppm and 575 ppm lead, respectively. The range of lead concentrations in the triplicate samples and laboratory duplicate split sample is typical and likely due to the heterogeneous nature of soil samples with dispersed bullet fragments.

#### **2.3.4 Data Validation**

A Data Validation Report is presented in Appendix B. The results of the Data Validation Review indicate that overall, the analytical data are of good quality and acceptable for use.

#### **2.4 Preliminary Remedial Goals**

Preliminary Remedial Goals (PRGs) are based on acceptable screening levels set by the State of Washington, which are more protective than typical United States Environmental Protection Agency (EPA) values. These levels are general values that have been determined to be protective of human health and the environment as discussed below.

The soil PRG proposed for the Sites, as determined by NOCA, is 50 ppm lead based on the MTCA ecological screening level of 50 ppm lead for plants (WaDOE, 2007). This value is more conservative than any applicable EPA criteria (i.e., 400 ppm for residential land-use). The MTCA ecological screening level of 50 ppm lead for plants can be modified by conducting a site-specific Terrestrial Ecological Evaluation per WAC 173-340-7493.

The likelihood of impacting a threatened or endangered species is low, due to the limited aerial extent of impacts, coupled with human use activities in the vicinity of the Sites. It is unlikely that threatened or endangered species would utilize or be impacted by activities at the Sites. No remediation activities at Stehekin would take place during March 15<sup>th</sup> to June 15<sup>th</sup> to ensure protection of the Northern Spotted Owl. NOCA provided a list of Threatened and Endangered (T&E) species occurring in the park. The T&E list is as follows:

##### **Endangered Species:**

Gray Wolf (*Canus lupus*) Listed as a State Endangered Species

##### **Threatened Species:**

Canada Lynx (*Lynx canadensis*) No State Listing

Grizzly Bear (*Ursus arctos*) Listed as a State Endangered Species

Marbled Murrelet (*Brachyramphus marmoratus marmoratus*) No State Listing

Northern Spotted Owl (*Strix occidentalis caurina*) Listed as a State Endangered Species

Bull Trout (*Salvelinus confluentus*) No State Listing

Puget Sound Chinook Salmon (*Oncorhynchus tshawtscha*) No State Listing

**Candidate Species:**

Fisher (*Martes pennanti*) Listed as a State Endangered Species  
Wolverine (*Gulo gulo luscus*) Listed as a State Candidate Species  
Columbia Spotted Frog (*Rana luteiventris*) Listed as a State Candidate Species

**Species of Concern:**

Bald Eagle (*Haliaeetus leucocephalus*) Listed as a State Sensitive Species  
Peregrine Falcon (*Falco peregrinus*) Listed as a State Sensitive Species

State T&E status was determined using the Washington Department of Fish and Wildlife Conversation Website (<http://wdfw.wa.gov/conservation/endangered/status/SE/>).

Further information on screening levels and how they relate to PRGs are provided in Section 2.3. Compliance with other applicable or relevant and appropriate requirements (ARARs) is addressed in Section 3.6.

**2.5 Streamlined Risk Evaluation**

The streamlined risk evaluation uses sampling data from the site to identify the chemical(s) of concern, provide an estimate of how and to what extent people and the environment might be exposed to the chemical(s), and provide an assessment of effects associated with the chemical(s). This section presents the results of the Human Health Risk Evaluation (HHRE) and the Ecological Risk Evaluation (ERE).

**2.5.1 Human Health Risk Evaluation**

This Streamlined HHRE based human health risk-related criteria for lead on the following:

- State of Washington Model Toxics Control Act (MTCA) soil screening criteria of 250 ppm for unrestricted use (WaDOE, 2007);
- EPA Region 9 Residential Preliminary Remediation Goal (PRG) of 400 ppm (EPA, 2010);
- EPA Region 3 Residential Risk-Based Concentration (RBC) of 400 ppm (EPA, 2010); and
- Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites of 400 ppm (EPA, 2010).

This Streamlined HHRE compared on-Site concentrations of lead in soil to the values described above:

- The maximum lead concentration of 427 ppm for DU 2 at Stehekin exceeded all of the above described screening values. The remaining DUs met the screening criteria described above.
- The maximum lead concentration of 2,730 ppm for DU 3 at Newhalem exceeded all of the above described screening values. DU 2 also exceeded all of the above described screening values. The remaining DUs met the screening criteria described above.

Both Sites contain maximum lead concentrations that exceeded screening values, thus the Sites “fail” and they can go directly into the corrective action process.

### **2.5.2 Ecological Risk Evaluation**

This Streamlined ERE based ecological risk-related criteria for lead on the following:

- Oak Ridge National Laboratory (ORNL) Toxicological Benchmarks for Screening Contaminants of Potential Concern of 500 ppm for earthworms and 900 ppm for soil microorganisms and microbial processes (ORNL, 1997); and
- State of Washington Model Toxics Control Act (MTCA) soil screening criteria (WaDOE, 2007) of 50 ppm for plants, 500 ppm for soil biota and 118 ppm for wildlife.

The Streamlined ERE compared on-Site concentrations of lead in soils to the values described above:

- The maximum lead concentration of 427 ppm at Stehekin exceeded MTCA soil screening criteria (WaDOE, 2007) of 50 ppm for plants and 118 ppm for wildlife.
- The maximum lead concentration of 2,730 ppm at Newhalem exceeded all of the above described screening values.

Both Sites contain maximum lead concentrations that exceeded screening values, thus the Sites “fail” and they can go directly into the corrective action process.

## **3.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES**

At any release where the lead agency determines there is a threat to public health, welfare, or the environment, a removal action may be taken to abate, prevent, minimize, stabilize, mitigate, or eliminate the release. This Section describes the objectives of the Removal Action.

### **3.1 Statutory Limits on Removal Actions**

Authority for responding to releases or threat of releases from an impacted site is addressed in Section 104(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9604(a). CERCLA, Section 104 and Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and 40 C.F.R. § 300.415, specifically address non time-critical removal actions. Section 104(c)(1) of CERCLA generally restricts the timing of removal actions funded with Superfund monies to one year and the cost to \$2 million; however, CERCLA does not impose these limitations on a removal action funded by a federal agency at a federal facility with dedicated monies appropriated to that agency for that purpose apart from Superfund. Therefore, no statutory limits apply to these removal actions.

### **3.2 Scope of the Removal for the Sites**

The scope of the removal actions will be limited to remediation of lead impacts from historic firing range activities to comply with Site PRGs. Activities performed at the Sites will be sufficient to achieve the Removal Action Objective established in Section 3.5.

### **3.3 Potential Schedules for the Removal at the Site**

The schedule for removal activities will be determined by NOCA and will be designed within a reasonable time frame that ensures adequate protection of public health and the environment.

### **3.4 Planned Removal/Remedial Activities**

Planned removal activities at the Sites will consist of tasks to reduce soil lead impacts to concentrations that eliminate impacts to human health and the environment. Planned removal activities may include but are not limited to:

- No action;
- Land use restrictions;
- Excavation of impacted soils;
- Treatment of impacted soils;
- Disposal of impacted soils; and
- Site reclamation.

Potential removal activities are detailed further in Section 4.0.

### **3.5 Removal Action Objectives**

Removal Action Objectives (RAOs) were developed based on the nature and extent of contamination as documented in Section 2.1.

One source of contamination has been identified in the EE/CA:

- Lead in soils.

One RAO has been established for the Sites:

- Eliminate the potential for lead impacts to human health and the environment.

### **3.6 Applicable or Relevant and Appropriate Requirements**

This section presents a summary of applicable or relevant and appropriate requirements (ARARs) for the Site. The National Contingency Plan (NCP) requires that fund-financed removal actions under CERCLA Section 104 and removal actions pursuant to CERCLA Section 106 attain ARARs under Federal environmental, State environmental or facility siting laws "to the extent practicable" considering the urgency of the situation and the scope of the removal action (See 40 C.F.R. Part 300.415(j)).

#### **3.6.1 Contaminant-Specific, Location-Specific and Action Specific Requirements**

Applicable or Relevant and Appropriate Requirements (ARARs) are divided into contaminant-specific, location-specific and action-specific requirements.

Contaminant-specific ARARs govern the release of material containing specific contaminants. In the case of the Stehekin and Newhalem firing ranges, contaminants are limited to lead.

Location-specific ARARs relate to the geographic or physical location of the site, rather than the nature of contaminants. These ARARs place restrictions, such as the concentration of hazardous substances or the conduct of cleanup activities, due to their location in the environment at the site.

Action-specific ARARs are usually technology- or activity-based requirements on actions taken with respect to hazardous substances. A particular remedial activity will trigger an action-specific ARAR. Unlike contaminant- or location-specific ARARs, action-specific ARARs do not determine the remedial alternative to be used, but rather how the selected remedy must be achieved.

The removal alternatives presented in this EE/CA were selected based on a combination of contaminant-specific, location-specific and action-specific ARARs.

### **3.6.2 Definitions of “Applicable” and “Relevant and Appropriate”**

#### **Applicable**

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental, State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by the State in a timely manner and are more stringent than Federal requirements may be applicable.

#### **Relevant and Appropriate**

Relevant and appropriate requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental, State environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

### **3.7 Summary of Potential ARARs**

A detailed list of ARARs applicable to the Site is presented in Table 3-1. These ARARs were developed to encompass all potentially relevant activities conducted on-Site.

## **4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES**

This section presents removal action alternatives proposed to achieve the RAO identified in Section 3.5.

The proposed removal action alternatives for the Stehekin firing range include the following:

- Alternative 1 – No Action;
- Alternative 2 – On-Site Treatment and Soil Cover;

- Alternative 3 – Full Removal, On-Site Treatment and Off-Site Disposal at an Appropriate Facility; and
- Alternative 4 – Full Removal and Off-Site Disposal at an Appropriate Facility.

The proposed removal action alternatives for the Newhalem firing range include the following:

- Alternative 1 – No Action;
- Alternative 2 – Institutional Controls;
- Alternative 3 – Full Removal, On-Site Treatment and Off-Site Disposal at an Appropriate Facility; and
- Alternative 4 – Full Removal and Offsite Disposal at an Appropriate Disposal Facility.

#### **4.1 Evaluation Criteria**

As specified by EPA guidance (USEPA, 1993), each response alternative is evaluated in terms of three criteria: Effectiveness, Implementability and Cost. These three criteria encompass the elements required to meet National Oil and Hazardous Substances Pollution Contingency Plan (NCP) removal criteria. The criteria are described below:

Effectiveness: The effectiveness of a proposed alternative refers to the ability to meet the removal action objective, and to the degree of protectiveness of the environment as well as public and site worker health, both in the short and long term. The RAO for the Sites are:

- Eliminate the potential for lead impacts to human health and the environment.

Effectiveness also includes the degree of compliance with ARARs (Table 3-1).

Implementability: Implementability addresses the technical and administrative feasibility of implementing an alternative. Technical feasibility includes the difficulty of conducting the proposed removal action, including future operations and maintenance requirements. Administrative feasibility includes issues such as statutory limits, permitting, availability of services and disposal sites and the likelihood of public and regulatory acceptance.

Cost: The cost of each proposed alternative includes direct and indirect capital costs as well as operations and maintenance (O&M) costs. There are no costs associated with Alternative 1 for either Site. Estimated costs are presented in Tables 4-1 through 4-6

#### **4.2 Stehekin**

The alternatives for Stehekin are presented in Sections 4.2.1 through 4.2.4 below.

#### 4.2.1 Stehekin Alternative 1 – No Action

Alternative 1 is a baseline alternative by which other alternatives may be compared. No Action involves not taking any further actions to manage environmental concerns at the Site.

**Effectiveness:** The Site would remain as-is. Implementation of the No Action alternative would not achieve the RAO or ARARs.

**Implementability:** The No Action alternative is technically feasible to implement.

**Cost:** As this alternative does not involve taking any actions at the Site, there are no associated costs.

#### 4.2.2 Stehekin Alternative 2 – Onsite Treatment and Soil Cover

Alternative 2 involves the treatment and covering of soils exceeding the PRG. All soils exceeding the PRG would be treated to ensure that they meet non-hazardous requirements based on leachability as determined by the Toxicity Characteristic Leaching Procedure (TCLP), placed back onsite and covered with clean cover soils.

Soils exceeding the PRG would be excavated and stockpiled in an on-site staging area. Following excavation, soils exceeding the PRG would be screened to remove intact bullets and large bullet fragments. Following screening, the soils would be mixed with the common agricultural fertilizer triple superphosphate (TSP). Treatment with TSP would reduce the leachability of remaining lead to levels that would be classified as non-hazardous as determined by TCLP. TSP would be mixed into the stockpiled soil using appropriate earth moving equipment. Confirmation sampling would be conducted to verify that treatment is complete and the soils can be classified as non-hazardous. The treated soils would then be placed back onsite, covered with native soil and revegetated.

Institutional controls such as a deed restriction would be established to control and warn users of hazards that they may encounter while using the Site. Institutional controls would include a set of written agreements for contractors working in impacted areas and deed restrictions. Institutional controls for recreational users would include the posting of lead hazard warnings and “No Trespassing” signs, in addition to identifying the site as closed to the public in the *Superintendent’s Compendium of Designations, Closures, Permit Requirements and Other Restrictions Imposed under Discretionary Authority*.

Treated soils would be classified as a solid waste as per 40 CFR 261.2 and 40 CFR 261.4. Intact bullets and large bullet fragments removed by screening would be transported to an appropriate recycling facility. A minimum of one foot of clean soil would be placed over the treated soils.

Contaminated soil would be handled by workers trained in accordance with 40 CFR 1910.120 (HAZWOPER). A five-year review would be conducted to evaluate the implementation and performance of the remedy in order to determine if the remedy was or would be protective of human health and the environment.

**Effectiveness:** Screening of soils, TSP treatment and placement of cover soil would achieve the RAO but would not achieve all ARARs. This alternative would eliminate risks to human health and would minimize, but not eliminate, risks to the environment.

**Implementability:** Screening of soils, TSP treatment and placement of cover soil is technically feasible to implement with no anticipated difficulties. Institutional controls are technically feasible to implement with no anticipated difficulties. The Site is located on land wholly owned by NOCA; restrictive use covenants are not difficult to prepare for a single federal agency. Site users would be expected to comply with posted closures.

Although technically feasible to implement, implementation of Alternative 2 is restricted by 36 CFR Part 6 – Solid Waste Disposal Sites in Units of The National Park System. Treated soils that would be covered and remain on-Site would be considered solid waste per 40 CFR 261.4(a)(13) and the Site would thus be considered a solid waste disposal site per 36 CFR Part 6. 36 CFR Part 6 prohibits the creation of new solid waste disposal sites within the boundaries of a National Park System unit unless an extensive set of criteria are met (36 CFR Part 6.4). The Site does not meet several of the required criteria and thus treated soils cannot remain on-Site.

**Cost:** Costs for implementation of Alternative 2 are presented in Table 4-1. The estimated total cost for this alternative is \$ 165,556.55.

#### **4.2.3 Stehekin Alternative 3 – Full Removal, On-site Treatment and Off-Site Disposal at an Appropriate Facility**

Alternative 3 involves the treatment and removal of soils exceeding the PRG. All soils exceeding the PRG would be excavated, treated to render them non-hazardous, and transported to an appropriate disposal facility. Confirmation samples would be collected to determine that all soils exceeding the PRG had been removed.

Soils exceeding the PRG would be excavated by a hazardous waste management contractor. Following excavation, soils exceeding the PRG (DU 1 and DU 2 soils) would undergo treatment

on-site by the hazardous waste management contractor to immobilize the lead present to levels that would be classified as non-hazardous as determined by TCLP. DU 2 soils are anticipated to be classified as hazardous waste without treatment due to the presence of large quantities of spent bullets and bullet fragments. Soils from DU 1 are not anticipated to be classified as non-hazardous without treatment, but will be still treated as a precautionary measure due to their small volume (approximately 10% of the total removal volume). Waste characterization samples (TCLP) would be collected from treated soils to confirm that the soils classify as non-hazardous waste prior to offsite shipment. The soils would then be loaded into containers for transport to an appropriate offsite disposal facility. Soils would be classified as a solid waste as per 40 CFR 261.2. Following remediation, the Site would be revegetated.

Contaminated soil would be handled by workers trained in accordance with 40 CFR 1910.120 (HAZWOPER).

**Effectiveness:** Soil treatment and off-site disposal at an appropriate facility would achieve the RAO and all ARARs. This alternative would eliminate risks to human health and the environment.

**Implementability:** Soil treatment and off-site disposal is technically feasible to implement, but with significant anticipated difficulties due to the remoteness of the Site. Barging is the only available transport option for large equipment and soil transport containers. Transporting soil transport containers and large equipment to and from the Site will require a minimum of five 110-mile round-trip barge trips over a period of several weeks.

**Cost:** Costs for implementation of Alternative 3 are presented in Table 4-2. The estimated total cost for this alternative is \$ 1,012,439.35.

#### **4.2.4 Stehekin Alternative 4 – Full Removal and Off-Site Disposal at an Appropriate Facility**

Alternative 4 involves the removal of soils exceeding the PRG. All soils exceeding the PRG would be excavated and transported to an appropriate disposal facility. Confirmation samples would be collected to determine that all soils exceeding the PRG had been removed.

Soils exceeding the PRG would be excavated by a hazardous waste management contractor and loaded into containers for transport to an appropriate offsite disposal facility. Waste characterization samples would be collected to determine if the soils classify as hazardous or non-hazardous waste (as determined by TCLP). DU 2 soils are anticipated to be classified as hazardous waste due to the presence of large quantities of spent bullets and bullet fragments. DU 1 soils are anticipated to be classified as non-hazardous waste. Soils deemed hazardous

would be transported to an offsite hazardous waste disposal facility. All hazardous soils removed from the Site would be regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle C, which establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal (i.e., from “cradle to grave”). Any soils determined to be non-hazardous would be transported to an appropriate offsite waste disposal facility for disposal as a solid waste as per 40 CFR 261.2. Following remediation, the Site would be revegetated.

Contaminated soil would be handled by workers trained in accordance with 40 CFR 1910.120 (HAZWOPER).

**Effectiveness:** Full removal and off-site disposal would achieve the RAO and all ARARs. This alternative would eliminate risks to human health and the environment.

**Implementability:** Full removal and off-site disposal is technically feasible to implement, but with significant anticipated difficulties due to the remoteness of the Site. Barging is the only available transport option for large equipment and soil transport containers. Transporting soil transport containers and large equipment to and from the Site will require a minimum of five 110-mile round-trip barge trips over a period of several weeks.

**Cost:** Costs for implementation of Alternative 4 are presented in Table 4-3. The estimated total cost for this alternative is \$ 1,159,571.35.

### 4.3 Newhalem

The alternatives for Newhalem are presented in Sections 4.3.1 through 4.3.4 below.

#### 4.3.1 Newhalem Alternative 1 – No Action

Alternative 1 is a baseline alternative by which other alternatives may be compared. No Action involves not taking any further actions to manage environmental concerns at the Site.

**Effectiveness:** The Site would remain as is. Implementation of the No Action alternative would not achieve the RAO or ARARs.

**Implementability:** The No Action alternative is technically feasible to implement.

Continued operation may require an Operating Plan in compliance with EPA Best Management Practices (USEPA, 2005), which is outside the scope of this EE/CA.

**Cost:** As this alternative does not involve taking any actions at the Site, there are no associated costs.

#### **4.3.2 Newhalem Alternative 2 – Institutional Controls**

Alternative 2 involves implementing institutional controls to control and warn users of hazards that they may encounter while using the Site. Institutional controls would include a set of written agreements for contractors working in impacted areas and deed restrictions. Institutional controls for recreational users would include the posting of lead hazard warning and “No Trespassing” signs, in addition to identifying the site as closed to the public in the *Superintendent’s Compendium of Designations, Closures, Permit Requirements and Other Restrictions Imposed under Discretionary Authority*. In the event that construction is considered at the Site, construction workers would be trained in proper health and safety protocols as well as construction Best Management Practices (BMPs). Deed restrictions would stay with the land as long as lead-impacted soils remain on-Site. A five-year review would be conducted to evaluate the implementation and performance of the remedy in order to determine if the remedy was or would be protective of human health and the environment.

**Effectiveness:** Implementation of institutional controls would not achieve the RAO or all ARARs. This alternative would only achieve protection of human health and would not provide protection of the environment. The potential for human exposure to metals would be reduced given the assumption that recreational users obeyed posted closures and regulations. Construction worker exposure, although unlikely, would be limited by following health and safety protocols. Risks to the environment would be unabated with this alternative.

**Implementability:** Institutional controls are technically feasible to implement with no anticipated difficulties. The Site is located on land wholly owned by NOCA; restrictive use covenants are not difficult to prepare for a single federal agency. Site users would be expected to comply with posted closures. A five-year review program would be conducted to evaluate the implementation and performance of the remedy in order to determine if the remedy was or would be protective of human health and the environment.

Continued operation may require an Operating Plan in compliance with EPA Best Management Practices (USEPA, 2005), which is outside the scope of this EE/CA.

**Cost:** Costs for implementation of Alternative 2 are presented in Table 4-4. The estimated total cost for this alternative is \$ 67,112.00.

### **4.3.3 Newhalem Alternative 3 – Full Removal, On-site Treatment and Off-Site Disposal at an Appropriate Facility**

Alternative 3 involves the removal of soils exceeding the PRG and treatment of soils anticipated to be classified as hazardous waste. All soils exceeding the PRG would be excavated, soils anticipated to be classified as hazardous waste would be treated to render them non-hazardous, and all soils would then be transported to an appropriate disposal facility. Confirmation samples would be collected to determine that all soils exceeding the PRG had been removed.

Soils exceeding the PRG would be excavated by a hazardous waste management contractor. Following excavation, soils anticipated to be classified as hazardous waste as determined by TCLP (DU 3 soils) would undergo treatment on-site by the waste management contractor to immobilize the lead present to levels that would be classified as non-hazardous as determined by TCLP. DU 3 soils are anticipated to be classified as hazardous waste without treatment due to the presence of large quantities of spent bullets and bullet fragments. Soils from DU 1, DU 2 and DU 4 are not anticipated to be classified as hazardous and would not be treated initially. Waste characterization samples (TCLP) would be collected from treated (DU 3) and untreated (DU 1, DU 2 and DU 4) soils to confirm that the soils classify as non-hazardous waste prior to offsite shipment. In the unlikely event that soils from DU 1, DU 2 and/or DU 4 fail TCLP, soils failing TCLP would be treated as necessary and re-characterized. The soils would then be loaded into containers for transport to an appropriate offsite disposal facility. Soils would be classified as a solid waste as per 40 CFR 261.2. Following remediation, the Site would be revegetated.

Contaminated soil would be handled by workers trained in accordance with 40 CFR 1910.120 (HAZWOPER).

**Effectiveness:** Excavation, soil treatment and off-site disposal at an appropriate facility would achieve the RAO and all ARARs. This alternative would eliminate risks to human health and the environment.

**Implementability:** Excavation, soil treatment and off-site disposal is technically feasible to implement with no anticipated difficulties.

**Cost:** Costs for Alternative 3 are presented in Table 4-5. The estimated total cost for this alternative is \$ 755,345.50.

#### **4.3.4 Newhalem Alternative 4 – Full Removal and Offsite Disposal at an Appropriate Disposal Facility**

Alternative 4 involves the removal of soils exceeding the PRG. All soils exceeding the PRG would be excavated and transported to an appropriate disposal facility. Confirmation samples would be collected to determine that all soils exceeding the PRG had been removed.

Soils exceeding the PRG would be excavated by a hazardous waste management contractor and loaded into containers for transport to an appropriate offsite disposal facility. Waste characterization samples would be collected to determine if the soils classify as hazardous or non-hazardous waste (as determined by TCLP). DU 3 soils are anticipated to be classified as hazardous waste due to the presence of large quantities of spent bullets and bullet fragments. Soils from DU 1, DU 2 and DU 4 would likely be classified as non-hazardous. Soils deemed hazardous would be transported to an offsite hazardous waste disposal facility. All hazardous soils removed from the Site would be regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle C, which establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal (i.e., from “cradle to grave”). Any soils determined to be non-hazardous would be transported to an appropriate offsite waste disposal facility for disposal as a solid waste as per 40 CFR 261.2. Following remediation, the Site would be revegetated.

Contaminated soil would be handled by workers trained in accordance with 40 CFR 1910.120 (HAZWOPER).

**Effectiveness:** Full removal and off-site disposal would achieve the RAO and all ARARs. This alternative would eliminate risks to human health and the environment.

**Implementability:** Full removal and off-site disposal is technically feasible to implement with no anticipated difficulties.

**Cost:** Costs for implementation of Alternative 4 are presented in Table 4-6. The estimated total cost for this alternative is \$ 799,477.50.

## **5.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES**

This section provides a comparative analysis of the proposed removal action alternatives for each Site as discussed in Section 4. The ability of each proposed removal action alternative to meet the criteria of effectiveness, implementability and cost is compared. The purpose of this comparison is to identify advantages and disadvantages of each alternative relative to each other so that key tradeoffs can be identified. Table 5-1 presents a comparison of the four proposed

alternatives for Stehekin and Table 5-2 presents a comparison of the four proposed alternatives for Newhalem.

## **5.1 Effectiveness Criteria**

Each of the alternatives was comparatively analyzed to determine which alternative(s) are the most effective in obtaining compliance with the RAO and ARARs.

The RAO is:

- Eliminate the potential for lead impacts to human health and the environment.

### **5.1.1 Stehekin**

Alternative 1 (No Action): This alternative would not be consistent with the RAO or ARARs.

Alternative 2 (Onsite Treatment and Soil Cover): This alternative only partially achieves the RAO and does not achieve all ARARs. Institutional controls would have to remain in place for the life of the Site.

Alternative 3 (Full Removal, On-site Treatment and Off-Site Disposal at an Appropriate Facility) and Alternative 4 (Full Removal and Offsite Disposal at an Appropriate Disposal Facility): Both alternatives provide the same level of additional exposure reduction compared to Alternative 2 (all material would be removed from the park) and therefore would be effective at meeting the RAO and ARARs. The difference between Alternatives 3 and 4 is related to the handling and final disposal of soils exceeding the PRG. Alternative 3 involves treating the soils prior to disposal to ensure that all soils classify as non-hazardous based on TCLP testing. Non-hazardous treated soils would be disposed of as solid waste per 40 CFR 261.2. Alternative 4 involves removal of soils without prior treatment. DU 2 soils would be disposed of as hazardous waste and DU 1 soils would be disposed on as non-hazardous waste. No long-term institutional controls would be required.

### **5.1.2 Newhalem**

Alternative 1 (No Action): This alternative would not be consistent with the RAO or ARARs.

Alternative 2 (Institutional Controls): This alternative only partially achieves the RAO and does not achieve all ARARs. Institutional controls would have to remain in place for the life of the Site.

Alternative 3 (Full Removal, On-site Treatment and Off-Site Disposal at an Appropriate Facility) and Alternative 4 (Full Removal and Offsite Disposal at an Appropriate Disposal Facility): Both alternatives provide the same level of additional exposure reduction compared to Alternative 2 (all material would be removed from the park) and therefore would be effective at meeting the RAO and ARARs. The difference between Alternatives 3 and 4 is related to the handling and final disposal of soils exceeding the PRG. Alternative 3 involves treating the DU 3 soils prior to disposal to ensure that all soils classify as non-hazardous based on TCLP testing. Treated soils would be disposed of as solid waste per 40 CFR 261.2. Alternative 4 involves removal of soils without prior treatment. DU 3 soils would be disposed of as hazardous waste and DU 1, DU 2 and DU 4 soils would be disposed on as non-hazardous waste. No long-term institutional controls would be required.

## **5.2 Implementability Criteria**

### **5.2.1 Stehekin**

Technical Feasibility: All of the alternatives are technically feasible to implement, with varying degrees of difficulty. All of the alternatives use well-established methods and protocols. The difficulty of implementation increases from Alternative 1 to 3. Alternative 4 is less difficult to implement than Alternative 3 but substantially more difficult than Alternative 2.

Although technically feasible to implement, implementation of Alternative 2 is restricted by 36 CFR Part 6 – Solid Waste Disposal Sites in Units of The National Park System. Treated soils that would be covered and remain on-Site would be considered solid waste per 40 CFR 261.4(a)(13) and the Site would thus be considered a solid waste disposal site per 36 CFR Part 6. 36 CFR Part 6 prohibits the creation of new solid waste disposal sites within the boundaries of a National Park System unit unless an extensive set of criteria are met (36 CFR Part 6.4). The Site does not meet several of the required criteria and thus treated soils cannot remain on-Site.

### **5.2.2 Newhalem**

Technical Feasibility: All of the alternatives are technically feasible to implement, with varying degrees of difficulty. All of the alternatives use well-established methods and protocols.

The difficulty of implementation increases from Alternative 1 to 3. Alternative 4 is less difficult to implement than Alternative 3 but substantially more difficult than Alternative 2.

### 5.3 Costs Criteria

#### 5.3.1 Stehekin

Estimated costs for Alternatives 1 through 4 from least expensive to most are provided below:

<u>Alternative</u>	<u>Estimated Cost</u>
Alternative 1 – No Action	None
Alternative 2 – Onsite Treatment and Soil Cover	\$ 165,556.55
Alternative 3 – Full Removal, Onsite Treatment and Off-Site Disposal at an Appropriate Disposal Facility	\$ 1,012,439.35
Alternative 4 – Full Removal and Off-Site Disposal at an Appropriate Disposal Facility	\$ 1,159,571.35

#### 5.3.2 Newhalem

Estimated costs for Alternatives 1 through 4, from least expensive to most are provided below:

<u>Alternative</u>	<u>Estimated Cost</u>
Alternative 1 – No Action	None
Alternative 2 – Institutional Controls	\$ 67,112.00
Alternative 3 – Full Removal, Onsite Treatment and Off-Site Disposal at an Appropriate Disposal Facility	\$ 755,345.50
Alternative 4 – Full Removal and Off-Site Disposal at an Appropriate Disposal Facility	\$ 799,477.50

### 5.4 Comparisons

#### 5.4.1 Stehekin

Table 5-1 presents a comparison of the four proposed alternatives. Implementing Alternative 1 would not achieve the RAO. Alternative 2 would only partially achieve the RAO, and implementation of Alternative 2 is prohibited by 36 CFR Part 6. Alternatives 3 and 4 would achieve the RAO by removing soils exceeding the PRG from the Site. Alternatives 3 and 4 would provide a greater degree of effectiveness and require less long-term Site management (i.e., institutional controls) than Alternative 2. Alternatives 3 and 4 provide identical levels of

effectiveness. Alternative 4 is more expensive than Alternative 3, but is less difficult to implement.

#### **5.4.2 Newhalem**

Table 5-2 presents a comparison of the four proposed alternatives. Implementing Alternative 1 would not achieve the RAO. Implementing Alternative 2 would not reduce lead concentrations in Site soils and thus does not achieve the RAO. Alternatives 3 and 4 would achieve the RAO by removing soils exceeding the PRG from the Site. Alternatives 3 and 4 provide identical levels of effectiveness. Alternative 4 is more expensive than Alternative 3, but is less difficult to implement.

### **6.0 RECOMMENDED REMOVAL ACTION ALTERNATIVES**

This section provides a recommendation for the preferred Removal Action Alternative for each Site that best satisfies the evaluation criteria based on the comparative analysis.

#### **6.1 Stehekin**

The Recommended Removal Action is Alternative 3 – Full Removal, Onsite Treatment and Off-Site Disposal at an Appropriate Disposal Facility. The following work tasks would be conducted:

1. DU 1 and DU 2 will be cleared of vegetation (some large trees may be left in place);
2. Contaminated soils in DU 1 and DU 2 will be excavated;
3. Confirmation sampling will be conducted (to confirm that all contaminated soils have been removed);
4. Excavated soils would undergo treatment on-site by a hazardous waste management contractor to immobilize the lead present to levels that would be classified as non-hazardous as determined by TCLP;
5. Waste characterization samples (TCLP) would be collected from treated soils to confirm that the soils classify as non-hazardous waste prior to offsite shipment;
6. The soils would then be loaded into containers for transport to an appropriate offsite disposal facility (soils would be disposed of as a solid waste as per 40 CFR 261.2);
7. The Site will be reclaimed/revegetated.

## 6.2 Newhalem

The Recommended Removal Action is Alternative 3 – Full Removal, Onsite Treatment and Off-Site Disposal at an Appropriate Disposal Facility. The following work tasks would be conducted:

1. DU 1, DU 2, DU 3 and DU 4 will be cleared of vegetation (some large trees may be left in place);
2. Contaminated soils in DU 1, DU 2, DU 3 and DU 4 will be excavated;
3. Confirmation sampling will be conducted (to confirm that all contaminated soils have been removed);
4. DU 3 soils would undergo treatment on-site by a hazardous waste management contractor to immobilize the lead present to levels that would be classified as non-hazardous as determined by TCLP;
5. Waste characterization samples (TCLP) would be collected from treated and untreated soils to confirm that the soils classify as non-hazardous waste prior to offsite shipment;
6. The soils would then be loaded into containers for transport to an appropriate offsite disposal facility (soils would be disposed of as a solid waste as per 40 CFR 261.2);
7. The Site will be reclaimed/revegetated.

## 7.0 REFERENCES

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State of Washington Department of Ecology (WaDOE), 1994. Natural Background Soil Metals Concentrations in Washington State, Toxics Cleanup Program, Dept. of Ecology, Publication #94-115.

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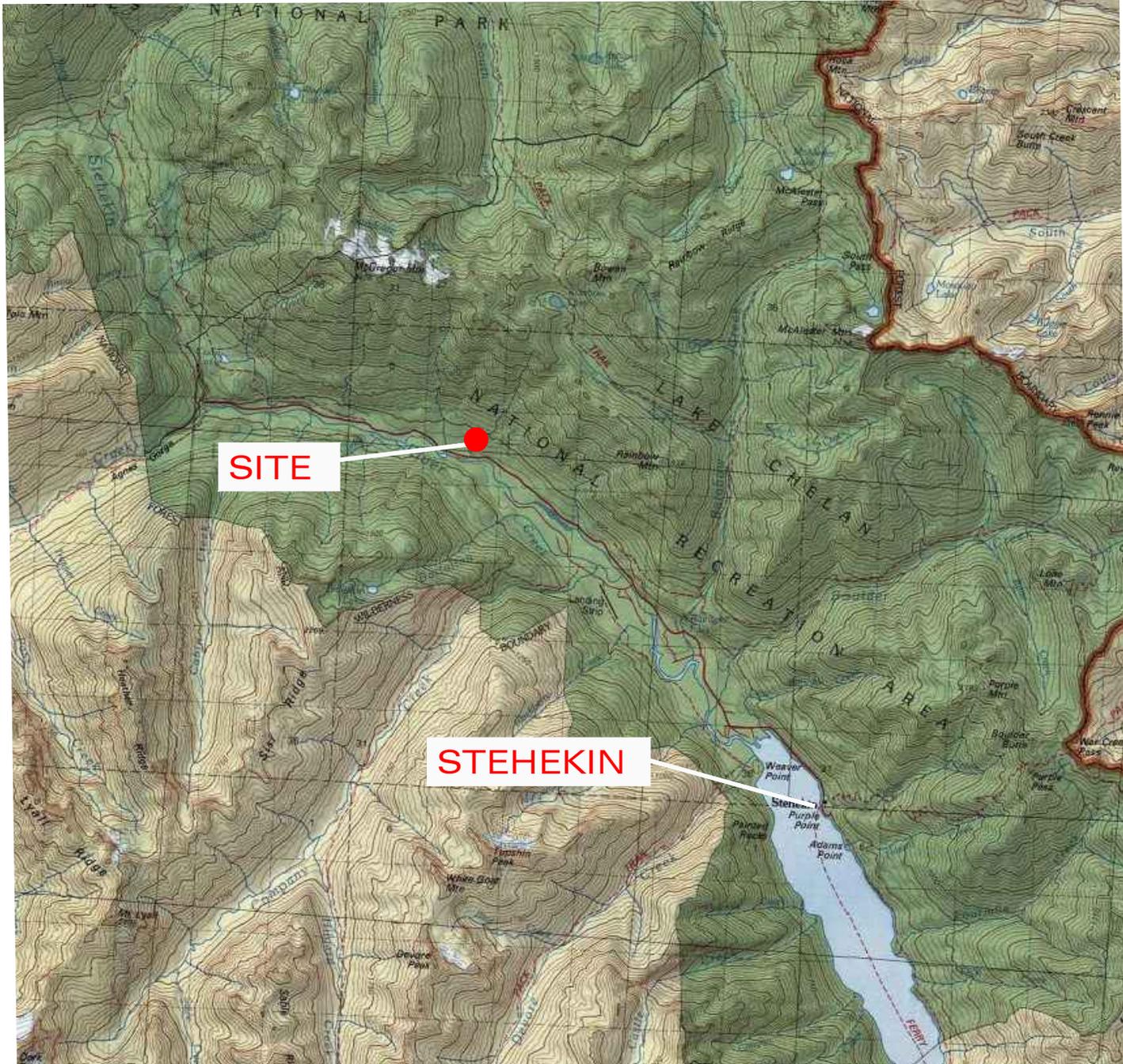
USEPA, 1993, Guidance on Conducting Non-Time Critical Removal Action Under CERCLA, EPA 540-R-93-057.

USEPA, 1998, Guidance for Quality Assurance Project Plans”, EPA QA/G5 EPA/600/R98.

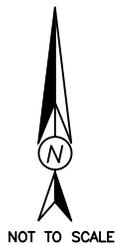
USEPA, 2005, Best Management Practices for Lead at Outdoor Shooting Ranges, EPA-902-B-01-00, Revised June 2005

USEPA, 2010, Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites.

## **FIGURES**



NOTE:  
LOCATIONS NOT SURVEYED



# NORTH CASCADES NP

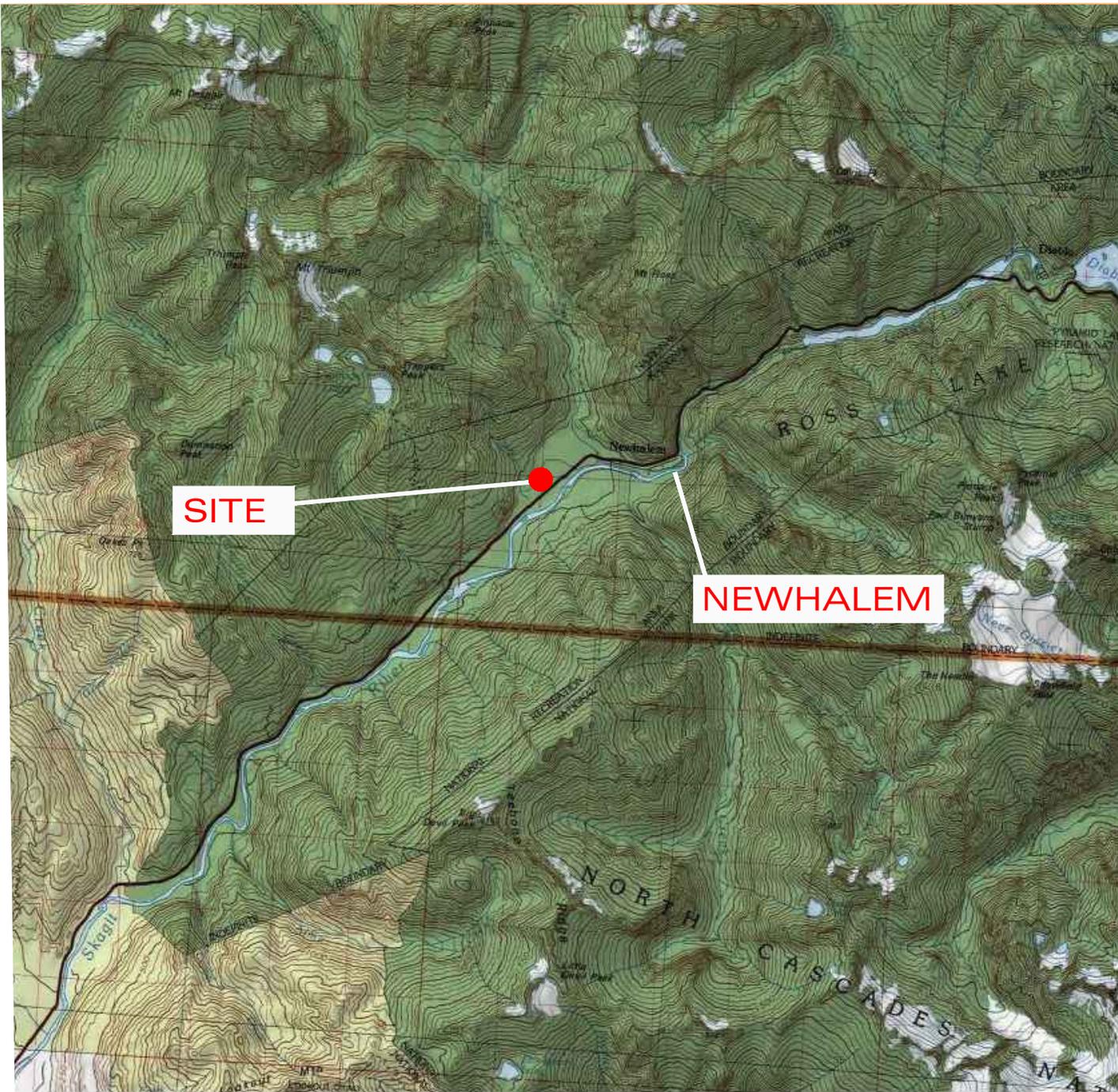
FIGURE 1-1  
STEHEKIN FIRING RANGE  
SITE MAP

RESOURCE MANAGEMENT CONSULTANTS  
8138 SOUTH STATE ST.  
SUITE 2A  
MIDVALE, UT 84047  
801-255-2626

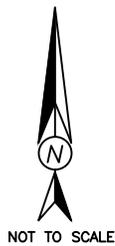


OCTOBER 2013

nc site map.dwg



NOTE:  
LOCATIONS NOT SURVEYED



## NORTH CASCADES NP

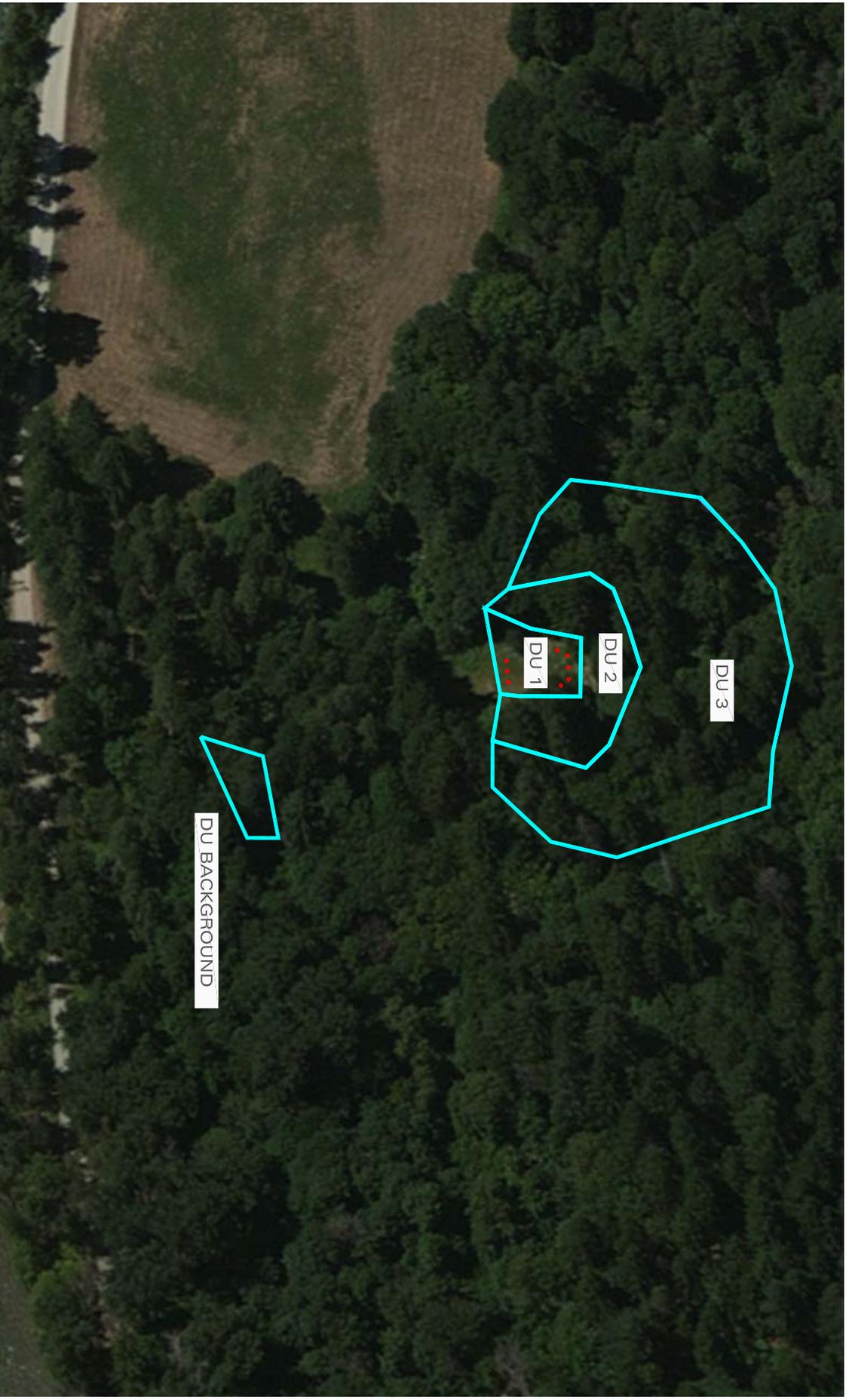
FIGURE 1-2  
NEWHALEM FIRING RANGE  
SITE MAP

RESOURCE MANAGEMENT CONSULTANTS  
8138 SOUTH STATE ST.  
SUITE 2A  
MIDVALE, UT 84047  
801-255-2626



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LEGEND

— DECISION UNIT (DU) BOUNDARY

● TARGET STRUCTURE

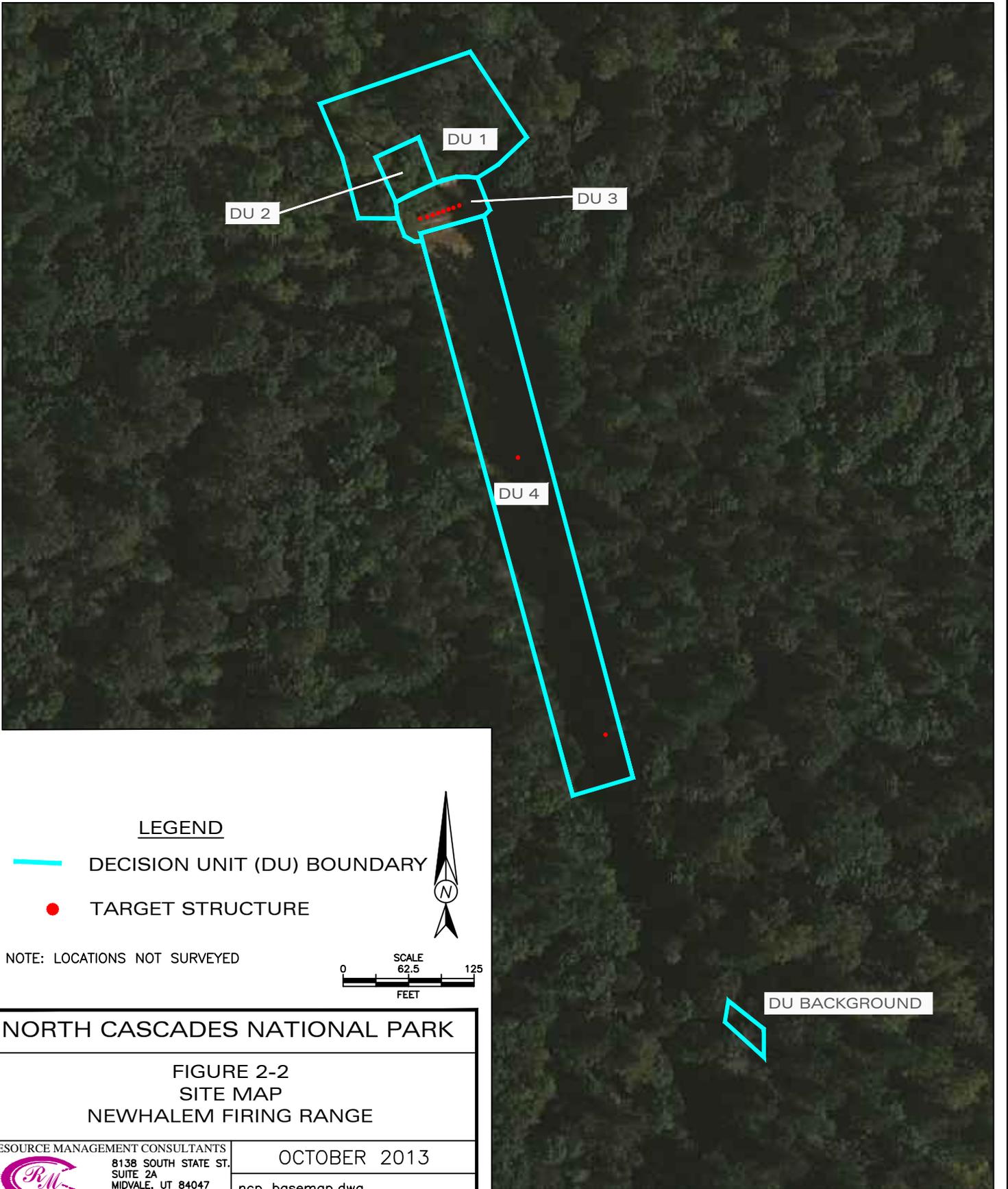
NOTE: LOCATIONS NOT SURVEYED

**NORTH CASCADES NATIONAL PARK**

FIGURE 2-1  
SITE MAP  
STEHEKIN FIRING RANGE

RESOURCE MANAGEMENT CONSULTANTS  
  
 8138 SOUTH STATE ST.  
 SUITE 2A UT 84047  
 MIDVALE, UT 84047  
 801-255-2626

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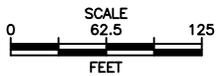


LEGEND

- DECISION UNIT (DU) BOUNDARY
- TARGET STRUCTURE



NOTE: LOCATIONS NOT SURVEYED



NORTH CASCADES NATIONAL PARK

FIGURE 2-2  
SITE MAP  
NEWHALEM FIRING RANGE

RESOURCE MANAGEMENT CONSULTANTS  
 8138 SOUTH STATE ST.  
 SUITE 2A  
 MIDVALE, UT 84047  
 801-255-2626

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## **TABLES**

**Table 2-1  
Data Summary  
Stehekin and Newhalem  
Firing Ranges EE/CA**

<b>Stehekin</b>			
<b>Decision Unit</b>	<b>Sample Identification</b>	<b>Lead (ppm)</b>	<b>Description</b>
DU background	ST-BG	10	Background area, south of firing range. Forested.
DU 1	ST-DU1	54	Target area. Two sets of target posts. One for close range shooting (3 posts) and the second is directly in front of the berm (5 posts). Open meadow.
DU 2	ST-DU2	427	Berm area. Berm is a cut slope. This area may have been a borrow pit. Cut slope is up to 10' in height. Semi-forested
DU 2	ST-DU2 Duplicate	285	QA split of DU 2
DU 2	ST-DU8	320	Triplicate Sample of DU 2 for QA
DU 2	ST-DU9	350	Triplicate Sample of DU 2 for QA
DU 3	ST-DU3	10	Wooded area behind berm area. Forested

<b>Newhalem</b>			
<b>Decision Unit</b>	<b>Sample Identification</b>	<b>Lead (ppm)</b>	<b>Description</b>
DU background	NE-BG	9	Background area, south of firing range. Forested.
DU 1	NE-DU1	154	Wooded area behind berm area. Forested
DU 2	NE-DU2	586	Wooded area with galvanized metal shack behind berm area. Shack has bullet holes on all sides and dirt floor which was part of the MI sample. Forested
DU 2	NE-DU2 Duplicate	575	QA split of DU 2
DU 3	NE-DU3	2,730	Target and berm area. Area contains 8 target structures. Berm consists of imported material and is supported by large logs on the backside. Front side of berm is 8-9 feet tall.
DU 4	NE-DU4	181	Target and range area. Area contains 2 target posts. Open meadow.
DU 4	NE-DU8	138	Triplicate Sample of DU 4 for QA
DU 4	NE-DU9	136	Triplicate Sample of DU 4 for QA

**Table 2-2  
Decision Unit Physical Descriptions  
Stehekin and Newhalem  
Firing Ranges EE/CA**

<b>Stehekin</b>				
<b>Decision Unit</b>	<b>Area</b>			<b>Description</b>
	<b>M<sup>2</sup></b>	<b>Ft<sup>2</sup></b>	<b>Acres</b>	
DU background	262	2,820	0.06	Background area, south of firing range. Forested.
DU 1	396	4,263	0.10	Target area. Two sets of target posts. One for close range shooting (3 posts) and the second is directly in front of the berm (5 posts). Open meadow.
DU 2	1,094	11,776	0.27	Berm area. Berm is a cut slope. This area may have been a borrow pit. Cut slope is up to 10' in height. Semi-forested
DU 3	4,461	48,018	1.10	Wooded area behind berm area. Forested

<b>Newhalem</b>				
<b>Decision Unit</b>	<b>Area</b>			<b>Description</b>
	<b>M<sup>2</sup></b>	<b>Ft<sup>2</sup></b>	<b>Acres</b>	
DU background	78	840	0.02	Background area, south of firing range. Forested.
DU 1	1,425	15,339	0.35	Wooded area behind berm area. Forested
DU 2	177	1,905	0.04	Wooded area with galvanized metal shack behind berm area. Shack has bullet holes on all sides and dirt floor which was part of the MI sample. Forested
DU 3	300	3,229	0.07	Target and berm area. Area contains 8 target structures. Berm consists of imported material and is supported by large logs on the backside. Front side of berm is 8-9 feet tall.
DU 4	3,000	32,292	0.74	Target and range area. Area contains 2 target posts. Open meadow.

**Table 2-3  
Stehekin and Newhalem  
Firing Ranges EE/CA  
Quality Assurance Results**

<b>Stehekin Triplicate Statistics</b>		
<b>Location</b>	<b>Sample ID</b>	<b>Lead (ppm)</b>
DU 2	ST-DU2	427
DU 2	ST-DU8	320
DU 2	ST-DU9	350
<b>Average</b>		<b>365.7</b>
<b>Median</b>		<b>350.0</b>
<b>Standard Deviation</b>		<b>45.1</b>

<b>Stehekin QA Duplicate Analysis</b>		
<b>Location</b>	<b>Sample ID</b>	<b>Lead (ppm)</b>
DU 2	ST-DU2	427
DU 2	ST-DU2 Duplicate	285
<b>RPD (%)</b>		<b>39.9</b>

<b>Newhalem Triplicate Statistics</b>		
<b>Location</b>	<b>Sample ID</b>	<b>Lead (ppm)</b>
DU 4	NE-DU4	181
DU 4	NE-DU8	138
DU 4	NE-DU9	136
<b>Average</b>		<b>151.7</b>
<b>Median</b>		<b>138.0</b>
<b>Standard Deviation</b>		<b>20.8</b>

<b>Newhalem QA Duplicate Analysis</b>		
<b>Location</b>	<b>Sample ID</b>	<b>Lead (ppm)</b>
DU 2	NE-DU2	586
DU 2	NE-DU2 Duplicate	575
<b>RPD (%)</b>		<b>1.9</b>

**Equipment Rinsate Blank**

<b>Sample ID</b>	<b>Lead (ppb)</b>
ST-1	0.05

**Table 3-1  
Potential Chemical Specific ARARs**

<b>Requirement</b>	<b>Citation</b>	<b>Description</b>	<b>Determination</b>	<b>Comment</b>
Site Cleanup	Chapter 173-340 WAC	Model Toxics Control Act (MTCA)	Applicable	MTCA establishes administrative processes and standards to identify, investigate, and clean up facilities where hazardous substances have come to be located
Washington Surface Water Quality Standards	Chapter 173-201A WAC	Establishes surface water quality standards. Washington has received approval from EPA to adopt standards more stringent than federal standards.	Potentially Applicable	Potentially applicable for Site surface and storm water discharges.
Groundwater Quality Standards	Chapter 173-201A WAC	Establishes state groundwater quality standards.	Potentially Relevant and Appropriate	Potentially relevant and appropriate to any discharges of contaminants to ground water (if any).
Storm Water Rules - Water Pollution Control Act	Chapter 90.48 RCW	Establishes state storm water requirements.	Applicable	Applicable during any Removal Action that requires construction.

**Table 3-1 (continued)**  
**Potential Location Specific ARARs**

<b>Requirement</b>	<b>Citation</b>	<b>Description</b>	<b>Determination</b>	<b>Comment</b>
Protection of Wetlands	33 USC § 1344 and 40 CFR Part 6, Appendix A, Executive Order No. 11990	Mandates that federal agencies and potentially responsible parties (PRPs) avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists. Also prohibits discharge of dredged or fill materials into waters of the United States.	Potentially Applicable	Measures will be developed to avoid, restore, or mitigate impacts to jurisdictional wetlands, if any.
National Historic Preservation	16 U.S.C. §§ 470 et seq, 40 CFR § 6.301(b), 36 CFR Part 800	Requires protection of district, site, building, structure or object eligible for inclusion in national register of historic places.	Applicable	Proposed activities will be designed to not adversely affect any such historic district, site, building, structure or object.
Archeological and Historic Preservation Act	<i>16 U.S.C. §§ 469 et seq., 40 CFR § 6.301(c)</i>	Requires preservation of significant historical and archeological data.	Applicable	Proposed activities will not adversely affect archeological data or landmarks.
Historic Sites, Buildings, and Antiquities Act	16 U.S.C. § 461 et seq., 40 CFR § 6.310(a)	Requires Federal agencies, in conducting an environmental review of a remedial action, to consider, inter alia, the existence and location of historic or prehistoric sites, buildings, objects, and properties of national historical or archaeological significance.	Applicable	Will apply to buildings deemed historic (Newhalem, if required). Proposed activities will not adversely affect natural landmarks.

**Table 3-1 (continued)**  
**Potential Location Specific ARARs**

<b>Requirement</b>	<b>Citation</b>	<b>Description</b>	<b>Determination</b>	<b>Comment</b>
Fish and Wildlife Coordination Act	16 USC § 1531 <i>et seq.</i> , 16 U.S.C. §§ 661 <i>et seq.</i> and 40 CFR § 6.302(g)	Requires that actions taken in areas that may affect streams and rivers be undertaken in a manner that protects fish and wildlife.	Applicable	USFWS will be contacted if required.
Endangered Species Act	16 U.S.C. §§ 1531 - 1544, 50 CFR Part 402, and 40 CFR § 6.302(h))	Requires protection of endangered and threatened species.	Applicable	USFWS will be contacted if required.
Migratory Bird Treaty Act	16 USC § 703 <i>et seq</i>	Requires protection of migratory nongame birds.	Applicable	USFWS will be contacted if required.
Solid Waste Handling Standards	Chapter 173-350 WAC	Establishes requirements for handling of solid wastes.	Applicable	Applicable to material handling and treatment.
Floodplain Management Order	40 CFR Part 6, Appendix A, Executive Order No. 11988	Mandates that federally funded or authorized actions within the 100 year floodplain avoid, to the maximum extent possible, adverse impacts associated with development of a floodplain.	Potentially Applicable	Measures will be developed to avoid, restore, or mitigate impacts within the 100 year floodplain, if any.
Resource Conservation and Recovery Act (RCRA)	40 CFR § 264.18 (a)	Any discrete waste units created or actively managed at the cleanup of a NPS Site must comply with the siting restrictions and conditions.	Applicable	Applicable to waste left on-Site.
Resource Conservation and Recovery Act (RCRA)	40 CFR § 261	Defines hazardous waste, solid waste, and when discharged ammunition is considered to be solid waste.	Applicable	Applicable to waste left on-Site and waste disposed of offsite.
Native American Graves Protection and Repatriation Act (NAGPRA)	25 U.S.C. § 3001; 43 CFR §§ 10.1 - 10.17	NAGPRA and its implementing regulations provide for the disposition of Native American remains and objects inadvertently discovered on federal or tribal lands after November 1990.	Potentially Applicable	Applicable to Native American remains and objects inadvertently discovered on-Site.

**Table 3-1 (continued)**  
**Potential Location Specific ARARs**

<b>Requirement</b>	<b>Citation</b>	<b>Description</b>	<b>Determination</b>	<b>Comment</b>
Solid Waste Disposal in National Parks	16 U.S.C. §§ 4601 - 22(c) et seq and 36 CFR Part 6	Applies to creation of any new solid waste disposal units within the boundary of an NPS unit.	Applicable - Stehekin	No new sites for disposal of solid waste may be created within NPS boundaries unless an extensive set of criteria are met.
The National Park Service Organic Act	16 U.S.C. §§ 1-3	The Organic Act and the statute establishing the affected NPS unit do not allow permanent or long-term restrictions on public access to the Site as a component of the selected remedial action.	Applicable	The Organic Act and the statute establishing the affected NPS unit do not allow permanent or long-term restrictions on public access to the Site as a component of the selected remedial action

**Table 3-1 (continued)  
Potential Action Specific ARARs**

<b>Requirement</b>	<b>Citation</b>	<b>Description</b>	<b>Determination</b>	<b>Comment</b>
Site Cleanup	Chapter 173-340 WAC	Model Toxics Control Act (MTCA)	Applicable	MTCA establishes administrative processes and standards to identify, investigate, and clean up facilities where hazardous substances have come to be located.
Air Pollution	Chapter 173-470 WAC	General requirements for compliance with National Ambient Air Quality Standards (NAAQS).	Potentially Applicable	Potentially applicable to earth moving, grading, and excavating activities that may result in release of contaminants to air.
Fugitive Dust Control	Chapter 173-400 WAC	Establishes requirements for fugitive dust, construction activities, and roadways associated with Site cleanup.	Potentially Applicable	Potentially applicable to earth moving, grading, and excavating activities that may result in dust.
Solid Waste Handling Standards	Chapter 173-350 WAC	Establishes requirements for handling of solid wastes.	Applicable	Applicable to material handling and treatment.

**TABLE 4-1  
STEHEKIN COST ESTIMATE  
ALTERNATIVE 2, On-Site Treatment and Soil Cover**

	Quantity Unit	Cost	Total Cost
<b>Direct Capitol Costs</b>			
Equipment Mob/Demob (Note 1)	1 Unit	\$ 5,000.00	\$ 5,000.00
HAZWOPER Operators Mob/Demob	1 Unit	\$ 5,000.00	\$ 5,000.00
Clearing and grubbing (DU 1, DU 2 and staging area)	0.75 Acre	\$4,000.00	\$ 3,000.00
Excavation Contractor - Trackhoe	54 Hour	\$200.00	\$ 10,800.00
Excavation Contractor - Skid Steer	54 Hour	\$150.00	\$ 8,100.00
Excavation Contractor - Dump Truck	40 Hour	\$150.00	\$ 6,000.00
Excavation Contractor - Screen Plant	16 Hour	\$200.00	\$ 1,400.00
TSP	35 Ton	\$300.00	\$ 10,500.00
Cover Soils (Note 2)	400 Cyd	\$10.00	\$ 4,000.00
Site Reclamation - DU 1, DU 2 and staging area	0.75 Acre	\$8,750.00	\$ 6,562.50
Barge hauling - Haul screened bullets from Stehekin to Chelan (Note 3)	1 Container	\$3,460.00	\$ 3,460.00
Haul screened bullets from Chelan to recycling facility	10 Ton	\$200.00	\$ 2,000.00
Environmental Samples - TCLP, 24 hour turnaround	12 Pb Sample	\$300.00	\$ 3,600.00
Environmental Samples - Confirmation, 24 hour turnaround	10 Sample	\$100.00	\$ 1,000.00
XRF rental	2 day	\$300.00	\$ 600.00
	<b>Subtotal</b>		<b>\$ 71,022.50</b>
 <b>Long-Term Operation and Maintenance Costs</b>			
Operation and Maintenance - Confirm reclamation and cover	3 Years	\$2,500.00	\$ 7,500.00
5 Year Review	1 Unit	\$5,000.00	\$ 5,000.00
	<b>Subtotal</b>		<b>\$ 12,500.00</b>
		<b>Total Direct Costs</b>	<b>\$ 83,522.50</b>
 <b>Indirect Capitol Costs</b>			
Project Design - Remedial Action Work Plan		\$	20,000.00
Project Oversight and Administration		\$	20,000.00
Health and Safety Plan		\$	2,000.00
On-Site Environmental Oversight		\$	15,000.00
Contingency (15% of Direct Capitol Costs)		\$	12,528.38
Health and Safety (3% of Direct Capitol Costs)		\$	2,505.68
IC's		\$	10,000.00
	<b>Subtotal</b>		<b>\$ 82,034.05</b>
		<b>Total Indirect Costs</b>	<b>\$ 82,034.05</b>
		<b>Total Costs</b>	<b>\$ 165,556.55</b>

Notes:

1 - Screen plant only. Assumes other equipment available at Stehekin from Cragg Courtney.

2 - Assumes local source of cover soils available.

3 - Unit cost for barge hauling per cost estimate received from Pool Engineering. Assumes <1 container of material.

**TABLE 4-2**  
**STEHEKIN COST ESTIMATE**  
**ALTERNATIVE 3, Full Removal, On-Site Treatment and Off-Site Disposal at an Appropriate Facility**

	Quantity	Unit	Cost	Total Cost
<b>Direct Capitol Costs</b>				
Clearing and grubbing (DU 1, DU 2 and staging area)	0.75	Acre	\$4,000.00	\$ 3,000.00
Treatment & Disposal - Excavation, soil treatment, hauling from Chelan to disposal facility, disposal (non-Haz) (Note 1)	1190	Ton	\$352.00	\$ 418,880.00
Barge hauling - Hauling from Stehekin to Chelan (Note 2)	99	Container	\$3,460.00	\$ 342,540.00
Site Reclamation - DU 1, DU 2 and staging area	0.75	Acre	\$8,750.00	\$ 6,562.50
Environmental Samples - TCLP, 24 hour turnaround	12	Pb Sample	\$300.00	\$ 3,600.00
Environmental Samples - Confirmation, 24 hour turnaround	12	Sample	\$100.00	\$ 1,200.00
XRF rental	4	day	\$300.00	\$ 1,200.00
		<b>Subtotal</b>		<b>\$ 776,982.50</b>
<b>Long-Term Operation and Maintenance Costs</b>				
Operation and Maintenance - Confirm Reclamation	3	Year	\$5,000.00	\$ 15,000.00
5 Year Review	1	Unit	\$5,000.00	\$ 5,000.00
		<b>Subtotal</b>		<b>\$ 20,000.00</b>
			<b>Total Direct Costs</b>	<b>\$ 796,982.50</b>
<b>Indirect Capitol Costs</b>				
Project Design - Remedial Action Work Plan			\$	30,000.00
Project Oversight and Administration			\$	25,000.00
Health and Safety Plan			\$	2,000.00
On-Site Environmental Oversight			\$	15,000.00
Contingency (15% of Direct Capitol Costs)			\$	119,547.38
Health and Safety (3% of Direct Capitol Costs)			\$	23,909.48
		<b>Subtotal</b>		<b>\$ 215,456.85</b>
			<b>Total Indirect Costs</b>	<b>\$ 215,456.85</b>
			<b>Total Costs</b>	<b>\$ 1,012,439.35</b>

Notes:

1 - Unit cost for excavation, treatment, hauling and disposal per cost estimate received from Clean Harbors Environmental Services

2 - Unit cost for barge hauling per cost estimate received from Pool Engineering. Assumes 12 tons soil per waste container.

**TABLE 4-3  
STEHEKIN COST ESTIMATE  
ALTERNATIVE 4, Full Removal and Off-Site Disposal at an Appropriate Facility**

	Quantity Unit	Cost	Total Cost
<b>Direct Capitol Costs</b>			
Clearing and grubbing (DU 1, DU 2 and staging area)	0.75 Acre	\$4,000.00	\$ 3,000.00
Removal & Disposal - Excavation, hauling from Chelan to disposal facility, disposal (Haz) (Note 1)	1050 Ton	\$490.00	\$ 514,500.00
Removal & Disposal - Excavation, hauling from Chelan to disposal facility, disposal (non-Haz) (Note 1)	140 Ton	\$352.00	\$ 49,280.00
Barge hauling - Hauling from Stehekin to Chelan (Note 2)	99 Container	\$3,460.00	\$ 342,540.00
Site Reclamation - DU 1, DU 2 and staging area	0.75 Acre	\$8,750.00	\$ 6,562.50
Environmental Samples - TCLP, 24 hour turnaround	12 Pb Sample	\$300.00	\$ 3,600.00
Environmental Samples - Confirmation, 24 hour turnaround	12 Sample	\$100.00	\$ 1,200.00
XRF rental	4 day	\$300.00	\$ 1,200.00
	<b>Subtotal</b>		<b>\$ 921,882.50</b>
<b>Long-Term Operation and Maintenance Costs</b>			
Operation and Maintenance - Confirm Reclamation	3 Years	\$2,500.00	\$ 7,500.00
5 Year Review	1 Unit	\$5,000.00	\$ 5,000.00
	<b>Subtotal</b>		<b>\$ 12,500.00</b>
		<b>Total Direct Costs</b>	<b>\$ 934,382.50</b>
<b>Indirect Capitol Costs</b>			
Project Design - Remedial Action Work Plan		\$	20,000.00
Project Oversight and Administration		\$	20,000.00
Health and Safety Plan		\$	2,000.00
On-Site Environmental Oversight		\$	15,000.00
Contingency (15% of Direct Capitol Costs)		\$	140,157.38
Health and Safety (3% of Direct Capitol Costs)		\$	28,031.48
	<b>Subtotal</b>	<b>\$</b>	<b>225,188.85</b>
		<b>Total Indirect Costs</b>	<b>\$ 225,188.85</b>
		<b>Total Costs</b>	<b>\$ 1,159,571.35</b>

Notes:

- 1 - Unit cost for excavation, hauling and disposal per cost estimate received from Clean Harbors Environmental Services
- 2 - Unit cost for barge hauling per cost estimate received from Pool Engineering. Assumes 12 tons soil per waste container.

**TABLE 4-4  
NEWHALEM COST ESTIMATE  
ALTERNATIVE 2, Institutional Controls**

	Quantity	Unit	Cost	Total Cost
<b>Direct Capitol Costs</b>				
Signs	4	Sign	\$100.00	\$ 400.00
Site Monitoring Plan	1	Plan	\$2,000.00	\$ 2,000.00
Health and Safety Plan	1	Plan	\$1,000.00	\$ 1,000.00
Develop Institutional Controls	1	Unit	\$5,000.00	\$ 5,000.00
		<b>Subtotal</b>	<b>\$</b>	<b>8,400.00</b>
<b>Long-Term Operation and Maintenance Costs</b>				
Operation and Maintenance	5	Year	\$2,000.00	\$ 10,000.00
Annual Sampling - 5 Year Review	1	Event	\$10,000.00	\$ 10,000.00
5 Year Review	1	Report	\$5,000.00	\$ 5,000.00
Institutional Controls Monitoring and Repair	30	Year	\$500.00	\$ 15,000.00
		<b>Subtotal</b>	<b>\$</b>	<b>40,000.00</b>
		<b>Total Direct Costs</b>		<b>\$ 48,400.00</b>
<b>Indirect Capitol Costs</b>				
Project Administration			\$	10,000.00
Contingency (15% of Direct Capitol Costs)			\$	7,260.00
Health and Safety (3% of Direct Capitol Costs)			\$	1,452.00
		<b>Subtotal</b>	<b>\$</b>	<b>18,712.00</b>
		<b>Total Indirect Costs</b>		<b>\$ 18,712.00</b>
		<b>Total Costs</b>		<b>\$ <u>67,112.00</u></b>

**TABLE 4-5  
NEWHALEM COST ESTIMATE  
ALTERNATIVE 3, Full Removal, On-Site Treatment and Off-Site Disposal at an Appropriate Facility**

	Quantity Unit	Cost	Total Cost
<b>Direct Capitol Costs</b>			
Clearing and grubbing (DU 1, DU 2, DU 3 and DU 4)	1.5 Acre	\$4,000.00	\$ 6,000.00
Treatment & Disposal - DU 3 soils excavation, soil treatment, hauling from Site to disposal facility, disposal (non-Haz) (Note 1)	200 Ton	\$352.00	\$ 70,400.00
Removal & Disposal - DU 1, DU 2, and DU 4 soils excavation, hauling from Site to disposal facility, disposal (non-Haz) (Note 1)	2300 Ton	\$210.00	\$ 483,000.00
Site Reclamation - DU 1, DU 2, DU 3 and DU 4	0.5 Acre	\$8,750.00	\$ 4,375.00
Environmental Samples - TCLP, 24 hour turnaround	25 Pb Sample	\$300.00	\$ 7,500.00
Environmental Samples - Confirmation, 24 hour turnaround	20 Sample	\$100.00	\$ 2,000.00
XRF rental	1.5 day	\$300.00	\$ 450.00
	<b>Subtotal</b>		<b>\$ 573,725.00</b>
<b>Long-Term Operation and Maintenance Costs</b>			
Operation and Maintenance - Confirm Reclamation	1 Year	\$2,500.00	\$ 2,500.00
5 Year Review	1 Report	\$5,000.00	\$ 5,000.00
	<b>Subtotal</b>		<b>\$ 7,500.00</b>
		<b>Total Direct Costs</b>	<b>\$ 581,225.00</b>
<b>Indirect Capitol Costs</b>			
Project Design - Remedial Action Work Plan		\$	25,000.00
Project Oversight and Administration		\$	15,000.00
Health and Safety Plan		\$	2,000.00
On-Site Environmental Oversight		\$	20,000.00
Contingency (15% of Direct Capitol Costs)		\$	87,183.75
Health and Safety (3% of Direct Capitol Costs)		\$	17,436.75
Environmental Stewardship Plan		\$	7,500.00
	<b>Subtotal</b>		<b>\$ 174,120.50</b>
		<b>Total Indirect Costs</b>	<b>\$ 174,120.50</b>
		<b>Total Costs</b>	<b>\$ 755,345.50</b>

Notes:

1 - Unit cost for excavation, treatment, hauling and disposal per cost estimate received from Clean Harbors Environmental Services

**TABLE 4-6  
NEWHALEM COST ESTIMATE  
ALTERNATIVE 4, Full Removal and Off-Site Disposal at an Appropriate Facility**

	Quantity Unit	Cost	Total Cost
<b>Direct Capitol Costs</b>			
Clearing and grubbing (DU 2 and staging area)	1.5 Acre	\$4,000.00	\$ 6,000.00
Removal & Disposal - DU 3 soils excavation, hauling from Site to disposal facility, disposal (Haz) (Note 1)	200 Ton	\$490.00	\$ 98,000.00
Removal & Disposal - DU 1, DU 2, and DU 4 soils excavation, hauling from Site to disposal facility, disposal (non-Haz) (Note 1)	2300 Ton	\$210.00	\$ 483,000.00
Site Reclamation - DU 2 and staging area	1.5 Acre	\$8,750.00	\$ 13,125.00
Environmental Samples - TCLP, 24 hour turnaround	25 Pb Sample	\$300.00	\$ 7,500.00
Environmental Samples - Confirmation, 24 hour turnaround	20 Sample	\$100.00	\$ 2,000.00
XRF rental	5 day	\$300.00	\$ 1,500.00
	<b>Subtotal</b>		<b>\$ 611,125.00</b>
<b>Long-Term Operation and Maintenance Costs</b>			
Operation and Maintenance - Confirm Reclamation	1 Year	\$2,500.00	\$ 2,500.00
5 Year Review	1 Report	\$5,000.00	\$ 5,000.00
	<b>Subtotal</b>		<b>\$ 7,500.00</b>
		<b>Total Direct Costs</b>	<b>\$ 618,625.00</b>
<b>Indirect Capitol Costs</b>			
Project Design - Remedial Action Work Plan		\$	25,000.00
Project Oversight and Administration		\$	15,000.00
Health and Safety Plan		\$	2,000.00
On-Site Environmental Oversight		\$	20,000.00
Contingency (15% of Direct Capitol Costs)		\$	92,793.75
Health and Safety (3% of Direct Capitol Costs)		\$	18,558.75
Environmental Stewardship Plan		\$	7,500.00
	<b>Subtotal</b>		<b>\$ 180,852.50</b>
		<b>Total Indirect Costs</b>	<b>\$ 180,852.50</b>
		<b>Total Costs</b>	<b>\$ 799,477.50</b>

Notes:

1 - Unit cost for excavation, hauling and disposal per cost estimate received from Clean Harbors Environmental Services

TABLE 5-1  
STEHEKIN  
COMPARISON OF ALTERNATIVES

Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	No Action	On-Site Treatment and Soil Cover	Full Removal, On-Site Treatment and Off-Site Disposal at an Appropriate Facility	Full Removal and Off-site Disposal at an Appropriate Disposal Facility
<b>Effectiveness</b>				
RAO Objective: Minimizing the potential for lead impacts to human health and the environment.	Not effective, baseline conditions.	Effective - On-site treatment and soil cover would partially achieve the RAO.	Effective - Full removal, on-site treatment and off-site disposal would achieve the RAO.	Effective - Full removal and off-site disposal would achieve the RAO.
<b>Implementability</b>				
Technically feasible	Yes	Yes	Yes	Yes
Availability of Goods and Services	No services required	All goods and services are available. TSP and screening equipment would need to be transported to/from the Site. Other earthmoving equipment is available onsite.	All goods and services are available. Treatment equipment, soil transport roll off boxes and possibly earth moving equipment would need to be transported to/from the Site.	All goods and services are available. Soil transport roll off boxes and possibly earth moving equipment would need to be transported to/from the Site.
Difficulty	Nothing to implement.	Moderately difficult. Some equipment and HAZWOPER operators will have to be mobilized to the site. Screened bullets will have to be transported to a recycling facility. Restrictive use covenants are not difficult to prepare for a single federal agency.	Very difficult - Contaminated material will have to be transported through North Cascades National Park. NOCA would have to mobilize a specialized contractor to treat and remove contaminated soils.	Very difficult - Contaminated material will have to be transported through North Cascades National Park. NOCA would have to mobilize a specialized contractor to remove soils.
Impacts to Site Users and Public	Impacts remains as is.	Impacts to site users will controlled by fencing and/or signs. Future workers would be notified when working in areas containing the impacted soils.	None.	None.
Administrative Feasibility				
Public Acceptance	Not likely	Likely	Possible	Possible
Regulatory Acceptance	Not likely	Unlikely - Creation of new solid waste disposal sites within NPS boundaries is prohibited by 36 CFR Part 6	Likely	Likely
<b>Cost</b>	<b>\$0.00</b>	<b>\$165,556.55</b>	<b>\$1,012,439.35</b>	<b>\$1,159,571.35</b>

TABLE 5-2  
NEWHALEM  
COMPARISON OF ALTERNATIVES

Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	No Action	Institutional Controls	Full removal, On-Site Treatment and Off-Site Disposal at an Appropriate Facility	Full Removal and Off-site Disposal at an Appropriate Disposal Facility
<b>Effectiveness</b>				
RAO Objective: Minimizing the potential for lead impacts to human health and the environment.	Not effective, baseline conditions.	Partially effective - Would not achieve the RAO. The potential for human exposure to metals would be reduced given the assumption that administrative users obeyed posted closures and regulations. Construction worker exposure would be limited by following health and safety protocols. Environmental exposure would remain unchanged.	Effective - Full removal, on-site treatment and off-site disposal would achieve the RAO.	Effective - Full removal and off-site disposal would achieve the RAO.
<b>Implementability</b>				
Technically feasible	Yes	Yes	Yes	Yes
Availability of Goods and Services	No services required	All goods and services are available.	All goods and services are available. Treatment equipment, soil transport roll off boxes and earth moving equipment would need to be transported to/from the Site.	All goods and services are available. Soil transport roll off boxes and earth moving equipment would need to be transported to/from the Site.
Difficulty	Nothing to implement.	Not difficult. Restrictive use covenants are not difficult to prepare for a single federal agency.	Most difficult - Contaminated material will have to be transported through North Cascades National Park. NOCA would have to mobilize a specialized contractor to treat and remove contaminated soils. Some excavation would be required in a wooded area with rough terrain.	More difficult - Contaminated material will have to be transported through North Cascades National Park. NOCA would have to mobilize a specialized contractor to remove contaminated soils. Some excavation would be required in a wooded area with rough terrain.
Impacts to Site Users and Public	Impacts remains as is.	Impacts to future site users will controlled by fencing and/or signs. Future workers would be notified when working in areas containing the impacted soils.	None.	None
<b>Administrative Feasibility</b>				
Public Acceptance	Not likely	Possible	Possible	Possible
Regulatory Acceptance	Not likely	Not Likely	Likely	Likely
<b>Cost</b>	<b>\$0.00</b>	<b>\$67,112.00</b>	<b>\$755,345.50</b>	<b>\$799,477.50</b>

## **APPENDIX A**

### **Analytical Laboratory Reports**



October 17, 2013

Analytical Report for Service Request No: K1310002

Todd Leeds  
Resource Management Consultants, Inc.  
8138 South State Street, Suite 2A  
Midvale, UT 84047

Dear Todd:

Enclosed are the results of the samples submitted to our laboratory on September 23, 2013. For your reference, these analyses have been assigned our service request number K1310002.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3363. You may also contact me via Email at [Lisa.Domenighini@alsglobal.com](mailto:Lisa.Domenighini@alsglobal.com).

Respectfully submitted,

**ALS Group USA Corp. dba ALS Environmental**

Lisa Domenighini  
Project Manager

LD/mj

Page 1 of 19

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2286
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L12-28
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Georgia DNR	<a href="http://www.gaepd.org/Documents/techguide_pcb.html#cel">http://www.gaepd.org/Documents/techguide_pcb.html#cel</a>	881
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
Indiana DOH	<a href="http://www.in.gov/isdh/24859.htm">http://www.in.gov/isdh/24859.htm</a>	C-WA-01
ISO 17025	<a href="http://www.pjlabs.com/">http://www.pjlabs.com/</a>	L12-27
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	3016
Maine DHS	Not available	WA0035
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-368
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA35
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA200001
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	704427-08-TX
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C1203
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.caslab.com](http://www.caslab.com) or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.

## ALS ENVIRONMENTAL

**Client:** Resource Management Consultants, Inc.  
**Project:** NA  
**Sample Matrix:** Soil

**Service Request No.:** K1310002  
**Date Received:** 09/23/13

### Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Laboratory Control Sample (LCS).

### Sample Receipt

Six soil samples were received for analysis at ALS Environmental on 09/23/13. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory. As instructed, the discreet samples were processed using incremental sampling techniques prior to analysis.

### Total Metals

#### **Matrix Spike Recovery Exceptions:**

The control criteria for matrix spike recovery of Lead for sample ST-DU2 were not applicable. The analyzed concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

#### **Relative Percent Difference Exceptions:**

The Relative Percent Difference (RPD) for the replicate analysis of Lead in sample ST-DU2 was outside the Method control limits. The variability in the results was attributed to the heterogeneous distribution of Lead in the sample. Air drying, grinding in combination with ISM technique were used, but were not sufficient for complete homogenization of this sample.

No other anomalies associated with the analysis of these samples were observed.

Approved by



# RMC

## Laboratory Services Request Form

K1 3002

<b>I. CLIENT INFORMATION</b>				<b>SEND REQUESTS TO:</b>	
Client Name: <u>Resource Management Consultants, Inc.</u>				<b>ALS Laboratories</b> 1317 S 13th Avenue Kelso, Washington 98626  Lisa Domenighini Phone # (360)801-0932 Fax (801)-268-9992	
Client Address: <u>8138 S. State St., Suite 2A, Midvale, UT 84047</u>					
Client Phone: <u>801-255-2626</u>					
Client Fax: <u>801-255-3266</u>					
<b>II. ACCOUNT INFORMATION</b>					
Account Name: <u>North Cascades</u>				Lisa Domenighini Phone # (360)801-0932 Fax (801)-268-9992	
Sample Questions- <u>Todd Leeds RMC- 801-255-2626</u>					
TAT: <u>Standard</u> P.O. No: <u>Stehakin</u>					
<b>III. REPORT INSTRUCTIONS</b>					
Report Results To: <u>TODD LEEDS - RMC FAX-255-3266</u>					
Report Address: <u>TODD LEEDS, RMC, 8138 S. STATE ST., STE. 2A, MIDVALE, UT 84047</u>					
Please Forward Results By: <input checked="" type="checkbox"/> US Mail ( X ) <input type="checkbox"/> Fed Ex ( ) <input type="checkbox"/> Fax ( ) Ot: <u>Todd@rmc-ut.com</u>					
Services Requested below are required no later than _____ (date)					
<b>IV. TYPE OF SERVICE REQUESTED</b>					
Please analyze the enclosed environmental samples for:					
Lab Use Only Lab No.	Field Sample No./Description	Sampling Date & Time	No. of Cont.	Analysis Requested	
	ST-BG-	9/17/2013 5:00 am	1	See attached table	
	ST-DU1	9/18/2013 11:15 am	↓	↓	
	ST-DU2	12:30 pm			
	ST-DU3	12:45 pm			
	ST-DU8	2:45 pm			
	ST-DU9	3:45 pm			
notes:					
<b>V. CHAIN OF CUSTODY RECORD</b>					
Dispatched by: _____			Date _____ Time _____		Courier Co. Name <u>Alcistic Air</u>
Relinquished by: _____			Date <u>9/21/2013</u> Time <u>8:20 am</u>		Airbill # _____
Received by: _____			Date <u>9/23/13</u> Time <u>0900</u>		Custody Seal Intact?
Received for lab by: _____			Date _____ Time _____		Yes _____ No _____



PC hisa

### Cooler Receipt and Preservation Form

Client / Project: Resource Management Cons Service Request K13 10002  
 Received: 9/23/13 Opened: 9/23/13 By: [Signature] Unloaded: 9/23/13 By: [Signature]

1. Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
2. Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
3. Were custody seals on coolers?  NA  Y  N If yes, how many and where? one, front  
 If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
-0.2	-0.2	2.3	2.7	0	329	NA		NA	
-0.2	0.0	1.2	1.4	+0.2	316				

4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
5. Were custody papers properly filled out (ink, signed, etc.)?  NA  Y  N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.*  NA  Y  N
7. Were all sample labels complete (i.e analysis, preservation, etc.)?  NA  Y  N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.*  NA  Y  N
9. Were appropriate bottles/containers and volumes received for the tests indicated?  NA  Y  N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*  NA  Y  N
11. Were VOA vials received without headspace? *Indicate in the table below.*  NA  Y  N
12. Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Analytical Results

**Client:** Resource Management Consultants, Inc.  
**Project:**  
**Sample Matrix:** Soil

**Service Request:** K1310002

**Total Solids**

**Prep Method:** NONE  
**Analysis Method:** 160.3M  
**Test Notes:**

**Units:** PERCENT  
**Basis:** Air Dried

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
ST-BG	K1310002-001	09/17/2013	09/23/2013	09/30/2013	98.4	
ST-DU1	K1310002-002	09/18/2013	09/23/2013	09/30/2013	98.7	
ST-DU2	K1310002-003	09/18/2013	09/23/2013	09/30/2013	98.5	
ST-DU3	K1310002-004	09/18/2013	09/23/2013	09/30/2013	98.2	
ST-DU8	K1310002-005	09/18/2013	09/23/2013	09/30/2013	98.9	
ST-DU9	K1310002-006	09/18/2013	09/23/2013	09/30/2013	98.9	

QA/QC Report

**Client:** Resource Management Consultants, Inc.  
**Project:**  
**Sample Matrix:** Soil

**Service Request:** K1310002  
**Date Collected:** 09/18/2013  
**Date Received:** 09/23/2013  
**Date Analyzed:** 09/30/2013

**Duplicate Sample Summary**  
**Total Solids**

**Prep Method:** NONE  
**Analysis Method:** 160.3M  
**Test Notes:**

**Units:** PERCENT  
**Basis:** Air Dried

Sample Name	Lab Code	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
ST-DU2	K1310002-003	98.5	98.6	98.6	<1	

ALS Group USA, Corp.  
dba ALS Environmental

- Cover Page -

INORGANIC ANALYSIS DATA PACKAGE

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA

**Service Request :** K1310002

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**Sample Name :**

ST-BG  
ST-DU1  
ST-DU2  
ST-DU2  
ST-DU2  
ST-DU3  
ST-DU8  
ST-DU9  
Method Blank

**Lab Code :**

K1310002-001  
K1310002-002  
K1310002-003  
K1310002-003D  
K1310002-003S  
K1310002-004  
K1310002-005  
K1310002-006  
K1310002-MB

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310002  
**Date Collected :** 09/17/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/02/13

Total Metals

**Sample Name :** ST-BG  
**Lab Code :** K1310002-001

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/03/13	10	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

Client : Resource Management Consultants, Inc.  
Project Name : NA  
Project No. : NA  
Matrix : Soil

Service Request : K1310002  
Date Collected : 09/18/13  
Date Received : 09/23/13  
Date Extracted : 10/02/13

Total Metals

Sample Name : ST-DU1  
Lab Code : K1310002-002

Units : mg/Kg (ppm)  
Basis : Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/03/13	54	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

Client : Resource Management Consultants, Inc.  
Project Name : NA  
Project No. : NA  
Matrix : Soil

Service Request : K1310002  
Date Collected : 09/18/13  
Date Received : 09/23/13  
Date Extracted : 10/02/13

Total Metals

Sample Name : ST-DU2  
Lab Code : K1310002-003

Units : mg/Kg (ppm)  
Basis : Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/03/13	427	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310002  
**Date Collected :** 09/18/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/02/13

Total Metals

**Sample Name :** ST-DU3  
**Lab Code :** K1310002-004

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/03/13	10	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310002  
**Date Collected :** 09/18/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/02/13

Total Metals

**Sample Name :** ST-DU8  
**Lab Code :** K1310002-005

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/03/13	320	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310002  
**Date Collected :** 09/18/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/02/13

Total Metals

**Sample Name :** ST-DU9  
**Lab Code :** K1310002-006

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/03/13	350	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310002  
**Date Collected :** NA  
**Date Received :** NA  
**Date Extracted :** 10/02/13

Total Metals

**Sample Name :** Method Blank  
**Lab Code :** K1310002-MB

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/03/13	ND	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

Client : Resource Management Consultants, Inc.  
Project Name : NA  
Project No. : NA  
Matrix : Soil

Service Request : K1310002  
Date Collected : 09/18/13  
Date Received : 09/23/13  
Date Extracted : 10/02/13  
Date Analyzed : 10/03/13

Duplicate Summary  
Total Metals

Sample Name : ST-DU2  
Lab Code : K1310002-003D

Units : mg/Kg (ppm)  
Basis : Dry

Analyte	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Lead	6010C	2	427	285	356	40	*

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310002  
**Date Collected :** 09/18/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/02/13  
**Date Analyzed :** 10/03/13

Matrix Spike Summary  
Total Metals

**Sample Name :** ST-DU2  
**Lab Code :** K1310002-003S

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Lead	2	101	427	389	NA	75-125	

Comments:



October 17, 2013

Analytical Report for Service Request No: K1310003

Todd Leeds  
Resource Management Consultants, Inc.  
8138 South State Street, Suite 2A  
Midvale, UT 84047

Dear Todd:

Enclosed are the results of the samples submitted to our laboratory on September 23, 2013. For your reference, these analyses have been assigned our service request number K1310003.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3363. You may also contact me via Email at [Lisa.Domenighini@alsglobal.com](mailto:Lisa.Domenighini@alsglobal.com).

Respectfully submitted,

**ALS Group USA Corp. dba ALS Environmental**

Lisa Domenighini  
Project Manager

LD/mj

Page 1 of 21

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2286
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L12-28
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Georgia DNR	<a href="http://www.gaepd.org/Documents/techguide_pcb.html#cel">http://www.gaepd.org/Documents/techguide_pcb.html#cel</a>	881
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
Indiana DOH	<a href="http://www.in.gov/isdh/24859.htm">http://www.in.gov/isdh/24859.htm</a>	C-WA-01
ISO 17025	<a href="http://www.pjlabs.com/">http://www.pjlabs.com/</a>	L12-27
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	3016
Maine DHS	Not available	WA0035
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-368
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA35
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA200001
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	704427-08-TX
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C1203
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.caslab.com](http://www.caslab.com) or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.

**ALS ENVIRONMENTAL**

**Client:** Resource Management Consultants, Inc.  
**Project:** NA  
**Sample Matrix:** Soil

**Service Request No.:** K1310003  
**Date Received:** 09/23/13

**Case Narrative**

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Laboratory Control Sample (LCS).

**Sample Receipt**

Seven soil samples were received for analysis at ALS Environmental on 09/23/13. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory. As instructed, the discreet samples were processed using incremental sampling techniques prior to analysis.

**Total Metals**

**Matrix Spike Recovery Exceptions:**

The control criteria for matrix spike recovery of Lead for sample NE-DU2 were not applicable. The analyzed concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

No other anomalies associated with the analysis of these samples were observed.

Approved by



K1 390003

# RMC

## Laboratory Services Request Form

<b>I. CLIENT INFORMATION</b>				<b>SEND REQUESTS TO:</b>	
Client Name: <u>Resource Management Consultants, Inc.</u>		Client Address: <u>8138 S. State St., Suite 2A, Midvale, UT 84047</u>		<b>ALS Laboratories</b> 1317 S 13th Avenue Kelso, Washington 98626	
Client Phone: <u>801-255-2626</u>		Client Fax: <u>801-255-3266</u>			
<b>II. ACCOUNT INFORMATION</b>					
Account Name: <u>North Cascades</u>		Sample Questions- <u>Todd Leeds RMC- 801-255-2626</u>			
TAT: <u>Standard</u>		P.O. No: <u>Newhalen</u>			
<b>III. REPORT INSTRUCTIONS</b>					
Report Results To: <u>TODD LEEDS - RMC FAX-255-3266</u>					
Report Address: <u>TODD LEEDS, RMC, 8138 S. STATE ST., STE. 2A, MIDVALE, UT 84047</u>					
Please Forward Results By: <input checked="" type="checkbox"/> US Mail ( X ) <input type="checkbox"/> Fed Ex ( ) <input type="checkbox"/> Fax ( ) <input type="checkbox"/> Otl <u>Todd@rmc-ut.com</u>					
Services Requested below are required no later than _____ (date)					
<b>IV. TYPE OF SERVICE REQUESTED</b>					
Please analyze the enclosed environmental samples for:					
Lab Use Only Lab No.	Field Sample No./Description	Sampling Date & Time	No. of Cont.	Analysis Requested	
	<u>NE-BG</u>	<u>9/20/2013 9:30 am</u>	<u>1</u>	<u>See attached table</u>	
	<u>NE-DU1</u>	<u>12:00 pm</u>			
	<u>NE-DU2</u>	<u>1:30 pm</u>			
	<u>NE-DU3</u>	<u>2:30 pm</u>			
	<u>NE-DU4</u>	<u>3:30 pm</u>			
	<u>NE-DU8</u>	<u>4:15 pm</u>			
	<u>NE-DU9</u>	<u>5:00 pm</u>			
notes:					
<b>V. CHAIN OF CUSTODY RECORD</b>					
Dispatched by: _____		Date _____	Time _____	Courier Co. Name <u>Alaska Air Cargo</u>	
Relinquished by: _____		Date <u>9/21/2013</u>	Time <u>8:20 am</u>	Airbill # _____	
Received by: _____		Date <u>9/23/13</u>	Time <u>0900</u>	Custody Seal Intact?	
Received for lab by: _____		Date _____	Time _____	Yes	No

Table 4.1  
 Sample Collection Guide - Target Analytes and Collection Requirements  
 Stehekin and Newhalem Firing Ranges  
 Sampling and Analysis Plan

Parameters	Method	PRL <sup>1</sup>	Container	Volume <sup>2</sup>	Temperature <sup>3</sup>	Preservative	Technical Holding Times (Days)	Maximum Lab Precision (RPD%), and Accuracy (LCS % Recovery)
Pb (Total) - Soil	SW-846 6010C	1 mg/K	LDPE Jar or Bag	>500 grams	4°C +/- 2°	N/A	180	+/- 35%, 75%-125%
Soil Sample Preparation	Multi-Increment	NA	NA	NA	NA	NA	NA	NA
Soil Duplicate Sample Splits at Laboratory	One sample from each COC (Site) will be randomly selected for duplicate tests. Splits of these samples will be created in the laboratory after grinding is complete and will be identified as duplicates by adding the suffix "-D"							
<del>Pb (Total) - Water</del>	<del>EPA 200.7</del>	<del>10 ug/L</del>	<del>Laboratory Supplied Bottle</del>	<del>TBD</del>	<del>4°C +/- 2°</del>	<del>HCl pH&lt;2</del>	<del>180</del>	<del>+/- 20%, 85%-115%</del>

R

N/A - Not Applicable

PRL - Practical Reporting Limit

1 - All units are mg/kg based upon dry weight unless otherwise noted.

Reporting limits are goals and may vary. These goals are at or near method detection limits and may be impacted by sample volume and/or sample matrix.

2 - Sample will be sieved to <2mm in laboratory

3 - Laboratory will measure the temperature of each cooler upon receipt to ensure proper temperature was maintained (4°C +/- 2°).



PC Lisa

### Cooler Receipt and Preservation Form

Client / Project: Resource Management Cons Service Request K13 10003  
 Received: 9/23/13 Opened: 9/23/13 By: [Signature] Unloaded: 9/23/13 By: [Signature]

1. Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
2. Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
3. Were custody seals on coolers?  NA  Y  N If yes, how many and where? one, front
- If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
-0.2	-0.2	2.3	2.3	0	329	NA		NA	
-0.2	0.0	1.2	1.4	+0.2	316				

4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves
5. Were custody papers properly filled out (ink, signed, etc.)? NA  Y  N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA  Y  N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA  Y  N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA  Y  N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA  Y  N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*  NA  Y  N
11. Were VOA vials received without headspace? *Indicate in the table below.*  NA  Y  N
12. Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Analytical Results

**Client:** Resource Management Consultants, Inc.  
**Project:**  
**Sample Matrix:** Soil

**Service Request:** K1310003

**Total Solids**

**Prep Method:** NONE  
**Analysis Method:** 160.3M  
**Test Notes:**

**Units:** PERCENT  
**Basis:** Air Dried

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
NE-BG	K1310003-001	09/20/2013	09/23/2013	10/01/2013	98.6	
NE-DU1	K1310003-002	09/20/2013	09/23/2013	10/01/2013	98.2	
NE-DU2	K1310003-003	09/20/2013	09/23/2013	10/01/2013	97.8	
NE-DU3	K1310003-004	09/20/2013	09/23/2013	10/01/2013	99.1	
NE-DU4	K1310003-005	09/20/2013	09/23/2013	10/01/2013	98.8	
NE-DU8	K1310003-006	09/20/2013	09/23/2013	10/01/2013	98.9	
NE-DU9	K1310003-007	09/20/2013	09/23/2013	10/01/2013	98.8	

QA/QC Report

**Client:** Resource Management Consultants, Inc.  
**Project:**  
**Sample Matrix:** Soil

**Service Request:** K1310003  
**Date Collected:** 09/20/2013  
**Date Received:** 09/23/2013  
**Date Analyzed:** 10/01/2013

**Duplicate Sample Summary**  
**Total Solids**

**Prep Method:** NONE  
**Analysis Method:** 160.3M  
**Test Notes:**

**Units:** PERCENT  
**Basis:** Air Dried

Sample Name	Lab Code	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
NE-DU2	K1310003-003	97.8	97.7	97.8	<1	

ALS Group USA, Corp.  
dba ALS Environmental

- Cover Page -

INORGANIC ANALYSIS DATA PACKAGE

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA

**Service Request :** K1310003

---

**Sample Name :**

NE-BG  
NE-DU1  
NE-DU2  
NE-DU2  
NE-DU2  
NE-DU3  
NE-DU4  
NE-DU8  
NE-DU9  
Method Blank

**Lab Code :**

K1310003-001  
K1310003-002  
K1310003-003  
K1310003-003D  
K1310003-003S  
K1310003-004  
K1310003-005  
K1310003-006  
K1310003-007  
K1310003-MB

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310003  
**Date Collected :** 09/20/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/04/13

Total Metals

**Sample Name :** NE-BG  
**Lab Code :** K1310003-001

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/08/13	9	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

Client : Resource Management Consultants, Inc.  
Project Name : NA  
Project No. : NA  
Matrix : Soil

Service Request : K1310003  
Date Collected : 09/20/13  
Date Received : 09/23/13  
Date Extracted : 10/04/13

Total Metals

Sample Name : NE-DU1  
Lab Code : K1310003-002

Units : mg/Kg (ppm)  
Basis : Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/08/13	154	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310003  
**Date Collected :** 09/20/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/04/13

Total Metals

**Sample Name :** NE-DU2  
**Lab Code :** K1310003-003

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/08/13	586	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310003  
**Date Collected :** 09/20/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/04/13

Total Metals

**Sample Name :** NE-DU3  
**Lab Code :** K1310003-004

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/08/13	2730	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310003  
**Date Collected :** 09/20/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/04/13

Total Metals

**Sample Name :** NE-DU4  
**Lab Code :** K1310003-005

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/08/13	181	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310003  
**Date Collected :** 09/20/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/04/13

Total Metals

**Sample Name :** NE-DU8  
**Lab Code :** K1310003-006

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/08/13	138	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310003  
**Date Collected :** 09/20/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/04/13

Total Metals

**Sample Name :** NE-DU9  
**Lab Code :** K1310003-007

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/08/13	136	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310003  
**Date Collected :** NA  
**Date Received :** NA  
**Date Extracted :** 10/04/13

Total Metals

**Sample Name :** Method Blank  
**Lab Code :** K1310003-MB

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Date Analyzed	Sample Result	Result Notes
Lead	6010C	2	10/08/13	ND	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** NA  
**Project No. :** NA  
**Matrix :** Soil

**Service Request :** K1310003  
**Date Collected :** 09/20/13  
**Date Received :** 09/23/13  
**Date Extracted :** 10/04/13  
**Date Analyzed :** 10/08/13

Duplicate Summary  
Total Metals

**Sample Name :** NE-DU2  
**Lab Code :** K1310003-003D

**Units :** mg/Kg (ppm)  
**Basis :** Dry

Analyte	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Lead	6010C	2	586	564	575	4	

Comments:

ALS Group USA, Corp.  
dba ALS Environmental

QA/QC Report

Client : Resource Management Consultants, Inc.  
Project Name : NA  
Project No. : NA  
Matrix : Soil

Service Request : K1310003  
Date Collected : 09/20/13  
Date Received : 09/23/13  
Date Extracted : 10/04/13  
Date Analyzed : 10/08/13

Matrix Spike Summary  
Total Metals

Sample Name : NE-DU2  
Lab Code : K1310003-003S

Units : mg/Kg (ppm)  
Basis : Dry

Analyte	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Lead	2	102	586	1360	NA	75-125	

Comments:



October 21, 2013

Analytical Report for Service Request No: K1310162

Todd Leeds  
Resource Management Consultants, Inc.  
8138 South State Street, Suite 2A  
Midvale, UT 84047

**RE: North Cascades**

Dear Todd:

Enclosed are the results of the sample submitted to our laboratory on September 25, 2013. For your reference, these analyses have been assigned our service request number K1310162.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3363. You may also contact me via Email at [Lisa.Domenighini@alsglobal.com](mailto:Lisa.Domenighini@alsglobal.com).

Respectfully submitted,

**ALS Group USA Corp. dba ALS Environmental**

  
Lisa Domenighini  
Project Manager

LD/mj

Page 1 of 11

## Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

### **Inorganic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

### **Metals Data Qualifiers**

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Organic Data Qualifiers**

- \* The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.  
*DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.  
  - i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

### **Additional Petroleum Hydrocarbon Specific Qualifiers**

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

**ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso  
State Certifications, Accreditations, and Licenses**

<b>Agency</b>	<b>Web Site</b>	<b>Number</b>
Alaska DEC UST	<a href="http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx">http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx</a>	UST-040
Arizona DHS	<a href="http://www.azdhs.gov/lab/license/env.htm">http://www.azdhs.gov/lab/license/env.htm</a>	AZ0339
Arkansas - DEQ	<a href="http://www.adeq.state.ar.us/techsvs/labcert.htm">http://www.adeq.state.ar.us/techsvs/labcert.htm</a>	88-0637
California DHS (ELAP)	<a href="http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx">http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx</a>	2286
DOD ELAP	<a href="http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm">http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm</a>	L12-28
Florida DOH	<a href="http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm">http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm</a>	E87412
Georgia DNR	<a href="http://www.gaepd.org/Documents/techguide_pcb.html#cel">http://www.gaepd.org/Documents/techguide_pcb.html#cel</a>	881
Hawaii DOH	Not available	-
Idaho DHW	<a href="http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx">http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx</a>	-
Indiana DOH	<a href="http://www.in.gov/isdh/24859.htm">http://www.in.gov/isdh/24859.htm</a>	C-WA-01
ISO 17025	<a href="http://www.pjlabs.com/">http://www.pjlabs.com/</a>	L12-27
Louisiana DEQ	<a href="http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx">http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx</a>	3016
Maine DHS	Not available	WA0035
Michigan DEQ	<a href="http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html">http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html</a>	9949
Minnesota DOH	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	053-999-368
Montana DPHHS	<a href="http://www.dphhs.mt.gov/publichealth/">http://www.dphhs.mt.gov/publichealth/</a>	CERT0047
Nevada DEP	<a href="http://ndep.nv.gov/bsdw/labservice.htm">http://ndep.nv.gov/bsdw/labservice.htm</a>	WA35
New Jersey DEP	<a href="http://www.nj.gov/dep/oqa/">http://www.nj.gov/dep/oqa/</a>	WA005
North Carolina DWQ	<a href="http://www.dwqlab.org/">http://www.dwqlab.org/</a>	605
Oklahoma DEQ	<a href="http://www.deq.state.ok.us/CSDnew/labcert.htm">http://www.deq.state.ok.us/CSDnew/labcert.htm</a>	9801
Oregon – DEQ (NELAP)	<a href="http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	WA200001
South Carolina DHEC	<a href="http://www.scdhec.gov/environment/envserv/">http://www.scdhec.gov/environment/envserv/</a>	61002
Texas CEQ	<a href="http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html</a>	704427-08-TX
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C1203
Wisconsin DNR	<a href="http://dnr.wi.gov/">http://dnr.wi.gov/</a>	998386840
Wyoming (EPA Region 8)	<a href="http://www.epa.gov/region8/water/dwhome/wyomingdi.html">http://www.epa.gov/region8/water/dwhome/wyomingdi.html</a>	-
Kelso Laboratory Website	<a href="http://www.alsglobal.com">www.alsglobal.com</a>	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at [www.caslab.com](http://www.caslab.com) or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.





PC *SLA*

### Cooler Receipt and Preservation Form

Client / Project: DMC Service Request K13 10162

Received: Sept. 25, 2013 Opened: 9/25 By: SD Unloaded: 9/25 By: SD

- 1. Samples were received via?  Mail  Fed Ex  UPS  DHL  PDX  Courier  Hand Delivered
- 2. Samples were received in: (circle)  Cooler  Box  Envelope  Other  NA
- 3. Were custody seals on coolers?  NA  Y  N If yes, how many and where? \_\_\_\_\_  
 If present, were custody seals intact?  Y  N If present, were they signed and dated?  Y  N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
0.3	0.3	0.6	0.6	0.0	333		831311229163		

- 4. Packing material:  Inserts  Baggies  Bubble Wrap  Gel Packs  Wet Ice  Dry Ice  Sleeves \_\_\_\_\_
- 5. Were custody papers properly filled out (ink, signed, etc.)?  NA  Y  N
- 6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.*  NA  Y  N
- 7. Were all sample labels complete (i.e analysis, preservation, etc.)?  NA  Y  N
- 8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.*  NA  Y  N
- 9. Were appropriate bottles/containers and volumes received for the tests indicated?  NA  Y  N
- 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*  NA  Y  N
- 11. Were VOA vials received without headspace? *Indicate in the table below.*  NA  Y  N
- 12. Was C12/Res negative?  NA  Y  N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

ALS Group USA, Corp.  
dba ALS Environmental

- Cover Page -

INORGANIC ANALYSIS DATA PACKAGE

**Client :** Resource Management Consultants, Inc.  
**Project Name :** North Cascades  
**Project No. :** NA

**Service Request :** K1310162

---

**Sample Name :**

ST-1  
ST-1  
ST-1  
Laboratory Control Sample  
Method Blank

**Lab Code :**

K1310162-001  
K1310162-001D  
K1310162-001S  
K1310162-LCS  
K1310162-MB

Comments:

ALS Group USA, Corp.  
dba ALS Environmental  
Analytical Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** North Cascades  
**Project No. :** NA  
**Matrix :** Water

**Service Request :** K1310162  
**Date Collected :** 09/13/13  
**Date Received :** 09/25/13  
**Date Extracted :** 10/09/13

Total Metals  
Units: ug/L (ppb)

**Analyte:** Lead  
**Analysis Method:** 6020A  
**Method Reporting Limit:** 0.02  
**Date Analyzed:** 10/15/13

<b>Sample Name</b>	<b>Lab Code</b>	
ST-1	K1310162-001	0.05
Method Blank	K1310162-MB	ND

Comments:

ALS Group USA, Corp.  
dba ALS Environmental  
QA/QC Report

**Client :** Resource Management Consultants, Inc.  
**Project Name :** North Cascades  
**Project No. :** NA  
**Matrix :** Water

**Service Request :** K1310162  
**Date Collected :** 09/13/13  
**Date Received :** 09/25/13  
**Date Extracted :** 10/09/13  
**Date Analyzed :** 10/15/13

Duplicate Summary  
Total Metals

**Sample Name :** ST-1  
**Lab Code :** K1310162-001D

**Units :** ug/L (ppb)  
**Basis :** NA

Analyte	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Lead	6020A	0.02	0.05	0.05	0.05	<1	

Comments:

**ALS Group USA, Corp.**  
**dba ALS Environmental**  
**QA/QC Report**

**Client :** Resource Management Consultants, Inc.  
**Project Name :** North Cascades  
**Project No. :** NA  
**Matrix :** Water

**Service Request :** K1310162  
**Date Collected :** 09/13/13  
**Date Received :** 09/25/13  
**Date Extracted :** 10/09/13  
**Date Analyzed :** 10/15/13

Matrix Spike Summary  
 Total Metals

**Sample Name :** ST-1  
**Lab Code :** K1310162-001S

**Units :** ug/L (ppb)  
**Basis :** NA

Analyte	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Lead	0.02	50.0	0.05	49.3	99	75-125	

Comments:

**ALS Group USA, Corp.**  
**dba ALS Environmental**  
**QA/QC Report**

**Client :** Resource Management Consultants, Inc.  
**Project Name :** North Cascades  
**Project No. :** NA  
**Matrix :** Water

**Service Request :** K1310162  
**Date Collected :** NA  
**Date Received :** NA  
**Date Extracted :** 10/09/13  
**Date Analyzed :** 10/15/13

Laboratory Control Sample Summary  
 Total Metals

**Sample Name :** Laboratory Control Sample  
**Lab Code :** K1310162-LCS

**Units :** ug/L (ppb)  
**Basis :** NA

<b>Analyte</b>	<b>Analysis Method</b>	<b>True Value</b>	<b>Result</b>	<b>Percent</b>	<b>CAS Percent Recovery Acceptance Limits</b>	<b>Result Notes</b>
Lead	6020A	50.0	50.0	100	80-120	

Comments:

## **APPENDIX B**

### **Data Validation Report**



## **Technical Memorandum**

**To:** File  
**From:** Daniel Dean  
**Date:** November 13, 2013  
**Subject:** Quality Assurance Review Summary for Stehekin and Newhalem Firing Range EE/CA Data Package

Soil sampling was conducted at the Stehekin and Newhalem firing range sites (Sites) during September 2013 with the purpose of providing data for the preparation of an Engineering Evaluation/Cost Analysis report (EE/CA). Six soil samples were collected by Resource Management Consultants, Inc. from the Stehekin site on September 17 and 18, 2013. Seven soil samples were collected by Resource Management Consultants, Inc. from the Newhalem site on September 20, 2013. The samples were submitted under chain-of-custody to ALS Environmental in Kelso, Washington, for analysis of lead via USEPA Method SW-846 6010C.

The results of the quality assurance review indicate that, overall, the analytical data are of good quality and acceptable for use based on the following:

- Samples were collected in accordance with the Sampling and Analysis Plan.
- All sample preservation requirements and holding times were met.
- No contaminants were detected for any method blank results reported in the laboratory data package.
- Relative percent differences (RPDs) for laboratory duplicate sample results were within acceptable ranges.
- Matrix spike results were outside of recovery acceptance limits. However, the sample concentrations were greater than 4x the spike amount added and spike recovery limits do not apply.
- RPDs for field duplicate sample pairs were within acceptable ranges.
- Lead was detected in the equipment rinsate blank collected from the stainless steel soil coring tool used to collect soil sub-samples. However, the lead concentration in the equipment rinsate blank was 0.05 µg/L, which is five orders of magnitude below the Reporting Limit for USEPA Method SW-846 6010C. Thus, there is no possibility that contamination from the soil coring tool affected sample results.