

# **ENGINEERING EVALUATION/ COST ANALYSIS**

## **WORK PLAN**

**Kalaloch Firing Range  
Olympic National Park  
Kalaloch, Washington**

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**Prepared for:**

**Olympic National Park  
600 East Park Avenue  
Port Angeles, WA 98362-9757**

**Prepared by:**

**Resource Environmental Management Consultants, Inc.  
8138 South State Street, Ste. 2A  
Midvale, Utah 84047  
801-255-2626**

## Contents

<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	BACKGROUND .....	1
1.2	PREVIOUS INVESTIGATIONS.....	1
1.3	WORK PLAN ORGANIZATION.....	2
<b>2.0</b>	<b>SITE INVESTIGATIONS .....</b>	<b>2</b>
2.1	PLANNING DOCUMENTS .....	2
2.3	SITE INVESTIGATIONS.....	3
2.3.1	<i>Firing Range Soils</i> .....	3
2.3.2	<i>Surface and Shallow Groundwater</i> .....	4
<b>3.0</b>	<b>STREAMLINED RISK EVALUATION.....</b>	<b>5</b>
3.1	HUMAN HEALTH RISK EVALUATION .....	5
3.2	ECOLOGICAL RISK EVALUATION .....	5
<b>4.0</b>	<b>ENGINEERING EVALUATION/COST ANALYSIS .....</b>	<b>6</b>
<b>5.0</b>	<b>SCHEDULE .....</b>	<b>8</b>
<b>6.0</b>	<b>REFERENCES .....</b>	<b>9</b>

## FIGURES

Figure 1-1 Site Location Map

Figure 1-2 Technical Review Sample Locations (Baker, 2007)

## APPENDICES

Appendix A - Technical Review Report

## **1.0 INTRODUCTION**

This Engineering Evaluation/Cost Analysis (EE/CA) Workplan has been prepared to address potential contamination at the former Kalaloch Firing Range, located in Olympic National Park. This EE/CA Work Plan (Work Plan) provides the framework for implementing an EE/CA that supports a non-time critical removal action (NTCRA) at the Kalaloch Firing Range (Site). The EE/CA is being conducted in accordance with Guidance on Conducting Non-Time Critical Removal Actions under CERCLA (EPA, 1993).

### **1.1 Background**

The former Kalaloch Firing Range is located approximately 0.25 miles east of Highway 101 in Jefferson County, Washington. A Site Location Map is presented in Figure 1-1. The elevation of the Site is approximately fifty feet above mean sea level (Baker, 2007). The Site is owned by the National Park Service and is within Olympic National Park. The site was used by NPS Law Enforcement Rangers from 1975 until 2001. Various types of small arms were believed to have been used at the range. The range consisted of ten metal target stands, roughly seven to ten feet apart. There is no backstop or berm present. The area behind the stands is heavily vegetated, overgrown and wet in many places (Baker, 2007). No visible signs of spent bullets or lead were noted during the site visit documented in the Technical Review Report (Baker, 2007)

### **1.2 Previous Investigations**

One previous Site investigation was conducted and is documented in the Technical Review Report (Baker, 2007). During the Site investigation seven soil samples were collected with reported (Baker, 2007) lead concentrations ranging from of 12 to 5,200 parts per million (ppm). Sample locations are presented in Figure 1-2. Sample results are presented in Appendix A. The concentrations were compared to the USEPA Action Level of 400 ppm for lead in residential settings (Baker, 2007). Four of the samples exceed the USEPA Action Level for residential settings. In addition, the data were also compared to USEPA Ecological Soil Screening Levels (Eco-SSLs, USEPA OSWER Directive #9285.7-70, 2005). Eco-SSLs are concentrations of contaminants in soil that are protective of ecological receptors that commonly come into contact with soil or ingest biota that live on or in soil. Total lead concentrations were compared to Eco-SSLs for birds and mammals, of which several of the samples exceed the screening criteria for the following species:

- Avian Herbivore, Dove (46 ppm)
- Avian Ground Insectivore, Woodcock (11 ppm)
- Avian Carnivore, Hawk (510 ppm)

- Mammalian Herbivore, Vole (1,200 ppm)
- Mammalian Ground Insectivore, Shrew (56 ppm)
- Mammalian Carnivore, Weasel (460 ppm).

Three samples were analyzed to determine if they would be characterized as "hazardous waste" if disposed off-Site using the Toxicity Characteristic Leaching Procedure (TCLP). Two of the three samples had TCLP lead concentrations above the regulatory level of 5 ppm which requires the waste to be treated or disposed of as hazardous waste.

The results from the Site Investigation are provided in Appendix A and the results are summarized in subsequent sections of this Work Plan.

### **1.3 Work Plan Organization**

Section 2 of this Work Plan presents the investigations to be conducted under the Work Plan, including a discussion of the planning documents that will be prepared to direct and control the investigations. A description of the streamlined evaluations that will be conducted to evaluate the risks posed by the Site to human health and the environment are presented in Section 3. Section 4 presents a description of the activities that will be undertaken as part of the EE/CA to develop and analyze alternatives to address any identified unacceptable risks to human health and the environment. The schedule to complete the various elements of work is presented in Section 5. References cited in the Work Plan are presented in Section 6.

## **2.0 SITE INVESTIGATIONS**

This section describes the investigations that will be conducted at the Site to describe the nature and extent of contamination at the Site, to provide the information to conduct the streamlined risk evaluations and to provide the information to develop and evaluate alternatives to address any identified unacceptable risks to human health and the environment.

### **2.1 Planning Documents**

Planning documents to guide field work have been prepared and include the Sampling and Analysis Plan (SAP) consisting of a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP), and a Health and Safety Plan (HASP). The SAP will comply with 40 C.F.R. 300.451 (b) (4) (ii) and will include procedures for collecting, transporting and analyzing all samples to be collected under this Work Plan. The FSP will include Standard Operating Procedures (SOPs) for sample collection. The QAPP will be prepared consistent with "EPA Guidance for Quality Assurance Project Plans", EPA QA/G5 (EPA/600/R-98, Feb. 1998) and

will include identification of the data quality objectives and the quality assurance and quality control (QA/QC) protocols that will be used to achieve these objectives.

The HASP will be prepared in conformance with applicable Occupational Safety and Health Administration (OSHA) requirements, including but not limited to OSHA regulation in 29 CFR Part 1910 (54 Fed. Reg. 9294). The HASP will detail health and safety protocol for Site activities that will keep the activities in compliance with applicable regulations and provide for a safe work environment.

## **2.2 Potentially Affected Media**

For purposes of this Work Plan the potentially affected media at the Site include:

- Site soils;
- Surface water; and
- Shallow groundwater.

## **2.3 Site Investigations**

The source materials at the Site are limited to lead derived from firing range activities. The lead is not derived from an industrial source.

### **2.3.1 Firing Range Soils**

The range and extent of lead impacted soils will be investigated by collecting surface and at-depth soil samples to determine the vertical and horizontal extent of lead impacts. Sample locations will be field-fit. The depth of sampling will be dependent on Site impacts as determined by real-time Field X-Ray Fluorescence (XRF) screening conducted concurrently with soil sampling. Samples will be collected in accordance with the NPS-approved Sampling and Analysis Plan (SAP). Analytical samples will be analyzed for lead by a laboratory certified by the State of Washington.

Soil samples will be collected in three general areas:

Area 1: Down-Range - Target zone and behind the target zone.

This portion of the Site will contain the greatest concentration of lead and hence the greatest number of samples will be collected in this area. Samples will be collected on grid-based locations. Six samples were collected in this area during the Technical Review conducted in

2007. Samples will be collected to provide additional data on the extent of lead impacts. It is estimated that approximately ten surface and six at-depth laboratory analytical samples will be collected in this area. In addition to laboratory analytical sampling, an extensive XRF survey will be conducted. The XRF survey will enable the proposed sample locations to be adjusted based on real-time data. Actual sample numbers and locations may be adjusted based on the results of XRF screening. An example of this method would be to move the extent of contamination outward or downward based on the field XRF reading. Once the extent is defined with the XRF a laboratory sample will be collected for later analyses. Laboratory sample locations will be noted on a hand held GPS for later transfer into a mapping data base.

#### Area 2: Up-Range - In front of the target zone.

This portion of the Site will likely contain lower concentrations of lead than the area behind the targets. At-depth lead impacts are also expected to be significantly lower than in Area 1. Samples will be collected on grid-based locations. No samples were collected in this area during the Technical Review conducted in 2007. It is estimated that approximately five surface and three at-depth samples will be collected in this area. In addition to laboratory analytical sampling, an extensive XRF survey will be conducted. Actual sample numbers and locations may be adjusted based on the results of XRF screening.

#### Area 3: Background Sampling

Samples will be collected to determine site background lead concentration. One background sample was collected in this area during the Technical Review conducted in 2007. Approximately three samples will be collected outside of and in the vicinity of the firing range area. In addition, XRF screening will also be conducted in these areas.

### **2.3.2 Surface and Shallow Groundwater**

As likely warranted by Site conditions and/or applicable or relevant and appropriate requirements (ARARs), surface and shallow groundwater samples will be collected. Sample locations will be field-fit. Samples will be collected in accordance with the NPS-approved Sampling and Analysis Plan (SAP) Samples may be collected in two locations:

1. One shallow groundwater sample may be collected using a hand-inserted mirco piezometer in a potentially wet area located in the down range area, and
2. One surface water sample may be collected downstream of the Site

Analytical samples, if required, will be analyzed for total and dissolved lead by a laboratory certified by the State of Washington.

### **3.0 STREAMLINED RISK EVALUATION**

A streamlined human health and ecological risk evaluation will be conducted to determine if there are any unacceptable risks to human health or the environment associated with the Site. These evaluations will be based on current land use of the Site, source material data and potentially affected media collected as part of Site investigations presented in Section 2.0. The Contaminant of Concern (COC) at the Site is lead derived from non-industrial firing range activities. The human health and ecological evaluations will be included in the EE/CA Report (Section 4.0).

#### **3.1 Human Health Risk Evaluation**

The Streamlined Human Health Risk Assessment included in the EE/CA will base risk-related criteria on the following:

For Human Health Risk Assessment (HHRA):

- EPA Region 9 Residential Preliminary Remediation Goals (PRG) (EPA, 2010);
- EPA Region 3 Residential Risk-Based Concentrations (RBCs) (EPA, 2010);
- Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites (EPA, 2010); and
- State of Washington Model Toxics Control Act (MTCA) soil screening criteria (WaDOE, 2007).

The Region 9 PRGs have been harmonized with similar risk-based screening levels used by Regions 3 and 6 into a single table: "Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites" (EPA, 2010). The Streamlined HHRA will compare onsite concentrations of lead to values listed in the above-described tables. If the maximum or mean detected values exceed the screening values for lead, the site "fails". Thus, it can go directly into the corrective action process.

#### **3.2 Ecological Risk Evaluation**

The Streamlined Ecological Risk Assessment included in the EE/CA will base risk-related criteria on the following:

For Ecological Risk Assessment (ERA):

- EPA Region 3 Biological Technical Assistance Group (BTAG) Screening Levels (EPA, 2006);
- Oak Ridge National Laboratory (ORNL) Toxicological Benchmarks for Screening Contaminants of Potential Concern (ORNL, 1997); and
- State of Washington Model Toxics Control Act (MTCA) soil screening criteria (WaDOE, 2007).

The Streamlined ERA will compare on-Site concentrations of lead to values listed in the above-described tables. For EPA to approve an ERA, the current EPA Eco-SSLs must be utilized (e.g. EPA Region 3 Biological Technical Assistance Group (BTAG) Screening Levels). The Eco-SSLs are soil concentrations below which a site is presumed to have little or no risk to ecological receptors.

The potential risks to terrestrial receptors will be evaluated by comparing the concentrations of constituents found in soil at the Site to the BTAG, ORNL and MTCA screening levels for lead. If the maximum or mean detected values exceed the screening values for lead, the site “fails”. Thus, it can go directly into the corrective action process.

#### **4.0 ENGINEERING EVALUATION/COST ANALYSIS**

The EE/CA will present the results of the investigations performed at the Site, the human and ecological risk evaluations and will document the development and screening of removal action alternatives to address any unacceptable risks to human health or the environment associated with the Site.

The EE/CA will present the removal action objectives (RAOs) for the removal action, the ARAR's that will have to be met by the removal action and will develop and evaluate alternatives to address any identified unacceptable risks at the Site. A range of removal alternatives will be developed in the EE/CA and these alternatives will be evaluated against the short term and long-term aspects of the National Contingency Plan (NCP) criteria of effectiveness, implementability and cost. The EE/CA will provide a comparative analysis of the alternatives and will define the removal action alternative which best satisfies the NCP criteria.

The EE/CA will be prepared in accordance with EPA guidance (EPA, 1993), will adhere to EPA's suggested EE/CA outline and will at a minimum include the following elements:

Executive Summary:

- Identification of the threat;
- Description of the Removal Action Objectives; and
- Summary of the recommended action.



Site Characterization:

- Site description and background information;
- Description of previous investigations and site activities;
- Summary of the source, nature and extent of contamination;
- Presentation and review of XRF and laboratory data;
- Develop Preliminary Remedial Goals (PRGs); and
- Streamlined Risk Assessment.

Identification of Removal Action Objectives:

- Description of statutory limits on Removal Actions;
- Determination of the scope of the Removal for the site;
- Determination of potential schedules for the Removal at the site;
- Description of the planned Removal/Remedial activities.

Identification and Analysis of Removal Action Alternatives:

- Effectiveness;
- Implementability; and
- Cost.

Comparative Analysis of Removal Action Alternatives:

- Based on Effectiveness, Implementability and Cost.

Recommended Removal Action Alternative:

- Description of Recommended Removal Action Alternative and reasoning behind the Recommendation.

A Streamlined Risk Assessment will be conducted as part of the EE/CA. Risk assessment methodologies are presented in Section 3.0 of this Work Plan.

## 5.0 SCHEDULE

The following is the schedule for the performance of the work to be conducted under this Work Plan:

<b>Action</b>	<b>Timing</b>
EE/CA Approval Memorandum	June 2011
EE/CA Project Administrative Record, initiate AR to inform public of Project update as new public documents are prepared.	June 2011
Community Relations Plan	June 2011
Prepare and Implement EE/CA Work Plan SAP, QAPP, and HASP	June 2011
Prepare Draft EE/CA Report	Within 45 days of completion of field work.
Prepare Proposed Final EE/CA Report	Within 60 days of receipt of modifications to Draft EE/CA Report
Final EE/CA Report	Within 20 days of receipt of modifications/comments Proposed Final EE/CA Report.
Draft Update to AR File and Index	Within 20 days of Final EE/CA Report
Final Update to AR File and Index	Within 10 days of receipt of comments
Post Final EE/CA Report for Public Comment Period of 30 days	NPS will publish within 10 days of receipt of Final EE/CA report.
Draft Response to Significant Public Comments	Within 20 days of end of public comment period.
Proposed Final Response to Significant Public Comment	Within 15 days of receipt of modifications to Draft Significant Public Comments.
Final Response to Significant Public Comment	Within 10 days of receipt of modifications to Proposed Final Significant Public Comments
Draft EE/CA Action Memorandum	within 40 days of Final Response to Significant Public Comments on the EE/CA Report

Proposed Final EE/CA Action Memorandum	within 20 days of receipt of modifications to Draft EE/CA Action Memorandum
Final EE/CA Action Memorandum	within 10 days of receipt of modifications to Proposed Final EE/CA Action Memorandum
Draft Update to AR File and AR Index (including the Final EE/CA Action Memorandum)	within 20 days of Final EE/CA Action Memorandum
Final Update to AR File and AR Index (including the Final EE/CA Action Memorandum)	within 10 days of receipt of modifications to draft AR File and AR Index Update

## 6.0 REFERENCES

Michel Baker Jr. Inc, (Baker), 2007, Final Technical Report, Kalaloch Firing Range, ECL Site No. 1475, Olympic National Park, Port Angeles, Washington

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.

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USEPA, 2006, Region III Biological Technical Assistance Group (BTAG) Freshwater Screening Benchmarks,  
<http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/screenbench.htm>

State of Washington Department of Ecology (WaDOE), 2007, Model Toxics Control Act (MTCA), Chapter 173-340 WAC