

# **SAMPLING AND ANALYSIS PLAN**

## **FIRING RANGE ENGINEERING EVALUATION/COST ANALYSIS**

**REDWOOD NATIONAL PARK  
ALDER CAMP ROAD  
ORICK, CALIFORNIA**

*Prepared for:*

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## TABLE OF CONTENTS

|  |   |
|--|---|
| 1.0 INTRODUCTION.....                  | 1 |
| 2.1 PROJECT SCOPE AND OBJECTIVES ..... | 1 |
| 2.2 Sample Analysis Summary .....      | 3 |
| 3.1 FIELD ACTIVITIES.....              | 4 |
| 3.2 Field Operations.....              | 4 |
| 3.3 Equipment Decontamination .....    | 4 |
| 3.4 Environmental Sampling .....       | 5 |
| 3.4.1 Soil Sampling Procedures .....   | 5 |
| 3.4.2 Sample Handling .....            | 6 |
| 3.4.3 Sample Identification .....      | 6 |
| 3.4.4 Sample Custody .....             | 7 |
| 3.4.5 Quality Control Samples.....     | 7 |

## FIGURE

Figure 1 Proposed Sample Locations

## TABLES

Table 1 Proposed Analytical Program for Engineering Evaluation/Cost Analysis  
Table 2 Requirements for Containers, Preservation Techniques, Sample Volumes and Holding Times

## **1.0 INTRODUCTION**

The purpose and scope of the Sampling and Analysis Plan (SAP) is to define project sampling and analysis activities and specify the methodology, testing, quality control, documentation, and other procedures that will be used to provide and maintain consistent quality during sampling and analysis.

The SAP presents, in specific terms, the requirements and procedures for conducting field operations and investigations. This project specific SAP has been prepared to ensure (1) the data quality objectives specified for this project are met, (2) the field sampling protocols are documented and reviewed in a consistent manner, and (3) the data collected are scientifically valid and defensible.

This SAP is required reading for all staff participating in the work effort. The SAP shall be in the possession of the field teams collecting the samples. All field team personnel will be required to comply with the procedures documented in this SAP in order to maintain comparability and representativeness of the collected and generated data.

## **2.1 PROJECT SCOPE AND OBJECTIVES**

The NPS has the responsibility, under the Comprehensive Environmental Recovery and Liability Act (CERCLA), to determine if potential hazardous substances exist within each NPS unit. The objective of the Engineering Evaluation/Cost Analysis (EE/CA) is to determine if hazardous substances exist at the firing range located in the Alder Camp Road area of Redwood National Park (Site).

The scope of work for this project comprises the following nine tasks:

- Task 1. Conduct a Project Conference Call to discuss project coordination, schedules and deliverables and a Project Schedule;
- Task 2. Complete an initial field visit.
- Task 3. Perform response activities including preparation of Site Administrative Record (AR) File, AR Index, EE/CA Approval Memorandum, Community Relations Plan (CRP), EE/CA Work Plan, EE/CA Report and EE/CA Action Memorandum.
- Task 4. Develop a Health and Safety Plan (HASP).

- Task 5. Develop a Sampling and Analysis Plan (SAP).
- Task 6. Develop a Quality Assurance Project Plan (QAPP).
- Task 7. Perform field activities. Field activities will include conducting a Site reconnaissance, non-intrusive and intrusive investigations. Non-intrusive investigations include locating and reviewing reasonably accessible, Site-related documents and records, and interviews with persons knowledgeable of Site conditions and history. Intrusive investigations include collecting thirteen (13) surface or near surface soil samples from the firing range target area (including one background sample), three (3) surface or near surface soil samples from the short firing line area, three (3) surface or near surface soil samples from the mailbox barricade area, three (3) surface or near surface soil samples from the long firing line area, and one (1) background sample from the southern end of the Site for laboratory analysis.
- Task 8. Submit the field samples for analysis by an accredited, experienced laboratory.

Data Quality Objectives for the project are summarized as follows:

- Versar will conduct an investigation of soils at the firing range in compliance with the Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA) to assess the presence of lead, antimony, barium and copper at the Site.
- Versar will survey the number of visible lead particles at the surface by screening with a #40 sieve prior to sampling, to produce an estimate of the quantity of lead particles for remedial soil screening as described in the Statement of Work.
- Soil samples will be analyzed for total lead, copper and antimony. Soil samples from the short firing line, mailbox barricade, long firing line and background will also be analyzed for total barium. The sample(s) from each area having the highest concentration of each metal will also be analyzed using the California Title 22 Waste Extraction Test (WET) to assess the soluble fraction.
- Near surface soil samples (collected from a depth of 6 to 12 inches) from the firing range target area and background locations will be held for analysis until a comprehensive review of the surface samples has been performed. If a review of the results of surface sampling

identifies one or more locations exhibiting potentially hazardous concentrations of total lead, copper or antimony the near surface soil sample will be analyzed, with NPS authorization, to determine the potential depth of the high concentration metal.

## **2.2 Sample Analysis Summary**

Figure 1 shows the proposed sample locations.

Table 1 summarizes the sample analyses to be conducted at the Site.

Table 2 summarizes the sample containers and holding times.

### **3.1 FIELD ACTIVITIES**

Field activities to be conducted at the Site are described in detail in the EE/CA Work Plan. Field activities to be conducted include both intrusive and non-intrusive investigations.

### **3.2 Field Operations**

The Site will be accessed by 4-wheel drive vehicle via the existing unpaved access road. Equipment transported to the Site shall be sufficient in type, quantity and condition to complete the scope of work.

Versar will provide one field person to perform the field work, over a maximum time frame of two consecutive days. The NPS may provide full or part time oversight, but will maintain radio contact with the Versar field person at all times.

Equipment decontamination shall be conducted at the Site and the waste stored in 55-gallon drums or 5-gallon buckets (as appropriate) for disposal. Waste storage containers shall be properly labeled with information describing the contents, accumulation date, and generator.

Each work site or sampling location shall be returned to its original condition when possible. Efforts shall be made to minimize impacts to work sites and sampling locations, particularly those in or near sensitive environments such as wetlands. Following the completion of work at a site, all drums, trash, and other waste shall be removed.

### **3.3 Equipment Decontamination**

The following procedure shall be used to decontaminate sampling devices intended for re-use. For samplers and hand auguring devices, scrub the equipment with a solution of potable water and Alconox, or equivalent laboratory-grade detergent. Then rinse the equipment with potable water, followed by ASTM Type II Reagent Water or distilled water. Air dry the equipment on a clean surface or rack, such as Teflon, stainless steel, or oil-free aluminum elevated at least two feet above ground. If the sampling device is not used immediately after being decontaminated, it shall be wrapped in oil-free aluminum foil, or placed in a clean, closed container.

### **3.4 Environmental Sampling**

#### **3.4.1 Soil Sampling Procedures**

The Site will be divided into five decision units:

1. Firing range target area
2. Short firing line area
3. Mailbox barricade area
4. Long firing line area
5. Background area

The following steps will be taken for surface and near-surface sampling:

1. Sample locations will be selected from each of the five locations.
2. Samples will be collected from surface or near-surface soils using a drive sampler, hand auger or other appropriate sampling device.
3. Surface samples from the firing range target area and background area will be collected from 0 to 3 inches below ground surface (bgs). An additional near-surface sample from each firing range target area and background area sampling location will be collected from 6 to 12 inches (if possible). The additional samples will be held at the laboratory for possible analysis based on the results of the surface soil sample analysis.
4. Each sample from the short firing line area, long firing line area and mailbox barricade will be collected from 0 to 6 inches bgs.
5. At each sample location a #40 sieve will be used to sieve the sample into another clean container.
6. The remaining sample will be placed in a clean sample jar, labeled and placed on ice in a cooler for delivery to the contract laboratory. Composite samples will be collected separately and composited by the contract laboratory.
7. The number of visible lead particles collected on the sieve will be counted and noted on a table.

All sampling activities shall be recorded in the field logbook. The following information shall be recorded each time a sample is collected: (1) sample location, (2) sample depth, (3) visual characteristics of the sample, and (4) other relevant field information.

### 3.4.2 Sample Handling

Sample volumes, container types, and preservation requirements for the analytical methods performed on Site samples are listed in Table 2. Sample holding time tracking begins with the collection of samples and continues until the analysis is complete. Holding times for methods required routinely for Site work are also specified in Table 2. Samples not preserved or analyzed in accordance with these requirements shall be re-sampled and analyzed.

Sample containers will be pre-cleaned to laboratory standards and treated according to EPA specifications for the listed methods. Sampling containers that are reused will be decontaminated between uses by the EPA-recommended procedures (i.e., EPA 540/R-93/051). Containers will be stored in clean areas to prevent exposure to dusts, fuels, solvents, and other contaminants.

Sampling equipment and laboratory coolers will be shipped directly to the contract laboratory for analysis. Versar will prepare all necessary paperwork, provide the laboratory with the proper labels, and coordinate transport of the sampling containers and equipment to the laboratory.

### 3.4.3 Sample Identification

At the time of sampling, each sample will be assigned a unique sequential number that will be permanently marked on the sample container label. Sample identification numbers shall have the following example format: REDW-AC-DUX where:

1. REDW designates the project location (Redwood National Park)
2. AC designates the location within Redwood National Park (Alder Creek)
3. DUX indicates the decision unit (X equals 1 thru 5)

Duplicate samples will be designated with an "A" and "B" at the end of the sample IDs.

The labels will be waterproof or covered with clear tape to prevent loss during shipment. The label will contain the following information:

1. Sample Number
2. Sampling Date
3. Sampling Time
4. Analyte(s) or Analytical Method Number(s)
5. Sampler's Name
6. Site Name
7. Sample Location

### **3.4.4 Sample Custody**

Procedures to ensure the custody and integrity of the samples begin at the time of sampling and continue through transport, sample receipt, preparation, analysis and storage, data generation and reporting, and sample disposal. Records concerning the custody and condition of the samples are maintained in field and laboratory records.

Versar shall maintain chain-of-custody records for all samples. A sample is defined as under a person's custody if any of the following conditions exist: (1) it is in their possession, (2) it is in their view, after being in their possession, (3) it was in their possession and they secured it or, (4) it is in a designated secure area. All sample containers shall be sealed in a manner that shall prevent or detect tampering if it occurs.

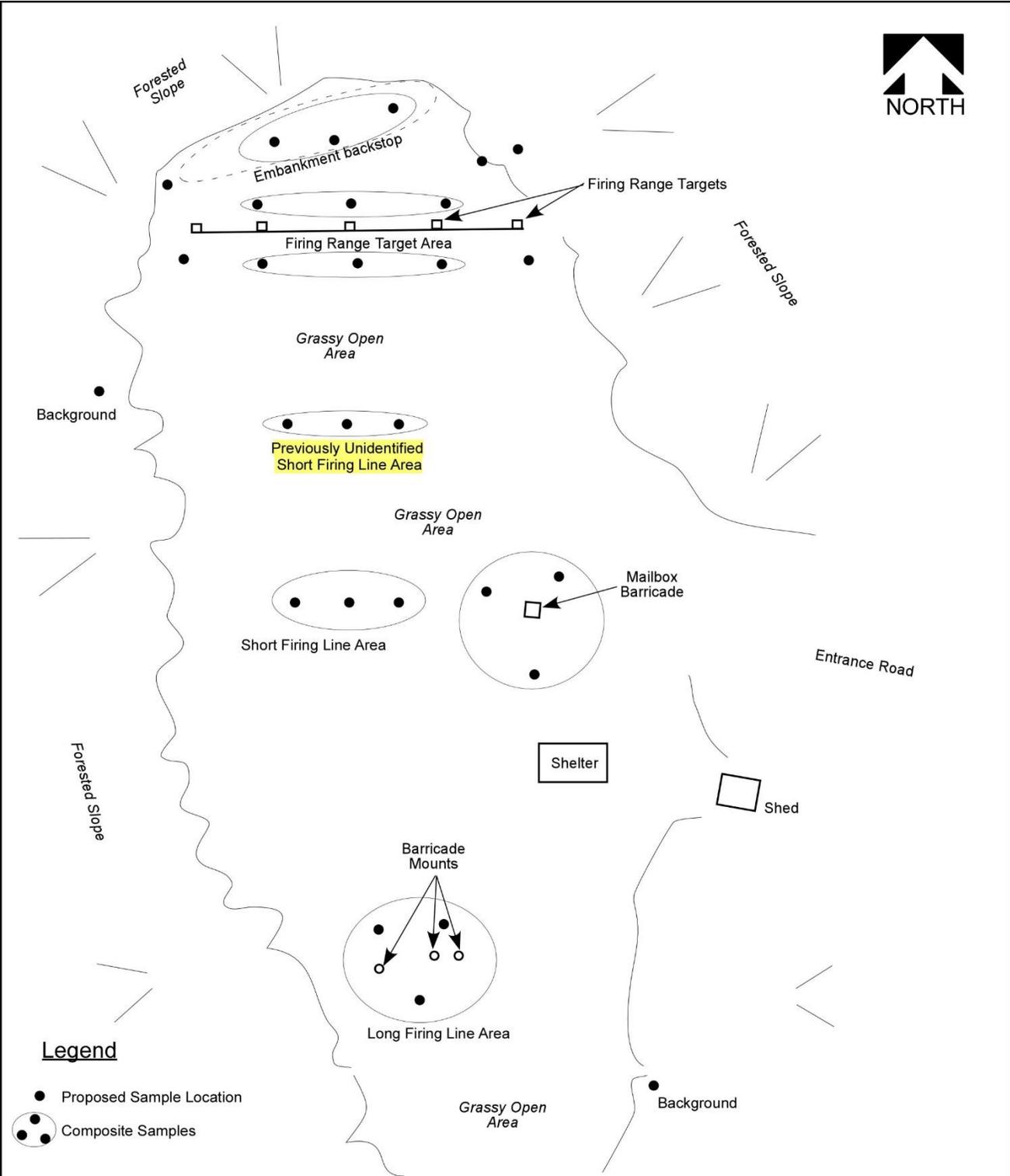
The following minimum information concerning the sample shall be documented on the Versar chain of custody (COC) form:

1. Unique sample identification
2. Date and time of sample collection
3. Source of sample (including name, location, and sample type)
4. Analyses required
5. Name of collector(s)
6. Custody transfer signatures, dates and times of sample transfer from the field to transporters and to the laboratory or laboratories.

### **3.4.5 Quality Control Samples**

Quality control samples will include one field duplicate and one equipment blank. The field duplicate will be collected from a location that is not part of a composite sample. The equipment blank will be collected where non-disposable equipment is used.

**FIGURE**



|                              |
|------------------------------|
| Dr. By: NH                   |
| Date: 10/1/2014              |
| Scale: NTS                   |
| Project No.: 112036.0004.001 |



**PROPOSED SAMPLE LOCATIONS**  
Firing Range  
Redwood National Park  
Alder Camp Road  
Orick, California

**Figure 1**

## **TABLES**



**TABLE 1**

PROPOSED ANALYTICAL PROGRAM  
FOR ENGINEERING EVALUATION/COST ANALYSIS

Alderwood Creek Road Firing Range  
Redwood National Park  
Orick, California

| Area of Concern               | Proposed Number of Soil Sample Locations | Proposed Number of Samples Submitted for Analysis | Proposed Soil Sample Collection Depth (inches) | Antimony, Copper, and Lead | Barium          | California WET (Lead tested/area) |
|-------------------------------|--|---|--|----------------------------|-----------------|-----------------------------------|
| Decision Unit / Test Method   |  |   |  | EPA Series 6010            | EPA Series 6010 |                                   |
| #1 Firing range target area   | 14                                       | 8   | 0-3"/6"-12"                                    | 8                          | 0               | 1                                 |
| #2 Short firing line area     | 3  | 1   | 0-6"   | 1                          | 1               | 1                                 |
| #3 Mailbox barricade          | 3  | 1   | 0-6"   | 1                          | 1               | 1                                 |
| #4 Long firing line area      | 3  | 1   | 0-6"   | 1                          | 1               | 1                                 |
| #5 Background soils           | 2  | 2   | 0-3"/6"-12"                                    | 2                          | 2               | --                                |
| #6 New short firing line area | 3  | 1   | 0-6"   | 1                          | 1               | 1                                 |
| Estimated Total Samples       |  |   |  | 14                         | 6               | 5                                 |

Note: Does not include quality control/quality assurance samples



**TABLE 2**

REQUIREMENTS FOR CONTAINERS, PRESERVATION TECHNIQUES,  
SAMPLE VOLUMES AND HOLDING TIMES

Firing Range  
Redwood National Park  
Orick, California

| <b>Name</b> | <b>Analytical Method</b> | <b>Container</b> | <b>Preservation</b> | <b>Minimum Sample Volume or Weight</b> | <b>Maximum Holding Time</b> |
|-------------|--------------------------|------------------|---------------------|--|-----------------------------|
| Antimony    | EPA Method 6010          | Glass Jar        | None                | 4 ounces                               | 180 days (soil)             |
| Barium      | EPA Method 6010          | Glass Jar        | None                | 4 ounces                               | 180 days (soil)             |
| Copper      | EPA Method 6010          | Glass Jar        | None                | 4 ounces                               | 180 days (soil)             |
| Lead        | EPA Method 6010          | Glass Jar        | None                | 4 ounces                               | 180 days (soil)             |