

# Engineering Evaluation/Cost Analysis Work Plan

## ALDER CAMP ROAD FIRING RANGE REDWOOD NATIONAL PARK ORICK, CALIFORNIA

November 17, 2014



U.S. DEPARTMENT OF THE  
INTERIOR  
NATIONAL PARK SERVICE  
Pacific West Regional Office  
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Prepared by:  
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## FOREWORD

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Mr. Paul Day reviewed this Work Plan and concurs with its content. Mr. Day has served as President of Patriot Technical Consultants for the past eight years. He was previously the EPA Region 10 Hanford Project Manager, in charge of the largest remediation project in the nation's history.

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**ABBREVIATIONS AND ACRNONMS**

ARAR	Applicable or Relevant and Appropriate Requirement
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIP	Community Involvement Plan
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
HASP	Health and Safety Plan
HRS	Hazard Ranking System
NCP	National Oil Pollution and Hazardous Substances Contingency Plan
NPL	National Priorities List
NPS	National Park Service
ORNL	Oak Ridge National Laboratory
PA	Preliminary Assessment
PRG	Preliminary Remediation Goal
QAPjP	Quality Assurance Project Plan
REDW	Redwood National Park
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SI	Site Investigation

## 1.0 INTRODUCTION

The Alder Camp Road Firing Range (Site) is located in Redwood National Park in Northern California. The National Park Service (NPS) has managed the Redwood National Park since 1968 and the Site was already an established firing range at that time, according to NPS personnel, (Reference 1). Several NPS park rangers have historically used the Site twice per year for permit qualifying. The Site was also used occasionally by personnel from California State Parks, the Bureau of Land Management (BLM), and Tribal Police. The NPS intends to continue using the Site as a firing range and does not intend to open the area to public access.

The NPS began transitioning from lead bullets to “green” bullets. The NPS curtailed the use of lead ammunition in 2012 and restricted access to only NPS personnel. No lead bullets are used at the Site at this time.

No lead removal actions have occurred at the Site. There are no constructed barriers behind the targets to catch stray bullets; therefore, bullets are known to be present in the soil behind and near the target line. Bullet casings have been observed sporadically on the soil surface at the Site. All permit qualifiers are supposed to pick up and remove spent shell casings; however, casings were observed sporadically spread on the ground at the Site. Some release of lead to the soil is likely due to use of lead bullets at this Site for over three decades. The extent to which lead or other heavy metals associated with firing range activities may have migrated within the soil and potentially to underlying groundwater, has not yet been determined. Contaminant exposure of persons not engaged in firing range activities at the Site is limited because visitors are not allowed access to the Site.

The Site is subject to a Removal Site Evaluation (RSE) (40 Code of Federal Regulation [CFR] 300.410(b)) as part of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), cleanup evaluation, Reference 2. The RSE includes a removal Preliminary Assessment (PA) and, if warranted, a Site Inspection (SI). Versar, Inc. (Versar) conducted a Site reconnaissance with NPS personnel on September 30, 2010. Versar subsequently conducted a PA of the Site and the PA Report was issued March 1, 2011 (Reference 3). The PA was based on readily available information to identify the source and nature of the release, evaluate the magnitude of the threat, assess the threat to public health, and determine if more information is needed to characterize the release. This PA addressed the potential environmental pathways and environmental hazards, including the exposure pathways of groundwater, surface water, soil, and air. The PA recommended that an SI be performed.

The PA included an EPA hazard ranking system (HRS) scoring package for the Site. The score for the Site was 6.3, well below the threshold of 28.5 that is required for listing on EPA’s National Priority List (NPL). An Approval Memorandum was issued by the NPS to document that the Site meets the National Oil Pollution and Hazardous Substances Contingency Plan (NCP), (Reference 4) criteria for initiating a non-time critical removal action. The NPS has determined that the use of removal action authority at the Site to investigate, abate, prevent, minimize, stabilize, mitigate, and/or eliminate the release or threat of release of hazardous substances at or from the Site is appropriate. The NPS has elected not to perform an SI, but

rather to move directly to an Engineering Evaluation/Cost Analysis (EE/CA). The EE/CA is a process through which the NPS, as lead agency, can maintain compliance with CERCLA and document the information necessary to make a final decision regarding a removal action at the Site.

### **1.1 Purpose**

This EE/CA Work Plan identifies the specific activities that will be undertaken to obtain the data and information necessary for NPS to make a final determination regarding a non-time critical removal action. The Work Plan activities provide a roadmap to help NPS determine:

- If potential hazardous substances are present at the Site through sampling and analysis;
- The nature and extent of contamination found;
- Actions that may be necessary to protect human health and the environment;
- Alternatives, including technical feasibility and cost, that could be used to address the contamination and Site restoration; and,
- A final decision regarding removal of hazardous substances at the Site.

The EE/CA Work Plan details the data gathering efforts, provides a clear scope of work and timeline for performing the work, and defines the methodologies to be used while performing project activities.

This EE/CA Work Plan includes a project schedule (Appendix A), a Site-specific Health and Safety Plan (HASP), (Appendix B, Reference 5), and a Sampling and Analysis Plan (SAP), (Appendix C, Reference 6). The project schedule provides anticipated time lines for completion of each of the tasks identified in Section 1.2.

The HASP addresses Site-specific conditions and hazards, responsibilities of Versar personnel, chemicals of concerns, emergency contact information, physical hazards, personal protection equipment, employee training and medical monitoring. The SAP includes the requirements and procedures for conducting field operations and investigations, including sampling and analysis of near-surface soils. The SAP also presents the Quality Assurance/Quality Control requirements designed to achieve the data quality goals for the project.

### **1.2 Scope of Work**

The scope of work for this EE/CA consists of the following eight 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, EE/CA Work Plan, EE/CA Report and EE/CA Action Memorandum.

- Task 4. Develop a HASP.
- Task 5. Develop a SAP.
- Task 6. Develop a Quality Assurance Project Plan.
- 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 soil samples for analysis by an accredited, experienced laboratory.

### 1.3 Site Description

The Redwood National Park is a four-park system in Northern California, managed jointly by the NPS and the California Department of Parks and Recreation. The Site is located approximately 19 miles north of the town of Orick, off of Highway 101. The Site coordinates are 41.51275° north (latitude) and -124.07571° west (longitude). The Site is located in an area of second growth forest. Access to the Site is via an unimproved road that ties into Alder Camp Road. The road is closed to the general public and can only be accessed with NPS personnel escort.

The dirt entrance road is approximately 0.1-mile from Alder Camp Road and terminates at the firing range. The range is approximately 20 yards by 75 yards and consists of a cleared space within an area of dense second growth forest. The range is a flat grassy area surrounded by alder, herbaceous plants, sword fern, salmonberry and other shrubs. The firing range, used since at least 1968, has a line of 12 targets located at the northern end of the Site. The targets consist of old pieces of conveyor belts. The target line is positioned in front of a natural embankment that is known to contain bullets fired at the targets over the years.

Above-ground plastic piping can be observed at several locations at the Site. The piping provides fixed base supports for posts attached to barricades. NPS personnel position themselves behind these barricades during qualifying for a handgun permit. A shed, picnic table and old mailbox are located on the eastern side of the range. The shed is used to store portable barricades and the mailbox itself is used as a barricade.

The location of the Site is shown in Figure 1, *Site Location Map*. A Site photograph is provided in Figure 2, *Site Photograph. View North Toward Firing Line*. Figure 3 is the *Site Layout Map*.



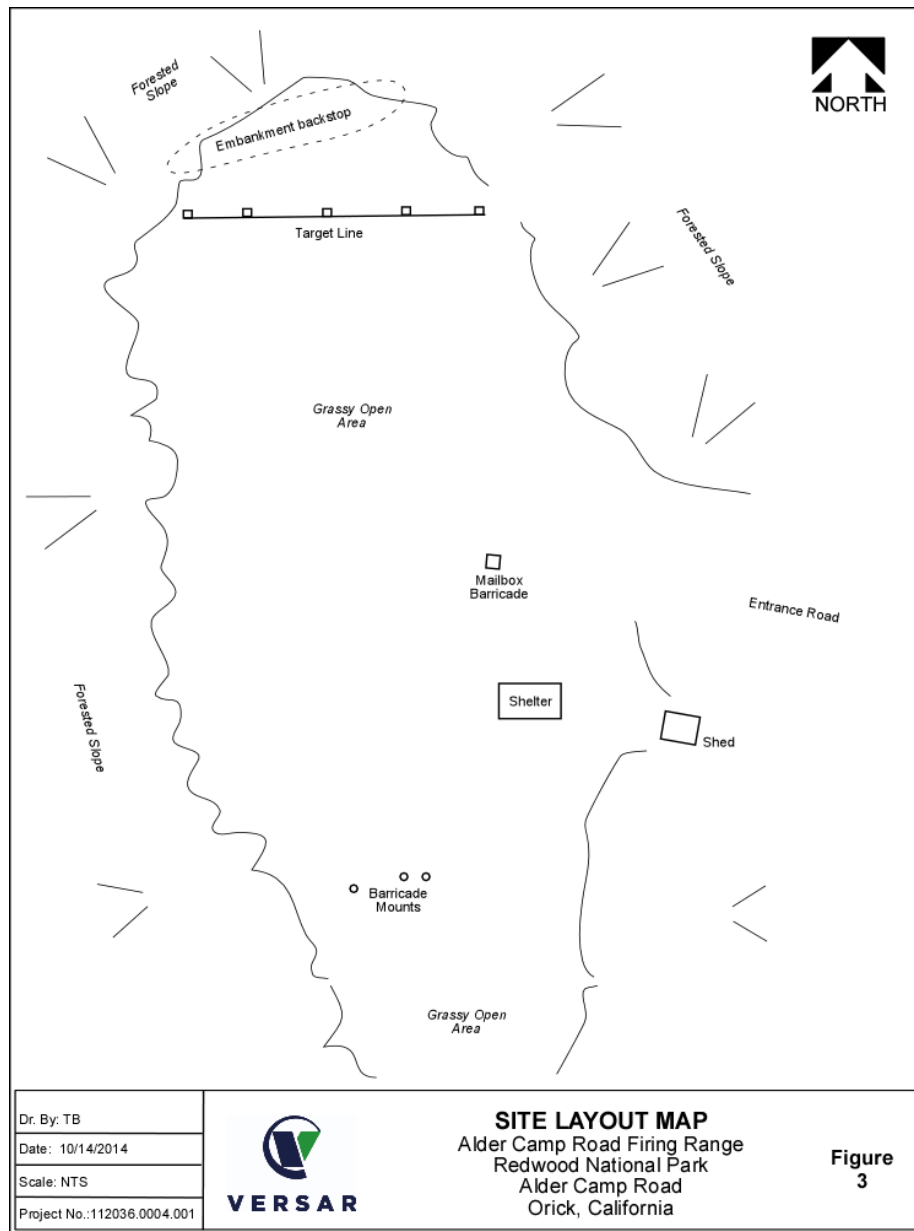


**Figure 1. Site Location Map**





**Figure 2. Site Photograph. View North Toward Firing Line**



**Figure 3. Site Layout Map**

## 1.4 Site Geology and Hydrogeology

The North Coast region, which includes Redwood National Park and the adjacent offshore area, is the most seismically active region in the United States. Frequent earthquakes and rapid uplift rates have led to landslides, actively braiding and shifting rivers, and rapid coastal erosion (Reference 8).

The geologic setting of the North Coast region comprises the triple junction of three tectonic plates (discrete portions of the Earth's crust which float above the mantle) known as the North American, the Pacific, and the Gorda plates. This junction lies offshore near Cape Mendocino, which is about 100 miles southwest of the Redwood National Park (Reference 8).

Most of the Redwood National Park is underlain by rocks of the Franciscan assemblage, which is primarily composed of sandstones and mudstones, and also contains submarine volcanics, cherts and low-temperature metamorphic rocks. This assemblage is best seen along the coast from Enderts Beach to the mouth of Redwood Creek and in road cuts on the way to the Tall Trees Grove trailhead. Much of the Franciscan assemblage consists of rock that has been sheared and lifted from the ocean floor as a result of the plate action along the Cascadia subduction zone (Reference 8).

Oceanic influences ensure fairly constant year-round temperatures along California's redwood coast: mid-40s to low-60s°F. Winters are cool with considerable precipitation. A high pressure area sitting atop the North Pacific drives a series of storms onshore from October through April, dumping the majority of 60-80 inches of annual rain over the region (Reference 8).

There are three major bodies of surface water within 15 miles of the Site; Richardson Creek, Klamath River, and the Pacific Ocean. Richardson Creek and Klamath River provide drinking water for surrounding communities (more than two miles away). Richardson Creek is located approximately 0.25-mile to the east of the Site and drains easterly to the Klamath River. The Pacific Ocean is located approximately 0.25-mile to the west of the Site. The Klamath River is located approximately one mile north of the Site and 1.5 miles east of the Site. The Site is not within a 100-year or 500-year floodplain (Reference 8).

## 1.5 Groundwater Use

Groundwater is fairly shallow and ranges from approximately three to ten feet below ground surface, based on groundwater data from surrounding properties. Hazardous releases to groundwater are considered unlikely. Lead is relatively immobile in the subsurface and it is unlikely that lead has migrated below surface to a depth sufficient to contact groundwater. Groundwater is not used for drinking water purposes in the Site area. There are no municipal or private drinking wells within four miles of the Site. There is no evidence or reason to believe that groundwater has been impacted by Site activities at this time (Reference 3).

## 2.0 FIELD ACTIVITIES

Planning for field activities began with a review of the PA (Reference 3). The site-specific HASP for this project has been developed (Appendix B) to protect the health and safety of all personnel on the Site during field activities. A SAP has been developed (Appendix C) which specifies all sampling and analysis protocols, including quality control/quality assurance.

Field activities consist non-intrusive and intrusive activities. Non-intrusive activities include an initial field visit/walk-down to provide the field sampling team with reconnaissance information regarding Site features and physical characteristics that will aid in identifying soil sampling locations and protocols.

Intrusive activities include collection of fourteen (14) surface or near surface soil samples. These will be composite samples, except for the background samples, and will range in depth from 3 to 12 inches below ground surface. General sample locations are as follows:

- |                          |           |                              |           |
|--------------------------|-----------|------------------------------|-----------|
| • Fire range target area | 8 samples | • Long firing line area      | 1 sample  |
| • Short firing line area | 1 sample  | • Background soils           | 2 samples |
| • Mailbox barricade      | 1 sample  | • New short firing line area | 1 sample  |

Details on the sampling locations and number of samples by location are shown in the attached SAP (Figure 1 and Table 1). Global Positioning System coordinates will be recorded for each sample location.

The Versar sampling team will immediately transport the soil samples to a qualified, accredited laboratory for analysis, in accordance with the SAP. Laboratory analysis methods are detailed in the SAP. The EPA Series 6010 method will be used to analyze the samples for lead, antimony, copper, and barium. A California Title 22 Wet Extraction Test will also be run for each sampling location to assess the soluble fraction.

Other activities, which are not considered field activities, include review of relevant documents and records about the site and interviews with persons knowledgeable about Site conditions and history. These activities will be performed throughout the EE/CA process and the NPS will use this information, along with field information, in drafting the EE/CA Report.

## 3.0 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

The presence of substantively elevated lead concentrations in soil within the Site is considered likely, based on the observations of the Site and review of available information regarding the past and present use of the Site. Elevated concentrations of lead or other heavy metals in ground water and surface water is not considered likely, due to the Site's location and the characteristics of the metals in question to. These metals are known to have low solubility in soil and, therefore, would not be expected to migrate a substantial distance through the soil column.

This PA conducted in 2011 addressed the potential environmental pathways and environmental hazards, including the exposure pathways of groundwater, surface water, soil, and air. The PA

also included an EPA HRS scoring package for the Site. The score for the Site was 6.3, well below the threshold of 28.5 that is required for listing on EPA's NPL.

The EE/CA will address exposure to metals and assess human health and ecological risk. This is done via a streamlined risk evaluation in accord with guidance issued by EPA. Part of streamlined risk evaluation can be comparison to established risk thresholds. The EE/CA will include, among other things, the following:

For Human Receptors:

U.S. EPA Region 9 Regional Screening Levels for Chemical Contaminants at Superfund Sites (<http://www.epa.gov/region9/superfund/prg/>) et seq, updated in May 2014 (Reference 8).

For Ecological Receptors:

NPS Protocol for the Selection and use of Ecological Screening Values for Non-Radiological Analytes, Revision 1, January 2014. (Reference 9).

These reference values are to be used for screening purposes only. They do not constitute clean-up standards for the Site. Final clean-up levels will be specific to this EE/CA and will be based upon the results of Site characterization, risk evaluation, and analysis of applicable or relevant and appropriate requirements (ARAR) consistent with CERCLA and the NCP.



## **4.0 REPORTING**

The investigation results and recommendations will be presented in an EE/CA Report. The EE/CA Report identifies the objectives of the removal action and analyzes the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives. The EE/CA Report will summarize the results of the investigation, assess human and ecological risk, identify ARARs, establish target risk levels, develop Site-specific PRGs, and analyze an appropriate array of response action alternatives, including the “No Action Alternative”, consistent with CERCLA and the NCP.

The EE/CA Report will include the following sections:

1. Executive Summary;
2. Site characterization, including a site description and background; previous removal actions; source, nature, and extent of contamination; analytical data; and a streamlined risk evaluation;
3. Identification of removal action objectives which includes the removal action scope and schedule and planned remedial activities;
4. Identification and analysis of removal action alternatives for effectiveness, implementability, and cost;
5. Comparative analysis of removal action alternatives; and,
6. The recommended removal action alternative.

The EE/CA Report is intended to:

1. Satisfy environmental review requirements for removal actions under CERCLA and the NCP;
2. Satisfy AR requirements for documentation of removal action selection;
3. Serve as a technically accurate and understandable presentation of facts and recommendations on which the public can comment; and,
4. Provide a framework for NPS to evaluate and select an appropriate decision regarding a non-time critical removal action at the Site.

## **5.0 WORK SCHEDULE**

The schedule for the project is provided in Appendix A.

## **6.0 REFERENCES**

- (1) Jennifer Isaac, Environmental Scientist, Versar, Inc. Site reconnaissance conducted with Mike Sanders of NPS on September 30, 2010.



- (2) Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. § 9601 et seq (2002).
- (3) Versar, Inc. (Versar) 2011. Preliminary Assessment, Camp Alder Road Firing Range, Redwood National and State Parks, Alder Camp Road, Orick, California. Versar Project No. 104700.4929.041. March 1.
- (4) Office of the Federal Register. 1994. NCP, 40 Code of Federal Regulations (CFR) Part 300.
- (5) Versar, Inc. (Versar) 2014. Site Health and Safety Plan, Firing Range, Engineering Evaluation/Cost Analysis, Redwood National Park, Alder Camp Road, Orick, California.
- (6) Versar, Inc. (Versar) 2014. Sampling and Analysis Plan, Firing Range, Engineering Evaluation/Cost Analysis, Redwood National Park, Alder Camp Road, Orick, California. Versar Project No.112036.0004.001. October 3
- (7) National Park Service (NPS). Redwood National and State Parks Website. <http://www.nps.gov/redw/>.
- (8) U.S. EPA Region 9 Regional Screening Levels for Chemical Contaminants at Superfund Sites (<http://www.epa.gov/region9/superfund/prg/>) et seq, updated in May 2014
- (9) NPS Protocol for the Selection and use of Ecological Screening Values for Non-Radiological Analytes, Revision 1, January 2014.

## **APPENDIX A**

### **SCHEDULE**

The scheduled activities shown on the following pages begin with contract award and end with submittal of the final deliverable required by the contract. Activities shown in italics are the responsibility of NPS personnel. All other activities are the responsibility of the contractor for this project, Patriot Technical Consultants, Inc.

<b>SCHEDULED EE/CA ACTIVITIES AND STATUS (AS OF NOVEMBER 17, 2014)</b>			
<b>ACTIVITY</b>	<b>PLANNED START</b>	<b>PLANNED FINISH</b>	<b>STATUS</b>
Contract Award and Notice to Proceed	09/16/14	09/16/14	complete
Project Conference Call and Schedule	09/16/14	09/19/14	complete
Submit Project Work Schedule	09/19/14	09/24/14	complete
Develop Health and Safety Plan	09/19/14	09/26/14	complete
Initial Field Visit	09/26/14	09/30/14	complete
Submit Draft Sampling and Analysis Plan (SAP)	09/29/14	10/07/14	complete
<i>NPS Review of Draft Sampling and Analysis Plan</i>	10/07/14	10/20/14	complete
Submit Final Sampling and Analysis Plan	10/20/14	10/31/14	complete
Submit Draft Quality Assurance Project Plan (QAPjP)	09/19/14	10/07/14	complete
<i>NPS Review of Draft QAPjP</i>	10/07/14	11/16/14	on schedule
Submit Final QAPjP	11/16/14	11/25/14	on schedule
Submit Draft Administrative Record (AR) File and Index	09/16/14	09/30/14	complete
<i>NPS Review of Draft AR File and Index</i>	09/30/14	10/13/14	complete
Submit Final AR File and Index	10/13/14	10/22/14	complete
Submit Draft EE/CA Approval Memorandum	09/16/14	09/30/14	complete
<i>NPS Review of Draft EE/CA Approval Memorandum</i>	09/30/14	10/13/14	complete
Submit Final EE/CA Approval Memorandum	10/13/14	10/26/14	complete
<i>NPS Issues Final EE/CA Approval Memorandum</i>	10/26/14	11/09/14	complete
Submit Draft Community Involvement Plan (CIP)	10/07/14	10/27/14	complete
<i>NPS Review of Draft CIP</i>	10/28/14	10/31/14	complete
Submit Final CIP	10/31/14	10/31/14	complete
Submit Draft EE/CA Work Plan	09/29/14	10/31/14	complete

<b>SCHEDULED EE/CA ACTIVITIES AND STATUS (AS OF NOVEMBER 17, 2014)</b>			
<b>ACTIVITY</b>	<b>PLANNED START</b>	<b>PLANNED FINISH</b>	<b>STATUS</b>
<i>NPS Review of Draft EE/CA Work Plan</i>	11/03/14	11/18/14	complete
Submit Final EE/CA Work Plan	11/18/14	11/26/14	on schedule
Complete All Field Activities (including Soil Sampling)	12/01/14	12/04/14	on schedule
Complete All Laboratory Analysis and QA on Lab Data	12/05/15	12/19/14	on schedule
Submit Draft EE/CA Report	12/19/14	01/28/15	on schedule
<i>NPS Review of Draft EE/CA Report</i>	01/28/15	02/17/15	on schedule
Submit Proposed Final EE/CA Report	02/17/15	03/02/15	on schedule
<i>NPS Review of Proposed Final EE/CA Report</i>	03/03/15	03/16/15	on schedule
Submit Final EE/CA Report	03/16/15	03/30/15	on schedule
<i>NPS Prepares and Issues Public Comment Notice</i>	03/30/15	04/06/15	on schedule
<i>NPS Holds Public Comment Period (30 days)</i>	04/06/15	05/04/15	on schedule
Submit Draft AR File/Index Update including EE/CA Report	03/30/15	04/06/15	on schedule
<i>NPS Reviews AR File/Index Update</i>	04/06/15	04/15/15	on schedule
Submit Final AR File/Index Update including EE/CA Report	04/15/15	04/24/15	on schedule
Submit Draft Response to Significant Public Comments	05/04/15	05/18/15	on schedule
<i>NPS Reviews Draft Response to Public Comments</i>	05/18/15	06/01/15	on schedule
Submit Final Response to Significant Public Comments	06/01/15	06/10/15	on schedule
Submit Draft EE/CA Action Memorandum	06/10/15	06/21/15	on schedule
<i>NPS Reviews Draft EE/CA Action Memorandum</i>	06/22/15	07/06/15	on schedule
Submit Final Action Memorandum	07/06/15	07/13/15	on schedule
Submit Draft Update to AR File/Index including Action Memo	07/13/15	07/20/15	on schedule
<i>NPS Reviews AR File/Index Update</i>	07/20/15	08/03/15	on schedule
Submit Final Update to AR File/Index including Action Memo	08/03/15	08/10/15	on schedule

## **APPENDIX B**

### **SITE HEALTH AND SAFETY PLAN**

# **SITE HEALTH AND SAFETY PLAN**

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

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

*Prepared for:*

**NATIONAL PARK SERVICE**  
Pacific West Regional Office  
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Order No. P14PX03671

Versar Project No.112036.0004.001

September 26, 2014



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### ATTACHMENTS:

Hospital Route Map  
Material Safety Data Sheet - Lead

## 1.0 INTRODUCTION

### 1.1 Background

The National Park Service (NPS) has retained Patriot Technical Consultants, Inc. (Patriot) to perform an engineering evaluation/cost analysis (EE/CA) at the active firing range located in the Alder Camp Road area of Redwood National Park, Orick, California. Patriot has retained Versar, Inc. (Versar) as a subconsultant to perform all onsite field activities associated with this EE/CA, including an initial site visit/walk down and near-surface soil sampling. Versar has developed this Health and Safety Plan (HASP), as its personnel will be conducting the onsite activities. This HASP is also referred to as the site safety plan.

### 1.2 Site Characterization

Client Name: National Park Service

Location of Site: Alder Camp Road, Redwood National Park, Orick, California

Client Contact Person(s):

Name: Mr. Stephen Mitchell – COR REDW: (415) 623-2286

Topography of the area surrounding the site:

Hilly ☒ Flat ☐ Hummocky ☐ Marshy ☐  
Mountainous ☐ Other ☐

Area affected:

Urban ☐ Rural ☒ Residential ☐ Industrial ☐ Commercial ☐ Other ☐

Types of bodies of water bordering the site, if any:

Stream ☐ River ☐ Pond ☐ Lake ☐ Bay ☐  
Ocean ☐ Other ☐ None ☒

Are the services being provided as a consequence of orders from local, state, or federal officials?

Yes ☐ No ☒

### 1.3 Purpose

The primary purpose of this HASP is to provide Versar field personnel with an understanding of the potential chemical and physical hazards that exist or may arise while the tasks of this project are being performed. The HASP incorporates the guidelines set forth in the Versar's corporate Health and Safety Manual; Injury Illness

and Prevention Program (IIPP); and Medical Monitoring Program. Additionally, the information contained herein will define the safety precautions necessary to respond to such hazards should they occur.

## 1.4 Objective

The primary objective is to ensure the well-being of all field personnel and the community surrounding the site. To accomplish this, project staff shall acknowledge and adhere to the policies and procedures established herein. Accordingly, all personnel assigned to this project shall read this site safety plan and sign the Agreement Statement in Section 8.1 to certify that they have read, understood, and agreed to abide by its provisions. All Versar personnel shall perform work in compliance with standards set forth in the Versar Corporate Health and Safety Manual and the IIPP.

## 1.5 Hazard Determination

Serious \_\_\_\_\_ Moderate \_\_\_\_\_ Low   X   Unknown \_\_\_\_\_

## 1.6 Level of Protection

  X   Modified level D

The minimum acceptable level of protection at this site is a Modified Level D, as described in Section 5.0 entitled "Health and Safety Requirements."

## 1.7 Amendments

Any change in the scope of this project and/or site conditions must be amended in writing in Section 8.2 entitled Site-specific Safety and Health Plan Amendment Sheet and approved by the Versar Regional Health and Safety Officer.

Proposed time frame for site work: Site walk - September 29, 2014, one day  
Field sampling – Spring 2015

## **2.0 PROJECT PERSONNEL**

Versar will oversee the implementation of health and safety protocols and procedures by project personnel for project activities. The following management structure will be instituted for the purpose of successfully and safely completing this project.

### **2.1 Project Manager: Tim Berger**

The Project Manager will be responsible for implementing the project, the site safety plan, and the IIPP, and obtaining any necessary personnel or resources for the completion of the project. Specific duties will include:

- providing authority and resources to ensure that the Site Safety Officer is able to implement and manage safety procedures;
- preparing reports and recommendations about the project to clients and affected Versar personnel;
- ensuring that all persons allowed to enter the site (i.e. EPA, contractors, state officials, visitors) are made aware of the potential hazards associated with the substances known or suspected to be on site and are knowledgeable as to the on-site copy of the specific site safety plan;
- ensuring that the Site Safety Officer is aware of all of the provisions of this site safety plan and is instructing all personnel on site about the site practices and emergency procedures defined in the plan; and
- ensuring that the Site Safety Officer is making an effort to monitor the site safety and has designated a Field Team Leader to assist with the responsibility when necessary.

### **2.2 Regional Health and Safety Officer: David Sendek**

The Regional Health and Safety Officer shall be responsible for the overall coordination and oversight of the site safety plan. Specific duties will include:

- approving the selection of the types of personal protective equipment (PPE) to be used on site for specific tasks;
- monitoring the compliance activities and the documentation processes undertaken by the Site Safety Officer as required in Versar's Corporate Health and Safety Manual, the IIPP, and the Medical Monitoring Program;
- evaluating weather and chemical hazard information and making recommendations to the Project Manager about any modifications to work plans or personal protection levels in order to maintain personal safety;
- coordinating upgrading or downgrading of PPE with Site Safety Officer, as necessary, due to changes in exposure levels, monitoring results, weather, other site conditions;

- approving all field personnel working on site, taking into consideration their level of safety training, their physical capacity, and their eligibility to wear the protective equipment necessary for their assigned tasks (i.e. respirator fit testing results and Medical Monitoring Program requirements); and
- overseeing the air-monitoring procedures as they are carried out by site personnel for compliance with all company health and safety policies.

## **2.3 Site Safety Officer: Nicole Hastings**

The Site Safety Officer shall be responsible for the implementation of the site safety plan and IIPP on site. Specific duties will include:

- monitoring the compliance of field personnel for the routing and proper use of the PPE that has been designated for each task;
- routinely inspecting PPE and clothing to ensure that it is in good condition and is being stored and maintained properly;
- stopping work on the site or changing work assignments or procedures if any operation threatens the health and safety of workers or the public;
- monitoring personnel who enter and exit the site and all controlled access points;
- reporting any signs of fatigue, work-related stress, or chemical exposures to the Project Manager and the Regional Health and Safety Officer within 24 hours, as directed in Versar's Corporate Health and Safety Manual and the IIPP;
- dismissing field personnel from the site if their actions or negligence endangers themselves, co-workers, or the public and reporting the same to the Project Manager and the Regional Health and Safety Officer within 24 hours, as directed in Versar's Corporate Health and Safety Manual and IIPP;
- reporting accidents or violations of the site safety plan to the Project Manager and/or Regional Health and Safety Manager within 24 hours, as directed by Versar's Corporate Health and Safety Manual and the IIPP;
- knowing emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire and police departments, per the site safety plan;
- ensuring that all project-related personnel have signed the personnel agreement and acknowledgments form contained in this site safety plan;
- coordinating, upgrading, and downgrading of PPE with the Regional Health and Safety Officer, as necessary, due to changes in exposure levels, monitoring results, weather, and other site conditions; and
- performing air monitoring with approved instruments in accordance with requirements stated in this HASP.

## **2.4 Field Team Leader: Nicole Hastings**

In the event that the Project Manager and the Site Safety Officer are not on the site, the Field Team Leader will assume all responsibility for enforcing safety procedures, as covered in this site safety plan, the Versar Corporate Health and Safety Manual, and the IIPP.

## **2.5 Field Personnel**

All field personnel shall be responsible for acting in compliance with all safety procedures outlined in this HASP, Versar's Corporate Health and Safety Manual, and the IIPP. Any hazardous work situations or procedures should be reported to the Site Safety officer so that corrective steps can be taken. The Regional Health and Safety Officer and/or Site Safety Officer have the authority to halt any operation that does not follow the provisions of the HASP.



### 3.0 EMERGENCIES

In the event of an accident or emergency situation, immediate action must be taken by the first person to recognize the event. First aid equipment is located on site inside the Versar vehicle. Immediately after emergency procedures are implemented, notify (1) the Site Safety Officer and (2) the Project Manager and the Regional Health and Safety Officer about the situation.

#### 3.1 Emergency Telephone Numbers

Immediate Emergencies:

Local Police:	911
Fire:	911
Ambulance:	911
NPS REDW (Joe Seney)	(707) 465-7707 (mobile)

Medical Emergency:

Sutter Coast Hospital  
800 East Washington Blvd  
Crescent City, CA 95531  
707-464-8511

Environmental Emergency:

Versar, Inc. (Tim Berger)	Sacramento: (916) 849-3258 (mobile)
Versar, Inc. (Nicole Hastings-Bethel)	Sacramento (805) 801-4998 (mobile)
NPS COR (Steve Mitchell)	San Francisco (415) 623-2286
Patriot Technical Consultants, Inc. (Paul Day)	Richland: (509) 947-0472 (mobile)
OSHA	(800) 648-1003
Poison Control Center	(800) 532-2222
National Response Center	(800) 424-8802

#### 3.2 Encountering Hazardous Situations (requiring evacuation)

Personnel encountering a hazardous situation shall instruct others on site to evacuate the vicinity IMMEDIATELY and call the (1) Site Safety Officer, (2) the Project Manager, and (3) the Regional Health and Safety Officer for instructions.

The site must not be re-entered until the situation has been corrected (i.e. appropriate back-up help, monitoring equipment, personal protective equipment is at the site).

Usual Procedures for Injury

A. Call for ambulance/medical assistance if necessary. Notify the receiving hospital of the nature of the physical injury or chemical overexposure. If a telephone is not available transport the person to the nearest hospital and have another person inform the hospital, at the nearest phone, of the route taken to the hospital and description of transporting vehicle.

- B. Send/take this site safety plan, with the attached Material Safety Data Sheet (MSDS) if available, to the medical facility with the injured person. Complete the required forms.
- C. If the injury is minor, proceed to administer first aid, and notify the Site Safety Officer, the Project Manager, and the Regional Health and Safety Officer. Complete the required forms.
- D. Notify the Site Safety Officer, Project Manager, and Regional Health and Safety Officer of all accidents, incidents, or near miss situations. Ensure that all required procedures in Versar's Corporate Health and Safety Manual and IIPP are followed.

### **3.3 Emergency Treatment**

When transporting an injured person to a hospital, bring this site safety plan to assist medical personnel with injury diagnosis and treatment. In all cases of chemical overexposure, follow standard procedures as outlined below for poison management, first aid, and if applicable, cardiopulmonary resuscitation. Four different routes of exposure and their respective first aid/poison management procedures are outlined below:

A. Ingestion:

IMMEDIATELY transport the person to the nearest medical facility, or call 911

B. Inhalation/Confined Space:

DO NOT ENTER A CONFINED SPACE TO RESCUE A PERSON WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.

C. Inhalation/Other:

Move the person from the containment environment. Initiate cardiopulmonary resuscitation (CPR), if necessary. Call, or have someone call, for medical assistance. Refer to Material Safety Data Sheet for additional specific information. If necessary, transport the victim to the nearest hospital as soon as possible and have someone contact the hospital with the description of the transporting vehicle and route taken to the hospital.

D. Skin Contact:

IMMEDIATELY wash off skin with a large amount of water. Remove any contaminated clothing and rewash skin. Transport person to a medical facility, if necessary.

E. Eyes:

Hold eyelids open and rinse the eyes IMMEDIATELY with copious amounts of water for 15 minutes. If possible, have the person remove his/her contact lenses (if worn). Never permit the eyes to be rubbed. Transport the person to a hospital as soon as possible and notify the hospital of the route taken to their facility and the description of the transport vehicle.

## **4.0 CHEMICALS OF CONCERN**

### **4.1 Chemical Hazards**

Potential effects of any exposure are dependent on several factors such as: toxicity of substance, time frame of exposure, concentration of substance producing the exposure and general health of person exposed.

#### **4.1.1 Lead**

The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting and headache. Acute poisoning can lead to muscle weakness, “lead line” on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine, with shock, coma and death in extreme cases.

Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased blood levels may follow.

Lead may be absorbed through the skin on prolonged exposure, the symptoms for lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness and pain.

#### **4.1.2 Antimony**

Antimony present as a metal does not typically affect human health. Antimony dust is considered harmful and is suspected of causing cancer with long term acute exposure. Antimony can be absorbed through the respiratory system or orally, and is mainly excreted from the human body through urine.

Antimony poisoning symptoms include vomiting, diaphoresis (profuse perspiring), diarrhea and a metallic taste in the mouth. External exposure can cause irritation of the skin or mucous membranes. Severe poisoning resembles arsenic poisoning.

#### **4.1.3 Copper**

In low doses, copper is a nutrient for humans. Copper deficiency can produce anemia-like symptoms, bone abnormalities, impaired growth increased incidence of infections and other abnormalities. Chronic copper toxicity does not normally occur in humans because of transport systems that regulate absorption and excretion.

#### **4.1.4 Barium**

Barium is a highly reactive metal and is typically associated with barium compounds. Water-soluble barium compounds are poisonous. High doses of barium can affect the nervous system, causing cardiac irregularities, tremors, weakness anxiety, dyspnea and paralysis.

Barium is not carcinogenic and does not bioaccumulate. Insoluble barium sulfate is non-toxic and not classified as dangerous. However, inhaled dust containing insoluble barium compounds can accumulate in the lungs causing a benign condition called baritosis.

## **4.2 Physical Hazards**

The physical hazards are those typically associated with general construction. Slips, trips, and falls are of primary concern in accident prevention. The contractor will exercise care to maintain good housekeeping practices within the work areas. The work areas will be closed off with caution tape and barricades when work is not in progress.

### **4.2.1 Climate and Altitude**

The REDW-area climate is coastal marine; cool wet winters and cool summers. Summer temperatures range from a nighttime low of 50 degrees Fahrenheit (F) to a daytime high of 66 F. Annual precipitation averages 66 inches of rain per year, with the majority occurring from November through March. Snow in the region is rare, but may occur in January. All sampling activities must cease if lightning is present or threatening. All personnel onsite must keep well away from construction equipment during a thunderstorm.

### **4.2.2 Heavy Equipment**

The more severe accidents will be related to the use of heavy equipment. During activities, trucks, drilling, and steam cleaning equipment are not expected to be used. However, all heavy equipment used on this project will be in good working order and operated in accordance with recognized industry standard and Cal-OSHA Title 8, Subchapter 4, Construction Safety Orders. Safety maintenance checks of all equipment shall be conducted just prior to the start of each work day. All chains, cables, grounding equipment, lifting machinery shall be of sufficient grade or rating to handle the weights and conditions at the site. Employers and workers at the site shall comply with all Cal OSHA requirements including personal protection, safety, training, and safety planning rules. Drilling activities that pose imminent hazard to site personnel will not be permitted. All cables, slings, and locks will be inspected daily by the contractor to insure that they are in safe working order. All cranes and backhoes will use side bracing when in operation to secure against lateral movement. Bracing must have secure footing.

### **4.2.3 Heat and Cold Stress**

Heat stress results when the ability of the body to internally regulate heat buildup is exceeded. Heat stress can range from a rash to death. Symptoms of heat stress begin with malaise, weakness, mental fatigue, and sometimes rashes in moist areas of the body such as under arms. Symptoms progress to increased physical and mental fatigue, irritability, irrational behavior, and muscle cramps. A critical condition is signaled by cessation of sweating, cool dry skin, and fainting.

Workers will guard against heat stress by monitoring fluid intake and pulse, and incorporating body temperature monitoring and rest periods as the need arises. If prolonged or unusually hot conditions persist, work may be performed during evening and night hours.

Workers who are exposed to extreme cold or work in cold environments may be at risk of cold stress. The result may be hypothermia, or abnormally low body temperature, and/or frostbite. A body temperature that is too low affects the brain, making the victim unable to think clearly or move well. This makes hypothermia particularly dangerous because a person may not know it is happening. Typical early symptoms of hypothermia are shivering, fatigue, loss of coordination, confusion and disorientation. Late symptoms include no shivering, blue skin, dilated pupils, slowed pulse and breathing and loss of consciousness. A victim can be moved into a warm room or shelter. Remove their wet clothing. Warm the center of their body first-chest, neck, head, and groin-using an electric blanket, if available; or use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets. Warm beverages may help increase the body temperature.

Frostbite is an injury to the body that is caused by freezing. Frostbite causes a loss of feeling and color in the affected areas. It most often affects the nose, ears, cheeks, chin, fingers, or toes. Frostbite can permanently damage body tissues, and severe cases can lead to amputation. In extremely cold temperatures, the risk of frostbite is increased in workers with reduced blood circulation and among workers who are not dressed properly.

## **5.0 HEALTH AND SAFETY REQUIREMENTS**

### **5.1 Work Zone Access**

Access within a 30-foot radius of any on-site operation in the situation that significant contamination is encountered is prohibited to all but Versar field personnel. Standard work practices, such as performing field activities in the upwind position, will be observed whenever possible. Personal protective equipment indicated in Section 5.4 will be worn by all onsite field personnel.

#### **5.1.1 Exclusion Zones**

Formal exclusion zones are not expected to be required. Unauthorized personnel will not be permitted near the work zone area.

#### **5.1.2 Decontamination Zone**

A formal decontamination zone may be required. It would be sited in the monitored, upwind direction from the work zone area. Decontamination procedures are covered in Section 5.5. All site personnel will be required to follow the procedures as reported in the corporate Health and Safety Manual.

#### **5.1.3 Support Zones**

No formal requirements will be necessary for the support zone area, although the general practice of locating the zone in the upwind direction will be followed.

### **5.2 Air/Gas/Vapor Monitoring Procedures**

The greatest potential hazards to safety and health at this site include:

- 1) Exposure to lead airborne dust through inhalation; and
- 2) Exposure to chemical contamination and/or airborne dust through skin contact or ingestion.

In the event that soil and/or groundwater chemical contamination is encountered, ongoing air monitoring during project tasks will provide data to ensure that vapor concentrations are within acceptable ranges and will provide adequate selection criteria for respiratory and dermal protection.

No volatile chemicals are a contaminant of concern at this site.



### **5.3 Action Levels/Level of Personal Protection Equipment (PPE)**

Action levels are not applicable to this site. Contaminants of concern are not volatile and routes of ingestion are limited.

### **5.4 PPE**

Modified Level D is the minimum acceptable level for this site. Modified Level D provides minimal dermal protection. Respiratory protection is not required.

#### **A. Modified Level D includes:**

- coveralls/work uniform
- Tyvek (optional)
- Nitrile butyl-rubber or Viton gloves with disposable nitrile liner (optional)
- boots/shoes, leather or chemical resistant, with steel shank and approved toe protection
- approved safety glasses or chemical splash goggles if the potential for splash exists
- hard hat
- reflective traffic vest (if traffic, construction, or other related activities are present)
- hearing protection (as appropriate)
- respiratory protection (as necessary)

#### **B. Additional equipment upgrade:**

1. Protocols for upgrading -- The Site Safety Officer and/or Regional Health and Safety Officer will determine if changes in PPE are needed.
2. Upgraded equipment
  - a. Respirators -- Respirators are not applicable to this Site.
  - b. Other -- Tyvek suits and appropriate gloves shall be worn if potential for dermal exposure exists while performing job tasks.

#### **C. First Aid Equipment**

First aid equipment for this site is the responsibility of the Site Safety Officer. Vehicles used for site work will be equipped with a first aid kit and safety equipment including:

- cones and flags
- barricades
- fire extinguisher
- water, suitable for drinking
- portable eye wash
- complete first aid kit

### **5.5 Decontamination Procedures**

All operations conducted at this site have the potential to contaminate field equipment and PPE. To prevent the transfer of any contamination to vehicles, administrative areas, and other personnel, the following procedures must be followed:

1. Whenever possible, field equipment should be decontaminated with a solution of Alconox or Green Soap and thoroughly rinsed with water prior to leaving the site. This must be done outside a 10-foot radius of any work area or the hot zone.
2. Personal Decontamination  
  
Level D: Segregated Equipment Drop
  - wash/rinse outer boot (as appropriate)
  - wash/rinse chemical resistant outer glove, then remove as appropriate
  - remove and throw out inner disposable nitrile liner gloves in designated, lined receptacles

## **5.6 Drilling Procedures**

No drilling will be performed during this investigation.

## **5.7 Fire Protection**

Only approved metal cans will be used to transport and store flammable liquids. All gasoline and diesel-driven engines requiring refueling must be shut down and allowed to cool before filling. No open flame or spark is allowed in any area containing petroleum products or other flammable liquids.

Smoking is not allowed during any operations within the work area in which petroleum products or solvents in free-floating, dissolved or vapor forms, or other flammable liquids may be present.

## **5.8 General Health**

Medicine and alcohol can increase the effects of exposure to toxic chemicals. Unless specifically approved by a qualified physician, prescription drugs should not be taken by personnel assigned to operations where the potential for absorption, inhalation, or ingestion of toxic substances exists.

Drinking and driving is prohibited at any time.

Driving at excessive speeds is always prohibited.

Skin abrasions must be thoroughly protected to prevent chemicals from penetrating the abrasion.

It is recommended that contact lenses not be worn by persons working on the site.

## **6.0 EMPLOYEE TRAINING**

All Versar employees with the potential for hazardous exposures are required to participate in an initial minimum of 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training to recognize, evaluate, and control site hazards. Three days of supervised field-training is also included within the initial training program. Project Manager level and above must also participate in an additional eight-hour supervisory training course. Once employees have received the above training, they receive a certificate of completion and are scheduled for an eight-hour refresher training session within one year of their initial training. Versar training includes specific details on the following:

- regulatory requirements
- confined space entry
- respiratory protection
- hazard communication
- decontamination procedures
- incident command system
- first aid/CPR
- air monitoring
- toxicology
- Prop. 65 (California)
- fire technology
- PPE
- IIPP

## **7.0 MEDICAL MONITORING PROGRAM**

All Versar, Inc. field personnel are required to have annual medical evaluations in accordance with the company's Health and Safety Program policy. Additional re-evaluation will be considered in the event of chemical over-exposure while working on this site.

The chemicals typically encountered by Versar, Inc. field personnel site can affect specific organ systems producing characteristic health effects. The medical evaluation required by the Health and Safety Program policy will, therefore, focus on the liver, kidney, nervous system, blood systems, and skin and lung function. Laboratory testing will include complete blood count, and applicable kidney and liver function tests. Other tests include skin examination.

## 8.0 DOCUMENTATION

### 8.1 Site-specific Safety and Health Plan Agreement

In the situation that contamination or other hazards are encountered, all details of this site safety plan will be implemented. Versar personnel have the authority to stop work performed at this site if any work is not performed in accordance with the requirements of this site safety plan.

All Versar project personnel and other personnel, including NPS staff, who will be entering the site during the term of this project are required to sign the following agreement prior to conducting work at the site.

- A. I have read and fully understand the site safety plan and my individual responsibilities.
- B. I agree to abide by the provisions of the site safety plan.

Name	Company	Date	Signature

## 8.2 Site Safety Plan Amendment Sheet

Project Name: \_\_\_\_\_

Project Number: \_\_\_\_\_

Location: \_\_\_\_\_

Changes in field activities or hazards:

Proposed Amendment:

Proposed By: \_\_\_\_\_

Date \_\_\_\_\_

Approved By: \_\_\_\_\_

Date \_\_\_\_\_

Project Manager

\_\_\_\_\_  
Regional Health & Safety Officer

Date \_\_\_\_\_

Declined By: \_\_\_\_\_

Date \_\_\_\_\_

Amendment Effective Date \_\_\_\_\_

# ATTACHMENT 1 HOSPITAL ROUTE MAP



**A** Alder Camp Loop Rd, CA 95548









**B** 800 E Washington Blvd, Crescent City, CA 95531

My Notes

Route: 30.6 mi, 40 min



On the go? Use **m.bing.com** to find maps, directions, businesses, and more

A	Alder Camp Loop Rd, CA 95548	A-B: 30.6 mi 40 min
1.	Depart <b>Alder Camp Loop Rd / Coastal Loop Rd</b> toward Alder Camp Rd / Coastal Dr	0.7 mi
	2. Turn <b>left</b> onto <b>Alder Camp Rd / Coastal Dr</b>	2.3 mi
	3. Turn <b>left</b> onto <b>Newton B Drury Scenic Pkwy</b>	0.9 mi
	4. Take ramp <b>left</b> and follow signs for <b>US-101 North</b>	0.2 mi
	5. Bear <b>right</b> onto <b>US-101</b>	24.6 mi 26 min
	6. Keep <b>straight</b> onto <b>US-101 N</b>	0.6 mi
	7. Bear <b>right</b> onto <b>US-101</b>	0.2 mi
	8. Bear <b>left</b> onto <b>Northcrest Dr / CR-D3</b>	0.7 mi
	9. Turn <b>right</b> onto <b>E Washington Blvd / CR-D1</b> <i>76 on the corner</i>	0.3 mi
B	10. Arrive at <b>800 E Washington Blvd, Crescent City, CA 95531</b> <i>The last intersection is Burtschell St If you reach Leif Circle, you've gone too far</i>	

These directions are subject to the Microsoft® Service Agreement and for informational purposes only. No guarantee is made regarding their completeness or accuracy. Construction projects, traffic, or other events may cause actual conditions to differ from these results. Map and traffic data © 2014 NAVTEQ™.

**ATTACHMENT 2**  
**MATERIAL SAFETY DATA SHEET – LEAD**

**Material Safety Data Sheet**  
**Tin, Antimony, Lead Alloy**

**SECTION I: Product and Company Identification**

Common Name: ASTM B23 – Various Bullet Alloys

Chemical Family: Lead Based Alloy Infotrac

Material Use: Soldering, Pouring, Bullets

Supplier Name: Rotometals Inc. 865 Estabrook Street, San Leandro, CA 94577  
(800) 779-1102

In Case Of Emergency 800-779-1102

Date Prepared: February 2001

**Reviewed:** October 2009

**SECTION II: Composition and Information on**

**Ingredients**

<b>Name</b>	<b>CAS #</b>	<b>% by Weight</b>	<b>Exposure Limit LD50</b>
<b>oral, rat</b>			
Tin (Sn) (mouse)	7440-31-5	0.0- 7.0	2.0 mg/m <sup>3</sup> 72 mg/kg
Antimony (Sb) (man)	7440-36-0	0.0-14.0	0.5 mg/m <sup>3</sup> 15 mg/kg
Lead (Pb) mg/kg	7439-92-1	74-99	0.05 mg/m <sup>3</sup> 790

**SECTION III: Physical Information**

**Boiling Point (°C)** Unknown **Specific Gravity** 9.73

**Vapour Pressure (mm Hg)** Unknown **% Volatile (By Volume)** Not Pertinent

**Vapour Density (Air=1)** Unknown **Evaporation Rate (Ether=1)** Not Pertinent

**Solubility In Water** Nil **pH** Not Pertinent

**Appearance** Silver to Gray **Melting Point (°C)** 240

**Odour** None **Form** Bar, Ingot

**SECTION IV: Transport Information**

**Shipping Name** Not Regulated **Class/Division** Not Pertinent

**UN Number** Not Pertinent **Packing Group** Not Pertinent

**SECTION V: Fire and Explosion Hazards**

**Flash Point (°C) and Method** Dust may generate a fire

**Flammable Limits in Air (Vol %)** **Upper:** Not Pertinent **Lower:** Not Pertinent

**Means of Extinction** Class D – Dry Chemical or Sand

**SECTION VI: Health Hazard and First Aid Data**



**Ingestion Effects:** Metallic taste, abdominal cramps, frequent headaches, foul breath, stomatitis, nephritis.

**First Aid:** If particles ingested, give 1-2 glasses of water or milk. Do induce vomiting. Seek medical assistance.

**Eye Contact Effects:** Molten metal may splash.

**First Aid:** Flush with large amounts of water.

**Skin Contact Effects:** Dermatitis.

**First Aid:** If dust or mist gets on skin, wash skin with soap and water. Remove clothing and launder.

**Skin Absorption** Not Pertinent

**Inhalation** Fumes from welding or grinding can in excess cause "Metal Fume Fever". Remove victim and get aid.

**Effects of Acute Exposure** A very large dose may result in diarrhea.

**Effects of Chronic Exposure** A very large dose may result in dark lines in the gums.

**Carcinogenicity** IARC (No)

**Mutagenicity** No **Teratogenicity** No **Reproductive Effects** No

## SECTION VII: Reactivity Data

**Stability** Stable - Yes **Conditions to Avoid** Not Pertinent

**Incompatible**

**Materials**

**Water** No **Acid** No **Oxidizers** Yes

**Corrosive** No **Alkali** No **Reducers** No

**Other** Yes

**Hazardous Decomposition Products** Not Pertinent

**Hazardous Polymerization** May Occur No **Will Not Occur** X

**Conditions to Avoid** Not Pertinent

## SECTION VIII: Preventative Measures

**Steps to be taken in case Material is Released or Spilled:** If spill of dust, use cleanup methods which avoid dust generation. Use water and wet sweep or vacuum.

**Waste Disposal Method:** Dispose of in accordance with appropriate federal and local regulations.

**Respiratory Protection:** When engineering controls are not feasible to control overexposure, use appropriate **NIOSH** approved respirators.

**Engineering Controls Local Exhaust** Essential to keep worker exposure within allowable limits during welding or grinding.

**Mechanical (General)** Not Applicable

**Special** Not Applicable **Other** Not Applicable  
Not Applicable

**Protective Gloves:** As needed to protect against physical hazards.

**Eye Protection:** Safety glasses, goggles or face shield if molten.

**Other Protective Equipment:** Heat resistant leggings and gloves if pouring molten metal..

## **SECTION IX: Special Precautions**

**Precautions to be taken in Handling and Storing:** The scrap metal itself presents no health hazard unless it is welded, burned, ground or cut. Possible fumes may be generated. Should have complete evaluation done. Wash hands and arms after handling.

**Special Precautions and Waste Disposal Methods:** Return to manufacturer, scrap dealer, or dispose of in accordance to local & federal regulations.

The information contained in this MSDS was obtained from sources which are believed to be reliable. It is the user's responsibility to determine the suitability of this information for adoption of necessary safety precautions. The manufacturer does not assume responsibility and expressly disclaims liability for any loss, damage, or expense arising out of or in any way connected with, the handling, storage, use or disposal of the product identified in this MSDS.

**Prepared by: Health, Safety and Environment Department of Alchemy Extrusions**

## **APPENDIX C**

### **SAMPLING AND ANALYSIS PLAN**

## **SAMPLING AND ANALYSIS PLAN**

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

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

*Prepared for:*

**NATIONAL PARK SERVICE  
Pacific West Regional Office  
333 Bush Street, Suite 500  
San Francisco, California 94104**

Order No. P14PX03671

Versar Project No.112036.0004.001

October 31, 2014



5330 Primrose Drive, Suite 147  
Fair Oaks, CA 95628  
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## FIGURE

Figure 1 Proposed Sample Locations

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## 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

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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.

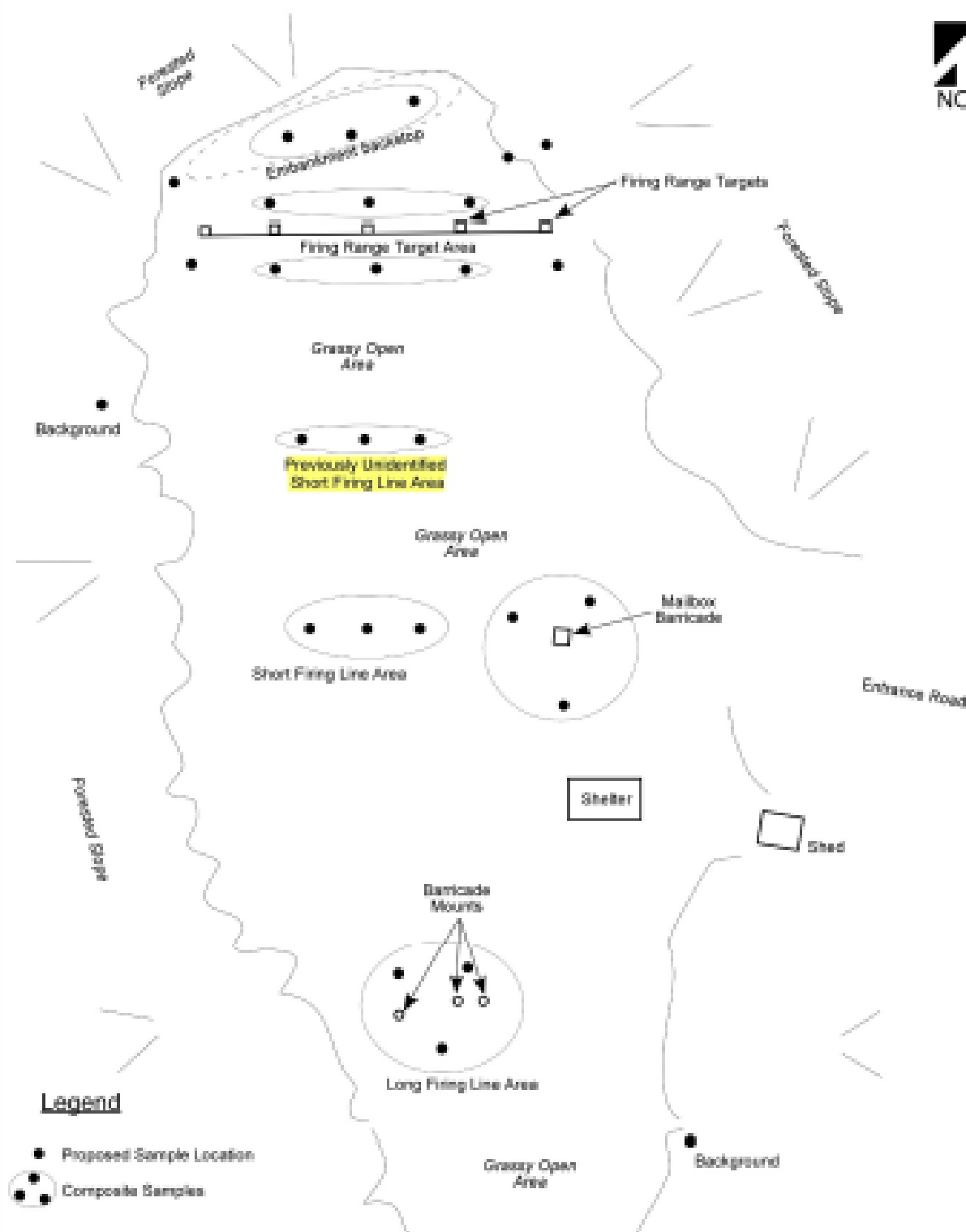
The following minimum information concerning the sample shall be documented on the Versar chain of custody (COC) form:

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.: 112008.0004.001



**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

Name	Analytical Method	Container	Preservation	Minimum Sample Volume or Weight	Maximum Holding Time
Antimony	EPA Method 8010	Glass Jar	None	4 ounces	180 days (soil)
Barium	EPA Method 8010	Glass Jar	None	4 ounces	180 days (soil)
Copper	EPA Method 8010	Glass Jar	None	4 ounces	180 days (soil)
Lead	EPA Method 8010	Glass Jar	None	4 ounces	180 days (soil)