Final
Work Plan for
Engineering Evaluation/Cost Analysis
Non-Time-Critical Removal Action
Ramona Burn Dump Site
Cleveland National Forest, California

October 2013

ERRG Project No. 2013-064

Prepared for:

U.S. Department of Agriculture
Forest Service
Cleveland National Forest

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Submitted by:
Engineering/Remediation Resources Group, Inc.

Signature	October 18, 2013
	Date
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Acronyms and Abbreviations

Allied Waste	Ramona Landfill Inc., Allied Waste Industries
ARARs	applicable or relevant and appropriate requirements
bgs	below ground surface
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COR	Contracting Officer's Representative
County	County of San Diego
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ERRG	Engineering/Remediation Resources Group, Inc.
Forest Service	U.S. Department of Agriculture Forest Service
GPS	global positioning system
LCD	laboratory control duplicate
LCS	laboratory control sample
MS	matrix spike
MSD	matrix spike duplicate
NAWQC	National Ambient Water Quality Criteria
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTCRA	non-time-critical removal action
PA/SI	Preliminary Assessment/Site Inspection
PCBs	polychlorinated biphenyls
QC	quality control
RAOs	removal action objectives
RSLs	regional screening levels
SCS	SCS Engineers
SCEM	site conceptual exposure model

SRE	streamlined risk evaluation
SVOCs	semivolatile organic compounds
TBC	to be considered
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TPH	total petroleum hydrocarbons
USC	United States Code
XRF	x-ray fluorescence
§	Section

Section 1. Introduction

Engineering/Remediation Resources Group, Inc. (ERRG) has prepared this work plan for an engineering evaluation/cost analysis (EE/CA) for a non-time-critical removal action (NTCRA) at the Ramona Burn Dump Site in Cleveland National Forest in San Diego County, California. ERRG is conducting the EE/CA on behalf of the U.S. Department of Agriculture Forest Service (Forest Service) under Regional A/E Indefinite Quantity Contract for Environmental Site Response Activities (AG-91S8-C-11-0001), Activity II, Task 2: EE/CA Support, Task Order AG-9A40-D-13-0028. This work plan has been prepared in accordance with the Forest Service Statement of Work (Forest Service, 2013) and the U.S. Environmental Protection Agency's (EPA's) "Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA [Comprehensive Environmental Response, Compensation, and Liability Act]" (EPA, 1993).

The purpose and objective of the EE/CA are to:

- Collect site data to characterize contamination at the site and evaluate the potential risk to human and ecological receptors
- Identify removal action objectives (RAOs)
- Develop and evaluate removal action alternatives by comparing their effectiveness, implementability, and cost
- Recommend a removal action alternative for the site

This work plan outlines the tasks to be accomplished during the EE/CA. The work plan includes a discussion of the process for evaluating applicable or relevant and appropriate requirements (ARARs) and the preliminary site conceptual exposure model (SCEM) and briefly describes the general site management approach.

The following sections describe the site location and features; summarize the operational history, the physical characteristics, current and future land use, and previous investigations at the site; and describe the regulatory framework for this project and the organization of this work plan.

1.1. SITE LOCATION AND DESCRIPTION

The Ramona Burn Dump Site is located in the Wildcat Canyon in Pamo Valley north of the city of Ramona, California (Figure 1). The site is located within the Palomar Ranger District of the Cleveland National Forest in the southwest quarter, of the northeast quarter of Section 34 of Township 12 south, Range 1 East (San Bernardino Base Meridian) in San Diego County, within assessor's parcel number

244-100-17. The Ramona Burn Dump Site is located at an average elevation of 1,600 feet above mean sea level and covers an area of approximately 2.47 acres (ERRG, 2010).

The site is accessible by two-wheel drive vehicle and is adjacent to Dump Road, which is a paved private road, managed by Ramona Landfill Inc., Allied Waste Industries (Allied Waste), which provides access to the city of Ramona Landfill (Figure 2). The site is separated from Dump Road by a 4-foot-tall wire fence, limiting public access. An unpaved access road allows vehicular and pedestrian access to the site from Dump Road. A locked gate at the main entrance to the Ramona Landfill separates Dump Road from Pamo Road (Figure 2). No man-made improvements are present on the site, which is vegetated with sage brush and other shrubs. Broken glass and pottery are visible on the surface across the area of the former burn dump (ERRG, 2010).

1.2. SITE HISTORY

The following site history was taken from the 2010 Preliminary Assessment/Site Inspection (PA/SI) Report (ERRG, 2010).

The Ramona Burn Dump Site was identified following the Witch Creek fires in November 2007, when vegetation in the area was burned and surface debris from the Ramona Burn Dump Site was exposed. The newly exposed former burn dump area included remnants of a fire pit and surface debris in the area of a former waste burn dump that was owned and operated by the County of San Diego (County). The burn dump sits on lands that are now owned and operated as a landfill by Allied Waste, as well as National Forest System lands that were previously used by the County as a part of its burn dump operation on its private lands under a special use permit issued by the Forest Service.

The County operated the Ramona Burn Dump Site from approximately 1947 to 1974 (ERRG, 2010). The County operated the burn dump for the disposal of trash and rubbish from the community of Ramona and surrounding County areas. According to the special use permit, the County was to confine dumping to the constructed pits within the permit area and ashes were to be placed in a separate pit (ERRG, 2010).

According to Forest Service records, the County's special use permit terminated on February 2, 1974, and the site was covered with soil (ERRG, 2010). Typical capping and closure requirements in the early 1970s included placing 1 or 2 feet of native soil over waste materials.

1.3. PHYSICAL CHARACTERISTICS

This section describes the physical characteristics of the site, including the geology, hydrology and hydrogeology, and environmental setting and climate.

1.3.1. Geology

The regional geology of Ramona is characterized by fertile valleys surrounded by foothills and mountains of granitic and metamorphic rock. The Ramona Burn Dump Site is underlain by Cretaceous Tonalite of Alpine formation, consisting of medium- to coarse-grained biotite-hornblende tonalite and quartz diorite (U.S. Geological Survey, 2001).

1.3.2. Hydrology and Hydrogeology

The Ramona Burn Dump Site is located at an average elevation of 1,600 feet above mean sea level on a small ridge that trends roughly east–west and is flanked by two natural drainages that merge just east of the site (Figure 1). Downstream (to the east), the drainage becomes an unnamed ephemeral creek that joins Santa Ysabel Creek, within 0.5 mile of the site. Santa Ysabel Creek is a major tributary to the San Dieguito River watershed. Current beneficial uses of Santa Ysabel Creek include municipal and domestic water supply, agricultural and industrial supply, and recreational uses. Portions of Santa Ysabel Creek support high-quality aquatic habitats suitable for spawning fish (Regional Water Quality Control Board, 1994). The Ramona Burn Dump Site is not located within a floodplain (Federal Emergency Management Agency, 1997).

Groundwater in the region is restricted by the limited storage capacity of regional aquifers, typically fractured crystalline rock. The estimated storage capacity of the fractured crystalline rock is less than 3 percent of the total rock volume (County, 2010a). Groundwater beneath the Ramona Burn Dump Site is estimated to be deeper than 60 feet below ground surface (bgs) (California Integrated Waste Management Board, 2008) and is assumed to flow to the east based on topographic information. Current beneficial uses for groundwater in the San Dieguito Hydrologic Unit are primarily municipal and agricultural. The Ramona Burn Dump Site is located within the Ramona Municipal Water District, and most potable water is provided by the water district because groundwater quality in the area is poor based on nitrate concentrations (Department of Public Works, 2010).

1.3.3. Environmental Setting and Climate

Regional vegetative communities include non-native agricultural and urban vegetation, as well as native mixed chaparral, oak woodland areas, grasslands, and riparian woodlands (County, 2010a). The dominant vegetative cover at the Ramona Burn Dump Site is chaparral, with riparian vegetation downslope from the site, flanking the unnamed ephemeral creek. The vegetative cover at the Ramona Burn Dump Site is dominated by shrubs interspersed with ruderal areas.

The PA/SI Report identified several sensitive downstream habitats (ERRG, 2010). Santa Ysabel Creek, located east (downstream) of the site, has been designated as critical habitat for the federally listed endangered arroyo toad (*Anaxyrus californicus*). Santa Ysabel Creek also provides freshwater wetland habitat along stretches that are within 4 miles of the site (U.S. Fish and Wildlife Service, 2010). Other

sensitive environments within a 4-mile radius of the Ramona Burn Dump Site include critical habitat for the coastal California gnat catcher (*Polioptila californica californica*), designated federally as a threatened species, and the federally listed endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*) (California Department of Fish and Wildlife [CDFW], 2010). In addition, suitable habitat for the federally listed endangered least bell's vireo (*Vireo bellii pusillus*) and the threatened San Diego thorn mint (*Acanthomintha ilicifolia*) may be present within a 4-mile radius of the site (CDFW, 2010). Sensitive species that may be present near and downstream from the site will be further investigated as part of this EE/CA.

Mean annual temperature at the Ramona Fire Department weather station (located approximately 3 miles south of the Ramona Burn Dump Site) is 61.7°F. The average temperature at this weather station is 71.5°F in the summer and 52.6°F in the winter. Total average precipitation is about 16.49 inches, with about 53 percent of the rainfall in winter, 30 percent rainfall in spring, 15 percent rainfall in fall, and about 2 percent in summer (Western Regional Climate Center, 2013).

1.4. CURRENT AND FUTURE LAND USE

The area immediately surrounding the site is zoned as open space under the County's Multiple Species Conservation Program. Adjacent lands are zoned as open space or agricultural (County, 2010b). The Ramona Burn Dump Site is located on Forest Service lands. The future site use will remain as open space. Recreational hikers or Forest Service personnel walking the site are potential future users of the site.

1.5. PREVIOUS INVESTIGATIONS

Two previous investigations have been conducted at or near the site. Allied Waste conducted an assessment of the old Ramona Burn Dump Site on the Allied Waste property south and east of the Forest Service property in 2008 (SCS Engineers [SCS], 2008). ERRG performed a PA/SI in 2010 (ERRG, 2010). The following sections summarize the results of these two investigations.

1.5.1. 2008 Allied Waste Investigation

On September 29, 2008, the Forest Service determined that there was a release or threat of release of hazardous substances at the site and initiated a response action to address the release under its delegated authorities pursuant to Section (§) 104 of CERCLA, as amended; Title 42 United States Code (USC) § 9604; and Executive Order 12580. The County, a potentially responsible party under CERCLA § 107(a), Title 42 USC § 9607(a), was provided with the opportunity to conduct the site investigation for the Ramona Burn Dump Site under Forest Service oversight. The lack of a response from the County prompted the Forest Service to pursue the investigation of the source, extent, and nature of the release (and/or threat of release) of hazardous substances, pollutants, or contaminants (or hazardous wastes) on or about the Ramona Burn Dump Site. The Forest Service contracted SCS to investigate the area.

An evaluation of aerial photographs of the site indicated that the Allied Waste landfill and the burn dump site on Forest Service property were originally used as a single burn dump site. Evidence of a historical incinerator on the Allied Waste property west of the site indicated that materials were historically burned on the Allied Waste property and the primary disposal area was on what is now the Forest Service property (SCS, 2008).

As part of the 2008 assessment, Allied Waste excavated eight trenches (indicated by "TR" on Figure 3). Debris was encountered between 1 and 3 feet bgs in a trench at the northern extent of the western property line. Mixed burn ash and debris were encountered between 1 and 8 feet bgs in the two western trenches along the southern property line. Sixty-two soil samples were collected and screened for metals using an x-ray fluorescence (XRF) analyzer. Screening results indicated elevated concentrations of chromium and zinc were present along the western property line and elevated concentrations of arsenic, cadmium, lead, mercury, and selenium were present along the southern property line (SCS, 2008). Soil samples were also collected for analysis of semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), dioxins and furans, and pH. No SVOCs or PCBs were detected in the soil samples, and pH results were considered neutral. Concentrations of TPH in the motor oil range and dioxins and furans were detected in soil samples collected from trenches (SCS, 2008).

The report did not recommend further assessment or mitigation on the Allied Waste property. SCS concluded there was a low likelihood for site workers, the public, or the environment to be exposed to burn ash and trash because the burn ash and trash on the site was covered with soil.

1.5.2. 2010 Preliminary Assessment/Site Inspection

ERRG conducted a PA/SI in 2010 as a part of the Forest Service's ongoing site investigation. The PA/SI consisted of reviewing historical documents, including permits and aerial photographs; advancing trenches and potholes; and collecting burn ash and soil samples for XRF and laboratory analyses. An XRF analyzer was used to identify areas where burn ash was most likely to be encountered to select pothole and trench locations for sampling activities. The XRF analyzer was also used in potholes and trenches along the site and property boundaries to delineate the lateral extent of burn ash and waste materials. The waste and debris encountered at each location primarily consisted of burn ash, ceramics, and glass, with lesser amounts of metal and brick. All debris and waste material encountered during the PA/SI appeared to be historical (pre-1970s) in nature (ERRG, 2010).

In total, 33 waste and soil samples were collected from surface soil and at depth (in potholes and trenches) and from two background locations and submitted for laboratory analysis. All samples were analyzed for metals, with a subset (six) of samples analyzed for SVOCs, PCBs, total recoverable petroleum hydrocarbons, and dioxins and furans. Metals (arsenic, lead, and zinc) and 2,3,7,8-TCDD were consistently detected at concentrations exceeding EPA's industrial regional screening levels (RSLs). Based on the pH range of waste samples, the results of leachability testing, and the solubility of each

chemical of concern, it is likely that some leaching of lead has occurred. Arsenic and zinc were not shown to be likely to leach, and 2,3,7,8-TCDD is considered unlikely to have leached because of its low water solubility (ERRG, 2010).

The preliminary analysis of soil and air pathways concluded that no known targets (nearby or adjacent residences) are associated with either pathway and neither pathway is considered likely to adversely impact human health or the environment. Because the site is mostly covered with at least 6 inches of native soil, there is little potential for contact with materials in the soil and aerial dispersion of materials in the waste to human or environmental receptors (ERRG, 2010).

Based on the results of the preliminary analysis of groundwater, the PA/SI concluded that chemicals of concern at the site are unlikely to have been released to groundwater at concentrations that will pose risk to human health or the environment. Groundwater at the site is approximately 60 feet bgs and burn ash is underlain by crystalline rock with limited permeability. Additionally, no permitted groundwater wells are directly downgradient from the site and most permitted wells in the area are being used for agricultural (irrigation) uses (ERRG, 2010).

Based on the results of the preliminary analysis of surface water, the PA/SI recommended further action to address the release of burn ash and waste materials to the surface water pathway. Metals (especially lead) in burn ash and waste materials at the Ramona Burn Dump Site may pose a threat to downstream municipal surface water supplies and may ultimately have a negative impact on downstream sensitive environments, including critical habitat for the arroyo toad and sensitive wetland environments.

1.6. REGULATORY FRAMEWORK

Authority for responding to releases from a hazardous waste site is addressed in CERCLA § 104. Executive Order 12580 delegates to the U.S. Department of Agriculture the authority for removal actions at Forest Service sites whether or not the sites are on the National Priorities List. The Forest Service, under the delegation of the U.S. Department of Agriculture's authority, is the lead federal agency for environmental investigation and cleanup of the site and as such will oversee all project activities. Other federal, state, or local agency representatives may be consulted, at the discretion of the Forest Service's Contracting Officer's Representative (COR). The Forest Service will ensure that all removal actions are performed in compliance with CERCLA; the National Oil and Hazardous Substances Pollution Contingency Plan (NCP); and Division 20, Chapter 6.8, of the California Health and Safety Code.

1.7. REPORT ORGANIZATION

The remainder of this work plan is organized as listed below.

- Section 2 presents the field sampling plan.
- Section 3 describes the data collection, documentation procedures, and analytical methods to be used.
- Section 4 summarizes the laboratory quality control (QC) program.
- Section 5 lists the criteria for evaluating analytical results and the rationale for their selection.
- Section 6 describes the process for conducting streamlined human health and ecological risk evaluations.
- Section 7 describes the process for conducting the EE/CA.
- Section 8 lists the documents and guidance used to prepare this work plan.

Figures are presented after Section 8. The following supplemental information is appended to this work plan:

- Appendix A – Site-Specific Health and Safety Plan

Section 2. Field Sampling Plan

This section presents the field sampling plan for the EE/CA to be conducted at the Ramona Burn Dump Site. The purpose of the site characterization and field sampling is to further evaluate metals and dioxins and furans in sediment at the site and the potential risk posed to human and ecological receptors. Specifically, the data will be used to support the development of streamlined human health and ecological risk evaluations, refine the SCEM, and support the development and evaluation of removal action alternatives. All fieldwork will be conducted in accordance with the Site-Specific Health and Safety Plan provided in Appendix A of this work plan. All sample results will be presented in the EE/CA.

2.1. SITE RECONNAISSANCE AND CHARACTERIZATION

ERRG personnel will perform a site reconnaissance to document the following physical characteristics of the site:

- Volume, size, or magnitude of contamination, including estimates of burn ash and debris on the Forest Service property
- The number, condition, and location of site features

During the PA/SI, a site map was prepared using a Trimble global positioning system (GPS) capable of sub-meter accuracy to document the site features, burn ash, and debris. Supplemental GPS data, including sample locations, will be added to the map. All field observations will be documented in the field logbook.

2.2. SAMPLE DESIGN AND RATIONALE

The ERRG field team will collect the following samples to meet the project objectives:

- Sediment
- Background

In addition, surface water samples will be collected if surface water is present.

The following subsections describe the sampling design and rationale for collection of each sample medium. Figure 3 shows the proposed sample locations. Section 3.1 describes the field and analytical methods and equipment used to collect samples. Section 3.6 presents the proposed analytical methods for each type of sample.

2.2.1. Sediment

Five sediment samples will be collected upstream and downstream of the site in the unnamed ephemeral creek. Samples will be analyzed for metals (arsenic, lead, and zinc) and TCDD, and results will be compared with the concentrations at the probable point of entry to evaluate whether contamination has been released to the ephemeral stream. Sediment samples will be collected from the approximate locations shown on Figure 3; however, the proposed sampling locations may be adjusted in the field, in consultation with the Forest Service COR, based on site conditions or professional judgment.

2.2.2. Background

Upstream sediment and surface water samples (if present) will be collected and will be considered background sediment and surface water samples.

2.2.3. Surface Water Samples

Up to five surface water samples collocated with sediment sampling locations will be collected from upstream and downstream of the site in the unnamed ephemeral creek located on the south side of the site. Samples will be analyzed for metals (arsenic, lead, and zinc) and TCDD, and results will be compared with the concentrations at the probable point of entry to evaluate whether contamination has been released to the ephemeral stream. Surface water is not likely to be present at the site except during major storm events. If surface water is not present no surface water samples will be collected.

Section 3. Data Collection, Documentation Procedures, and Analytical Methods

This section describes the data collection and documentation procedures that will be used during the EE/CA to properly document field activities. Documentation includes recordkeeping, photographic documentation, and GPS data collected in the field. This section also summarizes the sample handling and chain-of-custody procedures, analytical methods, laboratory QC samples, and criteria for evaluating analytical results. Section 4 summarizes the laboratory QC program.

3.1. SAMPLING METHODS AND EQUIPMENT

Prior to collecting samples, field personnel will review the work plan to ensure that they are familiar with the protocols and procedures established for this project. The appropriate sampling equipment will be ordered for the sampling event and will be verified upon receipt.

Samples will be collected in accordance with the following guidelines:

- All field samplers will be trained properly in both correct sampling procedures and appropriate health and safety protocols (see Appendix A of this work plan).
- Upon arrival at the site, the samplers shall put on appropriate personal protective equipment, as described in the Site-Specific Health and Safety Plan (Appendix A).
- New, clean disposable gloves will be used during collection of all samples.
- Samples will be collected using new disposable equipment.
- Samples for offsite laboratory analysis will be sent to a State of California-certified analytical laboratory.

If present surface water samples will be collected directly from the ephemeral stream into laboratory-prepared sample containers. Sediment samples will be collected using dedicated disposable plastic trowels. Each sediment sample will be collected from a discrete location.

3.2. SAMPLE DESIGNATION

A sample numbering scheme will be used to uniquely identify and track the samples from collection through laboratory analysis. The numbering scheme indicates the sample type and location and will be entered on labels and field forms. The scheme used to number field samples is presented below.

RBS A-BC

where:

RBS = Ramona Burn Site

A = Designation between surface sediment (SSed) and surface water (SW)

B = Sample location number beginning at 09, which is after the last location number used during the PA/SI and will be noted on field notes and sketch maps and by the GPS

C = Sample identifier beginning at AJ (the next number after the last sample identifier in the PA/SI), alphabetically assigned to each unique sample collected

For example, sample RBS-SSed-10AJ indicates the first sample collected at the second location containing a sediment matrix at the Ramona Burn Dump site. Sample information will be legibly recorded on the sample labels with indelible blue or black ink.

3.3. DISPOSAL OF INVESTIGATION-DERIVED WASTE

During sampling activities at the site, used personal protective equipment and single-use sampling supplies (such as plastic soil scoops) are the only types of investigation-derived waste that will be generated. Waste will be double-bagged in plastic trash bags and disposed of off site as municipal waste. Because no reusable sampling equipment will be used, no decontamination wastewater will be generated or require disposal.

3.4. RECORDKEEPING

A permanently bound field logbook will be assigned to this project for recording all field activities and observations. All entries will be recorded in indelible ink, and corrections will consist of a single line through the corrected item with the date and initials of the person making the correction. At a minimum, the logbook or field sampling form (whichever is appropriate) will contain the following information:

- Project name and location
- Date and time of collection for each sample
- Sample number, location, and type
- A log of photographs of each sample location
- Site sketch map, including sample locations and site features
- Problems encountered and corrective action taken
- Sampling personnel and site visitors
- Any unusual features of the samples or sampling location
- Any other observations or conditions that may affect the samples

3.5. SAMPLE HANDLING AND CHAIN OF CUSTODY

This section describes the sample labeling, sample packaging and shipment, and chain-of-custody procedures.

3.5.1. Sample Labeling

A sample label will be affixed directly to or recorded directly on each sample container immediately after each sample is collected. All samples for offsite laboratory analysis will have containers with printed labels affixed and completed in indelible black or blue ink. Each sample label will contain, at a minimum, the following information:

- Sample identification number (designated in accordance with Section 3.2)
- Sample collection date (mm/dd/yy)
- Time of collection (24-hour clock)
- Company name
- Project number/name
- Sampler's initials
- Preservation (if any)
- Analyses to be performed

3.5.2. Analytical Sample Packaging and Shipment

Samples for offsite laboratory analysis will be shipped to the analytical laboratory by delivery services in accordance with all applicable local, state, and federal regulations. Transportation methods will be selected to ensure that samples arrive at the laboratory in time to permit testing in accordance with established holding times and project schedules. No samples will be sent to, or accepted by, the receiving laboratory without a properly prepared chain-of-custody record and a properly labeled and sealed shipping container.

Sample containers will be packaged based on the level of protection a sample will require during handling, shipping, and storage. Protection may vary based on sample delivery method, required testing, and handling and storage conditions. Proper packaging will be based on the following considerations:

- Type and composition of inner packing (e.g., plastic bags, absorbent packing material, and ice for preservation)
- Type and composition of overpacks (e.g., plastic coolers and cardboard box)

- Method of overpacks sealing (e.g., strapping tape and custody seals)
- Marking and labeling of overpacks (e.g., laboratory address, any appropriate U.S. Department of Transportation Hazard Class Labels, and handling instructions)

After retaining a copy for the sampling team, the chain-of-custody record will be sealed in a resealable plastic bag and included with the shipment. If shipping via a third party, a copy of the courier airbill will be retained for documentation.

3.5.3. Chain-of-Custody Documentation for Analytical Samples

The chain-of-custody record will be the controlling document to ensure that sample custody is maintained. Upon collecting a sample, sampling personnel will initiate the chain-of-custody record. Each individual who has the sample(s) in his or her possession will sign the chain-of-custody record. Each time the sample custody is transferred, the former custodian will sign the chain-of-custody record in the "Relinquished by" line, and the new custodian will sign the chain-of-custody record in the "Received by" line. The date, time, and name of the custodian's project or company affiliation will accompany each signature.

After the laboratory receives the samples, the sample custodian will inventory each shipment before signing for it and will note on the original chain-of-custody record any discrepancy in the number of samples, the temperature of the cooler, and the presence of any broken sample containers. The laboratory will immediately notify the ERRG Project Manager of any problems identified with shipped samples, and the ERRG Project Manager will determine the appropriate course of action and discuss it with the Forest Service, if necessary.

3.6. ANALYTICAL METHODS

Samples will be submitted to TestAmerica Laboratories in Pleasanton, California, for analysis. Samples will be analyzed for metals (arsenic, lead, and zinc) and TCDD using the methods in Table 1.

3.7. LABORATORY QUALITY CONTROL SAMPLES

At a minimum, the laboratory will analyze one laboratory control sample (LCS) and laboratory control duplicate (LCD) for every 10 field samples (or 1 per project, if fewer than 10 samples are collected). LCSs and LCDs are samples of clean water or soil spiked with a known concentration of a surrogate compound. These samples are used as a measurement of the laboratory's ability to properly process and analyze a sample by a given method.

For matrix spike (MS) samples, the laboratory spikes a duplicate volume of a field sample with a known concentration of a target compound and analyzes the spiked sample with the field samples. The recovery of the target compound in the analytical process is a measure of the accuracy of the analytical method. It

measures bias recovery due to matrix. A matrix spike duplicate (MSD) is a second duplicate volume of a field sample. The relative percent difference between the MS and the MSD analyses is a measure of the precision of the analytical method in the actual sample media. MS/MSD samples will be collected at a rate of 20 percent for this project. The laboratory will also analyze a laboratory blank and laboratory duplicate at a frequency of 20 percent for each analysis. In addition, the laboratory will analyze an instrument blank to monitor the cleanliness of the instrument portion of the sample analysis process. Instrument blanks usually consist only of the solvent or acid solution of the standard used to calibrate the instrument.

Section 4 summarizes the data quality indicators and their use for assessment of data quality.

Section 4. Quality Control Program

This section describes the laboratory QC protocol to be followed during the assessment of data quality. Specifically, this section defines the data quality indicators of precision, accuracy, representativeness, completeness, and comparability parameters and their use in the assessment of data quality.

4.1. PRECISION

Precision measures the reproducibility of measurements under a given set of conditions. The following equation illustrates the method for calculating the relative percent difference to assess a method's precision:

$$Precision\ as\ RPD = \frac{2 \times (Result - Duplicate\ Result)}{Results + Duplicate\ Result} \times 100\%$$

Precision will be monitored by running duplicate samples to evaluate the sampling techniques, sample handling procedures, and homogeneity of the sample media.

4.2. ACCURACY

Accuracy measures the bias of an analytical system by comparing the difference of a measurement with a reference value. The percent recovery of a chemical, which has been added to the environmental samples at a known concentration before extraction and analysis, provides a quantitation tool for analytical accuracy. The spiking solutions used for accuracy determinations are not used for instrument calibrations. The following equation illustrates how accuracy is evaluated:

$$Accuracy\ as\ percent\ recovery = \frac{Spike\ Sample\ Result - Sample\ Result}{Sample\ True\ Value} \times 100\%$$

Percent recoveries for LCS/LCDs and MS/MSDs that are analyzed for every batch of up to 20 samples serve as a measure of analytical accuracy. Surrogate standards are added to all samples, blanks, and LCSs analyzed to evaluate the method's accuracy and assess the potential for matrix interferences.

Recovery results of elements spiked into samples must be within method control limits or laboratory-derived statistical limits (EPA, 2002). The surrogate standard advisory acceptability limits are 80 to 120 percent for all analyses involved during this project. In the absence of in-house statistically based control limits, the laboratory may use the advisory limits until the in-house statistically based control limits are developed for each method of organic analysis and sample matrix.

Control limits are defined as the mean recovery, plus or minus 3 standard deviations, of the 20 data points, with the warning limits set as the mean plus or minus 2 standard deviations. The laboratory will review the QC samples and surrogate standard recoveries for each analysis to ensure that internal QC data are within the limits of acceptability. The laboratory will investigate any suspect trends, take appropriate corrective actions, and report the findings to the ERRG Project Manager.

4.3. REPRESENTATIVENESS

Unlike precision and accuracy, which can be expressed in quantitative terms, representativeness is a qualitative parameter. Representativeness is the degree to which sample data represent accurately and precisely a characteristic of a population, parameter variations at a sampling point, or an environmental condition. A qualitative parameter depends on proper design of the sampling program.

Field personnel will be responsible for ensuring that samples are representative of field conditions by collecting and handling samples in accordance with the approved plan. Errors in sample collection, packaging, preservation, or chain-of-custody procedures may result in samples being judged nonrepresentative and may form a basis for rejecting the data.

Data generated by the laboratory must be representative of the laboratory database of accuracy and precision measurements for analytes in different matrices. Laboratory procedures for sample preparation will ensure that aliquots used for analysis are representative of the whole sample.

4.4. COMPARABILITY

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another, whether it was generated by a single laboratory or during inter-laboratory studies. The use of standardized field and analytical procedures ensures comparability of analytical data. Sample collection and handling procedures will adhere to ASTM International-approved protocols. Laboratory procedures will follow standard analytical protocols, use standard units, use standardized report formats, follow the calculations as referenced in approved analytical methods, and use a standard statistical approach for QC measurements.

4.5. COMPLETENESS

Completeness is a measure of whether all data necessary to meet the project have been collected. For the data to be considered complete, they must meet all acceptance criteria, including accuracy, precision, and other criteria specified for an analytical method. The data will be reviewed and validated to keep invalid data from being processed through data collection.

Section 5. Criteria for Evaluating Analytical Results

Analytical results for site samples will be compared with background sample results and appropriate screening criteria based on the sample medium, the site uses, and likely receptors. The criteria described in this section will be used in the streamlined risk evaluation (SRE), which is discussed in Section 6.

5.1. ESTABLISHING BACKGROUND AND INITIAL SCREENING

Background refers to chemicals or locations that are not influenced by the releases from a site, and is usually described as either naturally occurring or anthropogenic (EPA, 1989), as follows:

- Naturally occurring: substances present in the environment in forms that have not been influenced by human activity.
- Anthropogenic: natural and human-made substances present in the environment as a result of human activities (not specifically related to the CERCLA site in question).

Naturally occurring background samples will be collected upgradient of the Ramona Burn Dump site in areas that do not appear to be impacted by human or burning activities (Figure 3). Three times the background concentration for each medium will be considered representative of site background and used to initially screen the results.

5.2. REGULATORY CRITERIA

Surface water and sediment criteria for arsenic, lead, zinc, and TCDD have been developed to assist in evaluating health effects on both human and ecological receptors. The following screening criteria will be used to evaluate surface water and sediment results collected during this investigation, as well as results for samples collected during the PA/SI:

- Human Receptors:
  - Sediment– The EPA RSLs for industrial soil will be used to evaluate risks from metals and TCDD concentrations to potential site visitors (e.g., the site worker or recreational receptors) (EPA, 2013a).
  - Surface Water –The EPA National Ambient Water Quality Criteria (NAWQC) for human ingestion of water and fish will be used to evaluate risks from metals and TCDD concentrations to recreational visitors (EPA, 2009).

- Ecological Receptors:
- Sediment – The National Oceanographic and Atmospheric Administration's threshold effects levels from the Screening Quick Reference Tables will be used to evaluate risks from metals and TCDD concentrations in freshwater sediment for the protection of aquatic life (National Oceanographic and Atmospheric Administration, 2008).
- Surface Water – The EPA NAWQC for freshwater aquatic life (chronic exposure) will be used to evaluate risks from metals and TCDD concentrations to aquatic wildlife (EPA, 2009).

If metals and TCDD concentrations in samples are less than screening criteria for human and ecological receptors, adverse effects to potential receptors are unlikely, and the no further action alternative may be a viable alternative evaluated in the EE/CA. If metals and TCDD concentrations exceed the screening criteria, a removal action will be warranted and various removal action alternatives will be evaluated in the EE/CA.

Section 6. Streamlined Risk Evaluation

This section describes how the analytical data will be used to conduct the SRE. An SRE is being conducted because it is appropriate for a response action conducted as an NTCRA under CERCLA. The SRE will include screening-level evaluations of risks to human and ecological receptors.

Figure 4 provides the preliminary SCEM. Based on the site history and the results of previous investigations, the EE/CA will only evaluate risks posed to human and ecological receptors by exposure to arsenic, lead, zinc, and TCDD. The SCEM will be refined in the EE/CA based on the results of the site characterization and the SRE.

SREs provide sufficient information to justify a response action, but do not fully address cumulative risks. An SRE typically uses direct comparison with established cleanup goals or risk-based criteria, as identified in Section 5, to identify areas of concern. The SRE will be conducted in accordance with the following guidance:

- "Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA" (EPA, 1993)
- "Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual" (EPA 1991)
- "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments" (EPA, 1997)
- "Guidelines for Ecological Risk Assessment, Final, Risk Assessment Forum" (EPA, 1998)

Analytical results will be compared against human health and ecological screening criteria to evaluate whether releases from source areas pose an unacceptable risk to human health or the environment. The following subsections provide an overview of the SREs to be performed as part of the EE/CA.

6.1. STREAMLINED RISK EVALUATION FOR HUMAN HEALTH

An SRE will be performed to estimate current and potential future risk to human health at the site using the methodology outlined in the guidance cited above. Site data will be used to evaluate the risk to human health based on the current understanding of site conditions, potential human receptor populations, and exposure pathways.

The SRE will include summaries of the risk characterization results and hot spots and present preliminary risk-based cleanup goals, if applicable. Recommendations for additional assessment of risk to human

receptors will be provided, if deemed necessary, to understand the potential for health risks that may result from exposure of human receptors to arsenic, lead, zinc, and TCDD at the site.

6.2. STREAMLINED RISK EVALUATION FOR ECOLOGICAL RECEPTORS

An SRE will be performed to estimate current and potential future risk to ecological receptors at the site using the methodology outlined in the guidance cited above. The SRE will describe the important ecological habitats, plants, and wildlife that exist at the site and will identify threatened, endangered, and sensitive species. Assessment endpoints will be defined that describe the primary ecological concerns at the site and link the risk-based screening results to risk management decisions. The ecosystem components will include a description of the regional ecology and site-specific ecology to allow an understanding of the ecological setting. This description will also provide an understanding of the ecological receptors that are likely within the vicinity of the site.

The SRE will summarize the results based on the risk characterization and uncertainties and present preliminary risk-based cleanup goals, if applicable. Recommendations for additional assessment of risk to ecological receptors will be provided, if deemed necessary.

Section 7. Engineering Evaluation/Cost Analysis Activities

This section describes the tasks associated with activities to be performed by ERRG to prepare the EE/CA. The EE/CA will use the following guidance documents:

- "Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA" (EPA, 1993)
- "A Guide to Developing and documenting Cost Estimates During the Feasibility Study" (EPA, 2000)

ERRG will conduct the following tasks to complete the EE/CA:

- Evaluate sampling results (i.e., site characterization) and incorporate the results of the evaluation into the EE/CA.
- Develop RAOs in coordination with the Forest Service COR.
- Evaluate ARARs and discuss any statutory limits on removal actions.
- Develop removal action alternatives based on the results of the PA/SI and the EE/CA sampling and analysis in close coordination with the Forest Service COR, and analyze the removal action alternatives based on their effectiveness, implementability, and cost, and prepare an EE/CA cost estimate for each removal action alternative.
- Perform a comparative analysis of removal action alternatives.
- Identify post-removal site control activities (i.e., community relations support) necessary to sustain the integrity of the removal action.

The following sections describe ERRG's approach to completing each of the above tasks. Additionally, if any data gaps are identified during development of the EE/CA, they will be summarized along with brief descriptions and actions needed to ensure the completeness of the evaluation set forth in the EE/CA.

7.1. SITE CHARACTERIZATION

Site characterization activities outlined in this work plan will provide the basis for identifying and evaluating removal action alternatives. As part of the field activities outlined in the work plan, ERRG's staff will use data provided in the PA/SI and collected during this investigation to calculate the approximate volumes and locations of contaminated material on site and map any additional site features. The EE/CA will describe the site and vicinity, site history, sensitive populations, and meteorology, as well as characterize the source and extent of contamination. ERRG's staff will document site conditions

not included in the PA/SI using field notes and photographs and will complete comprehensive sketch maps and GPS mapping of all pertinent site features. All relevant field documentation will be included in the EE/CA.

7.2. DEVELOP REMOVAL ACTION OBJECTIVES

A removal action is undertaken to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of a release at a site. Based on site characterization results and observations during the site visit, ERRG will develop RAOs for the site in consultation with the Forest Service COR. Consideration will be given to methods that offer the least amount of disturbance to the overall environment of the Ramona Burn Dump site.

7.3. EVALUATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

NCP § 300.415(i) provides that a removal action must attain ARARs to the extent practical, considering the exigencies of the situation. Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address the situation at a CERCLA site. The requirement is applicable if the jurisdictional prerequisites of the law or regulation directly address the circumstances at the site. An applicable federal requirement is considered an ARAR. An applicable state requirement is an ARAR only if it is more stringent than federal ARARs.

If the requirement is not legally applicable, then the requirement is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those cleanup criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations similar to the circumstances of the proposed removal action and are well suited to the conditions of the site (EPA, 1988). A requirement must be determined to be both relevant and appropriate to be considered an ARAR.

To qualify as a state ARAR under CERCLA and the NCP, a state requirement must be a promulgated law, substantive, consistently applied, and more stringent than a federal requirement. Provisions of generally relevant federal and state statutes and regulations that were determined to be procedural or nonenvironmental, including permit requirements, are not considered to be ARARs. Nonpromulgated advisories or guidance issued by federal or state governments are not legally binding and do not have the status of ARARs. However, such requirements may be useful and are “to be considered” (TBC) for guiding decisions regarding cleanup goals or methods when regulatory standards are not available.

EPA has developed three categories of ARARs to assist in the identification of site requirements (EPA, 1988). The three categories are (1) chemical-specific, (2) location-specific, (3) and action-specific ARARs. The following definitions provide a general guideline for each of these categories:

- Chemical-Specific ARARs are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numeric values (cleanup goals). These values establish the acceptable amount or concentration of a chemical that may be found in or discharged to the ambient environment.
- Location-Specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations. Location-specific ARARs relate to the geographical or physical position of the site (e.g., presence of wetlands, sensitive species, flood plains, etc.).
- Action-Specific ARARs are activity-based requirements or limitations on actions taken with respect to hazardous substances.

As the lead agency, the Forest Service has primary responsibility for soliciting and identifying ARARs. The federal and state ARARs presented in the draft EE/CA will represent a preliminary analysis of potential ARARs, including any ARARs provided by the Forest Service or other agencies contacted by the Forest Service. In addition, any appropriate standards and statutes will be developed and compiled and included as TBC in the evaluation of ARARs. Other federal and state advisories, criteria, or guidance may, as appropriate, be considered in formulating the removal action.

7.4. DEVELOP AND ANALYZE REMOVAL ACTION ALTERNATIVES

As part of the EE/CA process, ERRG will conduct a detailed identification, screening, and analysis of removal action alternatives for the site. Alternatives will be identified that will meet the RAOs of reducing or eliminating the risk factors driving the removal action (i.e., the release of burn ash and waste materials to surface water). The focus will be on proven technologies, which will most likely focus on, but will not be limited to the following:

- No action
- Administrative controls, including:
  - close the routes to access the site; and
  - place signs noting hazards at the site boundary or other access points.
- Engineering controls, including:
  - excavation of material with contaminant concentrations exceeding screening criteria and placing it in an onsite capped repository(s) outside of the floodplain and within Forest Service lands; or
  - excavation of soil and waste with contaminant concentrations exceeding screening criteria and transporting and placing it in an offsite disposal facility(s) outside of Forest Service lands.

Each alternative will be developed based on the results of the SRE and the identified RAOs. ERRG will analyze each removal action alternative for its effectiveness, implementability, and cost. Effectiveness

will be evaluated in terms of protectiveness and ability to achieve the RAOs. The protectiveness of the alternatives will be assessed in terms of how well they (1) protect public health, (2) protect workers during implementation, (3) protect the environment (ecological), and (4) comply with ARARs.

The implementability of the alternatives depends on their technical feasibility, the availability of necessary resources to support the alternatives, and their administrative feasibility.

The cost of the alternatives is determined by looking at capital costs, costs for post-removal site control activities, and present-worth cost. Cost estimates for the screening will be prepared in accordance with "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (EPA, 2000).

7.5. COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES AND RECOMMENDED ALTERNATIVE

Following development and analysis of each removal action alternative, a comparative analysis of the alternatives will be performed to evaluate the relative performance of each alternative against the criteria and each other. This process will identify advantages and disadvantages of each alternative and will guide the selection of the removal action. The recommended removal action alternative or alternatives, based on the comparative analysis, will be presented in the EE/CA with the reasons for the recommendation.

7.6. POST-REMOVAL SITE CONTROL ACTIVITIES

Following selection of the removal action alternative, any post-removal site control activities (i.e., community relations support) necessary to sustain the integrity of the removal action will be identified.

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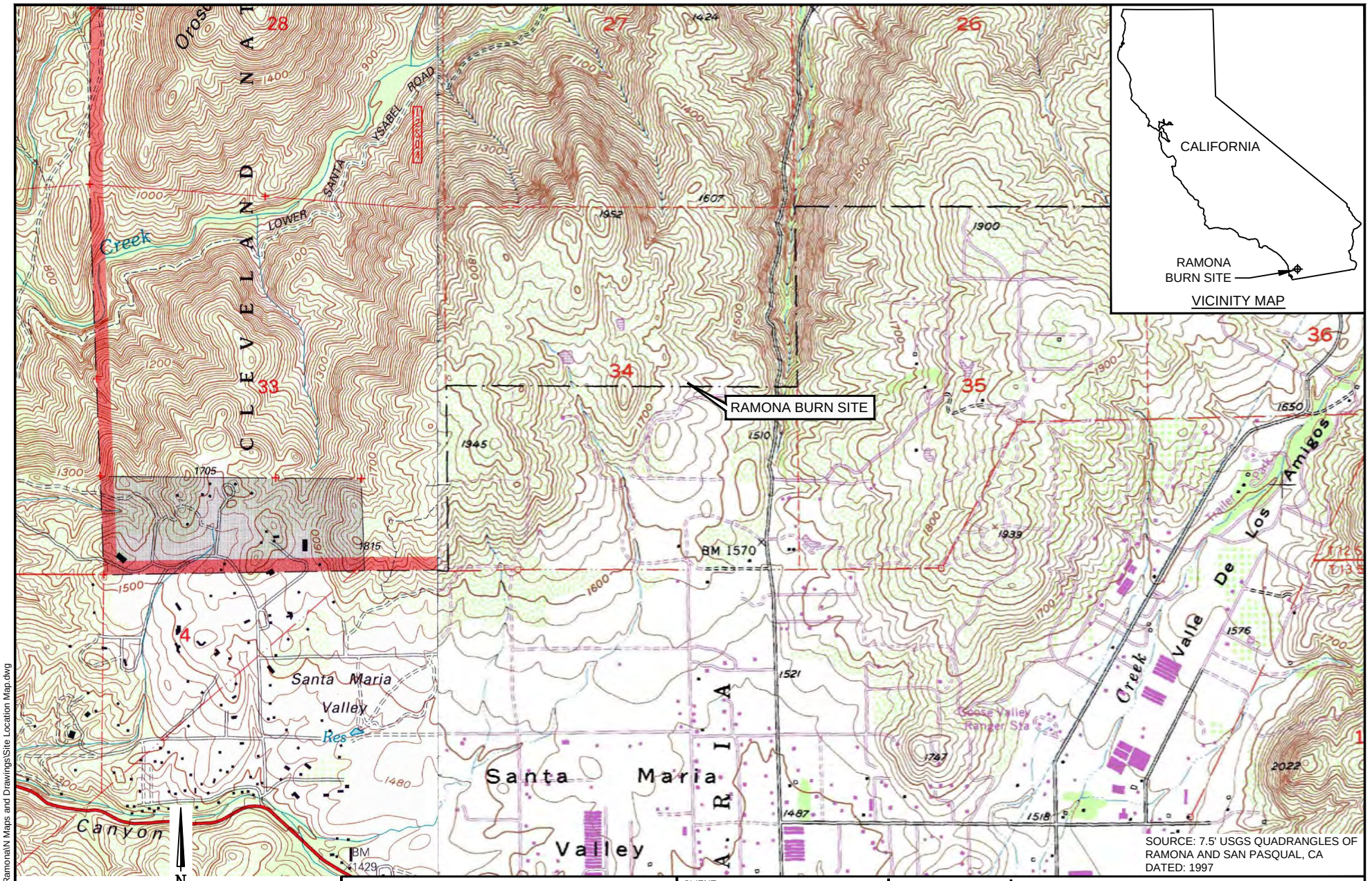
Figures



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APPROXIMATE SCALE IN FEET

ERRG

Engineering/Remediation Resources Group, Inc.
115 Sansome St., Suite 200
San Francisco, California 94104
(415) 395-9974

CLIENT:
US DEPARTMENT OF AGRICULTURE
FOREST SERVICE

LOCATION:
RAMONA BURN DUMP SITE
CLEVELAND NATIONAL FOREST
RAMONA, CALIFORNIA

DESIGNED BY: SC 08/27/13
CHECKED BY: AN 08/27/13
P.E/P.G.: AN 08/27/13

SITE LOCATION MAP

ERRG PROJECT NO.	REVISION NO.	SHEET	OF	FIG NO.
2013-064	0	1	1	1

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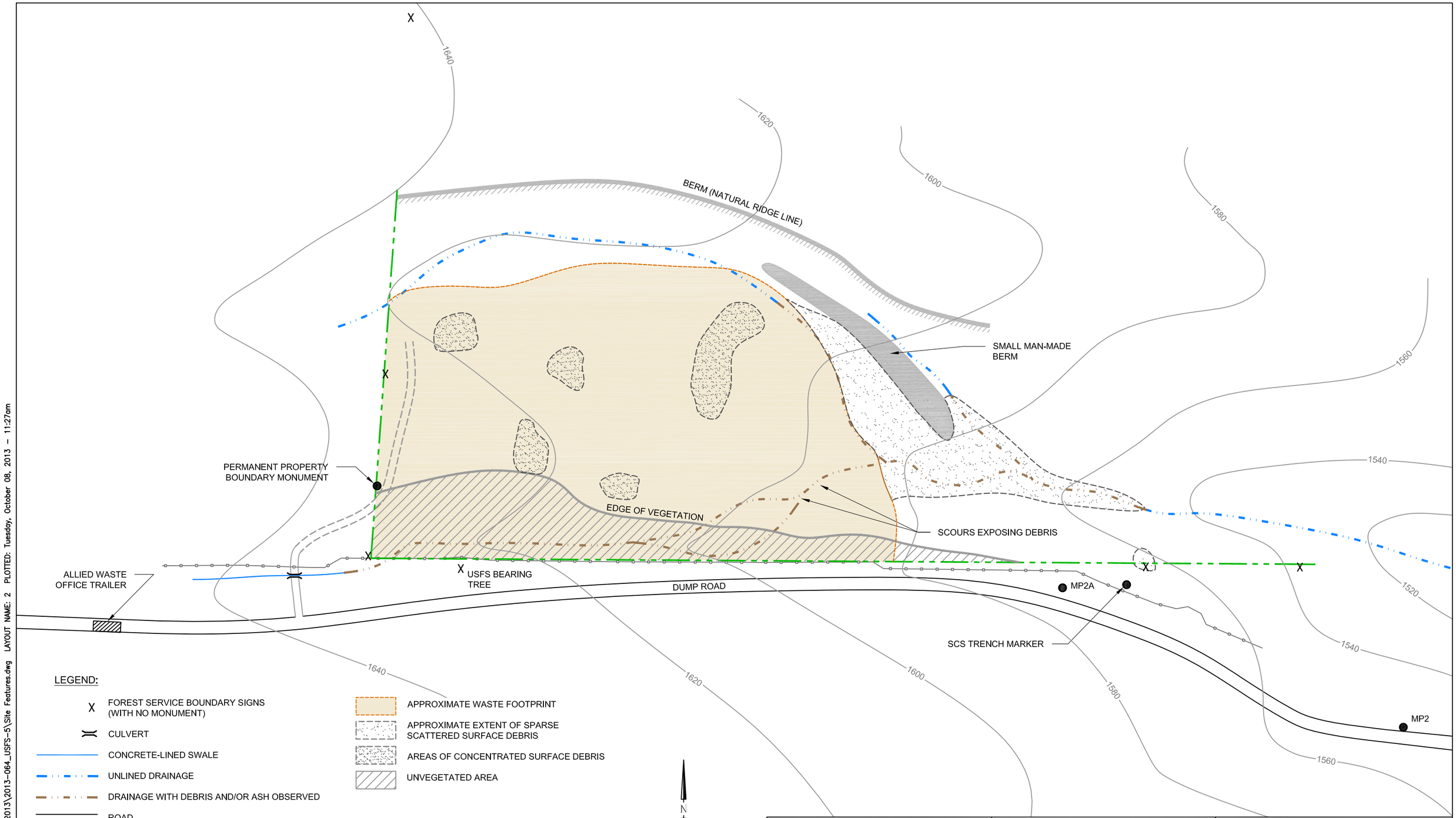

LEGEND:

- X — FOREST SERVICE BOUNDARY SIGNS (WITH NO MONUMENT)
- CULVERT
- CONCRETE-LINED SWALE
- UNLINED DRAINAGE
- DRAINAGE WITH DEBRIS AND/OR ASH OBSERVED
- ROAD
- FORMER ROAD (APPROXIMATE)
- PROPERTY BOUNDARY (APPROXIMATE)
- FENCELINE
- APPROXIMATE WASTE FOOTPRINT
- APPROXIMATE EXTENT OF SPARSE SCATTERED SURFACE DEBRIS
- AREAS OF CONCENTRATED SURFACE DEBRIS
- UNVEGETATED AREA

NOTE:

MAP IS BASED ON "FINAL PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT" PREPARED BY ERRG, MAY 2010

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0 80

APPROXIMATE SCALE IN FEET

ERRG
Engineering/Remediation Resources Group, Inc.
115 Sansome St., Suite 200
San Francisco, California 94104
(415) 395-9974

CLIENT: U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

LOCATION: RAMONA BURN DUMP SITE CLEVELAND NATIONAL FOREST RAMONA, CALIFORNIA

DESIGNED BY: JJC 8/27/13

CHECKED BY: AN 10/7/13

P.E/P.G.: AN 10/7/13

SITE FEATURES MAP

ERRG PROJECT NO.	REVISION NO.	SHEET	OF	FIG NO.
2013-064	0	1	1	2

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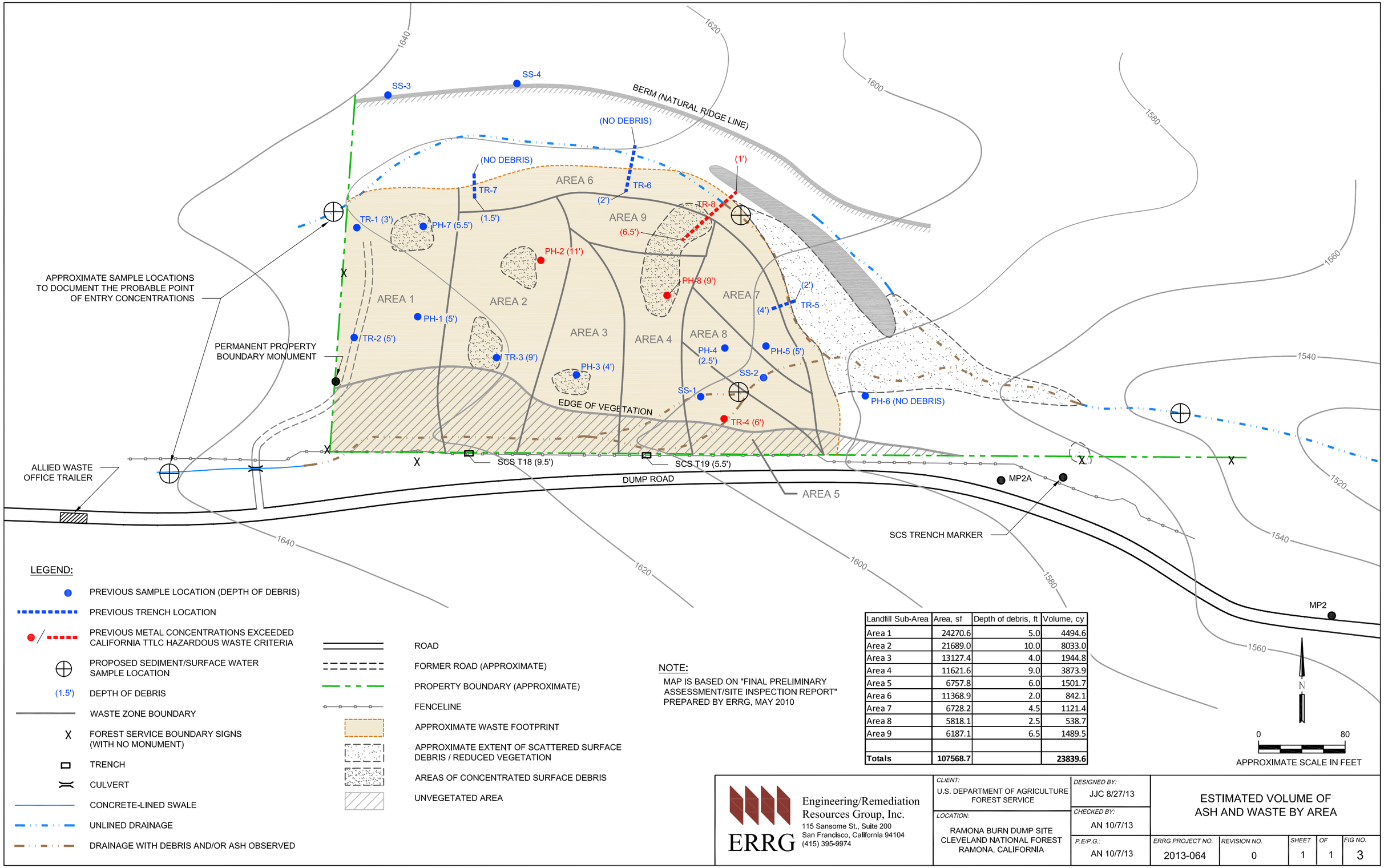

LEGEND:

- PREVIOUS SAMPLE LOCATION (DEPTH OF DEBRIS)
- PREVIOUS TRENCH LOCATION
- PREVIOUS METAL CONCENTRATIONS EXCEEDED CALIFORNIA TTLC HAZARDOUS WASTE CRITERIA
- PROPOSED SEDIMENT/SURFACE WATER SAMPLE LOCATION
- (1.5') DEPTH OF DEBRIS
- WASTE ZONE BOUNDARY
- X FOREST SERVICE BOUNDARY SIGNS (WITH NO MONUMENT)
- TRENCH
- CULVERT
- CONCRETE-LINED SWALE
- UNLINED DRAINAGE
- DRAINAGE WITH DEBRIS AND/OR ASH OBSERVED
- ROAD
- FORMER ROAD (APPROXIMATE)
- PROPERTY BOUNDARY (APPROXIMATE)
- FENCELINE
- APPROXIMATE WASTE FOOTPRINT
- APPROXIMATE EXTENT OF SCATTERED SURFACE DEBRIS / REDUCED VEGETATION
- AREAS OF CONCENTRATED SURFACE DEBRIS
- UNVEGETATED AREA

NOTE:

MAP IS BASED ON "FINAL PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT" PREPARED BY ERRG, MAY 2010

Landfill Sub-Area	Area, sf	Depth of debris, ft	Volume, cy
Area 1	24270.6	5.0	4494.6
Area 2	21689.0	10.0	8033.0
Area 3	13127.4	4.0	1944.8
Area 4	11621.6	9.0	3873.9
Area 5	6757.8	6.0	1501.7
Area 6	11368.9	2.0	842.1
Area 7	6728.2	4.5	1121.4
Area 8	5818.1	2.5	538.7
Area 9	6187.1	6.5	1489.5
Totals	**107568.7**		**23839.6**

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CLIENT: U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

LOCATION: RAMONA BURN DUMP SITE CLEVELAND NATIONAL FOREST RAMONA, CALIFORNIA

DESIGNED BY: JJC 8/27/13

CHECKED BY: AN 10/7/13

P.E/P.G.: AN 10/7/13

ESTIMATED VOLUME OF ASH AND WASTE BY AREA

ERRG PROJECT NO.	REVISION NO.	SHEET	OF	FIG NO.
2013-064	0	1	1	3

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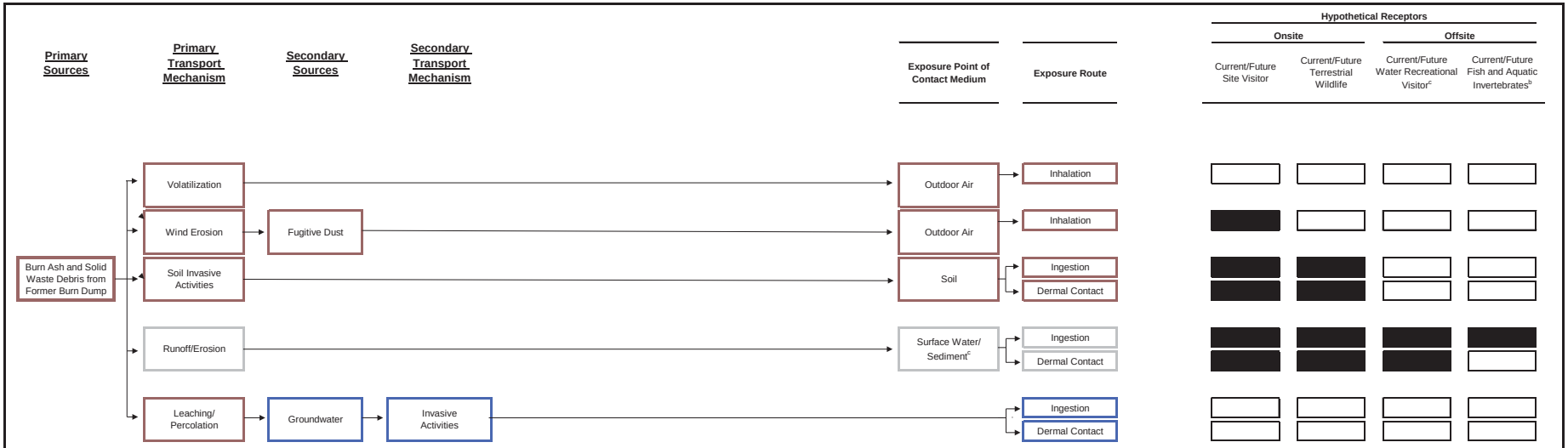

CSM components related to soil.

CSM components related to groundwater.

CSM components related to surface water and sediment.

Receptor likely to be exposed via this route, so pathway is considered potentially complete.

Receptor may be exposed via this route, so pathway is considered potentially complete; however, pathway is considered minor.

Pathway is incomplete, no further evaluation required.

Notes:

[a] Hypothetical site visitor receptor represents both site worker and recreational (i.e., hiker) receptors.

[b] Surface water leaving Ramona Burn Dump may potentially impact the Santa Ysabel Creek.

CSM = conceptual site model

RAMONA BURN DUMP
CLEVELAND NATIONAL FOREST
SAN DIEGO COUNTY, CALIFORNIA

PRELIMINARY CONCEPTUAL SITE MODEL

PROJECT NO.	DATE	DRAWN BY	APP. BY
2013-064	10/1/13	AN	SCK

ERRG
115 Sansome Street, Suite 200
San Francisco, CA 94104

FIGURE 4

Tables

Table 1. Analytical Groups and Methods, Sample Containers and Volumes, Preservation Requirements, and Holding Times

Analytical Group	Analytical Method	Sample Containers (number, size, and type)	Sample Volume (unit)	Preservation Requirements (chemical, temperature, light-protected)	Maximum Holding Time (preparation/analysis)
Surface Water					
Total arsenic, lead, and zinc	EPA Method 6010B	One polyethylene container	250 milliliters	Laboratory filter; HNO_3 to pH<2; store cool at 4°C	6 months
TCDD	EPA Method 8290	Two 1-liter amber glass container with polytetrafluoroethylene-lined lid	2 liters	Store cool at <4°C	45 days
Sediment					
Total arsenic, lead, and zinc	EPA Method 6010B	One 4 ounce jar	4 ounces	Store cool at <4°C	6 months
TCDD	EPA Method 8290	One 4 ounce jar	4 ounces	Store cool at <4°C	30 days

Notes:

EPA = U.S. Environmental Protection Agency

HNO_3 = nitric acid

TCDD = 2,3,7,8-tetrachlorodibenzodioxin

Appendix A. Site-Specific Health and Safety Plan

SITE HEALTH AND SAFETY PLAN

(Short Form)

A. INTRODUCTION

This plan has been prepared solely for implementation by ERRG employees, using operating procedures for which they are specifically trained. Any use of this plan by other parties is at their own risk.

B. GENERAL INFORMATION

Project No.: 2013-064 **Date:** October 10, 2013

Prepared by: Annica Nord, Site Safety and Health Officer (SSHO)

Approved by: Ed Grooman, CSP, Corporate Health and Safety Manager

Site Location: Ramona Burn Dump Site, Cleveland National Forest, Ramona, California

Description: Perform a site reconnaissance and collect surface water and sediment samples from an onsite ephemeral creek bed.

Hazard Summary:

Overall Chemical Hazard:	☐ Serious	☐ Moderate	☒ Low	☐ Unknown
Overall Physical Hazard:	☐ Serious	☐ Moderate	☒ Low	☐ Unknown

C. Project Team

PERSONNEL	RESPONSIBILITIES/COMPETENT PERSON
Samantha Caruthers-Knight, PG, Project Manager/Field Team Leader	▪ Primary, single point of contact for client on the project ▪ Establish contract management and operating procedures for project controls, training, safety and health, quality control, information management, and subcontractor procurement ▪ Select and direct qualified project staff for each task based on the specific needs of the work, as well as other key staff requirements ▪ Ensure the protection of public and worker safety and health ▪ Maintain compliance with contract requirements ▪ Stop project work for noncompliance with contractual requirements
Annica Nord, SSHO	▪ Implement this Health and Safety Plan (HASP) ▪ Enforce safe work and hygiene practices ▪ Monitor field procedures to ensure compliance with this HASP ▪ Establish and maintain restricted work areas ▪ Brief all field personnel regarding special hazards that may be associated with fieldwork ▪ Monitor the labeling, shipping, and control of hazardous or potentially hazardous samples ▪ Monitor field safety procedures ▪ Conduct daily safety meetings and record on daily tailgate safety meeting logs

PERSONNEL	RESPONSIBILITIES/COMPETENT PERSON
Annica Nord, SSHO	▪ Conduct daily safety inspections and unscheduled safety audits ▪ Require proper use of personal protective equipment ▪ Ensure maintenance of all health and safety monitoring and personnel protective equipment ▪ Maintain a first aid kit and provide first aid ▪ Notify the proper response agency if an emergency occurs ▪ Complete all necessary recordkeeping ▪ Stop fieldwork for noncompliance with this HASP ▪ Recommend field modifications to improve worker health and safety ▪ Execute the contract work under the direction of the Project Manager in accordance with this HASP

D. CHEMICAL/SITE CHARACTERISTICS

Contaminants(s) of Concern: Arsenic, Lead, and Zinc and 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)

Physical State: ☒ Liquid ☒ Solid ☐ Sludge ☐ Gas/Vapor

Characteristics:

☐ Flammable ☐ Combustible ☐ Corrosive ☒ Poison ☐ Explosive

☐ Reactive ☐ Volatile ☐ Biological ☐ Radioactive ☒ Carcinogen

Other:

Physical Hazards of Site:

☐ Overhead ☐ Confined Space ☐ Below Grade ☒ Trip/Fall ☐ Burn

☐ Puncture ☐ Noise ☐ Cut ☒ Splash ☒ Heat Stress

Other: Most work will be performed using hand tools to collect surficial sediment samples. Surface water samples will be collected by submerging a laboratory-prepared sample container into the surface water.

E. HAZARD EVALUATION

Physical Hazards:

NO.	TASK	PHYSICAL HAZARDS
1.	Mobilization and Site Preparation	▪ Heat stress ▪ Slips, trips, and falls
2.	Site Reconnaissance	▪ Heat stress ▪ Slips, trips, and falls
3.	Collection of sediment and surface water samples	▪ Heat stress ▪ Slips, trips, and falls ▪ Eye splash ▪ Dust
4.	Demobilization	▪ Heat stress ▪ Slips, trips, and falls

Chemical Hazard Evaluation: See attached NIOSH Guidebook sheet or Safety Data Sheet (SDS) for data on individual chemicals (Attachment A1).

Chemical Hazards:

NO.	TASK	CHEMICAL HAZARDS	Cal/OSHA PEL	ACTION LEVEL	AIR MONITORING	REQUIRED PPE
1.	Site reconnaissance	None	N/R	N/R	Air monitoring will not be performed because no dust will be generated during site reconnaissance activities	Level D
2.	Collection of surface water and sediment samples	Arsenic	0.01 mg/m^3	0.005 mg/m^3	Air monitoring will not be performed because dust generation will be minimal, if any, surface water and sediment sampling	Level D
		Lead	0.05 mg/m^3	0.0025 mg/m^3		
		Zinc	5.0 mg/m^3	2.5 mg/m^3		
		TCDD	No PEL exists	None		

Notes:

Cal/OSHA = California Division of Occupational Safety and Health

mg/m^3 = milligrams per cubic meter

N/R = not required

PEL = permissible exposure limit

PPE = personal protective equipment

All entries into an exclusion zone require the Buddy System. All ERRG field staff participates in a medical monitoring program and has completed applicable training in accordance with Title 29 Code of Federal Regulations (CFR) Section (§) 1910.120. ERRG's respiratory protection program meets the requirements of Title 29 CFR § 1910.134.

Decontamination Procedure and Solutions:

Personnel: Remove and dispose of disposable PPE as municipal waste because it will not be considered hazardous waste. Wash hands and face with water and soap or wet cleaning wipes.

Equipment: Not applicable (all sampling equipment will be disposable).

Instruments: No reusable sampling instruments will be used for this scope of work.

F. EQUIPMENT CHECKLIST

Item	Number
Disposable plastic trowels	6
1-L Glass sample bottles (unpreserved)	10
250 milliliter polyethylene bottle (preserved with nitric acid)	5
4 ounce glass sample jars	12
Disposable nitrile gloves	22
Camera Kit	1
Global Positioning System	1

G. ACTIVITY HAZARD ANALYSIS TABLES

Description	Number
Site Reconnaissance	1
Sample Collection	2

(see Attachment A2)

H. EMERGENCY INFORMATION

Emergency Contact	Phone Numbers
Jerry DeGraff (Forest Service Contracting Officer's Representative)	(559) 297-0706 x4932 (office) (559) 284-2230 (cell)
Caitlin Gorman (ERRG Program Manager)	(415) 848-7108 (office) (415) 425-2075 (cell)
Samantha Caruthers-Knight (ERRG Project Manager/Field Team Leader)	(415) 848-7100 (office) (510) 851-3279 (cell)
Annica Nord (ERRG SSHO)	(206) 512-3170 (office) (206) 295-9254 (cell)
Ed Grooman (ERRG Corporate Health and Safety Manager)	(925) 726-4117 (office) (925) 234-1333 (cell)

I. SITE RESOURCES
(To Be Completed Prior To Start Of Field Work)

Service/Organization	Division/Title/Location	Contact	Phone Numbers
Ambulance	N/A	N/A	911
Goose Valley Fire Station (Nearest Forest Service Station)		N/A	911 (emergency) (760) 788-0250 (nonemergency)
Sheriff – Ramona	San Diego County Sheriff Department 1424 Montecito Road Ramona, CA 92065	N/A	911 (emergency) (760) 789-9157 (nonemergency)
Poison Control Center	N/A	N/A	(800) 222-1222
U.S. Environmental Protection Agency Region 9 Spill Phone	N/A	N/A	(800) 300-2193
Pomerado Hospital	15615 Pomerado Road Poway, CA 92065	N/A	911 (emergency) (858) 613-4000 (nonemergency number)
Arch Health Partners – Urgent Care	211 13th Street Ramona, CA 92065	N/A	(760) 789-5160

J: HOSPITAL DIRECTIONS AND MAP

(See Attachment A3)

ATTACHMENT A1

SAFETY DATA SHEETS

Arsenic (inorganic compounds, as As)

Synonyms & Trade Names Arsenic metal: Arsenia
Other synonyms vary depending upon the specific As compound. [Note: OSHA considers "Inorganic Arsenic" to mean copper acetoarsenite and all inorganic compounds containing arsenic except ARSINE.]

CAS No. 7440-38-2 (metal)	**RTECS No.** CG0525000 (metal) (/niosh-rtecs/CG802C8.html)	**DOT ID & Guide** 1558 152 (http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=152) (http://www.cdc.gov/Other/disclaimer.html) (metal) 1562 152 (http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=152) (http://www.cdc.gov/Other/disclaimer.html) (dust)
Formula As (metal)	**Conversion**	**IDLH** Ca [5 mg/m³ (as As)] See: 7440382 (/niosh/idlh/7440382.html)
Exposure Limits **NIOSH REL** : Ca C 0.002 mg/m³ [15-minute] See Appendix A (nengapdxa.html) **OSHA PEL** : [1910.1018] TWA 0.010 mg/m³		**Measurement Methods** **NIOSH** 7300 (/niosh/docs/2003-154/pdfs/7300.pdf), 7301 (/niosh/docs/2003-154/pdfs/7301.pdf), 7303 (/niosh/docs/2003-154/pdfs/7303.pdf), 7900 (/niosh/docs/2003-154/pdfs/7900.pdf), 9102 (/niosh/docs/2003-154/pdfs/9102.pdf); **OSHA** ID105 (http://www.osha.gov/dts/sltc/methods/inorganic/id105/id105.html) (http://www.cdc.gov/Other/disclaimer.html) See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html) (http://www.cdc.gov/Other/disclaimer.html)

Physical Description Metal: Silver-gray or tin-white, brittle, odorless solid.

MW: 74.9	**BP:** Sublimes	MLT: 1135°F (Sublimes)	**Sol:** Insoluble	**VP:** 0 mmHg (approx)	**IP:** NA
Sp.Gr: 5.73 (metal)	**FLP:** NA	**UEL:** NA	**LEL:** NA		

Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of dust when exposed to flame.

Incompatibilities & Reactivities Strong oxidizers, bromine azide [Note: Hydrogen gas can react with inorganic arsenic to form the highly toxic gas arsine.]

Exposure Routes inhalation, skin absorption, skin and/or eye contact, ingestion

Symptoms Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]

Target Organs Liver, kidneys, skin, lungs, lymphatic system

Cancer Site [lung & lymphatic cancer]

Personal Protection/Sanitation (See protection codes (protect.html))
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated/Daily
Remove: When wet or contaminated
Change: Daily
Provide: Eyewash, Quick drench

First Aid (See procedures (firstaid.html))
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
(See Appendix E) (nengapdxe.html)

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having an N100, R100, or P100 filter.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also: INTRODUCTION (/niosh/npg/pgintrod.html) See ICSC CARD: 0013 (/niosh/ipcsneng/neng0013.html) See MEDICAL TESTS: 0017 (/niosh/docs/2005-110/nmed0017.html)

Page last reviewed: April 4, 2011
Page last updated: November 18, 2010
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Due to the lapse in government funding, only web sites supporting excepted functions will be updated unless otherwise funded. As a result, the information on this website may not be up to date, the transactions submitted via the website may not be processed, and the agency may not be able to respond to inquiries until appropriations are enacted.

Updates regarding government operating status and resumption of normal operations can be found at http://www.usa.gov.

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

Lead

Synonyms & Trade Names: Lead metal, Plumbum

CAS No.	RTECS No.	DOT ID & Guide
7439-92-1	OF7525000 (/niosh-rtecs/OF72D288.html)	

Formula	Conversion	IDLH
Pb		100 mg/m3 (as Pb) See: 7439921 (/niosh/idlh/7439921.html)

Exposure Limits

NIOSH REL *: TWA (8-hour) 0.050 mg/m3 See Appendix C (nengapdxc.html) [*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.]

OSHA PEL *: [1910.1025] TWA 0.050 mg/m3 See Appendix C (nengapdxc.html) [*Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.]

Measurement Methods

NIOSH 7082 (/niosh/docs/2003-154/pdfs/7082.pdf), 7105 (/niosh/docs/2003-154/pdfs/7105.pdf), 7300 (/niosh/docs/2003-154/pdfs/7300.pdf), 7301 (/niosh/docs/2003-154/pdfs/7301.pdf), 7303 (/niosh/docs/2003-154/pdfs/7303.pdf), 7700 (/niosh/docs/2003-154/pdfs/7700.pdf), 7701 (/niosh/docs/2003-154/pdfs/7701.pdf), 7702 (/niosh/docs/2003-154/pdfs/7702.pdf), 9100 (/niosh/docs/2003-154/pdfs/9100.pdf), 9102 (/niosh/docs/2003-154/pdfs/9102.pdf), 9105 (/niosh/docs/2003-154/pdfs/9105.pdf);
OSHA ID121 (http://www.osha.gov/dts/sltc/methods/inorganic/id121/id121.html) (http://www.cdc.gov/Other/disclaimer.html), ID125G (http://www.osha.gov/dts/sltc/methods/inorganic/id125g/id125g.html) (http://www.cdc.gov/Other/disclaimer.html), ID206 (http://www.osha.gov/dts/sltc/methods/inorganic/id206/id206.html) (http://www.cdc.gov/Other/disclaimer.html)
See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html) (http://www.cdc.gov/Other/disclaimer.html)

Physical Description: A heavy, ductile, soft, gray solid.

MW:	BP:	MLT:	Sol:	VP:	IP:
207.2	3164° F	621°F	Insoluble	0 mmHg (approx)	NA

Sp.Gr:	FLP:	UEL:	LEL:		
11.34	NA	NA	NA		

Noncombustible Solid in bulk form.

Incompatibilities & Reactivities Strong oxidizers, hydrogen peroxide, acids

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension

Target Organs Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue

Personal Protection/Sanitation (See protection codes (protect.html))
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: Daily
Remove: When wet or contaminated
Change: Daily

First Aid (See procedures (firstaid.html))
Eye: Irrigate immediately
Skin: Soap flush promptly
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations
(See Appendix E) (nengapdxe.html)
NIOSH/OSHA

Up to 0.5 mg/m3:
(APF = 10) Any air-purifying respirator with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

Up to 2.5 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Up to 100 mg/m3:
(APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also: INTRODUCTION (/niosh/npg/pgintrod.html) See ICSC CARD: 0052 (/niosh/ipcsneng/neng0052.html) See MEDICAL TESTS: 0127 (/niosh/docs/2005-110/nmed0127.html)

Page last reviewed: April 4, 2011
Page last updated: November 18, 2010
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Zinc oxide

Synonyms & Trade Names Zinc peroxide

CAS No.	RTECS No.	DOT ID & Guide
1314-13-2	ZH4810000 (/niosh-rtecs/ZH496510.html)	1516 143 (http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=143) (http://www.cdc.gov/Other/disclaimer.html)
Formula ZnO	**Conversion**	**IDLH** 500 mg/m3 See: 1314132 (/niosh/idlh/1314132.html)

Exposure Limits
NIOSH REL : Dust: TWA 5 mg/m3 C 15 mg/m3
Fume: TWA 5 mg/m3 ST 10 mg/m3
OSHA PEL † (nengapdxg.html) : TWA 5 mg/m3 (fume) TWA 15 mg/m3 (total dust) TWA 5 mg/m3 (resp dust)

Measurement Methods
NIOSH 7303 (/niosh/docs/2003-154/pdfs/7303.pdf) , 7502 (/niosh/docs/2003-154/pdfs/7502.pdf) ;
OSHA ID121 (http://www.osha.gov/dts/sltc/methods/inorganic/id121/id121.html) (http://www.cdc.gov/Other/disclaimer.html) , ID143 (http://www.osha.gov/dts/sltc/methods/inorganic/id143/id143.html) (http://www.cdc.gov/Other/disclaimer.html)
See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html) (http://www.cdc.gov/Other/disclaimer.html)

Physical Description White, odorless solid.

MW:	BP:	MLT:	Sol(64°F):	VP:	IP:
81.4	?	3587° F	0.0004%	0 mmHg (approx)	NA

Sp.Gr:	Fl.P:	UEL:	LEL:		
5.61	NA	NA	NA		

Noncombustible Solid

Incompatibilities & Reactivities Chlorinated rubber (at 419°F), water [Note: Slowly decomposed by water.]

Exposure Routes inhalation

Symptoms Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function

Target Organs respiratory system

Personal Protection/Sanitation (See protection codes (protect.html))
Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures (firstaid.html))

Breathing: Respiratory support

Respirator Recommendations
NIOSH/OSHA

Up to 50 mg/m3:
(APF = 10) Any particulate respirator equipped with an N95, R95, or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators. The following filters may also be used: N99, R99, P99, N100, R100, P100.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
(APF = 10) Any supplied-air respirator

Up to 125 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter.

Up to 250 mg/m3:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.
Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also: INTRODUCTION (/niosh/npg/pgintrod.html) See ICSC CARD: 0208 (/niosh/ipcsneng/neng0208.html) See MEDICAL TESTS: 0246 (/niosh/docs/2005-110/nmed0246.html)

Page last reviewed: April 4, 2011
Page last updated: November 18, 2010
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http://www.epa.gov/ttn/atw/hlthef/dioxin.html
Last updated on Tuesday, November 06, 2007

Technology Transfer Network
Air Toxics Web Site

2,3,7,8-Tetrachlorodibenzo-p-Dioxin (2,3,7,8,-TCDD)

1746-01-6

Hazard Summary-Created in April 1992; Revised in January 2000

2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) is formed as an unintentional by-product of incomplete combustion. It may be released to the environment during the combustion of fossil fuels and wood, and during the incineration of municipal and industrial wastes. It causes chloracne in humans, a severe acne-like condition. It is known to be a developmental toxicant in animals, causing skeletal deformities, kidney defects, and weakened immune responses in the offspring of animals exposed to 2,3,7,8-TCDD during pregnancy. Human studies have shown an association between 2,3,7,8-TCDD and soft-tissue sarcomas, lymphomas, and stomach carcinomas. EPA has classified 2,3,7,8- TCDD as a probable human carcinogen (Group B2).

Please Note: The main source of information for this fact sheet is the Agency for Toxic Substances and Disease Registry's (ATSDR's) *Toxicological Profile for Chlorinated Dibenzo-p-Dioxins*.

Uses

- 2,3,7,8-TCDD is not intentionally produced by industry. It can be inadvertently produced in very small amounts as an impurity during the incineration of municipal and industrial wastes and during the manufacture of certain chemicals. (1)
- The only present use for 2,3,7,8-TCDD is in chemical research. (1)

Sources and Potential Exposure

- 2,3,7,8-TCDD may be formed during the chlorine bleaching process used by pulp and paper mills, and as a by-product from the manufacture of certain chlorinated organic chemicals, such as chlorinated phenols. (1)
- 2,3,7,8-TCDD is primarily released to the environment during the combustion of fossil fuels (including motor vehicles) and wood, and during incineration processes. (1)
- Very low levels of 2,3,7,8-TCDD are found throughout the environment, including air, food, and soil. (1)
- Most of the exposure of the general population to 2,3,7,8-TCDD is from food, mainly meat, dairy products, and fish. (1)

Assessing Personal Exposure

- Body fat, blood, and breast milk may be analyzed for 2,3,7,8-TCDD. (1)

Health Hazard Information

Acute Effects:

- The major acute (short-term) effect from exposure of humans to high levels of 2,3,7,8-TCDD in air is chloracne, a severe acne-like condition that can develop within months of first exposure. (1,2)
- Acute animal tests in dogs, monkeys, and guinea pigs have shown 2,3,7,8-TCDD to have extreme toxicity from oral exposure. (1)

Chronic Effects (Noncancer):

- Chloracne is also the major effect seen from chronic (long-term) exposure to 2,3,7,8-TCDD in humans. (1)
- Animal studies have reported hair loss, loss of body weight, and a weakened immune system from oral exposure to 2,3,7,8-TCDD. (1)
- EPA has not established a Reference Concentration (RfC) or a Reference Dose (RfD) for 2,3,7,8-TCDD.
- ATSDR has calculated a chronic oral minimal risk level (MRL) of 1×10^{-9} milligrams per kilogram body weight per day (mg/kg/d) based on neurological effects in monkeys. The MRL is an estimate of daily exposure to a dose of a chemical that is likely to be without appreciable risk of adverse noncancerous effects over a specified duration of exposure. Exposure to a level above the MRL does not mean that adverse effects will occur. The MRL is used by public health professionals as a screening tool. (1)

Reproductive/Developmental Effects:

- The results of available reproductive and developmental studies in humans are inconclusive. (1)
- Animal studies have reported developmental effects, such as skeletal deformities, kidney defects, and weakened immune responses in the offspring of animals exposed to 2,3,7,8-TCDD during pregnancy. (1)
- Reproductive effects, including altered levels of sex hormones, reduced production of sperm, and increased rates of miscarriages, have been seen in animals exposed to 2,3,7,8-TCDD. (1)

Cancer Risk:

- Human studies, primarily of workers occupationally exposed to 2,3,7,8-TCDD by inhalation, have found an association between 2,3,7,8-TCDD and lung cancer, soft-tissue sarcomas, lymphomas, and stomach carcinomas, although for malignant lymphomas, the increase in risk is not consistent. (1)
- No information is available on the carcinogenic effects of 2,3,7,8-TCDD in animals following inhalation exposure. (1)
- Animal studies have reported tumors of the liver, lung, tongue, thyroid, and nasal turbinates from oral exposure to 2,3,7,8-TCDD. (1)
- EPA has classified 2,3,7,8-TCDD as a Group B2; probable human carcinogen. (2,3)
- EPA has calculated an inhalation cancer slope factor of 1.5×10^{5} $(mg/kg/d)^{-1}$ and an inhalation unit risk estimate of 3.3×10^{-5} $(pg/m^3)^{-1}$ for 2,3,7,8-TCDD. (2,3)
- EPA has calculated an oral cancer slope factor of 1.5×10^{5} $(mg/kg/d)^{-1}$ and an oral unit risk factor of 4.5 $(\mu g/L)^{-1}$ for 2,3,7,8-TCDD. (2,3)

Physical Properties

- 2,3,7,8-TCDD is a colorless solid with no distinguishable odor. (1)
- The chemical formula for 2,3,7,8-TCDD is $C_{12}H_4Cl_4O_2$, and the molecular weight is 322 g/mol. (1)
- The vapor pressure for 2,3,7,8-TCDD is 7.4×10^{-10} at 25 °C, and it has an octanol/water partition coefficient (log K_{ow}) of 6.8-7.58. (1)

Note: There are very few health numbers or regulatory/advisory numbers for 2,3,7,8-TCDD; thus, a graph has not been prepared for this compound. The health information cited in this fact sheet was obtained in December 1999.

Conversion Factors (only for the gaseous form):

To convert concentrations in air (at 25°C) from ppm to mg/m^3: mg/m^3 = (ppm) × (molecular weight of the compound)/(24.45). For 2,3,7,8-TCDD: 1 ppm = 13.2 mg/m^3.

References

1. Agency for Toxic Substances and Disease Registry (ATSDR). *Toxicological Profile for Chlorinated Dibenzo-p-Dioxins*. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 1998.
2. U.S. Environmental Protection Agency. *Health Effects Assessment Summary Tables. FY 1997 Update*. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Office of Research and Development, Cincinnati, OH. 1997.
3. U.S. Environmental Protection Agency. *Health Assessment Document for Polychlorinated Dibenzo-p-Dioxin*. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Office of Research and Development, Cincinnati, OH. EPA 600/8-84-014F. 1985.

ATTACHMENT A2

ACTIVITY HAZARD ANALYSES

Activity Hazard Analysis 1

Activity/Work Task: **Site Reconnaissance**	Overall Risk Assessment Code (RAC) (Use highest code)	**L**
Project Location: Ramona Burn Dump Site, Cleveland National Forest, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number: AG-9A40-S-13-0028	**Severity** / **Probability**	
Date Prepared: 9/30/2013		
Prepared by (Name/Title): Annica Nord/Site Safety and Health Officer		
Reviewed by (Name/Title): Ed Grooman, CSP/Corporate Health and Safety Manager		
Notes: (Field Notes, Review Comments, etc.)		

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	Field Modifications	Initials	RAC
1. Mobilize to the jobsite; unload supplies and equipment 2. Perform site reconnaissance of the site and collect GPS data and photographic documentation	▪ Physical hazards (slip, trip, and fall)	▪ Be aware of surroundings (e.g., footing, equipment, personnel, tools, etc.) ▪ Use caution in areas with unstable ground and steep slopes ▪ Use good housekeeping techniques to keep the workplace free of slip, trip, and fall hazards			L
	▪ Biological hazards	▪ Remain alert to presence of snakes, insects, and plants ▪ Do not step over blind objects or reach into blind areas because rattlesnakes may be present ▪ If bitten by a rattlesnake, immediately transport to local hospital ▪ Persons with allergies to insects should notify coworkers and SSHO, should carry an epinephrine pen with them at all times, and should notify coworkers and SSHO of the location of the epinephrine pen			L
	▪ Heat stress	▪ Follow proper procedures for minimizing heat stress, such as drinking adequate amounts of water (1 quart of water per hour), reducing outerwear, wearing sunscreen (minimum SPF 30), and taking appropriate breaks in a shaded area			L
	▪ Moving vehicles (driving to and from the site)	▪ Be alert and exercise defensive driving techniques ▪ Do not use cell phones while driving, unless a hands-free device is used ▪ Drive according to posted speed limits, environment, and road conditions ▪ Wear seat belts when driving or riding in vehicle, and use headlights and turn signals when applicable ▪ Do not park vehicles on dry grass ▪ Park to avoid backing up			L

Activity Hazard Analysis 1

Activity/Work Task: **Site Reconnaissance**	Overall Risk Assessment Code (RAC) (Use highest code)	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel	Inspection/Calibration Records/Checklists Used
▪ Steel-toe work boots ▪ Reflective Class II safety vest ▪ Cut-resistant gloves ▪ Hardhat (ANSI Z89.1) ▪ Safety glasses with side shields (ANSI Z87.1) ▪ Shirts with sleeves ▪ Long pants ▪ First-aid kit ▪ Fire extinguisher	▪ All site crew must have completed 40-hour HAZWOPER training and 8-hour refresher (if applicable) ▪ All site crew must review HASP and sign a Safety Compliance Agreement Form ▪ All site crew must attend onsite safety briefing and daily tailgate safety meetings ▪ At least one member of the site crew must be trained in first aid and CPR and up to date on their certifications ▪ Have a valid driver's license	▪ Inspection of PPE for damage and deterioration prior to each work shift ▪ Weekly inspection of first-aid kit ▪ Inspect fire extinguisher and certification monthly ▪ Inspect hand tools and equipment daily before use ▪ Report all needed repairs promptly; do not use any equipment that is unsafe

Printed Name	Signature	Date

Activity Hazard Analysis 2

Activity/Work Task: **Sample Collection**	Overall Risk Assessment Code (RAC) (Use highest code)					**L**
Project Location: Ramona Burn Dump Site, Cleveland National Forest, CA	**Risk Assessment Code (RAC) Matrix**					
Contract Number: AG-9A40-S-13-0028	**Severity**	**Probability**				
Date Prepared: 9/30/2013		**Frequent**	**Likely**	**Occasional**	**Seldom**	**Unlikely**
Prepared by (Name/Title): Annica Nord/Site Safety and Health Officer	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
Reviewed by (Name/Title): Ed Grooman, CSP/Corporate Health and Safety Manager	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**
Notes: (Field Notes, Review Comments, etc.)	Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)					
	"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.				**RAC Chart**	
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible				**E = Extremely High Risk**	
					H = High Risk	
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.				**M = Moderate Risk**	
					L = Low Risk	

Job Steps	Hazards	Controls	Field Modifications	Initials	RAC
1. Collect surface water and sediment grab samples from site locations as indicated in the Work Plan 2. Demobilize and remove all used PPE and disposable sampling supplies and equipment from the site	▪ Physical hazards (slips, trips, and falls)	▪ Be aware of surroundings (e.g., footing, equipment, personnel, tools, etc.) ▪ Use caution in areas with unstable ground and steep slopes ▪ Use caution when near water ▪ Use good housekeeping techniques to keep the workplace free of slip, trip, and fall hazards			L
	▪ Heavy lifting	▪ Use proper lifting techniques when lifting heavy items (use a buddy if the object weighs more than 50 pounds, bend with the knees and not back, and do not twist side-to-side when lifting heavy objects); wear steel-toed boots			L
	▪ Dermal contact and ingestion of chemical hazards (arsenic, lead, zinc, TCDD)	▪ Wear nitrile gloves when handling surface water and sediment during sampling			L
	▪ Eye splash/liquid spills when collecting surface water samples	▪ Wear safety glasses with side shields while collecting water samples			L
	▪ Biological hazards	▪ Remain alert to presence of snakes, insects, and plants ▪ Do not step over blind objects or reach into blind areas because rattlesnakes may be present ▪ If bitten by a rattlesnake, immediately transport to local hospital ▪ Persons with allergies to insects should notify coworkers and SSHO, should carry an epinephrine pen with them at all times, and should notify coworkers and SSHO of the location of the epinephrine pen			L

Activity Hazard Analysis 2

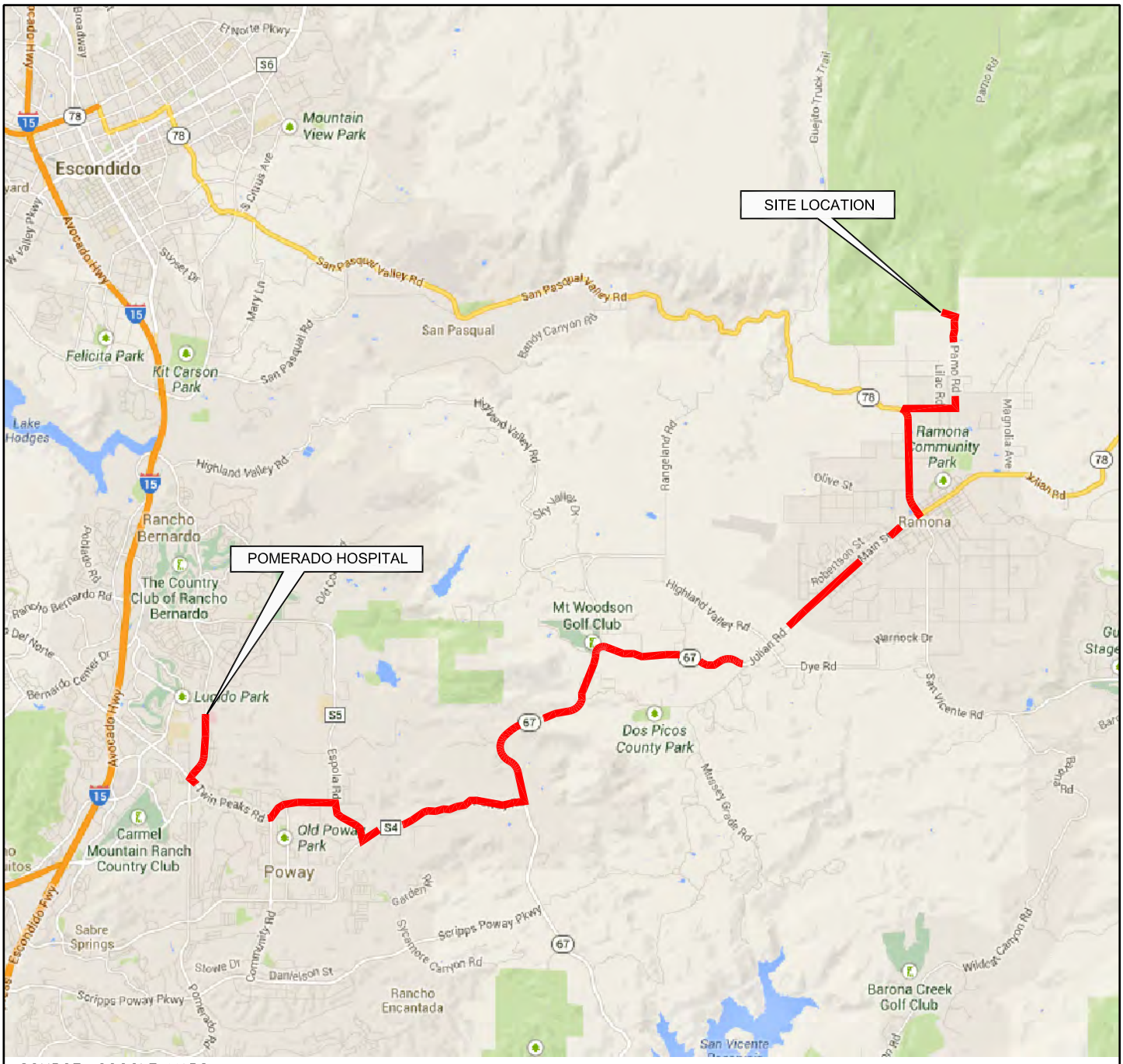
Activity/Work Task: **Sample Collection**		Overall Risk Assessment Code (RAC) (Use highest code)			**L**
Job Steps	**Hazards**	**Controls**	**Field Modifications**	**Initials**	**RAC**
1. Collect surface water and sediment grab samples from site locations as indicated in the Work Plan 2. Demobilize and remove all used PPE and disposable sampling supplies and equipment from the site *(continued)*	▪ Heat stress	▪ Follow proper procedures for minimizing heat stress, such as drinking adequate amounts of water (1 quart of water per hour), reducing outerwear, wearing sunscreen (minimum SPF 30), and taking appropriate breaks in a shaded area			L

Equipment to be Used	**Training Requirements/Competent or Qualified Personnel**	**Inspection/Calibration Records/Checklists Used**
▪ Steel toe boots ▪ Reflective Class II safety vest ▪ Cut-resistant gloves ▪ Hardhat (ANSI Z89.1) ▪ Nitrile gloves when handling water or sediment samples ▪ Safety glasses with side shields (ANSI Z87.1) ▪ Shirts with sleeves ▪ Long pants ▪ First-aid kit ▪ Fire extinguisher	▪ All site crew must have completed 40-hour HAZWOPER training and 8-hour refresher (if applicable) ▪ All site crew must review HASP and sign a Safety Compliance Agreement Form ▪ All site crew must attend onsite safety briefing and daily tailgate safety meetings ▪ At least one member of the site crew must be trained in first aid and CPR and up to date on their certifications ▪ Have a valid driver's license	▪ Inspection of PPE for damage and deterioration prior to each work shift ▪ Weekly inspection of first-aid kit ▪ Inspect fire extinguisher and certification monthly ▪ Inspect hand tools and equipment daily before use ▪ Report all needed repairs promptly; do not use any equipment that is unsafe

Printed Name	**Signature**	**Date**

ATTACHMENT A3

HOSPITAL AND OCCUPATIONAL CLINIC DIRECTIONS AND MAP



SOURCE: GOOGLE MAPS

HEAD EAST ON DUMP RD. TOWARD PAMO RD.	0.2 MI
CONTINUE ON PAMO RD.	1.4 MI
TURN RIGHT ONTO W HAVERFORD RD.	0.8 MI
TURN LEFT ONTO CA-78 E/PINE ST.	1.7 MI
TURN RIGHT ONTO CA-67 S/MAIN ST.	9.1 MI
TURN RIGHT ONTO POWAY RD.	2.6 MI
TURN RIGHT ONTO ESPOLA RD.	0.8 MI
TAKE THE 2nd LEFT ONTO TWIN PEAKS RD.	2.6 MI
TURN RIGHT ONTO POMERADO RD.	1.0 MI
TURN RIGHT	167 FT
TURN LEFT	0.2 MI
15615 POMERADO RD., POWAY, CA	TOTAL: 20.5 MI (~34 MINS)

N

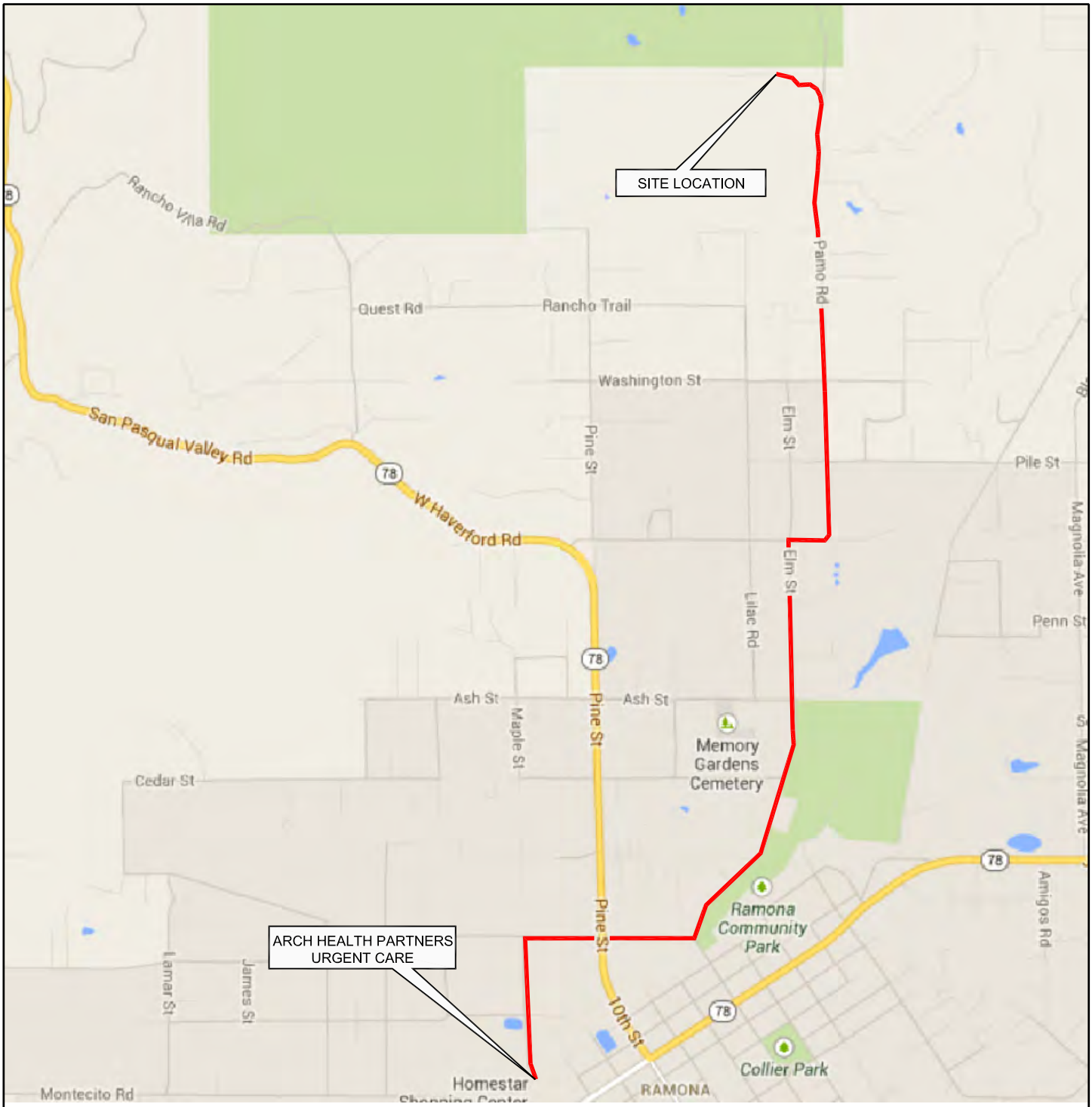
0' 2000'

APPROXIMATE SCALE: 1"=2000'

POMERADO HOSPITAL
15615 POMERADO ROAD
POWAY, CA 92064
(858) 613-4000

ERRG
Engineering/Remediation Resources Group, Inc.
115 Sansome St., Suite 200
San Francisco, California 94104
(415) 395-9974

CLIENT: USDA FORESTS SERVICE	HOSPTIAL ROUTE MAP			
LOCATION: RAMONA BURN DUMP SITE CLEVELAND NATIONAL FOREST RAMONA, CALIFORNIA	DRAWN BY: SC 10/03/13	CHECKED BY: AN 10/03/13	PROJECT NO. 2013-064	FIG NO. 1



SOURCE: GOOGLE MAPS

HEAD EAST ON DUMP RD. TOWARD PAMO RD.	0.2 MI
CONTINUE ON PAMO RD.	1.4 MI
TURN RIGHT ONTO W HAVERFORD RD.	0.1 MI
TAKE THE 1ST LEFT ONTO ELM ST.	1.4 MI
TURN RIGHT ONTO OLIVE ST.	0.5 MI
TAKE THE 2nd LEFT ONTO MAPLE ST.	0.4 MI
CONTINUE ONTO 13th ST.	246 FT
211 13th ST., RAMONA, CA	TOTAL: 4.0 MI (~10 MINS)

N

0' 2000'

APPROXIMATE SCALE: 1"=2000'

ARCH HEALTH PARTNERS – URGENT CARE
211 13th STREET
RAMONA, CA 92065
(760) 789-5160

ERRG
Engineering/Remediation Resources Group, Inc.
115 Sansome St., Suite 200
San Francisco, California 94104
(415) 395-9974

CLIENT: USDA FORESTS SERVICE

LOCATION: RAMONA BURN DUMP SITE CLEVELAND NATIONAL FOREST RAMONA, CALIFORNIA

CLINIC ROUTE MAP

DRAWN BY:	CHECKED BY:	PROJECT NO.	FIG NO.
SC 10/09/13	AN 10/09/13	2013-064	2

FILE NAME: N:\Graphics\2013\2013-064_USFS-5\Fig_2crm.dwg LAYOUT NAME: 2 PLOTTED: Tuesday, October 08, 2013 - 3:01pm