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

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Submitted by:
Engineering/Remediation Resources Group, Inc.

Signature	January 16, 2014
	Date
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Executive Summary

Engineering/Remediation Resources Group, Inc. conducted an engineering evaluation/cost analysis (EE/CA) for the Ramona Burn Dump Site in the Cleveland National Forest, approximately 4 miles north of Ramona, California (Figure 1). The purpose of this EE/CA is to develop and analyze removal action alternatives to aid the U.S. Department of Agriculture Forest Service (Forest Service) in reclamation of the site.

Based on the results of previous investigations in 2008 and 2009, as well as additional samples collected as part of this EE/CA, metals and dioxins and furans in soil have been identified as posing unacceptable risk to human health and the environment. As a result, a removal action is necessary to minimize the risks to humans and wildlife from metals in soil at the site.

The following preliminary removal action objectives (RAOs) were developed to reduce the risks to humans and wildlife at the site:

- Reduce exposure of humans and wildlife to metals and dioxins and furans in soil and burn ash to acceptable levels
- Reduce the risk of erosion of contaminated soil and burn ash

This EE/CA identifies preliminary cleanup levels that are protective of both human health and the environment based on the recreational and Forest Service uses of the site. Additionally, the following removal action alternatives were developed and evaluated in this EE/CA to address the RAOs:

1. Alternative 1: No Action
2. Alternative 2: Cap Contaminated Soil and Burn Ash in Place
3. Alternative 3: Consolidate and Cap Contaminated Soil and Burn Ash in Place
4. Alternative 4: Excavation and Offsite Disposal of Contaminated Soil and Burn Ash

Each alternative was analyzed for effectiveness, implementability, and cost. Following the analysis of alternatives, a comparative analysis of all alternatives was conducted and the recommended removal action alternative was selected. Based on the detailed and comparative analyses, **Alternative 3, Consolidate and Cap Contaminated Soil and Burn Ash in Place,** was recommended as the preferred remedy for the site. Alternative 3 was recommended because (1) it achieves the RAOs, (2) it meets the applicable or relevant and appropriate requirements, and (3) is more cost-effective than the other alternatives, except for Alternative 1 (no action).

The recommended removal action alternative has the following primary components:

- An engineering study and design would be completed to (1) establish site requirements for the cap, (2) confirm the depth to groundwater beneath the site, and (3) ensure that all appropriate requirements are met. The cap would be placed on top of the burn ash, debris, and contaminated soil located in the waste footprint resulting from the former activities at the burn dump (Figure 2).
- Engineering controls such as grading, drainage ditches, and culverts would be used where needed to divert water away from the cap and ensure that the repository is not impacted by drainage across the site. Future institutional controls may be required in the engineering design. The institutional controls would include, but are not limited to, placing fences or signs around the cap to reduce the potential for erosion of the cap by site visitors and ensure that permanent vegetation is established. A professional engineer, as well as the applicable regulatory agencies, would review the cap design prior to mobilization to the site.
- Area 6 would be excavated to a depth of 2.0 feet below ground surface (bgs), and Area 10 would be excavated to a depth of 0.5 foot bgs. Excavated materials from both areas would be placed on top of the waste footprint (Figure 2).
- An impermeable 40-mil high-density polyethylene liner would be constructed on top of the entire waste footprint. Two feet of clean fill would be installed and compacted on top of the liner, followed by installation of a surface water drainage system and erosion controls. A brightly colored demarcation fabric layer would be placed within the clean cover material at a depth of 1 foot bgs. The demarcation layer would alert future workers when performing inspections or maintenance, so they do not expose the waste material or compromise the integrity of the soil cap or liner.
- The capped area would have a surface area of approximately 2.6 acres. Approximately 2,458 tons of soil would be imported to construct the soil cover.
- The cap would be compacted and covered with biodegradable erosion control mats and hydroseeded. Certified weed-free straw wattle would be installed along contours as a best management practice to control erosion.
- Areas 6 and 10 would be regraded, rather than backfilled, to provide proper drainage and prevent erosion. Regrading would be conducted to restore, to the degree practicable, the natural contours and morphology of the area where material is removed.
- Biannual inspections would be conducted to evaluate the integrity of all cover elements and erosion control measures.

The estimated total capital cost for implementing this alternative is $1,662,276. The long-term total cost for implementing this alternative is $2,421,862, with a present value cost of $2,665,632. This cost represents an order-of-magnitude estimate, in accordance with the U.S. Environmental Protection Agency's guidance for conducting EE/CAs, with an intended accuracy of +50 to -30 percent.

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Abbreviations and Acronyms

Allied Waste	Ramona Landfill Inc., Allied Waste Industries
ARARs	applicable or relevant and appropriate requirements
bgs	below ground surface
BMP	best management practice
CalRecycle	California Department of Resources Recycling and Recovery
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPCs	chemicals of potential concern
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
HDPE	high-density polyethylene
LEA	Local Enforcement Agency
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NTCRA	non-time-critical removal action
O&M	operation and maintenance
PA/SI	Preliminary Assessment/Site Inspection
PCBs	polychlorinated biphenyls
pg/g	picograms per gram
PPE	personal protective equipment

Abbreviations and Acronyms *(continued)*

QC	quality control
RCRA	Resource Conservation and Recovery Act
RAOs	removal action objectives
RSL	regional screening level
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
TEF	toxic equivalency factor
TEL	threshold effect level
TEQ	toxic equivalent quotient
TPH	total petroleum hydrocarbons
USC	United States Code
USDA	U.S. Department of Agriculture
Water Board	San Diego Regional Water Quality Control Board
XRF	x-ray fluorescence
§	Section

Section 1. Introduction

Engineering/Remediation Resources Group, Inc. (ERRG) has prepared this Engineering Evaluation/Cost Analysis (EE/CA) Report for the U.S. Department of Agriculture (USDA) Forest Service (Forest Service) for the Ramona Burn Dump Site in the Cleveland National Forest located north of and adjacent to Ramona, California. This work was conducted under the Regional A/E Indefinite Quantity Contract for Environmental Site Response Activities (AG91S8-C-11-0001), Activity II, Task 2: EE/CA Support.

In 2010, the Forest Service performed a preliminary assessment/site inspection (PA/SI) at the site (ERRG, 2010). The PA/SI recommended that further action should be taken to address potential risks posed to humans and wildlife from elevated concentrations of metals and dioxins and furans in burn ash throughout the site and to further evaluate the surface water pathway. This EE/CA was prepared as part of the non-time-critical removal action (NTCRA) process under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The following subsections discuss the regulatory framework for the site, the purpose of the EE/CA, and the organization of this report.

1.1. REGULATORY FRAMEWORK

Authority for responding to releases from a hazardous waste site is addressed in Section 104 of CERCLA. Executive Order 12580 delegates the authority for removal actions to the USDA. The Forest Service, under the delegation of USDA's authority, is the lead federal agency for environmental investigation and cleanup of the site and as such oversees all project activities. Other federal, state, or local agency representatives may be consulted at the discretion of the Forest Service. The Forest Service will ensure that all removal action activities comply with CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and Division 20, Chapter 6.8, of the State of California Health and Safety Code.

The U.S. Environmental Protection Agency (EPA) has classified removal actions into three types: emergency, time-critical, and non-time critical. The classification is based on the type of situation, the urgency to take action, the threat of release or potential release, and the period of time in which the action must be initiated (EPA, 1993). An NTCRA was selected for the Ramona Burn Dump Site because no immediate threat is posed to human health and the environment from site contaminants, thus the NTCRA can start later than 6 months after the determination that a response is necessary. Section 300.415(b)(4)(i) of the NCP requires that an EE/CA is prepared for all NTCRAs to evaluate removal alternatives for the site.

1.2. PURPOSE

The purpose of the EE/CA is to develop and analyze removal action alternatives in accordance with CERCLA and to recommend a removal action alternative that is protective of human health and the environment and compliant with federal and state applicable or relevant and appropriate requirements (ARARs). In accordance with EPA guidance, the EE/CA is completed to (1) meet the environmental review requirements for removal actions; (2) satisfy administrative record requirements for documentation of removal action selection; and (3) identify the objectives of a removal action and analyze the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives (EPA 1993).

1.3. REPORT ORGANIZATION

After Section 1, this EE/CA is organized as follows:

- Section 2, Site Characterization – summarizes the site description and background, describes the physical characteristics of the site, and summarizes the source, nature, and extent of contamination based on previous investigations at the site.
- Section 3, Streamlined Risk Evaluation – discusses the selection and screening of chemicals of potential concern (COPCs) and summarizes the site conceptual exposure model (SCEM) the results of screening evaluation of site risks to human health and the environment.
- Section 4, Identification of Removal Action Goals and Objectives – identifies the removal action goals and remedial action objectives (RAOs) that, if met, will result in the protection of human health and the environment, pursuant to CERCLA criteria.
- Section 5, Applicable or Relevant and Appropriate Requirements – lists and details chemical-specific, location-specific, and action-specific ARARs that aid in establishing cleanup criteria for the site.
- Section 6, Identification and Analysis of Removal Action Alternatives – describes the identification of removal action alternatives and analyzes each alternative for effectiveness, implementability, and cost.
- Section 7, Comparative Analysis of and Recommended Removal Action Alternatives – provides a comparative analysis of the removal action alternatives to select a recommended removal action alternative for the site.
- Section 8, References – lists the reports, literature, and guidance documents used to prepare this EE/CA.

Figures and tables are provided after Section 8. In addition, the following supplemental information has been appended to the EE/CA:

- Appendix A. Photographic Log
- Appendix B. Field Activity Log
- Appendix C. Laboratory Analytical Report
- Appendix D. Cost Estimate for Alternative Actions

Section 2. Site Characterization

This section describes the site and its historical use. It also summarizes the source, nature, and extent of contamination at the site based on the results of previous environmental investigations. This section provides the basis for understanding the COPCs and media of potential concern at the site.

2.1. SITE DESCRIPTION AND BACKGROUND

The site is located north of the city of Ramona, California (Figure 1) within the Palomar Ranger District of the Cleveland National Forest in the southeast quarter[1] 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 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 vehicles and is adjacent to Dump Road, a paved private road that provides access to the currently closed Ramona Landfill which managed by Ramona Landfill Inc., a subsidiary of Allied Waste Industries (Allied Waste) (Figure 2). The site is separated from Dump Road by a 4-foot-tall wire fence, which limits public access. An unpaved access road allows vehicles and pedestrians to access the site from Dump Road. A locked gate at the main entrance to the Ramona Landfill separates Dump Road from Pamo Road. Sandbags have been placed in areas free of vegetation on the berm in the northwest corner of the site and in the drainages at the base of the berm to manage surface water flow to reduce erosion (Figure 2). No other manufactured improvements are present on the site, which is vegetated with sagebrush and other shrubs. Broken glass and pottery shards are visible on the surface across the area of the former burn dump.

Figure 2 shows the site features, and Appendix A includes photographs documenting the site features.

2.1.1. Site History

The site was identified following the Witch Creek fires in November 2007, when vegetation in the area was burned and surface debris from the site was exposed. The newly exposed former burn dump area included remnants of a fire pit located on lands that are now owned and operated as a landfill by Allied Waste, as well as surface debris in an area currently on National Forest System lands. The County of San Diego (County) previously operated both areas as a part of its burn dump operation located on its private

[1] The PA/SI Report incorrectly identified the landfill as being in the southwest quarter of the northeast quarter of Section 34, however all PA/SI field activities were conducted at the correct location in the southeast quarter of the northeast quarter of Section 34.

lands. The former waste burn dump operated under a special use permit issued by the Forest Service from approximately 1947 to 1974 (Forest Service, 2009). The County operated the burn dump for the disposal of trash and rubbish from the community of Ramona and surrounding County areas. Under the terms of the special use permit, the County was to confine the dumping to constructed pits within the permit area and ashes were to be placed in a separate pit (ERRG, 2010). When the special use permit terminated on February 2, 1974, the site was covered by soil. Typical capping and closure requirements in the early 1970s included placing 1 to 2 feet of native soil over waste materials.

On January 22, 2008, the County's Solid Waste Local Enforcement Agency (LEA) issued a notification to the Forest Service, the County, and Allied Waste alerting the parties to the presence of the burn dump areas on the properties and notifying them to bring the site into compliance with state minimum standards for cover soil, drainage, erosion control, and site security, as outlined in Title 27 California Code of Regulations (CCR) (County, 2008a). In 2007, the LEA completed a site identification form noting that the burn dump began operation in 1948 and was closed in 1969 (California Department of Resources Recycling and Recovery [CalRecycle], formerly California Integrated Waste Management Board, 2008a). The LEA identified the site as a closed, unpermitted county disposal facility (CalRecycle, 2008b). Since identifying the site, the LEA has conducted regular inspections of the property, consistently noting concerns about final cover, drainage and erosion control, and site security (County, 2008b and 2008c).

2.1.2. Land Use and Populations

The site is located wholly on federal lands within the Cleveland National Forest. As shown on Figure 1, the Cleveland National Forest consists of several discontinuous sections encompassing approximately 460,000 acres, with its headquarters in San Diego, California (Forest Service, 2013). The site is located approximately 4 miles north of Ramona, California, within the Palomar Ranger District (Figure 1). The local ranger district office is located in Ramona, California. Ramona's population was 20,292 in 2010 (U.S. Census Bureau, 2013).

The current land use of the site is open space recreational and is not expected to change in the future. Although the area is designated as a recreational area, recreational visitors are not common at the site (Forest Service, 2013). Occasional recreational hikers or Forest Service personnel walking the site are the likely potential future users of the site. Backpacking, camping, hiking, horseback riding, and off-road vehicle use occur elsewhere in the forest but are not known current uses of the site or anticipated future uses (Forest Service, 2013). The area immediately surrounding the site is zoned as open space under the County's Multiple Species Conservation Program (County, 2010a).

2.2. PHYSICAL SETTING

This section describes the physical setting of the site, including its climate, geology and soil, hydrology and hydrogeology, and ecology.

2.2.1. Climate

San Diego County exhibits a Mediterranean to semi-arid climate, typical of coastal southern California, with warm, dry summers and mild winters. The average temperature in Ramona, which is south of the site, ranges from 46 to 77°F. Total average annual precipitation is about 16.5 inches, with more than 60 percent of the rainfall in winter (January through March) (Western Regional Climate Center, 2006).

2.2.2. Geology and Soil

The regional geology of Ramona is characterized by fertile valleys surrounded by foothills and mountains of granitic and metamorphic rock. The 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, 2006). The native soil in the vicinity of the site comprises 1 to 2 feet of top soil overlying decomposed granite (SCS Engineers, 2008; ERRG, 2010).

2.2.3. Hydrology and Hydrogeology

The site is located within the San Diego Basin, and the San Diego Regional Water Quality Control Board (Water Board) regulates waters within the area of the site. The site is in close proximity to and upstream of Santa Ysabel Creek and Lake Hodges and downstream of Sutherland Reservoir. The site lies within the San Dieguito Watershed (Water Board Hydrogeologic Unit Basin Area 5.41) (Water Board, 2011). Current beneficial uses for groundwater in the San Dieguito Hydrologic Unit are primarily municipal and agricultural. The site is not located within any of the reservoir, lake, or coastal waters established by the "Water Quality Control Plan for the San Diego Basin" (Water Board, 2011). Surface waters within the Santa Ysabel Creek area have been designated for the following existing beneficial uses:

- Municipal and domestic supply
- Agricultural supply
- Industrial process supply
- Industrial service supply
- Recreation (water contact and non-water contact)
- Warm freshwater habitat
- Wildlife (including rare, threatened, or endangered species) habitat

Groundwater within the Ramona Hydrologic Subarea, within the San Dieguito Hydrologic Unit (Water Board Hydrogeologic Unit Basin Area 5.41) (Water Board, 2011), has been designated for the following existing beneficial uses:

- Municipal and domestic supply
- Agricultural supply
- Industrial process supply
- Industrial service supply

The 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 2). Downstream (to the east), the drainage becomes an unnamed ephemeral creek that joins Santa Ysabel Creek, within 0.5 mile of the site. The site is not located within a mapped floodplain (ERRG, 2010).

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, 2010b). Groundwater beneath the site is estimated to be deeper than 60 feet below ground surface (bgs) (CalRecycle, 2008b) and is assumed to flow to the east based on topographic information. No groundwater wells are present at the site. Groundwater monitoring data from the adjacent Ramona Landfill indicate that the depth to groundwater in adjacent wells ranges from 48 to 167 feet bgs (State Water Resources Control Board, 2010). The 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 (ERRG, 2010).

Ephemeral drainages are present at the site, but flowing water has not been observed in the drainages during any previous investigations. Unnamed ephemeral creeks at the site connect to offsite ephemeral creeks, which flow into the Santa Ysabel Creek and eventually into Lake Hodges.

2.2.4. Ecology

Santa Ysabel Creek 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 (California Department of Fish and Wildlife [CDFW], 2013). Other sensitive environments within a 4-mile radius of the site include critical habitat for the coastal California gnatcatcher (*Polioptila californica californica*), designated federally as a threatened species, and the federally listed endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*) (CDFW, 2013). 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, 2013). Table 1 provides a complete list of the sensitive species within 4 miles of the site.

2.2.5. Cultural Resources

No known cultural resources are present or have been identified at the site.

2.3. SOURCE, NATURE, AND EXTENT OF CONTAMINATION

This section summarizes the source, nature, and extent of contamination at the site based on analytical data collected during two previous investigations and the 2013 sampling event conducted as part of this EE/CA. This section also summarizes the results of the investigations and relevant data from the investigation areas that are further evaluated in the streamlined risk evaluation (SRE) in Section 3.

2.3.1. Allied Waste Investigation, 2008

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 under its delegated authorities pursuant to Section 104 of CERCLA, as amended; Title 42 United States Code (USC) Section (§) 9604; and Executive Order 12580, to address the release. The County, a potentially responsible party under CERCLA Section 107(a) and Title 42 USC § 9607(a), was provided with the opportunity to conduct the site investigation under Forest Service oversight. Based on the lack of a response from the County, the Forest Service decided 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) at the site (SCS Engineers, 2008).

During the 2008 investigation, limited historical information on the site and the adjacent landfill was found in the County's Department of Public Works files (SCS Engineers, 2008). Historical aerial photographs of the National Forest lands showed the burn dump area, dating back to 1949, with the concentrated area of disturbance and dumping extending approximately 300 to 400 feet along Dump Road and between 200 and 300 feet to the north (SCS Engineers, 2008). Firebreak roads were evident on the aerial photographs, defining the boundaries of the burn dump area with the most active areas in what appear to be two large north-to-south trending trenches. Typical wastes observed and documented at the site included glass, pottery, metal, and plastic (SCS Engineers, 2008).

Based on the evaluation of aerial photographs of the site, it was concluded that the Allied Waste landfill and the Burn Dump Site on Forest Service property were originally used as a single site (ERRG, 2010). 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 Engineers, 2008).

As part of the 2008 investigation, Allied Waste excavated eight trenches adjacent to the Forest Service's property line. 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 two western trenches along the southern property line. Sixty-two soil samples were screened using an x-ray fluorescence (XRF) device, and readings indicated elevated concentrations of metals were present along the western property line (chromium and zinc) and along the southern property line (arsenic, cadmium, lead, mercury, and selenium) (SCS Engineers, 2008).

Soil samples from two trenches were submitted to an offsite laboratory for analysis of metals. Sample results indicated that the material would likely be characterized as California (non-Resource Conservation and Recovery Act [RCRA]) hazardous waste (SCS Engineers, 2008).

Additionally, four soil samples were submitted to the laboratory for analysis of semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), and dioxins and furans. No SVOCs or PCBs were detected, and the pH results were considered neutral. TPH as motor oil was only detected in two of the four soil samples analyzed. Dioxins and furans were detected in one soil sample but determined to not affect the waste classification of the burn ash and waste because concentrations were less than the total threshold limit concentration and soluble threshold limit concentration (SCS Engineers, 2008). The investigation concluded that the burn dump on the Forest Service land extended beyond the southern boundary onto the Allied Waste property but not beneath Dump Road. Because the burn ash and waste was covered with soil, it is unlikely that site workers, the public, or the environment would be exposed to burn ash and waste (SCS, 2008).

2.3.2. Preliminary Assessment/Site Inspection, 2010

In 2009, ERRG conducted a PA/SI on behalf of the Forest Service as part of the ongoing response action (ERRG, 2010). The PA/SI consisted of reviewing historical documents, including permits and aerial photographs; completing trenches and potholes; and collecting burn ash and soil samples for XRF and laboratory analyses. A hand-held XRF detector was used to identify areas where burn ash was most likely to be encountered to determine pothole and trench locations for sampling activities. Subsurface XRF readings were collected from trenches and potholes along the site and property boundaries to help delineate the lateral extent of burn ash and waste materials. Potholes and trenches were excavated until undisturbed native materials (loosely classified as decomposed granite) were observed.

Thirty-three soil and ash samples were collected and analyzed for California Assessment Manual 17 metals and pH. Six of the 33 samples were also analyzed for SVOCs, PCBs, total recoverable petroleum hydrocarbons, and dioxins and furans. Two background soil samples were collected from areas outside of the burn area to represent site-specific background concentrations (ERRG, 2010). In general, locations where XRF readings for lead exceeded 105 parts per million were considered elevated with respect to background (ERRG, 2010). Subsurface XRF readings were collected from trenches and potholes to determine which materials to collect and submit for offsite laboratory analysis. For example, in areas where burn ash and soil were mixed, the XRF detector was used to confirm that the materials contained elevated metals concentrations, and that a sample should be collected.

All waste and soil samples were analyzed for metals, with a subset of samples analyzed for SVOCs, PCBs, total recoverable petroleum hydrocarbons, and dioxins and furans. Metals (arsenic, lead, and zinc) and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) were consistently detected at concentrations exceeding EPA industrial RSLs. Table 2 presents the dioxins and furans results for soil samples collected during the PA/SI.

Cadmium, copper, lead, and zinc exceeded the Bureau of Land Management's risk management criteria for wildlife and livestock. Based on the pH range of waste samples, the results of leachability testing, and the solubility of each COPC, it is likely that some leaching of lead has occurred. Table 3 provides the results of the leachability testing. Arsenic and zinc were not shown to be likely to leach, and TCDD is considered unlikely to have leached because of its low water solubility (ERRG, 2010).

During the PA/SI, waste was observed to be eroding into the unnamed ephemeral creek east of the site. However, surface water samples were not collected during the PA/SI because no water was present. Based on the field observations, the PA/SI concluded that waste and burn ash from the Ramona Burn Dump Site have been released to the downgradient ephemeral creek. The PA/SI recommended that further investigation be performed to evaluate whether metals (especially lead) and TCDD from burn ash and waste materials at the site are a potential threat to downstream municipal surface water supplies and sensitive environments, including critical habitat for the arroyo toad and downstream wetland habitat.

The PA/SI concluded that groundwater is unlikely to pose a risk to the environment based on the distance to the groundwater table (approximately 48 to 167 feet bgs) and because the burn ash is underlain by crystalline rock with limited permeability. No permitted groundwater wells are directly downgradient from the site and most permitted wells in the vicinity of the site are being used for agricultural (irrigation) uses. Depth to groundwater and groundwater use in the vicinity of the site indicated that arsenic, cadmium, copper, lead, zinc, and TCDD from the site were considered unlikely to have been released at concentrations that will pose risk to human health or the environment via the groundwater pathway (ERRG, 2010).

The PA/SI concluded there was little potential for humans or wildlife to come in contact with materials in the soil and the air. The preliminary estimated volume of waste at the site was calculated by dividing the waste footprint into nine subareas based on sample results, field observations, and results from the 2009 and 2008 investigations. The preliminary estimated volume of waste was calculated to be 23,839.6 cubic yards.

2.3.3. EE/CA Sampling Event, 2013

Based on the recommendations in the PA/SI Report, ERRG conducted a site reconnaissance and collected samples to further evaluate the risk posed to humans and wildlife from potentially contaminated surface water (i.e., the surface water pathway). No surface water was present at the site during the 2013 sampling event[2], so sediment samples were collected from the site drainages to provide additional data. In addition, ERRG surveyed the site using a global positioning system (GPS) to refine the waste volume estimate in the PA/SI Report and confirm the location of site features and sample locations. The GPS survey included documenting sandbags, which were observed during the 2013 site reconnaissance. The sandbags, which were not evident during the 2009 PA/SI sampling event, appeared to have been placed to

[2] Surface water is present in the drainages only during high flow (i.e., storm events).

control and reduce erosion as a result of surface water runoff. Figure 2 shows the approximate locations of the sandbags.

Laboratory analytical results for sediment samples collected during this EE/CA were screened against the following human health and ecological criteria for sediment.

- Human health: EPA RSLs for industrial soil based on the potential future use of the site (i.e., recreational open space) (EPA, 2013a).
- Ecological: National Oceanic and Atmospheric Administration (NOAA) threshold effect level (TEL) for sediment in freshwater ecosystems (Buchman, 2008).

Section 3, the SRE, further discusses the selection of the screening criteria. Appendix A presents a photographic log of the site during the 2013 sampling event, Appendix B presents field logs, and Appendix C provides the complete laboratory analytical reports. The following subsections summarize the results of the field sampling event.

2.3.3.1. Sediment Sampling

Six sediment samples were collected upstream and downstream of the site in the unnamed ephemeral creek in accordance with the work plan (ERRG, 2013a). Samples were collected directly into laboratory-prepared samples containers either by hand using a clean pair of disposable nitrile gloves or a decontaminated metal trowel. The trowel was decontaminated in between sample collection with clean water and wiped with a new, clean paper towel. Samples were placed on ice in a cooler and shipped to TestAmerica Laboratories, Inc. in Pleasanton, California, a State of California-certified analytical laboratory for analysis of California Assessment Manual 17 Metals by EPA Method 6010B/7471A and dioxins and furans by EPA Method 8290. Two samples were not analyzed as requested by the Forest Service because of their location off of Forest Service property (ERRG, 2013b).

One background sample (RBS-SSED-11AL) was collected from the northwest corner of the burn dump in a drainage gulley at the crest of the berm to establish background concentrations of metals and dioxins and furans in sediment. The area where the background sample was collected is upgradient from observed surface debris (Figure 3). Background concentrations were established for the following analytes and are used for screening purposes in the SRE (see Section 3):

- Antimony: 0.51 milligrams per kilogram (mg/kg)
- Arsenic: 1.0 mg/kg
- Barium: 80 mg/kg
- Chromium: 69 mg/kg
- Cobalt: 7.9 mg/kg
- Mercury: 0.0064 mg/kg
- Nickel: 4.2 mg/kg
- Selenium: 1.1 mg/kg
- Thallium: 2.6 mg/kg
- Vanadium: 240 mg/kg

- Copper: 26 mg/kg
- Lead: 2.3 mg/kg
- Zinc: 15 mg/kg

Background concentrations were not established for beryllium, cadmium, molybdenum, silver, and dioxins and furans because they were not detected in the background sediment sample.

The remaining three sediment samples that were analyzed for metals and dioxins and furans were collected from drainages in areas within the waste footprint (RBS-SSED-09AJ and RBS-SSED-12AM) and downstream of the confluence of all site drainages, just upstream of the Forest Service property boundary (RBS-SSED-13AN), because surface debris was noted at this location (Figure 3). The analytical results of the three sediment samples are summarized below.

COPC	Detection Frequency (out of 3 samples)	Minimum Detection	Maximum Detection
Antimony	3	0.75 mg/kg	1.0 mg/kg
Arsenic	3	0.82 mg/kg	1.6 mg/kg
Barium	3	63 mg/kg	96 mg/kg
Cadmium	2	0.054 mg/kg	0.055 mg/kg
Chromium	3	14 mg/kg	52 mg/kg
Cobalt	3	5.9 mg/kg	9.3 mg/kg
Copper	3	26 mg/kg	31 mg/kg
Lead	3	4.4 mg/kg	16 mg/kg
Mercury	3	0.0068 mg/kg	0.03 mg/kg
Molybdenum	1	0.40 mg/kg	0.40 mg/kg
Nickel	3	3.2 mg/kg	5.7 mg/kg
Selenium	1	2.4 mg/kg	2.4 mg/kg
Thallium	3	1.0 mg/kg	2.8 mg/kg
Vanadium	3	60 mg/kg	230 mg/kg
Zinc	3	49 mg/kg	68 mg/kg
OCDD (dioxin and furans isomer)	3	34 pg/g	62 pg/g
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (dioxin and furans isomer)	2	8.1 pg/g	8.3 pg/g

Note:
COPC = contaminant of potential concern
mg/kg = milligrams per kilogram
OCDD = Octachlorodibenzo-p-dioxin
pg/g = picograms per gram

Beryllium, silver, and all other dioxins and furans were not detected in any of the sediment samples.

2.3.3.2. GPS Survey and Volume Estimates

Site feature locations were recorded using GPS, and site features mapped during the PA/SI were verified for accuracy. Measured site features included: drainages, areas of concentrated surface debris, Forest Service property boundary signs, culverts, topographical ridges, and sandbags presumably used to prevent erosion during rain events. Figure 2 show the site features.

The lateral and vertical extent of burn ash and waste was estimated based on the following:

1. Reviewing data presented in previous documents (primarily the PA/SI Report), including compiling data on the extent of waste and burn ash from trench and pothole logs
2. Walking the site and mapping and observing waste and burn ash in drainage features and at the ground surface during the EE/CA sampling event
3. Reviewing the extent of waste documented in trench logs adjacent to the Forest Service property, including information from the PA/SI Report indicating that the deepest waste observed during 2008 excavation work along the southern property line was between 10 and 12 feet deep and was located between SCS trench sample locations T18 and T19 (ERRG, 2010; SCS, 2008; Figure 3)

During the PA/SI, nine subareas of burn ash and waste were preliminarily identified. Based on observations made during the 2013 site reconnaissance, the boundaries of the preliminary subareas were confirmed and an additional subarea (10) of burn ash and waste was delineated. Based on the methods above, an approximate area of 3.5 acres and volume of 28,967 cubic yards of contaminated soil were estimated to be present at the site. Figure 4 shows the approximate extent of waste and estimated depths of waste used in the volume estimate.

Section 3. Streamlined Risk Evaluation

This section summarizes the SRE of potential risks to human health and the environment from exposure to metals and dioxins and furans at the site. Based on the results of previous investigations, including the PA/SI (ERRG, 2010) and 2013 EE/CA sampling event, this SRE focuses on metals and dioxins and furans in soil and sediment at the site. No other COPCs were identified based on information collected during previous site investigations (Section 2.3).

Although surface water could not be quantitatively evaluated because no flowing water was present in the ephemeral drainages during the sampling events, a release to the surface water pathway was established during the PA/SI because waste was observed to be present in site drainages. The SRE is typically used to qualitatively evaluate rather than quantify potential risks to justify a removal action and develop appropriate removal action alternatives to reduce risk. Accordingly, the potential risks to human and ecological receptors from exposure to metals and dioxins and furans were evaluated by comparing their reported concentrations with appropriate screening criteria (see Section 3.1).

Potential risks to human health were evaluated based on recreational (hikers) and Forest Service uses (personnel walking or working at the site). Potential ecological risks were evaluated based on toxicity effects on select sensitive species exposed to impacted soil and sediment.

The following subsections describe the selection and screening of COPCs, the SCEM, and the results of the SRE.

3.1. SELECTION AND SCREENING OF CHEMICALS OF POTENTIAL CONCERN

Following compilation of the data, the data were screened against site-specific soil and sediment background values. Figure 3 shows the background sample locations. Concentrations that were greater than three times the lowest concentration for individual chemicals in the background samples (or were detected in cases where a chemical was not detected in background samples) were considered elevated with respect to background. If concentrations exceeded the established background value in one or more samples, it was retained as a COPC and evaluated further in the SRE (see Section 3.3). If concentrations did not exceed the established background value in any sample or the chemical was not detected at a concentration greater than the laboratory reporting limit in any sample, it was removed from the SRE and not evaluated further. Tables 4 and 5 summarize the results of the background screening evaluation for soil and sediment, respectively.

The following subsections summarize the findings of the comparison of sample results with background values for metals in soil and sediment. Only metals were evaluated for background values because dioxins and furans are not naturally occurring and no background values were established.

3.1.1. Soil

Based on the results of the background screening evaluation presented in Table 4, the following metals were retained as COPCs in soil for further evaluation in the SRE:

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Mercury
- Molybdenum
- Nickel
- Selenium
- Silver
- Zinc

Thallium and vanadium were not retained as COPCs in soil because they were not detected or were detected at concentrations less than background (Table 4).

3.1.2. Sediment

Based on the results of the background screening evaluation presented in Table 5, the following metals were retained as COPCs in sediment for further evaluation in the SRE:

- Cadmium
- Lead
- Mercury
- Molybdenum
- Zinc

Antimony, arsenic, barium, beryllium, chromium, cobalt, copper, nickel, selenium, silver, thallium, and vanadium were not retained as COPCs in sediment because they were not detected or were detected at concentrations less than background (Table 5).

3.2. SITE CONCEPTUAL EXPOSURE MODEL

This section describes the methods used to estimate exposures for potential receptors at the site. The exposure assessment provides a scientifically defensible basis for the selection of potentially exposed hypothetical receptors and the most likely ways they might be exposed to chemicals at the site. To

develop a conceptual understanding of the site, information on potential chemical sources, chemical releases and transport mechanisms, locations of potentially exposed human and ecological receptors, and potential exposure routes were assessed. This information is outlined schematically in the SCEM shown on Figure 5. The SCEM associates the source of chemicals with potentially exposed receptors and complete exposure pathways. In this way, the SCEM assists in quantifying potential impacts to human and ecological health.

All of the following four components are necessary for a chemical exposure pathway to be considered complete and for chemical exposure to occur (EPA, 1989):

- A chemical source and a mechanism of chemical release to the environment
- An environmental transport medium (e.g., soil) for the released chemical
- A point of contact between the contaminated medium and the receptor (i.e., the exposure point)
- An exposure route (e.g., dermal contact with chemically impacted soil) at the exposure point

In evaluating the first two components, chemical properties of the detected chemicals and the physical characteristics of the site were reviewed to identify factors that might allow the release and transport of a chemical from the site. As shown on Figure 5, the primary sources of contamination are burn ash and solid waste debris from the former burn dump at the site. The primary release mechanisms are mechanical and physical disturbance, resulting in the creation of contaminated materials at the site. Release of chemicals can potentially occur through wind (fugitive dust), leaching and infiltration of chemicals, lateral migration of chemicals via stormwater runoff, and deposition of burn ash and solid waste debris from the former burn dump. Groundwater is unlikely to pose a risk to the environment based on the distance to the groundwater table (approximately 48 to 167 feet bgs) and because burn ash is underlain by crystalline rock with limited permeability. Additionally, no known permitted groundwater wells are directly downgradient from the site. Therefore, site-related contaminants are unlikely to pose a risk to human health or the environment via the groundwater pathway. Although the site is flanked by two natural drainages that merge just east of the site in an unnamed ephemeral creek, which joins Santa Ysabel Creek within 0.5 mile of the site, no flowing water has been present in the drainages during any of the sampling events. The surface water pathway was not quantitatively evaluated in the SRE because, based on the ephemeral nature of the drainages, it is unlikely that site-related contaminants are impacting any downstream aquatic habitats. Potential exposure media at the site may include particulates (with sorbed chemicals) in air, surface and subsurface soil, and sediment.

The third component necessary for an exposure pathway to be complete is a point of contact between the contaminated medium and the receptor (i.e., the exposure point). This SRE evaluates potential exposure of receptors assuming that access to the site is unrestricted and that receptors are exposed directly to impacted soil, sediment, and surface water. Currently, the site is located on Forest Service lands and is zoned as open space (County, 2010a). Under current and future land use scenarios, recreational hikers

and Forest Service workers may be directly exposed to contaminated soil and sediment at the site. For contaminated soil, the exposure point is defined as the site (Figure 5). For sediment, the exposure point is sediment in the ephemeral drainages at the site (Figure 5).

In addition to exposure points, potential human and ecological receptors at the site are necessary for an exposure pathway to be complete. Hypothetical human and ecological receptors evaluated in this SRE were identified based on their proximity to the site, proposed activities that could possibly result in exposure to chemicals, and future site use (i.e., the site is located on Cleveland National Forest lands and land use is expected to remain open space in the future). Based on the current and potential future uses of the site, the following hypothetical human and ecological receptors were evaluated in this SRE:

- Hypothetical Current/Future Human Receptors: Onsite Site Visitor
- Hypothetical Current/Future Ecological Receptors: Onsite Terrestrial Wildlife

The fourth and final component, a complete exposure pathway (i.e., route of exposure), is discussed in combination with the third component (i.e., presence of receptors) to define those exposure pathways considered to be complete and significant. As indicated in the SCEM (Figure 5), potential contact with chemicals at the site could occur via exposure to burn ash, solid waste debris, soil, or sediment. The following sections summarize those pathways considered to be complete and significant for each receptor.

3.2.1. Hypothetical Current/Future Onsite Site Visitor

The onsite visitor is included in this SRE to represent both recreational visitors (i.e., hiker) and Forest Service workers. This receptor spends the day conducting outdoor activities, which may include hiking and moderate soil disturbance activities in surface or near-surface soil. The following exposure pathways are assumed to be complete and significant for the onsite site visitor:

- Incidental ingestion of soil or sediment
- Dermal contact with soil or sediment
- Inhalation of dust in outdoor air generated from the subsurface

3.2.2. Hypothetical Current/Future Onsite Terrestrial Wildlife

Onsite terrestrial wildlife included in this SRE represent plants, soil invertebrates, and birds and mammals that forage at the site or whose home range includes the site. The following exposure pathways are assumed to be complete and significant for onsite terrestrial wildlife:

- Incidental ingestion of soil and sediment
- Dermal contact with soil and sediment
- Uptake of COPCs in soil and sediment (for plants)

Inhalation of soil by terrestrial wildlife is considered a minor but potentially complete pathway.

3.3. RISK SCREENING

Potential risks to human and ecological receptors from metals and dioxins and furans were evaluated by comparing the COPC concentrations in each medium (soil and sediment) with appropriate screening criteria developed for protection of human health and the environment. If COPC results exceeded the screening criteria in any medium, then the chemical was retained as a chemical of concern for that medium.

To express cumulative toxicity of dioxin and furan mixtures, detected concentrations of the multiple dioxin and furan congeners were multiplied by the congener's toxic equivalency factor (TEF) and summed to produce the toxic equivalent quotient (TEQ) relative to TCDD. The calculated TEQ for TCDD was compared with the human health and ecological screening criteria. The NOAA Screening Quick Reference Tables provide the complete list of human and avian TEFs for dioxins and dioxin-like compounds (Buchman, 2008).

Tables 6 and 7 summarize the results of the risk screening evaluation for soil. Tables 8 and 9 summarize the results of the screening evaluation for sediment.

The following subsections summarize the SRE results for human and ecological receptors by medium (soil and sediment). Section 3.4 presents the conclusions of the SRE.

3.3.1. Human Receptors

The hypothetical current/future onsite visitor (i.e., recreational hiker and Forest Service worker) was identified as the primary human receptor that might be exposed to COPCs at the site. As a result, the EPA RSLs for industrial soil (EPA, 2013a) were selected as the most appropriate criteria to screen risk to humans from exposure to COPCs (metals and TCDD TEQ) in soil and sediment.

Thirty-seven soil samples collected during the 2008 and 2009 investigations were analyzed for metals. Seven of these samples were also analyzed for dioxins and furans. Three sediment samples were analyzed for metals, dioxins, and furans during the 2013 investigation.

3.3.1.1. Soil

Arsenic, cobalt, and lead concentrations in 21, 1, and 4 soil samples, respectively, exceeded their EPA RSLs for industrial soil (Table 6). Based on the range of detected concentrations, the magnitude of detected concentrations in relation to the background values, and the magnitude of the exceedances in relation to the screening criterion, arsenic, cobalt, and lead may pose a risk of adverse effects to humans exposed to soil at the site.

Antimony, barium, beryllium, cadmium, chromium, copper, mercury, molybdenum, nickel, selenium, silver, and zinc concentrations in soil samples were less than their respective EPA RSLs for industrial soil (Table 6). Based on the range of detected concentrations in relation to the screening criterion, antimony, barium, beryllium, cadmium, chromium, copper, mercury, molybdenum, nickel, selenium, silver, and zinc do not pose a risk of adverse effects to humans exposed to soil at the site.

The TCDD TEQ concentrations in the soil samples ranged from 0.29 pg/g to 1,904 pg/g, with five detections exceeding the EPA RSL for industrial soil (18 pg/g) (Table 7). Based on the range of detected concentrations and the magnitude of the exceedances in relation to the screening criterion, dioxins and furans may pose a risk of adverse effects to humans exposed to soil at the site.

3.3.1.2. Sediment

None of the COPCs (cadmium, lead, mercury, molybdenum, zinc, and TCDD TEQ) in sediment were detected at concentrations exceeding their respective EPA RSLs for industrial soil (Tables 8 and 9). Based on the range of detected concentrations in relation to the screening criterion, cadmium, lead, mercury, molybdenum, zinc, and dioxins and furans do not pose a risk of adverse effects to humans exposed to sediment at the site.

3.3.2. Ecological Receptors

Potential risks to hypothetical current/future onsite terrestrial wildlife from exposure to COPCs in soil and sediment were evaluated by comparing the detected concentrations of COPCs with appropriate screening criteria developed for protection of ecological receptors. The following ecological screening criteria were evaluated and used during the SRE, as appropriate:

- **Soil Ecological Screening Criteria.** For metals, the lesser of the available EPA ecological soil screening levels (Eco-SSLs) for plants, soil invertebrates, and avian and mammalian wildlife were selected as the screening criterion for soil (EPA, 2013b). For dioxins and furans (expressed as the TCDD TEQ), the EPA Region V ecological screening levels for soil were selected as the screening criteria for soil (EPA, 2003).
- **Sediment Ecological Screening Criteria.** The TEL developed to evaluate sediment quality in freshwater ecosystems was selected as the screening criterion for sediment (Buchman, 2008).

Thirty-seven soil samples collected during the 2008 and 2009 investigations were analyzed for metals. Seven of these samples were also analyzed for dioxins and furans. Three sediment samples were analyzed for metals, dioxins, and furans during the 2013 investigation.

3.3.2.1. Soil

The following chemicals were detected at concentrations exceeding their respective EPA ecological screening levels (Tables 6 and 7):

- Antimony in 20 soil samples
- Arsenic in three soil samples
- Barium in seven soil samples
- Cadmium in 23 soil samples
- Chromium in 18 soil samples
- Cobalt in four soil samples
- Copper in 36 soil samples
- Lead in 33 soil samples
- Nickel in five soil samples
- Selenium in four soil samples
- Zinc in 33 soil samples
- Dioxins and furans (expressed as calculated TCDD TEQ) in seven soil samples

Based on the range of detected concentrations, the magnitude of detected concentrations in relation to the background values (for metals only), and the magnitude of the exceedances in relation to the screening criterion, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, zinc, and dioxins and furans may pose a risk of adverse effects to ecological receptors exposed to soil at the site. Beryllium, mercury, molybdenum, and silver were less than their respective Eco-SSLs (Table 6). Based on the range of detected concentrations in relation to the screening criterion, beryllium, mercury, molybdenum, and silver do not pose a risk of adverse effects to ecological receptors exposed to soil at the site.

3.3.2.2. Sediment

None of the COPCs in sediment (cadmium, lead, mercury, molybdenum, zinc, and TCDD TEQ) were detected at concentrations exceeding their respective freshwater sediment TELs (Tables 8 and 9) in the three sediment samples collected. Based on the range of detected concentrations and the magnitude of the exceedances in relation to the screening criterion, cadmium, lead, molybdenum, mercury, zinc, and dioxins and furans do not pose a risk of adverse effects to ecological receptors exposed to sediment at the site.

3.4. SRE CONCLUSIONS

Based on the results of the SRE, human and ecological receptors that come into contact with contaminated soil at the Site may be exposed to antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, zinc, and dioxins and furans at concentrations that may pose an unacceptable risk.

Sediment is not expected to pose unacceptable risk to hypothetical current/future onsite visitors or hypothetical current/future terrestrial wildlife because concentrations of COPCs were detected at concentrations less than the human health and ecological screening criteria. Based on the lack of contamination in sediment, the surface water pathway is not considered a complete exposure pathway.

As mentioned previously, the site is flanked by two natural drainages that merge just east of the site in an unnamed ephemeral creek. No surface water has been present in the drainages during any of the sampling events, and surface water likely only flows in these drainages during and immediately following rain events. A direct release to the surface water pathway has not been established, so the surface water pathway was not quantitatively evaluated this SRE. Based on the ephemeral nature of the drainages at the site and the low concentrations of chemicals in sediment, it is unlikely that site-related chemicals are significantly affecting any downstream aquatic habitats.

It is anticipated that by cleaning up contaminated soil and source materials (burn ash), human and ecological risks will be reduced to acceptable levels at the site.

Section 4. Removal Action Goals and Objectives

The purpose of this EE/CA is to develop and analyze removal action alternatives in accordance with CERCLA and to recommend a removal action alternative that is protective of human health and the environment and compliant with ARARs. The removal action alternative will be selected in an Action Memorandum, which is to be prepared by the lead federal agency (i.e., the Forest Service). The following sections describe the removal action goals and RAOs for the site, as well as the generalized removal action schedule. The goals for the site may be altered following the submittal of this EE/CA, if additional information becomes available from stakeholders or other interested parties that requires reevaluation of the RAOs. As such, the Action Memorandum will define the final removal action goal and RAOs to reflect any alterations and refinements.

4.1. REMOVAL ACTION GOALS AND OBJECTIVES

The overall goal of the removal action is to minimize the risks posed to human health and the environment from metals and dioxins and furans at the site. The following preliminary RAOs were developed to reduce the risks to humans and wildlife at the site:

- Reduce exposure of humans and wildlife to metals and dioxins and furans in soil and burn ash to acceptable levels.
- Reduce the risk of erosion of contaminated soil and burn ash.

These objectives will be achieved through attainment of the ARAR-based and risk-based goals. The NTCRA in this EE/CA considers a cleanup and containment level protective of human health and the environment based on the nonresidential and recreational use of the site, as well as the habitat use of onsite terrestrial wildlife. The NTCRA will focus on the removal of metals and dioxins and furans at concentrations exceeding cleanup levels developed for the protection of humans and wildlife. Metals and dioxins and furans are present in source materials at the site.

4.2. CLEANUP LEVELS

Based on the results of the SRE, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, zinc, and dioxins and furans in soil at the site pose a potential risk to both humans and wildlife. Regulatory standards and risk-based screening levels, along with site use considerations, were used to develop the cleanup levels. The cleanup levels for the site are based on reducing risks to acceptable levels for humans and wildlife that could potentially use the site.

While regulatory standards and risk-based screening levels must be considered in the development of cleanup levels, EPA guidance and policy do not recommend that cleanup levels be established at concentrations less than background, even if the background concentration exceeds an ARAR or risk-based screening level (EPA, 2002). Where a regulatory standard or risk-based screening level is greater than the background value, the standard or risk-based screening level is used as the cleanup level.

Preliminary cleanup levels for soil were developed using a combination of site background values, EPA RSLs, EPA Eco-SSLs, and EPA Region V ecological screening levels (Table 10). However, further evaluation of site background values should be incorporated into the final cleanup levels. The most conservative screening levels were selected as preliminary cleanup levels for antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, zinc, and dioxins and furans in soil. By achieving the RAOs, the potential risks to human health and the environment will be reduced or eliminated. Figure 4 shows the approximate boundaries of the areas where contaminated soil and burn ash have been identified for potential removal. Section 2.3 summarizes the results of previous investigations used to estimate the volume of soil and burn ash for potential removal and the rationale for the division of the site into these 10 subareas (Figure 4).

4.3. REMOVAL SCHEDULE

The Forest Service has determined that an NTCRA is appropriate for the site. The NTCRA could begin within 6 months following approval of this EE/CA. Based on past experience with implementation of removal action alternatives similar to those proposed in this EE/CA and the volume of material to be removed, it is estimated that any removal action undertaken can be completed within one construction season, depending on the date of award.

Section 5. Applicable or Relevant and Appropriate Requirements

Section 300.415(i) of the NCP provides that removal action must attain ARARs to the extent practical, considering the exigencies of the situation. In general terms, ARARs are environmental regulations, standards, criteria, or limitations promulgated under federal or more stringent state laws. An ARAR may be either applicable or relevant and appropriate, but not both.

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 to the specific situation at a CERCLA site, 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 non-environmental, including permit requirements, are not considered to be ARARs. Non-promulgated 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 levels or methodologies when regulatory standards are not available.

EPA has developed three categories of ARARs to assist in the identification of site requirements. The three categories of ARARs are (1) chemical-specific, (2) location-specific, (3) and action-specific. EPA guidance recognizes that some requirements do not fall neatly into this classification; however, 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 (i.e., cleanup levels). 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 concentrations 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 federal agency, the Forest Service has primary responsibility for identifying federal ARARs. EPA (1988) guidance recommends that the lead federal agency consult with the state when identifying state ARARs. In a letter dated May 2, 2012, the Forest Service requested ARARs from the Water Board but did not receive a response (Forest Service, 2012).

The federal and state ARARs that are presented in this document represent a preliminary analysis of ARARs. Other federal and state advisories, criteria, or guidance may, as appropriate, be considered in formulating the removal action. Tables 11 through 14 summarize the ARARs for this project.

Section 6. Identification and Analysis of Removal Action Alternatives

To identify removal action alternatives for the site, potential response actions were selected based on the RAOs, ARARs, and EPA guidance (EPA, 1993). The technologies and process options specific to the response actions are screened, and the retained technologies and process options of each general response action are assembled into removal action alternatives. The selected removal action alternatives are then evaluated with respect to their effectiveness, implementability, and cost.

Based on the guidelines presented in the "Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA" (EPA, 1993), only the most qualified technologies that apply to the media or source of contamination should be discussed in the EE/CA. Limiting the number of alternatives to those that have been selected in the past at similar sites or for similar contaminants provides an immediate focus to the discussion and selection of alternatives.

The remainder of this section summarizes the general response actions, presents the evaluation criteria, identifies the removal action alternatives, and summarizes the analysis of alternatives with respect to the evaluation criteria.

6.1. GENERAL RESPONSE ACTIONS

Three general response actions were considered for this EE/CA:

1. No Action
2. Engineering Controls
3. Offsite Disposal of Source Materials

The no-action category is retained throughout the evaluation process as required by the NCP to provide a baseline for comparison with other alternatives. Table 15 summarizes the screening of technologies and processes associated with the general response actions. The removal action alternatives were identified based on the general response actions and are discussed in Section 6.3.

6.2. EVALUATION CRITERIA

The analysis of removal action alternatives is qualitative in nature and is based on the following three evaluation criteria, as recommended by EPA (1993): effectiveness, implementability, and relative cost. The following subsections summarize each criterion.

6.2.1. Effectiveness

Alternatives are evaluated for effectiveness based on the following criteria:

- Overall Protection of Human Health and the Environment: This criterion assesses the ability of the alternative to be protective of human health and the environment under present and future land use conditions.
- Compliance with ARARs: Identifies whether or not implementation of the alternative would comply with all chemical-specific, action-specific, and location-specific ARARs.
- Long-Term Effectiveness: This criterion addresses the magnitude of residual risk remaining at the conclusion of removal activities. It addresses the adequacy and reliability of controls established by a removal action alternative to maintain reliable protection of human health and the environment over time.
- Short-Term Effectiveness: This criterion addresses the effects of an alternative during the construction and implementation phase until the RAOs are met. This criterion includes the time with which the remedy achieves protectiveness and the potential to create adverse impacts on human health and the environment during construction and implementation of the remedy.
- Reduction of Toxicity, Mobility, or Volume through Treatment: Identifies whether or not implementation of the alternative would reduce contaminant toxicity (e.g., reduction of metals), mobility, or actual volume of the hazardous substances.

6.2.2. Implementability

Alternatives are evaluated for implementability based on the following criteria:

- Technical Feasibility: Evaluates constructability and operational considerations, as well as demonstrated performance/useful life.
- Administrative Feasibility: Evaluates those activities such as statutory limits, permitting requirements, easements and rights of way, and impacts on adjoining property
- Availability of Services and Materials: Evaluates the availability of qualified contractors to provide the necessary services, materials, and equipment (with the preferred technologies being those that are commercially developed and readily available, or innovative technologies that have been field-tested with documented results). Also evaluates the availability of disposal facilities that are licensed to accept solid and liquid waste classified as hazardous and nonhazardous.
- State Acceptance: The concurrence of the State of California with the proposed alternatives.
- Community Acceptance: The acceptance of the proposed alternatives by the community.

6.2.3. Cost

Technologies were evaluated based on qualitative costs. Alternatives with lower costs were preferred if the effectiveness and implementability criteria were judged to be similar. The cost estimates were prepared to aid in the evaluation of alternatives using information that is currently available. These costs

are order-of-magnitude estimates with an intended accuracy of +50 to -30 percent (EPA, 2000). These costs are not construction bid costs, nor are they final project costs. Final project costs will depend on actual labor and material costs, actual engineering design costs, actual site conditions (including the actual quantities of soil and burn ash excavated and the amount of material that may be classified as hazardous waste), competitive market conditions, the final project scope, the final project schedule, and other variables. As a result, the final project costs will vary from these estimates.

6.3. ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The following removal action alternatives were identified for the site based on the general response actions and screening discussed in Section 6.1:

1. Alternative 1: No Action
2. Alternative 2: Cap Contaminated Soil and Burn Ash in Place
3. Alternative 3: Consolidate and Cap Contaminated Soil and Burn Ash in Place
4. Alternative 4: Excavation and Offsite Disposal of Contaminated Soil and Burn Ash

Each alternative was analyzed below for its capability to reduce the risks detailed in Section 3. Specifically, the alternatives are analyzed for effectiveness, implementability, and cost. Following the individual analysis of alternatives presented below, each alternative will be compared against the others to select the recommended removal action (Section 7).

6.3.1. Alternative 1: No Action

Under Alternative 1, no action would be taken at the site under current or future land use scenarios. As such, the human and ecological risks relating to the site would remain unchanged. The no-action alternative is evaluated as required by the NCP to provide a baseline for comparison with other alternatives.

6.3.1.1. Effectiveness

Alternative 1 does not provide short-term or long-term protection of public health. This alternative would not comply with ARARs. The time required to achieve the RAO is indefinite, and risks to current and future receptors would remain indefinitely. The toxicity, mobility, and volume of contamination at the site would not be reduced through treatment, and potential receptor exposure pathways would remain for current and future receptors.

6.3.1.2. Implementability

Alternative 1 would be readily technically and administratively feasible, and no services or materials are needed for implementation.

6.3.1.3. Cost

The total estimated cost for Alternative 1 is $0 (see Appendix D). No costs are associated with this alternative.

6.3.2. Alternative 2: Cap Contaminated Soil and Burn Ash in Place

Alternative 2 involves capping contaminated soil and burn ash in place (approximately 3.5 acres). This alternative involves minimal consolidation of waste prior to capping. Only Area 10 (shown on Figure 4) would be excavated to a depth of 0.5 foot bgs and placed on top of the main body of the waste. A soil cap consisting of at least 2 feet of clean soil, a demarcation layer, and an impermeable 40-mil high-density polyethylene (HDPE) liner with appropriate drainage features[3] would be constructed on top of the entire waste footprint (Figure 4). While site-related contaminants are unlikely to pose a risk to human health or the environment via the groundwater pathway, an impermeable liner would be constructed on top of the waste to prevent any release of chemicals through leaching and infiltration of chemicals and lateral migration of chemicals via stormwater runoff. Because the source material would be consolidated and capped on site, the Forest Service would ensure that substantive requirements for siting and construction of waste impoundments to ensure protection of groundwater and surface water downgradient from the encapsulation unit were met (Title 27 CCR § 20310). The cap would be graded to closely match the natural topography. The cap would cover an area of approximately 3.3 acres.

The site would be cleared and grubbed prior to construction. If needed, a 6-inch soil lift would be installed as a veneer prior to installation of the impermeable liner. Two feet of clean fill would be installed and compacted on top of the liner, followed by installation of a surface water drainage system and erosion controls. A brightly colored demarcation fabric layer would be placed at a depth of 1 foot bgs within the clean cover material to alert future workers when performing inspections or maintenance, so they do not expose the waste material or compromise the integrity of the soil cap or liner. Groundwater is presumed to be well below the proposed waste depth, which is underlain by crystalline rock with limited permeability, so a bottom liner would not be required. A pre-construction cap design and long-term maintenance of the cap would be required. Under Alternative 2, minimal consolidation would be required. Consolidated areas (i.e., Area 10) would not be backfilled but would be regraded to match preexisting topography. Regrading would be conducted to restore, to the degree practicable, the natural contours and morphology of the area where material is removed. The cap would be compacted and covered with biodegradable erosion control mats and hydroseeded. Certified weed-free straw wattle would be installed along contours as a best management practice (BMP) to control erosion.

This alternative would require an engineering study and design to establish site requirements for the cap, confirm the depth to groundwater beneath the site, and to ensure that all appropriate requirements are met. Engineering controls such as grading, drainage ditches, and culverts would be used where needed to

[3] The liner system design allows for drainage along the micro spikes in the geotextile.

divert water away from the cap and ensure that the repository is not impacted by drainage across the site. Future institutional controls, such as placing fences or signs around the cap to reduce the potential for erosion of the cap by site visitors and ensure that permanent vegetation is established, may be required in the engineering design.

Appropriate engineering and institutional controls would be required during construction to protect workers. These controls would address the presence of metals and dioxins and furans in source materials and the likelihood for metals and dioxins and furans to become airborne during construction work. These controls may include wetting of roads and source material throughout construction, using personal protective equipment (PPE) (e.g., disposable coveralls and air-purifying respirators), air monitoring (both personal air monitoring and site air monitoring), and contaminant reduction zones.

6.3.2.1. Effectiveness

Alternative 2 would minimize the potential for exposure to metals and dioxins and furans present at the site and would prevent exposure or continued erosion of waste materials from the site, thereby minimizing the potential for future or continued downstream releases. Appropriately designed and maintained surface water drainage and vegetative maintenance would limit future erosion of the cover materials and reduce the potential for future releases. The HDPE liner would prevent surface water infiltration through waste materials and minimize the potential for leachate development. This alternative would require long-term operation and maintenance (O&M) of the cover to ensure that no release of contaminants occur in the future. An impermeable cap is considered effective at addressing the risks posed to human health and the environment by contaminated soil and burn ash. Contaminated materials would be encapsulated such that exposure of humans or wildlife to waste would be reduced.

This alternative would comply with all chemical-, location-, and action-specific ARARs. The toxicity, mobility, or volume of contamination at the site would not be reduced through treatment. Risks to current and future receptors would be reduced by capping the burn ash and waste to prevent contact with human health and the environment. This alternative is considered to be reliable based on accepted industry standards for similar projects.

Long-term risks to current and future receptors related to waste materials would be minimized by covering the waste with a 2-foot-thick engineered cap with an impermeable liner. The finished surface would be smooth, compacted, and free from irregular surface changes. The final grades would provide positive drainage of surface water to minimize erosion. Long-term periodic inspection and maintenance of the cap would be required to ensure the long-term integrity of the cap (i.e., to ensure that it is not compromised by natural erosion or human activities) to provide long-term protection of human health and the environment. Additionally, this alternative would permanently remove source materials from the unnamed tributary that flows to Santa Ysabel Creek, thereby eliminating the potential for future releases

to the creek. While an impermeable cover is considered a durable and long-term solution, waste materials would remain on site and the risk of a breach of the cover would exist.

Measures would be implemented to minimize the short-term impacts to unnamed ephemeral creeks on site. Construction activities would be conducted during the dry season, and BMPs would be implemented such that short-term impacts to humans (including site construction workers) and the environment would be minimized. Worker protection would be provided during implementation of the remedy through strict adherence to a site-specific health and safety plan. An exclusion zone, a contaminant reduction zone, and a staging zone would be established at the site to reduce potential migration of contamination to adjacent areas. The exclusion zone would encompass the contaminated areas, and any persons entering this zone would be required to wear the appropriate PPE. The contaminant reduction zone would be used to remove contamination from equipment and PPE before it is cleared to leave the exclusion zone. The staging zone is where decontaminated equipment would be stored when not in use in the exclusion zone.

To meet action-specific ARARs, dust would be suppressed by applying water and performing real-time dust monitoring. Airborne arsenic, cadmium, copper, lead, zinc, and dioxins and furans are potential hazards to human health at the site, and strict controls must be implemented to ensure worker safety during construction. Real-time dust monitoring instrumentation would detect particulate concentrations greater than applicable dust action levels. Respiratory protection would be required for all site workers; however, use of water trucks is generally highly effective and may eliminate the need to use respiratory protection. Air monitoring to establish daily airborne arsenic, cadmium, copper, lead, zinc, and dioxin and furan levels for various work types may be conducted to establish the effectiveness of dust suppression techniques and down grade the level of respiratory protection if warranted. Airborne dust monitoring would be completed using portable hand-held dust monitors to verify and document daily dust-suppression efforts. These dust control methods would also reduce the migration of dust onto adjacent properties.

6.3.2.2. Implementability

This alternative is considered technically feasible and services and materials are readily available in the vicinity of the site. Onsite capping of contaminated soil and burn ash is a proven method for removing the exposure pathway to site receptors and reducing the risk posed to human health and the environment. This alternative could be implemented in a way that would minimize environmental impacts and could be performed within one construction season. The site is accessible by a paved road, which would allow heavy equipment to be easily transported to the site. This alternative is also considered to be administratively feasible. Permits, access agreements, and easements are either not required or would be granted by the Forest Service, which is both the property owner and is acting as the lead agency in this removal action. A Remedial Design and a Work Plan, with a site-specific health and safety plan, would be required prior to the start of work. The only impact to the adjacent Ramona Landfill property is the use of Dump Road, which is a private road owned by Allied Waste. Alternative 2 is considered feasible because the landfill is currently closed and receives minimal traffic.

The soil is classified as California hazardous waste but not RCRA hazardous waste in accordance with Title 22 CCR § 66261 and Title 40 Code of Federal Regulations (CFR) §261.24. However, other federal or state requirements for appropriate siting, construction, and long-term inspection and maintenance may apply [e.g., regulations for corrective action management units at Title 40 CFR Part 264, Subpart S, and Part 264.552(c)].

This alternative would likely be acceptable to the state and the community because it would meet the RAOs, would improve the site for recreational use, and would require minimal long-term maintenance.

6.3.2.3. Cost

The estimated total capital cost for implementing this alternative is $1,752,807. The long-term total cost for implementing this alternative is $2,512,394, with a present value cost of $2,756,164. Appendix D provides the detailed cost estimate. The following major assumptions have been identified for Alternative 2:

- Site personnel would consist of a site superintendent, a site quality control (QC) engineer who would also provide health and safety oversight, and six equipment operators/laborers.
- A backhoe, bulldozer, skip loader, and front-end loader would be used to consolidate Area 10 and install the clean soil cover. A 20,000-gallon water truck would also be used for dust suppression.
- The repository would have a surface area of approximately 3.3 acres. Approximately 19,972 tons of soil would be imported to construct the soil cover.
- No major road improvements would need to be performed.
- An HDPE liner and demarcation fabric would be placed between the top of the waste and the bottom of the clean cover.
- Approximately 3.3 acres of disturbed waste removal areas would be restored to a natural grade, hydroseeded, and would have BMPs installed.
- The estimated duration of field activities would be 45 working days.
- Biannual inspections to evaluate the integrity of all cover elements and erosion control measures would be conducted.

6.3.3. Alternative 3: Consolidate and Cap Contaminated Soil and Burn Ash in Place

Under Alternative 3, contaminated soil and burn ash would be consolidated and caped in place. Alternative 3 would be conducted the same way as Alternative 2, except that more soil around the edges of the cap (including Area 6) would be consolidated to reduce the total area of the cap.

Under Alternative 3, approximately 1,536 cubic yards of soil would be consolidated from Areas 1 through 10, placed on top of Areas 1 through 5 and 7 through 9, and capped (Figure 4). The cap is anticipated to cover an area of approximately 2.6 acres.

6.3.3.1. Effectiveness

Alternative 3 would provide similar effectiveness to Alternative 2 (see Section 6.3.2.1). The primary difference would be that the repository for Alternative 3 would cover a smaller surface area. As a result, it would require more excavation and site restoration, but less cap material (both cover soil and liner). These small differences do not impact the effectiveness of Alternative 3.

6.3.3.2. Implementability

The implementability of Alternative 3 is similar to Alternative 2 (see Section 6.3.2.2). The primary difference would be that the repository for Alternative 3 would cover a smaller surface area. As a result, it would require more excavation and site restoration, but less cap material (both cover soil and liner). These small differences do not impact the implementability of Alternative 3.

6.3.3.3. Cost

The estimated total capital cost for implementing this alternative is $1,662,276. The long-term total cost for implementing this alternative is $2,421,862, with a present value cost of $2,665,632. Appendix D provides the detailed cost estimate. The following major assumptions have been identified for Alternative 3:

- Site personnel would consist of a site superintendent, a site QC engineer who would also provide health and safety oversight, and six equipment operators/laborers.
- A backhoe, bulldozer, skip loader, and front-end loader would be used to consolidate Areas 6 and 10 on the waste footprint and install the clean soil cover. A 20,000-gallon water truck would also be used for dust suppression.
- The repository would have a surface area of approximately 2.6 acres. Approximately 2,458 tons of soil would be imported to construct the soil cover.
- No major road improvements would need to be performed.
- An HDPE liner and demarcation fabric would be placed between the top of the waste and the bottom of the clean cover.
- Approximately 3.5 acres of disturbed waste removal areas would be restored to a natural grade, hydroseeded, and would have BMPs installed.
- The estimated duration of field activities would be 45 working days.
- Biannual inspections to evaluate the integrity of all cover elements and erosion control measures would be conducted.

6.3.4. Alternative 4: Excavation and Offsite Disposal of Source Material

Under Alternative 4, all contaminated soil and burn ash would be removed from the site for transportation to an offsite disposal facility. In total, approximately 28,967 bank cubic yards of contaminated soil and

burn ash would be disposed of off site. Contaminated soil and burn ash would be excavated and loaded into trucks for hauling and disposal. The contaminated soil and burn ash would be hauled on Pamo Road and then to an appropriately licensed disposal facility such as South Yuma County Landfill in Yuma, Arizona. Excavated areas would be backfilled with clean soil, and the site would be restored to its original grade. BMPs would be installed in all disturbed and restored areas.

The site would be backfilled with clean fill material to restore, to the degree practicable, the natural contours and morphology of the areas where material was removed with the exception of Area 10. Site restoration would be conducted as presented in Alternative 3. No O&M activities would be required under this alternative.

6.3.4.1. Effectiveness

Alternative 4 would eliminate the potential for exposure to metals and dioxins and furans present at the site and would prevent continued erosion of waste materials from the site, thereby eliminating the potential for future or continued downstream releases. Removal of the waste is considered effective at addressing the risks posed to human health and the environment by contaminated soil and burn ash. Contaminated materials removed from the site would eliminate exposure to humans or wildlife.

This alternative would comply with all chemical-, location-, and action-specific ARARs. The toxicity, mobility, or volume of contamination at the site would be eliminated through removal. This alternative is considered to be reliable based on accepted industry standards for similar projects.

Long-term risks to current and future receptors related to waste materials would be eliminated. Additionally, this alternative would permanently remove source materials from the unnamed tributary that flows to Santa Ysabel Creek, thereby eliminating the potential for future releases to the creek. Similar to Alternatives 2 and 3, the exclusion zone, contaminant reduction zone, and the staging zone would be established to reduce potential migration of contamination to adjacent areas. BMPs and dust monitoring and control similar to Alternatives 2 and 3 would be implemented during Alternative 4.

6.3.4.2. Implementability

The closest landfill that would accept waste materials is located in Yuma, Arizona, which is nearly 200 miles away from the site. Otherwise, this alternative is considered technically feasible and services and materials are readily available in the vicinity of the Site. This alternative could be implemented in a way that would minimize environmental impacts and could be performed within one construction season. Excavation and offsite disposal is a proven method for removing the exposure pathway to site receptors and the risk posed to human health. A Remedial Design and a Work Plan, with an associated sampling and analysis plan and site-specific health and safety plan, would be required prior to the start of work.

This alternative would likely be acceptable to the state and community because it would meet the RAOs, would improve the site for recreational use, and would not require minimal long-term maintenance.

6.3.4.3. Cost

The estimated total capital cost for implementing this alternative is $9,552,088. The long-term total cost for implementing this alternative is $9,577,408, with a present value cost of $9,577,132. Appendix D provides the detailed cost estimate. The following major assumptions have been identified for Alternative 4:

- Site personnel would consist of a site superintendent, a site QC engineer who would also provide health and safety oversight, and six equipment operators/laborers.
- An excavator, bulldozer, skip loader, and front-end loader would be used to excavate, backfill, and restore the site. A 20,000-gallon water truck would also be used for dust suppression.
- No major road improvements would need to be performed.
- Approximately 46,347 tons of material would be would be hauled, stockpiled, and loaded for transport and disposal. Waste would be exported at a rate of 1,000 tons per day.
- Approximately 3.5 acres of disturbed waste removal areas would be restored to a natural grade, hydroseeded, and BMPs would be installed.
- The estimated duration of field activities would be 112 working days.
- Biannual inspections to evaluate the erosion control measures would be conducted for 1 year after construction, but would not be required after that.

Section 7. Comparative Analysis of and Recommended Removal Action Alternatives

The removal action alternatives identified in Section 6.3 were compared with one another by using the evaluation criteria described in Section 6.2. Section 7.1 below describes the results of the comparative analysis. Table 16 presents the comparative analysis of the alternatives for removal and either onsite encapsulation or offsite disposal of contaminated soil and burn ash. Section 7.2 provides the recommended removal action based on the results of the comparative analysis.

7.1. COMPARATIVE ANALYSIS OF ALTERNATIVES

7.1.1. Effectiveness

Alternative 1 is considered the least effective alternative to protect public health and the environment because risks to current and future receptors would remain indefinitely and the toxicity, mobility, and volume of contamination would not be reduced through either treatment or removal. Alternatives 2 and 3 would not reduce the toxicity, mobility, and volume of contamination through treatment. Alternative 4 would reduce the toxicity, mobility, and volume of contamination through removal. Alternatives 2 and 3 are considered equally effective alternatives to protect public health and the environment because risks to current and future receptors would be reduced by removal or encapsulation of contaminated soil and burn ash. Alternative 4 would be the most effective alternative because waste would be completely removed from the site, thus the risk to current and future receptors would be eliminated.

7.1.2. Implementability

Alternatives 1, 2, and 3 are technically and administratively feasible, and the services and materials necessary to implement the alternative are readily available. Alternative 4 is moderately technically feasible because the offsite landfill is located far from the site (~200 miles). Alternative 1 is the most implementable because no administration, services, or materials are required. Alternatives 2, 3, and 4 are very implementable and could be conducted within one construction season.

7.1.3. Cost

The estimated cost for Alternative 1 is $0. The estimated capital cost for Alternative 2 is $1,752,807, and the total cost with ongoing maintenance is $2,512,394. The estimated capital cost for Alternative 3 is $1,662,276, and the total cost with ongoing maintenance is $2,421,862. The estimated capital cost for

Alternative 4 is $9,552,088, and the total cost with ongoing maintenance is $9,577,408. Costs for Alternatives 2 and 3 are similar but Alternative 3 is slightly more cost-effective overall. Alternative 4 is the least cost-effective alternative.

7.2. RECOMMENDED REMOVAL ACTION ALTERNATIVE

The removal action alternative recommended for the Ramona Burn Dump Site is **Alternative 3, Consolidate and Cap Contaminated Soil and Burn Ash in Place**. Alternatives 2, 3, and 4 meet the RAOs but Alternative 4 is cost prohibitive. Alternative 3 would meet the RAOs at the site and is more cost-effective than Alternative 2.

The estimated total capital cost for implementing Alternative 3 is $1,662,276. The long-term total cost for implementing this alternative is $2,421,862, with a present value cost of $2,665,632. As discussed in Section 6.2.3, this cost represents an order-of-magnitude estimate with an intended accuracy of +50 to -30 percent (EPA, 2000). Final project costs will depend on actual labor and material costs, actual engineering design costs, actual Site conditions (including the actual quantities of contaminated soil and burn ash excavated and the amount of material that may be classified as hazardous waste), competitive market conditions, the final project scope, the final project schedule, and other variables.

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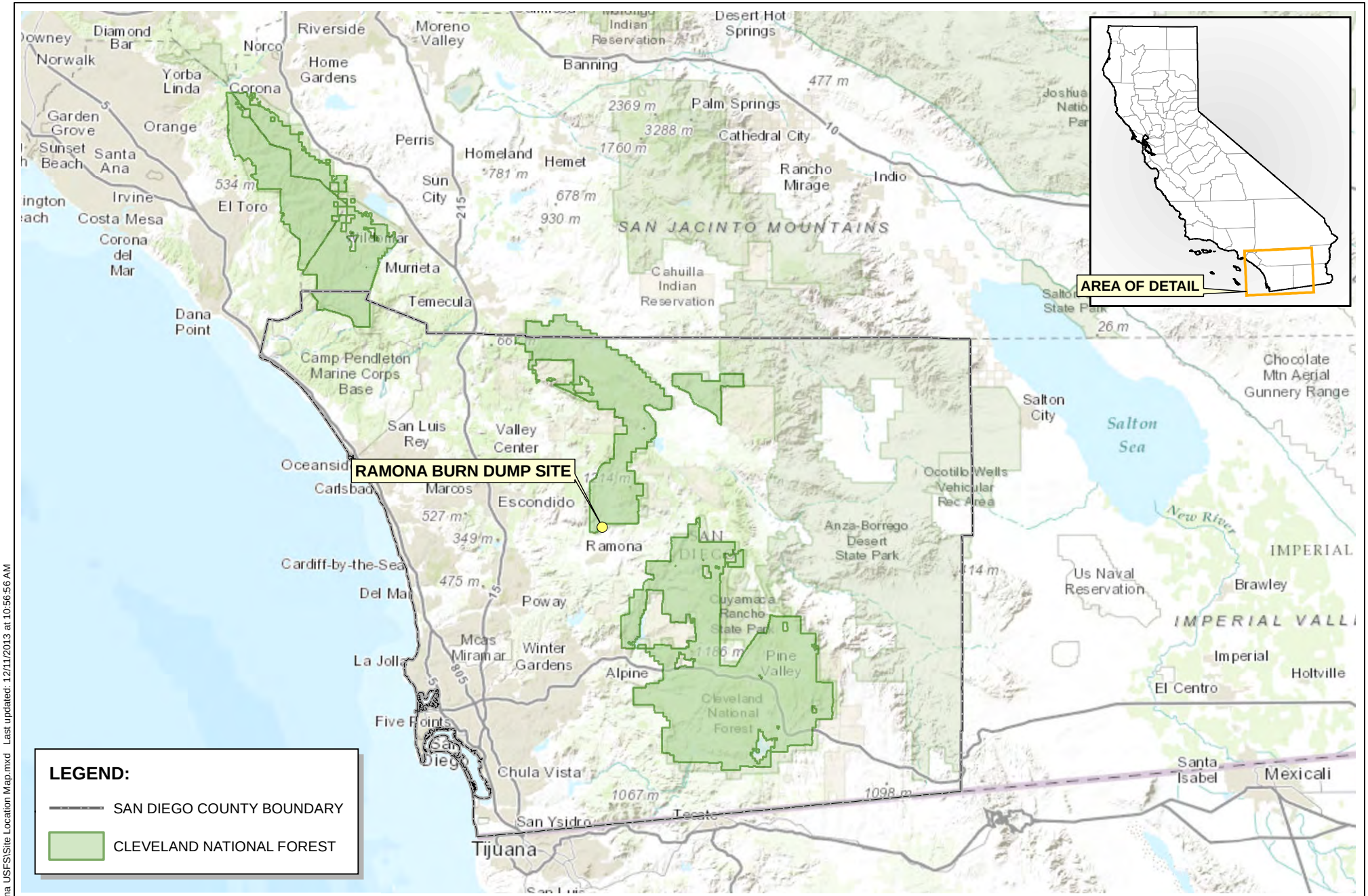
Figures



SOURCES: ESRI WORLD TOPOGRAPHIC MAP GIS SERVICE
COORDINATE SYSTEM: U.S. STATE PLANE, NAD 1983, CALIFORNIA ZONE 6

N

0 16

SCALE: 1" = APPROX. 16 MILES

ERRG

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115 Sansome Street, 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

SITE LOCATION MAP

DRAWN BY:	CHECKED BY:	PROJECT NO.	FIG NO.
JJC 11/27/2013	AN 11/27/2013	2013-064	1

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DUMP ROAD

NEWLY INSTALLED CULVERT

1640

1620

1600

1580

1560

1540

LEGEND:

- CULVERT
- DRAINAGE (NO DEBRIS AND/OR ASH OBSERVED)
- DRAINAGE WITH DEBRIS AND/OR ASH OBSERVED
- FORMER DRAINAGE WITH DEBRIS AND/OR ASH
- APPROXIMATE SANDBAG LOCATION
- AREAS OF CONCENTRATED SURFACE DEBRIS
- APPROXIMATE WASTE FOOTPRINT
- DIRECTION OF SURFACE WATER FLOW
- APPROXIMATE EXTENT OF SCATTERED SURFACE DEBRIS / REDUCED VEGETATION
- BERM
- FOREST SERVICE PROPERTY BOUNDARY
- ROAD
- FORMER ROAD (APPROXIMATE)
- FENCE
- ELEVATION CONTOUR (20-FOOT INTERVAL)

N

0 80

SCALE: 1" = 80 FEET

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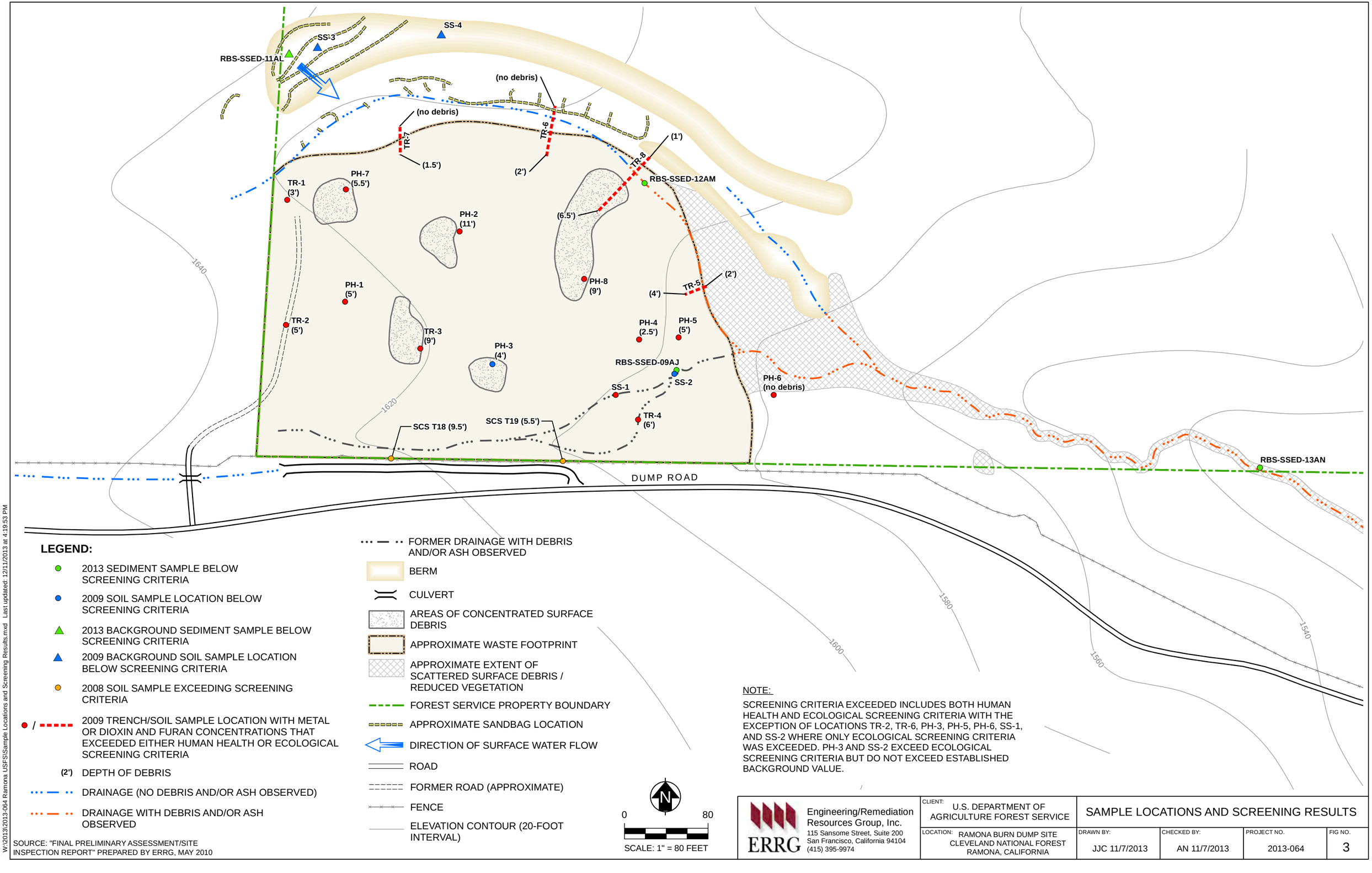
CLIENT: U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

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

SITE FEATURES MAP

DRAWN BY:	CHECKED BY:	PROJECT NO.	FIG NO.
JJC 11/7/2013	AN 11/7/2013	2013-064	2



LEGEND:

- 2013 SEDIMENT SAMPLE BELOW SCREENING CRITERIA
- 2009 SOIL SAMPLE LOCATION BELOW SCREENING CRITERIA
- 2013 BACKGROUND SEDIMENT SAMPLE BELOW SCREENING CRITERIA
- 2009 BACKGROUND SOIL SAMPLE LOCATION BELOW SCREENING CRITERIA
- 2008 SOIL SAMPLE EXCEEDING SCREENING CRITERIA
- / 2009 TRENCH/SOIL SAMPLE LOCATION WITH METAL OR DIOXIN AND FURAN CONCENTRATIONS THAT EXCEEDED EITHER HUMAN HEALTH OR ECOLOGICAL SCREENING CRITERIA
- (2') DEPTH OF DEBRIS
- DRAINAGE (NO DEBRIS AND/OR ASH OBSERVED)
- DRAINAGE WITH DEBRIS AND/OR ASH OBSERVED
- FORMER DRAINAGE WITH DEBRIS AND/OR ASH OBSERVED
- BERM
- CULVERT
- AREAS OF CONCENTRATED SURFACE DEBRIS
- APPROXIMATE WASTE FOOTPRINT
- APPROXIMATE EXTENT OF SCATTERED SURFACE DEBRIS / REDUCED VEGETATION
- FOREST SERVICE PROPERTY BOUNDARY
- APPROXIMATE SANDBAG LOCATION
- DIRECTION OF SURFACE WATER FLOW
- ROAD
- FORMER ROAD (APPROXIMATE)
- FENCE
- ELEVATION CONTOUR (20-FOOT INTERVAL)

SOURCE: "FINAL PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT" PREPARED BY ERRG, MAY 2010

0 80

SCALE: 1" = 80 FEET

NOTE:

SCREENING CRITERIA EXCEEDED INCLUDES BOTH HUMAN HEALTH AND ECOLOGICAL SCREENING CRITERIA WITH THE EXCEPTION OF LOCATIONS TR-2, TR-6, PH-3, PH-5, PH-6, SS-1, AND SS-2 WHERE ONLY ECOLOGICAL SCREENING CRITERIA WAS EXCEEDED. PH-3 AND SS-2 EXCEED ECOLOGICAL SCREENING CRITERIA BUT DO NOT EXCEED ESTABLISHED BACKGROUND VALUE.

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CLIENT: U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

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

SAMPLE LOCATIONS AND SCREENING RESULTS

DRAWN BY:	CHECKED BY:	PROJECT NO.	FIG NO.
JJC 11/7/2013	AN 11/7/2013	2013-064	3

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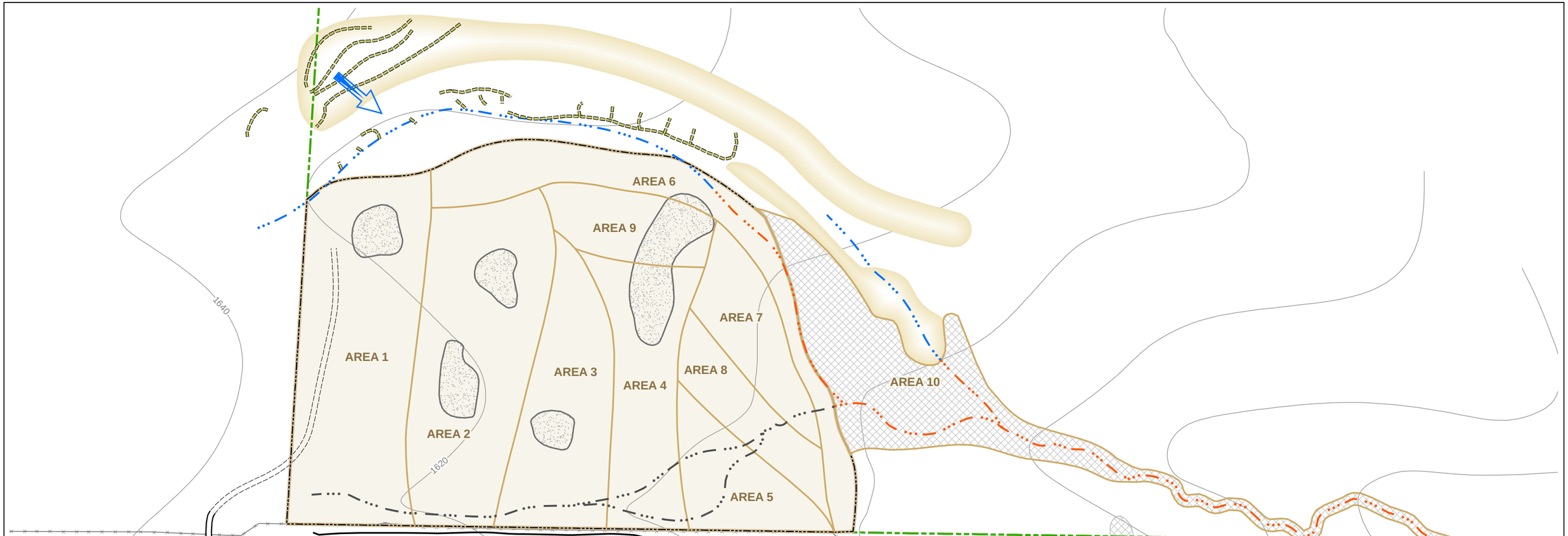


LEGEND:

- DRAINAGE (NO DEBRIS AND/OR ASH OBSERVED)
- DRAINAGE WITH DEBRIS AND/OR ASH OBSERVED
- FORMER DRAINAGE WITH DEBRIS AND/OR ASH OBSERVED
- BERM
- CULVERT
- AREAS OF CONCENTRATED SURFACE DEBRIS
- APPROXIMATE WASTE FOOTPRINT
- WASTE SUBAREA BOUNDARY
- APPROXIMATE EXTENT OF SCATTERED SURFACE DEBRIS / REDUCED VEGETATION
- FOREST SERVICE PROPERTY BOUNDARY
- APPROXIMATE SANDBAG LOCATION
- DIRECTION OF SURFACE WATER FLOW
- ROAD
- FORMER ROAD (APPROXIMATE)
- FENCE
- ELEVATION CONTOUR (20-FOOT INTERVAL)

SOURCE: "FINAL PRELIMINARY ASSESSMENT/SITE INSPECTION REPORT" PREPARED BY ERRG, MAY 2010

N

0 80

SCALE: 1" = 80 FEET

Burn Dump Subarea	Area (sf)	Average Depth of Debris (ft)	Volume (cy)
Area 1	28,788	5.0	5,331
Area 2	25,790	10.0	9,552
Area 3	15,706	4.0	2,327
Area 4	13,947	9.0	4,649
Area 5	8,196	6.0	1,821
Area 6	14,945	2.0	1,107
Area 7	8,074	4.5	1,346
Area 8	6,807	2.5	630
Area 9	7,373	6.5	1,775
Area 10	23,161	0.5	429
Totals	**152,787**		**28,967**

Notes:
sf = square feet
ft = feet (below ground surface)
cy = cubic yards

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

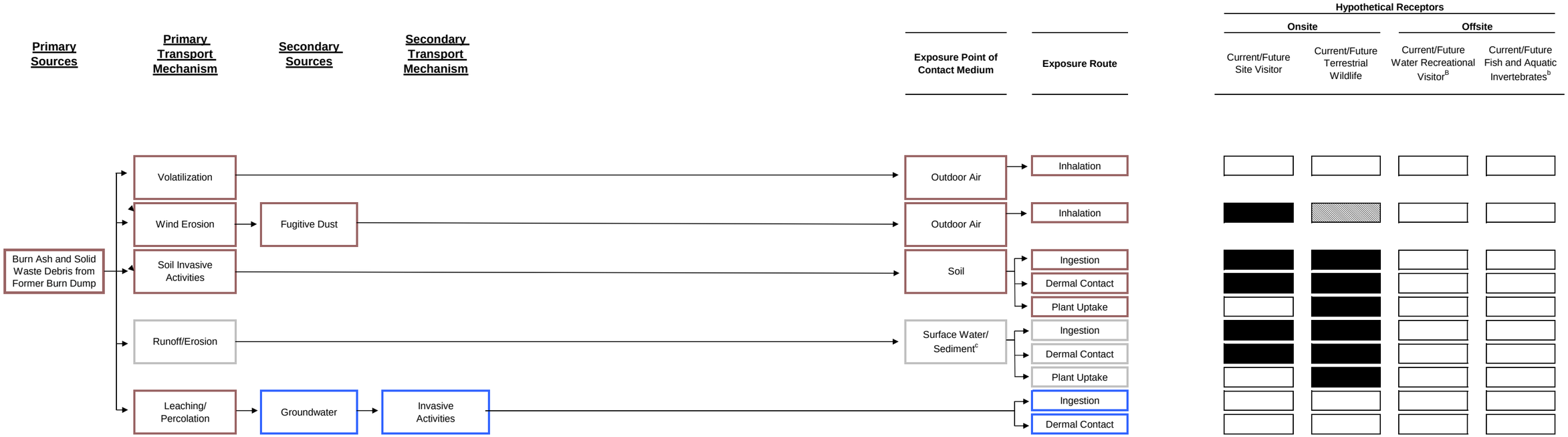
CLIENT: U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

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

WASTE EXTENT AND VOLUMES

DRAWN BY:	CHECKED BY:	PROJECT NO.	FIG NO.
JJC 11/7/2013	AN 11/7/2013	2013-064	4

W:\2013\2013-064 Ramona USFS\Waste Removal Action Areas.mxd Last updated: 12/11/2013 at 4:16:32 PM



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] The former Ramona Burn Dump Site is flanked by two natural drainages that merge just east of the Site in an unnamed ephemeral creek. No surface water has been present in the drainages during any of the sampling events. A direct release to the surface water pathway has not been established. Due to the ephemeral nature of the drainages at the Site and low concentrations of COPCs in sediment, it is unlikely that site-related contaminants are significantly impacting any downstream aquatic habitats.

RAMONA BURN DUMP
CLEVELAND NATIONAL FOREST
SAN DIEGO COUNTY, CALIFORNIA

SITE CONCEPTUAL EXPOSURE MODEL

PROJECT NO.	DATE	DRAWN BY	APP. BY
2013-064	12/10/13	AN	SCK

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

FIGURE 5

Tables

Table 1. Sensitive Species Potentially Present in the Vicinity of the Ramona Burn Dump Site

Common Name	Scientific Name	Federal Status	California Status	CDFW/CNPS
Amphibians				
Arroyo Toad [1,2]	*Anaxyrus californicus*	Endangered	None	CDFW California Species of Special Concern
Coast Range Newt[2]	*Taricha torosa*	None	None	CDFW California Species of Special Concern
Large-Blotched Salamander[2]	*Ensatina klauberi*	None	None	CDFW California Species of Special Concern
Western Spadefoot[2]	*Spea hammondii*	None	None	CDFW California Species of Special Concern
Birds				
Bell's Sage Sparrow[2]	*Artemisiospiza belli belli*	None	None	Watch List
Burrowing Owl[2]	*Athene cunicularia*	None	None	CDFW California Species of Special Concern
Coastal Cactus Wren[2]	*Campylorhynchus brunneicapillus sandiegensis*	None	None	CDFW California Species of Special Concern
Coastal California Gnatcatcher[1,2]	*Polioptila californica californica*	Threatened	None	CDFW California Species of Special Concern
Cooper's Hawk[2]	*Accipiter cooperii*	None	None	Watch List
Golden Eagle[2]	*Aquila chrysaetos*	None	None	Fully Protected/Watch List
Least Bell's Vireo[1,2]	*Vireo bellii pusillus*	Endangered	Endangered	None
Prairie Falcon[2]	*Falco mexicanus*	None	None	Watch List
Purple Martin[2]	*Progne subis*	None	None	CDFW California Species of Special Concern
Southern California Rufous-Crowned Sparrow[1,2]	*Aimophila ruficeps canescens*	None	None	Watch List
Southwestern Willow Flycatcher[2]	*Empidonax traillii extimus*	Endangered	Endangered	None

Table 1. Sensitive Species Potentially Present in the Vicinity of the Ramona Burn Dump Site *(continued)*

Common Name	Scientific Name	Federal Status	California Status	CDFW/CNPS
Birds *(continued)*				
Swainson's Hawk[2]	*Buteo swainsoni*	None	Threatened	None
Tricolored Blackbird[2]	*Agelaius tricolor*	None	None	CDFW California Species of Special Concern
White-Tailed Kite[1]	*Elanus leucurus*	None	None	Fully Protected
Mammals				
American Badger[1,2]	*Taxidea taxus*	None	None	CDFW California Species of Special Concern
Big Free-Tailed Bat[2]	*Nyctinomops macrotis*	None	None	CDFW California Species of Special Concern
Dulzura Pocket Mouse[1,2]	*Chaetodipus californicus femoralis*	None	None	CDFW California Species of Special Concern
Northwestern San Diego Pocket Mouse[1,2]	*Chaetodipus fallax fallax*	None	None	CDFW California Species of Special Concern
Pallid Bat[1,2]	*Antrozous pallidus*	None	None	CDFW California Species of Special Concern
Pocketed Free-Tailed Bat[2]	*Nyctinomops femorosaccus*	None	None	CDFW California Species of Special Concern
San Diego Black-Tailed Jackrabbit[2]	*Lepus californicus bennettii*	None	None	CDFW California Species of Special Concern
Stephens' Kangaroo Rat[2]	*Dipodomys stephensi*	Endangered	Threatened	None
Townsend's Big-Eared Bat[2]	*Corynorhinus townsendii*	None	Candidate, Threatened	CDFW California Species of Special Concern
Western Mastiff Bat[2]	*Eumops perotis californicus*	None	None	CDFW California Species of Special Concern
Western Red Bat[2]	*Lasiurus blossevillii*	None	None	CDFW California Species of Special Concern
Western Yellow Bat[1,2]	*Lasiurus xanthinus*	None	None	CDFW California Species of Special Concern

Table 1. Sensitive Species Potentially Present in the Vicinity of the Ramona Burn Dump Site *(continued)*

Common Name	Scientific Name	Federal Status	California Status	CDFW/CNPS
Reptiles				
Coast Horned Lizard[1,2]	*Phrynosoma blainvillii*	None	None	CDFW California Species of Special Concern
Coronado Island Skink[1]	*Plestiodon skiltonianus interparietalis*	None	None	CDFW California Species of Special Concern
Western Pond Turtle[1,2]	*Emys marmorata*	None	None	CDFW California Species of Special Concern
Orangethroat Whiptail[1,2]	*Aspidoscelis hyperythra*	None	None	CDFW California Species of Special Concern
California Mountain Kingsnake (San Diego population)[2]	*Lampropeltis zonata (pulchra)*	None	None	CDFW California Species of Special Concern
Coast Patch-Nosed Snake[2]	*Salvadora hexalepis virgultea*	None	None	CDFW California Species of Special Concern
Red-Diamond Rattlesnake[2]	*Crotalus ruber*	None	None	CDFW California Species of Special Concern
South Coast Garter Snake[2]	*Thamnophis sirtalis ssp.*	None	None	CDFW California Species of Special Concern
Two-Striped Garter Snake[2]	*Thamnophis hammondii*	None	None	CDFW California Species of Special Concern
San Diego Fairy Shrimp[1,2]	*Branchinecta sandiegonensis*	Endangered	None	None
Plants				
Baja Navarretia[2]	*Navarretia peninsularis*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Coulter's Saltbush[2]	*Atriplex coulteri*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Cuyamaca Larkspur[2]	*Delphinium hesperium ssp. Cuyamacae*	None	Rare	Plants rare, threatened, or endangered in California and elsewhere
Dean's Milk-Vetch[2]	*Astragalus deanei*	None	None	Plants rare, threatened, or endangered in California and elsewhere

Table 1. Sensitive Species Potentially Present in the Vicinity of the Ramona Burn Dump Site *(continued)*

Common Name	Scientific Name	Federal Status	California Status	CDFW/CNPS
Plants *(continued)*				
Delicate Clarkia[1,2]	*Clarkia delicate*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Dunn's Mariposa-Lily[2]	*Calochortus dunnii*	None	Rare	Plants rare, threatened, or endangered in California and elsewhere
Felt-Leaved Monardella[1,2]	*Monardella hypoleuca ssp. Lanata*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Encinitas Baccharis[2]	*Baccharis vanessae*	Threatened	Endangered	Plants rare, threatened, or endangered in California and elsewhere
Gander's Ragwort[2]	*Packera gander*	None	Rare	Plants rare, threatened, or endangered in California and elsewhere
Lakeside Ceanothus[2]	*Ceanothus cyaneus*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Little Mousetail[2]	*Myosurus minimus ssp. Apus*	None	None	Plants about which we need more information - a review list
Long-Spined Spineflower[2]	*Chorizanthe polygonoides var. longispina*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Mission Canyon Bluecup[2]	*Githopsis diffusa ssp. Filicaulis*	None	None	Plants about which we need more information - a review list
Moreno Currant[2]	*Ribes canthariforme*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Mud Nama[2]	*Nama stenocarpum*	None	None	Plants rare, threatened, or endangered in California, but more common elsewhere
Orcutt's Brodiaea[1,2]	*Brodiaea orcuttii*	None	None	Plants rare, threatened, or endangered in California and elsewhere

Table 1. Sensitive Species Potentially Present in the Vicinity of the Ramona Burn Dump Site *(continued)*

Common Name	Scientific Name	Federal Status	California Status	CDFW/CNPS
Plants *(continued)*				
Palmer's Goldenbush[1,2]	*Ericameria palmeri var. palmeri*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Palmer's Grapplinghook[2]	*Harpagonella palmeri*	None	None	Plants of limited distribution - a watch list
Parry's Tetracoccus[1,2]	*Tetracoccus dioicus*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Parish's Brittlescale[2]	*Atriplex parishii*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Parish's Meadowfoam[2]	*Limnanthes alba ssp. Parishii*	None	Endangered	Plants rare, threatened, or endangered in California and elsewhere
Prairie Wedge Grass[2]	*Sphenopholis obtusata*	None	None	Plants rare, threatened, or endangered in California, but more common elsewhere
Purple Stemodia[2]	*Stemodia durantifolia*	None	None	Plants rare, threatened, or endangered in California, but more common elsewhere
Ramona Horkelia[1,2]	*Horkelia truncata*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Robinson's Pepper-Grass[2]	*Lepidium virginicum var. robinsonii*	None	None	Plants of limited distribution - a watch list
Round-Leaved Filaree[2]	*California macrophylla*	None	None	Plants rare, threatened, or endangered in California and elsewhere
San Bernardino Aster[2]	*Symphyotrichum defoliatum*	None	None	Plants rare, threatened, or endangered in California and elsewhere
San Diego Button-Celery[2]	*Eryngium aristulatum var. parishii*	Endangered	Endangered	Plants rare, threatened, or endangered in California and elsewhere

Table 1. Sensitive Species Potentially Present in the Vicinity of the Ramona Burn Dump Site *(continued)*

Common Name	Scientific Name	Federal Status	California Status	CDFW/CNPS
Plants *(continued)*				
San Diego Gumplant[2]	*Grindelia hallii*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Southern Tarplant[2]	*Centromadia parryi ssp. australis*	None	None	Plants rare, threatened, or endangered in California and elsewhere
San Diego Milk-Vetch[1,2]	*Astragalus oocarpus*	None	None	Plants rare, threatened, or endangered in California and elsewhere
San Diego Thorn-Mint[1,2]	*Acanthomintha ilicifolia*	Threatened	Endangered	Plants rare, threatened, or endangered in California and elsewhere
Spreading Navarretia[2]	*Navarretia fossalis*	Threatened	None	Plants rare, threatened, or endangered in California and elsewhere
Southern Mountains Skullcap[2]	*Scutellaria bolanderi ssp. Austromontana*	None	None	Plants rare, threatened, or endangered in California and elsewhere
Thread-Leaved Brodiaea[2]	*Brodiaea filifolia*	Threatened	Endangered	Plants rare, threatened, or endangered in California and elsewhere
Velvety False Lupine[2]	*Thermopsis californica var. semota*	None	None	Plants rare, threatened, or endangered in California and elsewhere

Notes:

1 = Identified using http://imaps.dfg.ca.gov/viewers/cnddb_quickviewer/app.asp in Ramona Quadrant (which includes project site).

2 = Identified using http://imaps.dfg.ca.gov/viewers/cnddb_quickviewer/app.asp in quadrants surrounding the site, located at Mesa Grande, Santa Ysabel, El Cajon Mountain, and San Pasqual.

CDFW = California Department of Fish and Wildlife

CNPS = California Native Plant Society

Table 2. Dioxins and Furans Results for Soil Samples, 2008 and 2009 Investigations

Sample ID No.	Date Collected	Sampled By	Depth (feet bgs)	Dioxins and Furans (pg/g)																
				1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	OCDD	OCDF	1,2,3,7,8-PeCDD	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	2,3,7,8-TCDD	2,3,7,8-TCDF
T18-1	03/07/08	SCS[1]	1	28.5	5.36	0.247[2]	0.751[2]	2.03[2]	1.49[2]	1.09[2]	1.08[2]	0.272[2]	1.5[2]	99.3	2.72[2]	0.515[2]	1.09[2]	1.73[2]	0.306[2]	2.68
PH-2G	11/17/09	ERRG[3]	3.5	620	1,100	29	82	140	62	320	320	8.8	460	790	92	110	290	610	39	420
PH-3I	11/17/09	ERRG[3]	Surface	2.3[2,4]	1.3[2]	0.19[2]	<5.0	<5.0	<5.0	0.4[2,4]	<5.0	<5.0	0.32[2,4]	16[5]	1[2]	<5.0	0.21[2,4]	0.29[2,4]	<1.0	0.85[2]
TR-3S	11/18/09	ERRG[3]	3	17,000[7]	2,000	97	39	260	60	94	66	3.4	85	220,000[5,6,7]	10,000[7]	15	47	92	3.9	57[8]
TR-4W	11/18/09	ERRG[3]	6	220	170	8.8	5.6	15	13	28	35	1.4	36	1,400[5]	89	12	26	45	5.7	36[8]
PH-7AC	11/19/09	ERRG[3]	5.5	210	120	7.3	5	13	12	37	28	1.1[2]	37	1,000	58	6.5	20	38	1.8	24[8]
PH-8AI	11/19/09	ERRG[3]	9	260	180	11	8.4	20	18	48	42	1.8	50	1,100[5]	81	10	30	55	11	33[8]

Notes: Samples analyzed by US Environmental Protection Agency Method 8290.

1 = SCS Engineers, 2008. "Assessment of the Ramona Old Dump and Burn Site." April 30.

2 = Concentration is an estimate. Concentration is less than the calibration range.

3 = ERRG, 2010. "Final Preliminary Assessment/Site Inspection for the Ramona Burn Dump Site, Cleveland National Forest, San Diego County, California." May.

4 = Estimated maximum possible concentration.

5 = Method blank contamination.

6 = Estimated result. Result concentration exceeds the calibration range.

7 = Result was obtained from the analysis of a dilution.

8 = Result was reported from confirmation analysis.

9 = Buchman, M.F., 2008. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, 34 pages.

bgs = below ground surface
ERRG = Engineering / Remediation Resources Group, Inc.
HpCDD = Heptachlorodibenzo-p-dioxin
HpCDF = Heptachlorodibenzofuran
HxCDD = Hexachlorodibenzo-p-dioxin
HxCDF = Hexachlorodibenzofuran
OCDD = Octachlorodibenzodioxin
OCDF = Octachlorodibenzofuran
PeCDD = Pentachlorodibenzo-p-dioxin
PeCDF = Pentachlorodibenzofuran
pg/g = picograms per gram
NOAA = National Oceanic Atmospheric Administration
SCS = SCS Engineers
TCDD = tetrachlorodibenzo-p-dioxin
TCDF = tetrachlorodibenzofuran
< = not detected at concentration less than method detection limit

Table 3. Waste Characterization Analytical Results for Soil Samples, 2008 and 2009 Investigations

Sample ID No.	Date Collected	Collected By	Depth (feet bgs)	WET		TCLP	Waste Classification
				Arsenic (mg/L)	Lead (mg/L)	Lead (mg/L)	
T18-1	03/07/08	SCS[1]	1	NA	**5.73**	NA	California Hazardous Waste (non-RCRA)
T18-4	03/07/08	SCS[1]	4	NA	1.75	NA	California Hazardous Waste (non-RCRA)
T19-2	03/07/08	SCS[1]	2	NA	**13.9**	0.169	California Hazardous Waste (non-RCRA)
T19-4	03/07/08	SCS[1]	4	<0.150	**54.7**	1.51	California Hazardous Waste (non-RCRA)
PH-1F	11/17/09	ERRG[2]	Surface	NA	**75**	0.25	California Hazardous Waste (non-RCRA)
TR-4W	11/18/09	ERRG[2]	6	NA	**11**	0.13	California Hazardous Waste (non-RCRA)
PH-8-AG	11/19/09	ERRG[2]	Surface	NA	**6.7**	<2.0	California Hazardous Waste (non-RCRA)
			STLC	5	5	NA	
			MCCTC	NA	NA	**5**	

Notes:

Bold text indicates concentration exceeds STLC, which is indicative of a California (non-RCRA) hazardous waste.

All results analyzed by EPA Method 6010B.

1 = SCS Engineers, 2008. "Assessment of the Ramona Old Dump and Burn Site." April 30.

2 = ERRG, 2010. "Final Preliminary Assessment/Site Inspection for the Ramona Burn Dump Site, Cleveland National Forest, San Diego County, California." May.

bgs = below ground surface

EPA = U. S. Environmental Protection Agency

ERRG = Engineering / Remediation Resources Group, Inc.

MCCTC = maximum contaminant concentration for the toxicity characteristic (regulatory threshold for TCLP results)

mg/L = milligrams per liter

NA = not analyzed/not available

RCRA = Resource Conservation and Recovery Act

SCS = SCS Engineers

STLC = soluble threshold concentration limit (regulatory threshold for WET results)

TCLP = Toxicity Characteristic Leaching Procedure

WET = Waste Extraction Test

< = not detected at concentration less than reporting limit

Table 4. Background Screening Results for Metals in Soil Samples

Sample ID No.	Date Collected	Collected By	Depth (feet bgs)	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
T18-1	03/07/08	SCS[1]	1	**3.99**	**27**	153	**0.535**	**<0.500**	20.6	12.6	56.2	**73.7**	<0.0835	<0.250	13.6	**1.53**	<0.250	**<0.750**	83.5	**184**
T18-4	03/07/08	SCS[1]	4	<0.750	**4.3**	180	**0.36**	**<0.500**	14	9.98	64.1	**99.3**	<0.0835	<0.250	9.89	<0.750	<0.250	**<0.750**	57.5	**212**
T19-2	03/07/08	SCS[1]	2	**1.76**	**7.03**	242	**0.379**	**2.34**	17.7	11.4	**132**	**292**	**0.14**	**0.322**	**21.4**	<0.750	<0.250	<0.750	53.8	**881**
T19-4	03/07/08	SCS[1]	4	**20.5**	**59.5**	225	<0.250	**2.47**	26.7	16.4	**487**	**577**	0.108	<0.250	**63.3**	**352**	<0.250	<0.750	38.4	**790**
SS-1A	11/17/09	ERRG[2]	Surface	<2.0	<4.0	210	<0.40	**0.60**	19	11	86	**120**	0.066	<2.0	13	<2.0	<0.99	<2.0	62	**350**
SS-2B	11/17/09	ERRG[2]	Surface	<1.9	<3.8	85	<0.38	<0.48	14	7.6	30	3.6	<0.020	<1.9	4.0	<1.9	<0.96	<1.9	51	36
PH-1E	11/17/09	ERRG[2]	5	<2.0	<4.0	86	<0.40	<0.51	9.4	5.1	33	**16**	<0.019	<2.0	3.9	<2.0	**<1.0**	<2.0	34	**72**
PH-1F	11/17/09	ERRG[2]	Surface	**2.3**	**5.1**	340	<0.38	**3.4**	27	8.7	**200**	**470**	**0.15**	<1.9	**17**	<1.9	**1.6**	<1.9	34	**1,300**
PH-2G	11/17/09	ERRG[2]	3.5	**5.8**	**8.3**	**580**	<0.38	**10**	40	**39**	**500**	**1,000**	**0.35**	**22**	**100**	**5.8**	**2.6**	**<9.5**	37	**6,400**
PH-2H	11/17/09	ERRG[2]	11.25	**3.4**	**4.8**	290	<0.38	**3.0**	27	10	**770**	**650**	**0.12**	**2.0**	**25**	<1.9	**1.4**	<1.9	41	**1,400**
PH-3I	11/17/09	ERRG[2]	Surface	<2.0	<4.0	110	<0.40	<0.50	12	7.9	36	5.5	<0.019	<2.0	3.5	<2.0	<0.99	<2.0	55	37
PH-4J	11/17/09	ERRG[2]	Surface	<2.0	**4.9**	240	<0.40	**2.3**	26	9.8	**120**	**230**	**0.15**	<2.0	15	<2.0	**<1.0**	<2.0	51	**740**
PH-5K	11/17/09	ERRG[2]	4.5	<1.9	<3.8	230	<0.38	**0.94**	26	11	**190**	**300**	0.078	<1.9	**23**	<1.9	<0.95	<1.9	71	**680**
PH-6L	11/17/09	ERRG[2]	Surface	<2.0	<3.9	110	<0.39	<0.49	7.6	7.9	42	**27**	0.021	<2.0	4.4	<2.0	<0.98	<2.0	34	**85**
PH-7AA	11/19/09	ERRG[2]	Surface	**2.1**	<4.0	180	<0.40	<0.50	23	8.9	110	**200**	0.039	<2.0	14	<2.0	**<1.0**	<2.0	60	**590**
PH-7AB	11/19/09	ERRG[2]	3.5	**4.2**	**8.6**	**430**	<0.41	**3.9**	38	11	**250**	**650**	**0.21**	**2.3**	**27**	<2.0	**1.5**	<2.0	52	**1,700**
PH-7AC	11/19/09	ERRG[2]	5.5	**3.7**	**7.2**	**400**	<0.41	**3.8**	34	10	**290**	**550**	**0.33**	**2.6**	**26**	<2.0	**1.7**	<2.0	55	**1,500**
PH-8AH	11/19/09	ERRG[2]	8	**2.5**	**12**	360	<0.40	**8.3**	**43**	13	**870**	**620**	**0.16**	**4.1**	**61**	**3.5**	**1.8**	<5.0	34	**2,500**
PH-8AI	11/19/09	ERRG[2]	9	**7.8**	**4**	230	<0.38	**3.6**	36	6.9	**240**	**1,700**	**0.2**	<1.9	**24**	<1.9	**1.2**	<1.9	33	**1,500**
TR-1M	11/18/09	ERRG[2]	Surface	<2.0	<4.1	92	<0.41	<0.51	14	7.2	31	4.3	<0.019	<2.0	2.4	<2.0	**<1.0**	<2.0	83	23
TR-1N	11/18/09	ERRG[2]	2	**3.8**	**4.5**	310	<0.38	**2.1**	32	10	**190**	**340**	**0.12**	<1.9	**18**	<1.9	<0.96	<1.9	73	**950**
TR-1O	11/18/09	ERRG[2]	3	<2.0	<4.0	170	<0.40	<0.5	16	10	87	**52**	<0.019	<2.0	5.3	<2.0	<0.99	<2.0	82	**190**
TR-2P	11/18/09	ERRG[2]	Surface	<1.9	<3.9	180	<0.39	<0.49	14	8.4	27	**13**	<0.020	<1.9	3.6	<1.9	<0.97	<1.9	78	**140**
TR-2Q	11/18/09	ERRG[2]	5	<1.9	<3.9	130	<0.39	<0.49	21	8.4	45	**21**	<0.019	<1.9	9.3	<1.9	<0.97	<1.9	110	**170**
TR-3R	11/18/09	ERRG[2]	Surface	<1.9	<3.8	110	<0.38	<0.48	14	7.8	29	<1.9	<0.020	<1.9	4.1	<1.9	<0.96	<1.9	55	28
TR-3S	11/18/09	ERRG[2]	3	**5.4**	**6.2**	**450**	<0.39	**6.6**	**46**	9.6	**290**	**550**	**0.18**	**2.8**	**27**	<2.0	**1.7**	<2.0	50	**2,100**
TR-3T	11/18/09	ERRG[2]	9	**3.1**	**5.4**	300	<0.40	**6.3**	33	7.7	**200**	**380**	**0.51**	**2.1**	**28**	<2.0	**<1.0**	<2.0	42	**2,300**
TR-4U	11/18/09	ERRG[2]	Surface	<1.9	<3.8	110	<0.38	<0.48	29	8.8	44	**25**	<0.020	<1.9	4.7	<1.9	<0.96	<1.9	68	**89**
TR-4V	11/18/09	ERRG[2]	3	<2.0	<4.0	200	<0.40	**1.0**	25	7.9	**160**	**240**	0.11	<2.0	10	<2.0	**<1.0**	<2.0	67	**600**
TR-4W	11/18/09	ERRG[2]	6	**7.0**	**11**	180	<0.40	**0.66**	41	14	**300**	**2,300**	**0.17**	**4.7**	**31**	<2.0	<0.99	<2.0	32	**1,400**
TR-5X	11/18/09	ERRG[2]	2.5	**3.8**	**6.5**	220	<0.39	**1.0**	30	11	**140**	**390**	**0.16**	<2.0	**21**	<2.0	<0.98	<2.0	50	**840**
TR-6Y	11/18/09	ERRG[2]	2	<2.0	<3.9	91	<0.39	<0.49	21	6.6	68	**16**	<0.020	<2.0	3.1	<2.0	<0.98	<2.0	67	**52**
TR-7Z	11/18/09	ERRG[2]	1.5	**6.1**	**18**	320	<0.41	**4.2**	**110**	13	**360**	**680**	**0.22**	**4.2**	**86**	<2.0	**2.1**	<2.0	46	**1,700**
TR-8AD	11/19/09	ERRG[2]	1	**8.4**	**29**	320	<0.39	**5.0**	**65**	**25**	**290**	**1,100**	**0.16**	**9**	**130**	<1.9	**2**	<1.9	22	**2,300**
TR-8AE	11/19/09	ERRG[2]	3	**3.4**	**8.2**	370	<0.38	**4.4**	37	10	**290**	**660**	**0.12**	**2.5**	**24**	<1.9	**1.8**	<1.9	42	**1,600**
TR-8AF	11/19/09	ERRG[2]	6.5	**5.0**	**9.4**	320	<0.40	**2.7**	34	15	**220**	**390**	0.08	**4.3**	**32**	<0.20	**1.0**	<2.0	45	**1,500**
PH 8-AG	11/19/09	ERRG[2]	Surface	<1.9	<3.9	220	<0.39	**1.7**	19	8.4	110	**200**	0.064	<1.9	9.8	<1.9	<0.97	<1.9	52	**540**
		Background (Sample SS-3C)		<2.0	<3.9	130	<0.39	<0.49	14	7.6	37	3.5	0.038	<2.0	5.4	<2.0	<0.98	<2.0	72	17
		Background (Sample SS-4D)		<2.0	<4.0	170	<0.40	<0.50	16	9.9	38	4.1	0.037	<2.0	6.0	<2.0	<0.99	<2.0	82	22
		Established Background Value[3]		Detected	Detected	390	Detected	Detected	42	22.8	111	10.5	0.111	Detected	16.2	Detected	Detected	Detected	216	51
		Retained as COPC		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes

Notes:

Bold text indicates concentration exceeds established background value.

All samples analyzed by EPA Method 6010B and 7471A.

1 = SCS Engineers, 2008. "Assessment of the Ramona Old Dump and Burn Site." April 30.

2 = ERRG, 2010. "Final Preliminary Assessment/Site Inspection for the Ramona Burn Dump Site, Cleveland National Forest, San Diego County, California." May.

3 = Three times the lowest concentration for individual chemicals in the background samples (or detected in cases where a chemical was not detected in the background sample).

bgs = below ground surface

COPC = contaminant of potential concern

EPA = U. S. Environmental Protection Agency

ERRG = Engineering / Remediation Resources Group, Inc.

mg/kg = milligrams per kilogram

SCS = SCS Engineers

< = not detected at a concentration greater than reporting limit

Table 5. Background Screening Results for Metals in Sediment Samples

Sample ID No.	Date Collected	Description	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
RBS-SSED-09AJ	10/21/13	Onsite drainage	0.75[1,2]	1.6[1]	63	<0.34	**0.054[1]**	52	5.9	31	**16**	0.0068[1]	**0.40[1]**	5.7	2.4[1]	<0.86	2.8	230	**68**
RBS-SSED-12AM	10/21/13	Onsite drainage	1.0[1,2]	0.82[1]	96	<0.30	<0.038[3]	14	9.3	31	4.4	0.0092	<0.19[3]	4.2	<0.45[3]	<0.76	1.0[1]	60	**49**
RBS-SSED-13AN	10/22/13	Onsite drainage just before drainage runs off Forest Service property	0.85[1,2]	1.2[1]	83	<0.31	**0.055[1]**	15	6.2	26	**13**	**0.03**	<0.20[3]	3.2	<0.47[3]	<0.79	1.1[1]	78	**52**
		Background (Sample RBS-SSED-11AL)	0.51[1,2]	1.0[1]	80	<0.34	<0.042[3]	69	7.9	26	2.3	0.0064[1]	<0.22[3]	4.2	1.1[1]	<0.84	2.6	240	15
		Established Background Value[4]	1.53	3.0	240	Detected	Detected	207	23.7	78	6.9	0.0192	Detected	12.6	3.3	Detected	7.8	720	45
		Retained as COPC	No	No	No	No	Yes	No	No	No	Yes	Yes	Yes	No	No	No	No	No	Yes

Notes:

All samples analyzed by EPA Method 6010B and 7471A.

Bold text indicates concentration exceeds established background value.

1 = Concentration is an estimate.

2 = Compound was found in the blank and the sample.

3 = Concentration is an estimate and was not detected above the method detection limit.

4 = Three times the lowest concentration for individual chemicals in the background samples (or detected in cases where a chemical was not detected in the background sample).

EPA = U.S. Environmental Protection Agency

COPC = chemical of potential concern

mg/kg = milligrams per kilogram

< = not detected at concentration less than method detection limit

Table 6. Risk Screening Results for Metals in Soil Samples

Sample ID No.	Date Collected	Collected By	Depth (feet bgs)	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Zinc (mg/kg)
T18-1	03/07/08	SCS[1]	1	3.99	27	153	0.535	*<0.500*	20.6	12.6	56.2	73.7	<0.0835	<0.250	13.6	1.53	<0.250	184
T18-4	03/07/08	SCS[1]	4	*<0.750*	4.3	180	0.36	*<0.500*	14	9.98	64.1	99.3	<0.0835	<0.250	9.89	*<0.750*	<0.250	212
T19-2	03/07/08	SCS[1]	2	1.76	7.03	242	0.379	2.34	17.7	11.4	132	292	0.14	0.322	21.4	*<0.750*	<0.250	881
T19-4	03/07/08	SCS[1]	4	20.5	59.5	225	<0.250	2.47	26.7	16.4	487	577	0.108	<0.250	63.3	352	<0.250	790
SS-1A	11/17/09	ERRG[2]	Surface	*<2.0*	*<4.0*	210	<0.40	0.60	19	11	86	120	0.066	<2.0	13	*<2.0*	<0.99	350
SS-2B	11/17/09	ERRG[2]	Surface	*<1.9*	*<3.8*	85	<0.38	*<0.48*	14	7.6	30	3.6	<0.020	<1.9	4.0	*<1.9*	<0.96	36
PH-1E	11/17/09	ERRG[2]	5	*<2.0*	*<4.0*	86	<0.40	*<0.51*	9.4	5.1	33	16	<0.019	<2.0	3.9	*<2.0*	<1.0	72
PH-1F	11/17/09	ERRG[2]	Surface	2.3	5.1	340	<0.38	3.4	27	8.7	200	470	0.15	<1.9	17	*<1.9*	1.6	1,300
PH-2G	11/17/09	ERRG[2]	3.5	5.8	8.3	580	<0.38	10	40	39	500	1,000	0.35	22	100	5.8	2.6	6,400
PH-2H	11/17/09	ERRG[2]	11.25	3.4	4.8	290	<0.38	3.0	27	10	770	650	0.12	2.0	25	*<1.9*	1.4	1,400
PH-3I	11/17/09	ERRG[2]	Surface	*<2.0*	*<4.0*	110	<0.40	*<0.50*	12	7.9	36	5.5	<0.019	<2.0	3.5	*<2.0*	<0.99	37
PH-4J	11/17/09	ERRG[2]	Surface	*<2.0*	4.9	240	<0.40	2.3	26	9.8	120	230	0.15	<2.0	15	*<2.0*	<1.0	740
PH-5K	11/17/09	ERRG[2]	4.5	*<1.9*	*<3.8*	230	<0.38	0.94	26	11	190	300	0.078	<1.9	23	*<1.9*	<0.95	680
PH-6L	11/17/09	ERRG[2]	Surface	*<2.0*	*<3.9*	110	<0.39	*<0.49*	7.6	7.9	42	27	0.021	<2.0	4.4	*<2.0*	<0.98	85
PH-7AA	11/19/09	ERRG[2]	Surface	2.1	*<4.0*	180	<0.40	*<0.50*	23	8.9	110	200	0.039	<2.0	14	*<2.0*	<1.0	590
PH-7AB	11/19/09	ERRG[2]	3.5	4.2	8.6	430	<0.41	3.9	38	11	250	650	0.21	2.3	27	*<2.0*	1.5	1,700
PH-7AC	11/19/09	ERRG[2]	5.5	3.7	7.2	400	<0.41	3.8	34	10	290	550	0.33	2.6	26	*<2.0*	1.7	1,500
PH-8AH	11/19/09	ERRG[2]	8	2.5	12	360	<0.40	8.3	43	13	870	620	0.16	4.1	61	3.5	1.8	2,500
PH-8AI	11/19/09	ERRG[2]	9	7.8	4	230	<0.38	3.6	36	6.9	240	1,700	0.2	<1.9	24	*<1.9*	1.2	1,500
TR-1M	11/18/09	ERRG[2]	Surface	*<2.0*	*<4.1*	92	<0.41	*<0.51*	14	7.2	31	4.3	<0.019	<2.0	2.4	*<2.0*	<1.0	23
TR-1N	11/18/09	ERRG[2]	2	3.8	4.5	310	<0.38	2.1	32	10	190	340	0.12	<1.9	18	*<1.9*	<0.96	950
TR-1O	11/18/09	ERRG[2]	3	*<2.0*	*<4.0*	170	<0.40	*<0.5*	16	10	87	52	<0.019	<2.0	5.3	*<2.0*	<0.99	190
TR-2P	11/18/09	ERRG[2]	Surface	*<1.9*	*<3.9*	180	<0.39	*<0.49*	14	8.4	27	13	<0.020	<1.9	3.6	*<1.9*	<0.97	140
TR-2Q	11/18/09	ERRG[2]	5	*<1.9*	*<3.9*	130	<0.39	*<0.49*	21	8.4	45	21	<0.019	<1.9	9.3	*<1.9*	<0.97	170
TR-3R	11/18/09	ERRG[2]	Surface	*<1.9*	*<3.8*	110	<0.38	*<0.48*	14	7.8	29	<1.9	<0.020	<1.9	4.1	*<1.9*	<0.96	28
TR-3S	11/18/09	ERRG[2]	3	5.4	6.2	450	<0.39	6.6	46	9.6	290	550	0.18	2.8	27	*<2.0*	1.7	2,100
TR-3T	11/18/09	ERRG[2]	9	3.1	5.4	300	<0.40	6.3	33	7.7	200	380	0.51	2.1	28	*<2.0*	<1.0	2,300
TR-4U	11/18/09	ERRG[2]	Surface	*<1.9*	*<3.8*	110	<0.38	*<0.48*	29	8.8	44	25	<0.020	<1.9	4.7	*<1.9*	<0.96	89
TR-4V	11/18/09	ERRG[2]	3	*<2.0*	*<4.0*	200	<0.40	1.0	25	7.9	160	240	0.11	<2.0	10	*<2.0*	<1.0	600
TR-4W	11/18/09	ERRG[2]	6	7.0	11	180	<0.40	0.66	41	14	300	2,300	0.17	4.7	31	*<2.0*	<0.99	1,400
TR-5X	11/18/09	ERRG[2]	2.5	3.8	6.5	220	<0.39	1.0	30	11	140	390	0.16	<2.0	21	*<2.0*	<0.98	840
TR-6Y	11/18/09	ERRG[2]	2	*<2.0*	*<3.9*	91	<0.39	*<0.49*	21	6.6	68	16	<0.020	<2.0	3.1	*<2.0*	<0.98	52
TR-7Z	11/18/09	ERRG[2]	1.5	6.1	18	320	<0.41	4.2	110	13	360	680	0.22	4.2	86	*<2.0*	2.1	1,700
TR-8AD	11/19/09	ERRG[2]	1	8.4	29	320	<0.39	5.0	65	25	290	1,100	0.16	9	130	*<1.9*	2	2,300
TR-8AE	11/19/09	ERRG[2]	3	3.4	8.2	370	<0.38	4.4	37	10	290	660	0.12	2.5	24	*<1.9*	1.8	1,600
TR-8AF	11/19/09	ERRG[2]	6.5	5.0	9.4	320	<0.40	2.7	34	15	220	390	0.08	4.3	32	*<2.0*	1.0	1,500
PH 8-AG	11/19/09	ERRG[2]	Surface	*<1.9*	*<3.9*	220	<0.39	1.7	19	8.4	110	200	0.064	<1.9	9.8	*<1.9*	<0.97	540

Table 6. Risk Screening Results for Metals in Soil Samples *(continued)*

Sample ID No.	Date Collected	Collected By	Depth (feet bgs)	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Zinc (mg/kg)
Human Health Criteria and COC Determination																		
RSL for Industrial Soil[3]				41	2.4	190,000	200	800	1,500,000[4]	30	41,000	800	310	5,100	10,000	5,100	5,100	310,000
COC for Human Health?				No	Yes	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No
Ecological Criteria and COC Determination																		
Eco-SSL (Avian)[5]				NA	43	NA	NA	0.77	26	120	28	11	NA	NA	210	1.2	4.2	46
Eco-SSL (Invertebrates)[5]				78	NA	330	40	140	NA	NA	80	1,700	NA	NA	280	4.1	NA	120
Eco-SSL (Mammals)[5]				0.27	46	2,000	21	0.36	34	230	49	56	NA	NA	130	0.63	14	79
Eco-SSL (Plants)[5]				NA	18	NA	NA	32	NA	13	70	120	NA	NA	38	0.52	560	160
COC for Ecological Receptors?[6]				Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes

Notes:

Red text indicates concentration exceeds human health criteria.

Shaded cells indicate concentration exceeds lowest of the ecological criteria.

Italics indicate laboratory reporting limit exceeds screening criteria.

The detection limit for antimony, arsenic, chromium, and selenium exceeds screening criterion for one or more samples.

All samples analyzed by EPA Method 6010B and 7471A.

1 = SCS Engineers, 2008. "Assessment of the Ramona Old Dump and Burn Site." April 30.

2 = ERRG, 2010. "Final Preliminary Assessment/Site Inspection for the Ramona Burn Dump Site, Cleveland National Forest, San Diego County, California." May.

3 = EPA, 2013. "Regional Screening Levels (Formerly PRGs), Screening Levels for Chemical Contaminants." November. Available Online at <http://www.epa.gov/region09/superfund/prg/index.html>.

4 = RSL for Chromium III. No RSL has been established for Total Chromium.

5 = EPA, 2013. "Ecological Soil Screening Levels." Website accessed on October 25, 2013: <http://www.epa.gov/ecotox/ecossl/>.

6 = Lowest screening criteria used in the risk evaluation.

bgs = below ground surface

Eco-SSL = ecological soil screening level

EPA = U.S. Environmental Protection Agency

COC = chemical of concern

COPC = chemical of potential concern

mg/kg = milligrams per kilogram

NA = not analyzed/not available

RSL = regional screening level

< = not detected at a concentration greater than reporting limit

Table 7. Risk Screening Results for TCDD TEQ in Soil Samples

Sample ID No.	Date Collected	Sampled By	TCDD TEQ[1] (Total Mammals/Human)
T18-1	03/07/08	SCS[2]	2.84
PH-2G	11/17/09	ERRG[3]	540
PH-3I	11/17/09	ERRG[3]	0.29
TR-3S	11/18/09	ERRG[3]	1,904
TR-4W	11/18/09	ERRG[3]	53
PH-7AC	11/19/09	ERRG[3]	40
PH-8AI	11/19/09	ERRG[3]	65
Human Health Criteria and COC Determination			
		RSL for Industrial Soil[4]	18
		COC for Human Health?	Yes
Ecological Criteria and COC Determination			
		EPA Region V Ecological Screening Levels for Soil (Mammals)[5]	0.199
		COC for Ecological Receptors?	Yes

Notes:

All values are shown in picograms per gram.

Red text indicates concentration exceeds human health criteria.

Shaded cells indicate concentration exceeds ecological criteria.

1 = Dioxins and furans are expressed as a TEQ (TCDD equivalent concentration), which is estimated by multiplying the measured dioxin or furan congener concentration by its TEF, and the converted values are added to derive a TEQ for the sample. The World Health Organization's TEF values were used to calculate the TEQ (Van den Berg, M., and others, 2006. "The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds." *Toxicological Sciences.* Volume 93, No. 2. Pages 223–241.).

2 = SCS Engineers, 2008. "Assessment of the Ramona Old Dump and Burn Site." April 30.

3 = ERRG, 2010. "Final Preliminary Assessment/Site Inspection for the Ramona Burn Dump Site, Cleveland National Forest, San Diego County, California." May.

4 = EPA, 2013a. "Regional Screening Levels (Formerly PRGs)." November. Available Online at <http://www.epa.gov/region09/superfund/prg>.

5 = EPA, 2003. EPA Region 5, RCRA Ecological Screening Levels." August 22. Available Online at <http://www.epa.gov/Region5/waste/cars/pdfs/ecological-screening-levels-200308.pdf>.

COC = chemical of concern

EPA = U.S. Environmental Protection Agency

ERRG = Engineering / Remediation Resources Group, Inc.

RSL = regional screening level

SCS = SCS Engineers

TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin

TEF = toxic equivalency factor

TEQ = toxicity equivalent quotient

Table 8. Risk Screening Results for Metals in Sediment Samples

Sample ID No.	Date Collected	Description	Cadmium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Zinc (mg/kg)
RBS-SSED-09AJ	10/21/13	Onsite drainage	0.054[1]	16	0.0068[1]	0.40[1]	68
RBS-SSED-12AM	10/21/13	Onsite drainage	<0.038[2]	4.4	0.0092	<0.19[2]	49
RBS-SSED-13AN	10/22/13	Onsite drainage just before drainage runs off Forest Service property	0.055[1]	13	0.03	<0.20[2]	52
Human Health Criteria and COC Determination							
		RSL for Industrial Soil[3]	800	800	310	5,100	310,000
		COC for Human Health?	No	No	No	No	No
Ecological Criteria and COC Determination							
		NOAA Freshwater Sediment TEL[4]	0.596	35	0.174	NA	123
		COC for Ecological Receptors?	No	No	No	No	No

Notes:

All samples analyzed by EPA Method 6010B and 7471A.

1 = Concentration is an estimate.

2 = Concentration is an estimate and was not detected greater than the method detection limit.

3 = EPA, 2013a. "Regional Screening Levels (Formerly PRGs), Screening Levels for Chemical Contaminants." November. Available Online at <http://www.epa.gov/region09/superfund/prg/index.html>.

4 = Buchman, M.F., 2008. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, 34 pages.

EPA = U.S. Environmental Protection Agency

COC = chemical of concern

mg/kg = milligrams per kilogram

NOAA = National Oceanic and Atmospheric Administration

RSL = regional screening level

TEL = threshold effects level

< = not detected at concentration less than method detection limit

Table 9. Risk Screening Results for TCDD TEQ in Sediment Samples

Sample ID No.	Date Collected	Description	TCDD TEQ[1] (Total Mammals/Human)	TCDD TEQ[1] (Total Fish)	TCDD TEQ[1] (Total Avian)
RBS-SSED-09AJ	10/21/13	Onsite drainage	0.098	0.014	0.014
RBS-SSED-12AM	10/21/13	Onsite drainage	0.010	0.0034	0.0034
RBS-SSED-13AN	10/22/13	Onsite drainage just before drainage runs off Forest Service property	0.010	0.015	0.015
Human Health Criteria and COC Determination					
		RSL for Industrial Soil[2]	18	NA	NA
		COC for Human Health?	No	NA	NA
Ecological Criteria and COC Determination					
		NOAA Freshwater Sediment TEL[3]	0.85	0.85	0.85
		COC for Ecological Receptors?	No	No	No

Notes:

All values are shown in picograms per gram.

1 = Dioxins and furans are expressed as a TEQ (TCDD equivalent concentration), which is estimated by multiplying the measured dioxin or furan congener concentration by its TEF, and the converted values are added to derive a TEQ for the sample. The World Health Organization's TEF values were used to calculate the TEQ (Van den Berg, M., and others, 2006. "The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds." *Toxicological Sciences.* Volume 93, No. 2. Pages 223–241.). TEF values vary for different animal species because they involve potency to specific enzyme systems. The TEQ refers only to adverse effects after exposure to certain cellular enzyme systems.

2 = EPA, 2013. "Regional Screening Levels (Formerly PRGs), Screening Levels for Chemical Contaminants." May. Available Online at <http://www.epa.gov/region09/superfund/prg/index.html>.

3 = Buchman, M.F., 2008. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration, 34 pages.

COC = chemical of concern

EPA = U.S. Environmental Protection Agency

NA = not analyzed/not available

NOAA = National Oceanic Atmospheric Administration

RSL = regional screening level

TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin

TEF = toxic equivalency factor

TEL = threshold effects level

TEQ = toxicity equivalent quotient

Table 10. Preliminary Cleanup Levels for Soil

Source	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Zinc (mg/kg)	TCDD TEQ (pg/g)
Human Health Criteria												
EPA RSL for industrial soil [1]	41	2.4	190,000	800	1,500,000	30	41,000	800	10,000	5,100	310,000	18
Ecological Criteria												
Eco-SSL[2]	0.27	18	330	0.36	26	13	28	11	38	0.52	46	NA
EPA Region V ecological screening levels for soil (Mammals)[3]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.199
Background												
Background (Sample SS-3C)	<2.0	<3.9	130	<0.49	14	7.6	37	3.5	5.4	<2.0	17	NA
Background (Sample SS-4D)	<2.0	<4.0	170	<0.50	16	9.9	38	4.1	6.0	<2.0	22	NA

Notes:

1. EPA, 2013a. "Regional Screening Levels (Formerly PRGs), Screening Levels for Chemical Contaminants." November. Available Online at http://www.epa.gov/region09/superfund/prg.
2. EPA, 2013b. "Ecological Soil Screening Levels." Website accessed on October 25, 2013: <http://www.epa.gov/ecotox/ecossl/>.
3. EPA, 2003. EPA Region 5, RCRA Ecological Screening Levels" August 22. Available Online at <http://www.epa.gov/Region5/waste/cars/pdfs/ecological-screening-levels-200308.pdf>

Eco-SSL = ecological soil screening level
EPA = U.S. Environmental Protection Agency
mg/kg = milligrams per kilogram
NA = not available/not applicable
pg/p = picograms per gram
RSL = regional screening level
TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalency quotient
< indicates concentration was not detected above the reporting limit

Table 11. Potential Federal Chemical-Specific ARARs

Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
EPA Eco-SSLs and EPA Region V Ecological Screening Levels[a]				
Provides nonregulatory screening criteria for the protection of ecological receptors	Soil and waste material	Nonpromulgated guidance developed by EPA Office of Solid Waste and Emergency Response Directive 9285.7	To be considered	The (non-site-specific) Eco-SSLs and EPA Region V Ecological Screening Levels are appropriate as screening tools and initial cleanup goals if applicable.
EPA RSL[a]				
Provides nonregulatory screening criteria for the protection of human health.	Site Soil and waste	Nonpromulgated guidance developed by the EPA Superfund Program of the Pacific Southwest (Region 9)	To be considered	The (non-site-specific) RSLs are appropriate as site screening tools and initial cleanup goals if applicable.

Notes:

a = Statutes and policies are provided as headings to identify general categories of potential ARARs; only pertinent substantive requirements of the specific citations are considered potential ARARs.

ARARs = applicable or relevant and appropriate requirements

Eco-SSLs = ecological soil screening levels

EPA = U.S. Environmental Protection Agency

RSLs = regional screening levels

Table 12. Federal Location-Specific ARARs

Location	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Endangered Species Act of 1973[a]					
Habitat upon which endangered species or threatened species depend	Federal agencies may not jeopardize the continued existence of any listed species or cause the destruction or adverse modification of critical habitat.	Determination of effect upon endangered or threatened species or its habitat; critical habitat upon which endangered species or threatened species depend	16 USC § 1536(a),(h)(1)(B)	Applicable	The site contains habitat of several federally listed species (see Table 1 of EE/CA). Prior to any removal action, a biological evaluation may be required to determine the potential for adverse effects or harm to any listed species or the destruction or adverse modification of in-stream aquatic habitats along the Santa Ysabel Creek or within the site.
Archaeological and Historic Preservation Act[a]					
Federal lands	Establishes procedures to provide for preservation of historical and archeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.	Federal construction project or federally licensed activity or program	16 USC § 469–469(c)(1) 40 CFR § 6.301(c)	Relevant and appropriate	To date, no historical or archaeological resources have been identified at the site. Compliance with this act will be required if archaeological resources are identified. If any removal action would cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archaeological data, it will be necessary to follow the procedures in the statute to provide for data recovery and preservation activities.

Table 12. Federal Location-Specific ARARs *(continued)*

Location	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Archaeological Resources Protection Act of 1979, as Amended[a]					
Public lands	Prohibits unauthorized excavation, removal, damage, alteration, or defacement of archaeological resources located on public lands unless such action is conducted pursuant to a permit.	Archaeological resources on federal land	Public Law No. 96-95 16 USC § 470aa–470mm	Relevant and appropriate	To date, no archaeological resources have been identified at the site. Compliance with this act will be required if archaeological resources are identified. If any removal action would cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archaeological data, it will be necessary to follow the procedures in the statute to provide for data recovery and preservation activities.

Notes:

a = Statutes and policies are provided as headings to identify general categories of potential ARARs; only pertinent substantive requirements of the specific citations are considered potential ARARs.

ARAR = applicable or relevant and appropriate requirement

CFR = Code of Federal Regulations

EE/CA = engineering evaluation/cost analysis

USC = United States Code

§ = Section

Table 13. Federal Action-Specific ARARs

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Resource Conservation and Recovery Act (42 USC, ch. 82, §§ 6901 through 6991[i])[a]					
Waste Management	This requirement defines RCRA hazardous waste. Solid wastes are characterized as toxic based on the TCLP results if the wastes exceed the TCLP maximum concentrations.	Generator of waste	22 CCR, §§ 66261.24(a)(1), and 66261.100	Relevant and Appropriate	These regulations are applicable to activities that generate waste for offsite disposal. The selected remedy includes excavation and onsite disposal of soil and burn ash. The Forest Service will determine if excavated solid waste, soil, and sediment meet the definition of non-RCRA hazardous waste when it is generated.
Onsite generation of waste	Person who generates waste shall determine if the waste is a RCRA hazardous waste	Generator of waste	22 CCR §§ 66262.10 (a), 66262.11	Relevant and Appropriate	These regulations are applicable to any operation that generates waste for offsite disposal. The selected remedy will generate soil and burn ash to be disposed of on site. The Forest Service will decide whether the waste is RCRA hazardous waste when it is generated.
Onsite generation of waste	Requirements for analyzing waste for determining whether waste is hazardous	Generator of waste	22 CCR §§ 66264.13 (a)	Relevant and Appropriate	These regulations are applicable to any operation that generates waste for offsite disposal. The selected remedy will generate soil and burn ash to be disposed of on site. The Forest Service will decide whether the waste is RCRA hazardous waste when it is generated.

Table 13. Federal Action-Specific ARARs *(continued)*

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments
Clean Water Act, as Amended[a]					
Construction activities	Establishes the structure for regulating discharges of pollutants to waters of the United States and regulating quality standards for surface waters; establishes limitations, standards, and other permit conditions. SWRCB Order 99-08-DWQ, developed pursuant to these requirements sets forth requirements for all construction activity in the State of California)	Construction activities at least 1 acre in size	Clean Water Act 33 USC §1251 et seq. (1972) 40 CFR § 122.44(k)(2) and (4) (SWRCB Order 99-08-DWQ was adopted pursuant to this section)	Relevant and Appropriate	Applies to any alternative that will disturb more than 1 acre; compliance with the following substantive requirements of the State's General Permit (99-08-DWQ) is required: ▪ Develop and implement a Stormwater Pollution Prevention Plan specifying BMPs to protect stormwater ▪ Establish measures to eliminate non-storm discharges ▪ Specify BMP inspection requirements

Notes:

a = Statutes and policies are provided as headings to identify general categories of potential ARARs; only pertinent substantive requirements of the specific citations are considered potential ARARs.

ARAR = applicable or relevant and appropriate requirement
BMPs = best management practices
CCR = Code of California Regulations
CFR = Code of Federal Regulations
ch. = Chapter
Forest Service = U.S. Department of Agriculture Forest Service
RCRA = Resource Conservation and Recovery Act
SWRCB = State Water Resources Control Board
TBC = to be considered
TCLP = toxicity characteristic leaching procedure
USC = United States Code
§ = Section

Table 14. State Action-Specific ARARs

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments and Compliance Measures
Department of Toxic Substances Control / State Water Resources Control Board / California Department of Resources Recycling and Recovery					
Waste management	Definition of non-RCRA hazardous waste	Waste	CCR, tit. 22, §§ 66261.22(a)(3) and (a)(4), 66261.24(a)(2)-(a)(8), 66261.101, 66261.3(a)(2)(C) and (a)(2)(F)	Relevant and Appropriate	These regulations are applicable to activities that generate waste for disposal off site. The selected remedy includes excavation and onsite disposal of soil and burn ash. The Forest Service will determine if excavated soil or burn ash meets the definition of non-RCRA hazardous waste when it is generated.
Waste management	Definition of designated waste and nonhazardous waste; thresholds to determine if a waste is considered hazardous	Transportation and disposal of waste	22 CCR § 66261.24(a)(1); 27 CCR §§ 20210 and 20220	Relevant and Appropriate	Criteria to determine if a material is a hazardous waste. Regulations include soluble threshold limit concentration and total threshold limit concentration analytical procedures. The substantive provisions are applicable if the response action includes the off-Site transportation of all hazardous remediation wastes and materials generated.
Waste management	Describes standards applicable to transporters of hazardous waste	Transportation and disposal of waste	22 CCR § 66263.10 to 66263.32	Relevant and appropriate	Includes compliance with the manifest system and recordkeeping, as well as instructions for handling discharges during transport. The substantive provisions are applicable if the response action includes the offsite transportation of all hazardous remediation wastes and materials generated.

Table 14. State Action-Specific ARARs *(continued)*

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments and Compliance Measures
Department of Toxic Substances Control / State Water Resources Control Board / California Department of Resources Recycling and Recovery					
Waste management	Land disposal restrictions establishing specific treatment standards of hazardous waste prior to disposal to land	Generation of waste	22 CCR § 66273.50 and § 66273.56	Relevant and appropriate	The substantive provisions are applicable if the response action includes the offsite transportation of all hazardous remediation wastes and materials generated.
Waste management	Identifies requirements for land use covenants, including land use control on property owned by federal government	Generation of waste	22 CCR §67391.1(f)	Relevant and appropriate	When it is not feasible to record a land use covenant for property owned by the federal government, other mechanisms may be used to ensure that future land use will be compatible with the levels of hazardous materials, hazardous wastes or constituents, or hazardous substances that remain on the property.
Establishing and onsite landfill	General standards for the onsite consolidation of contaminated soil and debris	Onsite encapsulation of waste material	40 CFR § 264.552 (e)(3)(i)	Applicable	The design must include the following: ▪ The upper component must consist of a minimum 30-mil flexible membrane liner ▪ The lower component must consist of at least a 2-foot layer of compacted soil with a hydraulic conductivity of no more than $1x10^{-7}$ centimeters per second

Table 14. State Action-Specific ARARs *(continued)*

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments and Compliance Measures
Department of Toxic Substances Control / State Water Resources Control Board / California Department of Resources Recycling and Recovery					
Establishing an onsite landfill for the waste material	Final grading, slope stability, and drainage and erosion control requirements	Onsite encapsulation of waste material	40 CFR §264.552 (e)(6)(iv)	Applicable	Closure and postclosure maintenance requirements: ▪ Provide long-term minimization of migration of liquids through the closed unit ▪ Function with minimum maintenance ▪ Promote drainage and minimize erosion or abrasion of the cover ▪ Accommodate settling and subsidence so that the cover's integrity is maintained ▪ Have a permeability less than or equal to the permeability of any bottom liner system's natural subsoil
Establishing an on-site landfill for the waste material	Final cover requirements of the State Water Resources Control Board, including a prescriptive multilayer cap design.	On-site encapsulation of waste material	27 CCR, § 21090	Applicable	The design must include: ▪ A dense 2-foot foundation layer ▪ A low hydraulic conductivity layer (with a conductivity 1 foot per year or less) ▪ An erosion-resistant layer that is: ▪ not less than 1 foot thick ▪ free of waste (including leachate) ▪ placed above the low hydraulic conductivity layer ▪ capable of sustaining native, or other suitable plant growth ▪ resistant to erosion ▪ Final Cover Slope < 1 ¾ to 1 (H:V)

Table 14. State Action-Specific ARARs *(continued)*

Action	Requirement	Prerequisite	Citation	Preliminary ARAR Determination	Comments and Compliance Measures
Department of Toxic Substances Control / State Water Resources Control Board / California Department of Resources Recycling and Recovery					
Establishing an on-site landfill for the waste material	Construction and containment requirements of the State Water Resources Control Board.	On-site encapsulation of waste material	27 CCR, §§ 20310 and 20320	Applicable	General construction and containment criteria, which include the following: ▪ Design will prevent migration of wastes from the landfill to adjacent geologic materials, groundwater, or surface water ▪ Design will meet seismic design criteria (to withstand the maximum credible earthquake without damage) ▪ The containment structures will be designed and certified by a registered civil engineer or a certified engineering geologist ▪ A stability analysis will be performed in accordance with 27 CCR, §21750(f)(5) ▪ The materials used will have appropriate chemical and physical properties to ensure that the containment structures do not fail
Establishing an on-site landfill for the waste material	Final grading, slope stability, and drainage and erosion control requirements	On-site encapsulation of waste material	27 CCR §§ 21142, 21145, and 21150	Applicable	Closure and postclosure maintenance requirements: ▪ Function with minimum maintenance ▪ Provide waste containment to protect public health and safety ▪ Achieve compatibility with postclosure land use ▪ Provide equivalent protection from wind and surface water soil erosion with an erosion layer that contains a minimum of 6 inches of earthen material capable of sustaining native plant growth

Table 14. State Action-Specific ARARs *(continued)*

Notes:

a = Statutes and policies are provided as headings to identify general categories of potential ARARs; only pertinent substantive requirements of the specific citations are considered potential ARARs.

ARAR = applicable or relevant and appropriate requirement

CCR = California Code of Regulations

CFR = Code of Federal Regulations

Forest Service = U.S. Department of Agriculture Forest Service

RCRA = Resource Conservation and Recovery Act

§ = Section

Table 15. Summary of Response Action Screening

Response Action	Technology and Process	Description	Screening Summary
1. No Action	None	None	Retained; required by CERCLA
2. Engineering Controls	▪ Soil cap ▪ Encapsulation with an impermeable multilayer cap	▪ Excavate or consolidate source material for placement in onsite encapsulation unit ▪ Construct soil cap over encapsulation unit ▪ Encapsulate waste with an impermeable multilayer cap	Retained because: ▪ Protective of human health and the environment and meets RAOs ▪ Effective, easily implementable ▪ Reduces future risk of erosion into surface water pathway
3. Offsite Disposal	▪ Remove source materials for disposal off site	▪ Excavate contaminated soil and burn ash ▪ Load soil and burn ash into dump trucks and transport to an off-Site disposal facility	Retained because: ▪ Protective of human health and the environment and meets RAOs ▪ Effective, easily implementable ▪ Eliminates future risk of erosion into surface water pathway

Notes:

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

RAOs = remedial action objectives

Table 16. Comparative Analysis of Removal Action Alternatives

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Cap Contaminated Soil and Burn Ash in Place	Alternative 3 Consolidate and Cap Contaminated Soil and Burn Ash in Place	Alternative 4 Excavation and Offsite Disposal of Contaminated Soil and Burn Ash
Effectiveness	**Qualitative Ranking**			
Protection of Human Health and Environment	No	Yes	Yes	Yes
Compliance with ARARs	NA	Yes	Yes	Yes
Long-Term Effectiveness	Low	High	High	High
Short-Term Effectiveness	Low	High	High	High
Achieve RAOs	No	Yes	Yes	Yes
Reduction of Toxicity, Mobility, and Volume through Treatment	Low	Low	Low	Low
Implementability	**Qualitative Ranking**			
Technical Feasibility	High	High	High	Moderate
Administrative Feasibility	High	High	High	High
Availability of Services or Materials	NA	High	High	High
Cost				
Period of Analysis (Years)	30	30	30	30
Estimated Capital Cost	$0	$1,752,807	$1,662,276	$9,552,088
Estimated Total O&M/Periodic Cost	$0	$759,587	$759,587	$25,320
Estimated Total Cost	$0	$2,512,394	$2,421,862	$9,577,408
Estimated Total Present Value of Alternative	$0	$2,756,164	$2,665,632	$9,577,132
EE/CA Range (-30% / +50%)	$0	$1,929,315 — $4,134,246	$1,865,943 — $3,998,448	$6,703,993 — $14,365,698

Notes:

ARARs = applicable or relevant and appropriate requirements O&M = Operation and Maintenance RAO = removal action objective

Appendix A. Photographic Log

Photograph A-1: View of site facing northwest. Note vegetation-free berm in the background. Wire fence is in foreground. Southern property boundary indicated by yellow signs beyond fence.

Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California

Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Photograph A-2: View east of site along south Forest Service property line.

Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California

Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Photograph A-3: View north along the western Forest Service property boundary.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California

Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Photograph A-4: View east of berm at the north boundary of the Ramona Burn Dump and sandbags and erosion rutting.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California

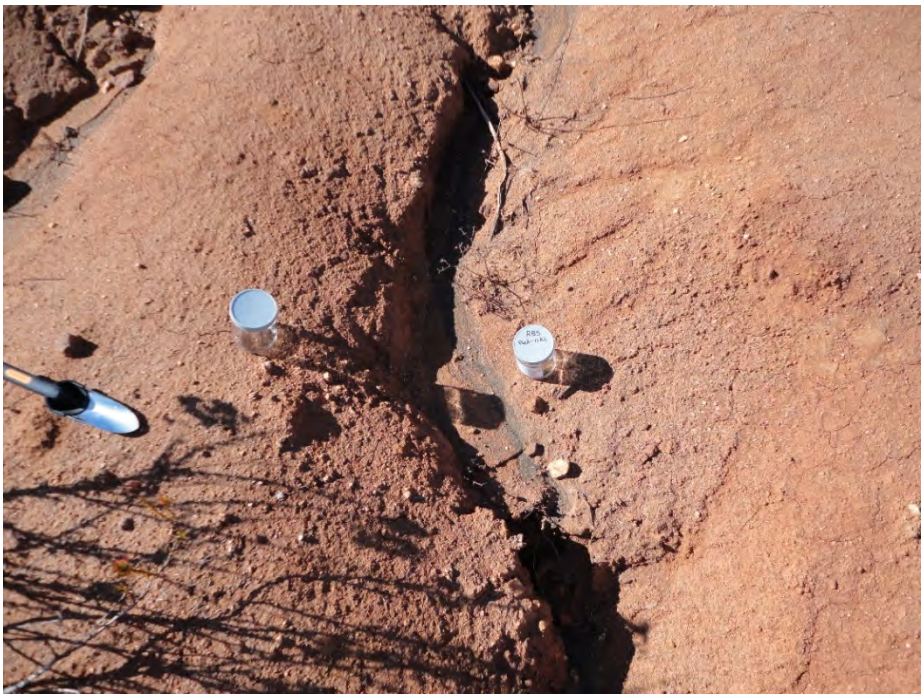
Photographed by: Annica Nord (ERRG) Date: October 21, 2013

Photograph A-5: View southeast of Site from headwall of erosion scarp.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California

Photographed by: Annica Nord (ERRG) Date: October 21, 2013

Photograph A-6: View northwest of headwall of erosion scarp and rutting from surface water flow downslope towards burn dump.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California

Photographed by: Annica Nord (ERRG) Date: October 21, 2013

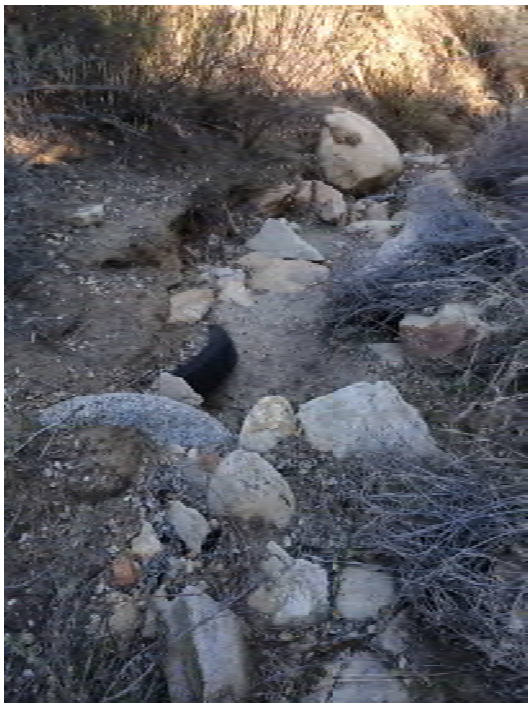


Photograph A-7: View of sample location RBS-SSed-11AL.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 21, 2013

Photograph A-8: View southeast of berm along north side of Ramona Burn Dump.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 21, 2013

Photograph A-9: Sample location RBS-SSed-09AJ.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 21, 2013

Photograph A-10: Sample location RBS-SSed-12AM.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 21, 2013



Photograph A-11: Debris in drainage.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Photograph A-12: Sample location RBS-SSed-13AN.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Photograph A-13: View west of culvert installed south of Forest Service property boundary.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Photograph A-14: View north. Culvert empties onto Dump Road, away from former Burn Dump Site.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Photograph A-15: View concentrated surface debris.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Photograph A-16: View west of drainage area and vegetation along the south property boundary.
Engineering Evaluation/Cost Analysis, Cleveland National Forest, Ramona, California
Photographed by: Annica Nord (ERRG) Date: October 22, 2013

Appendix B. Field Activity Logs

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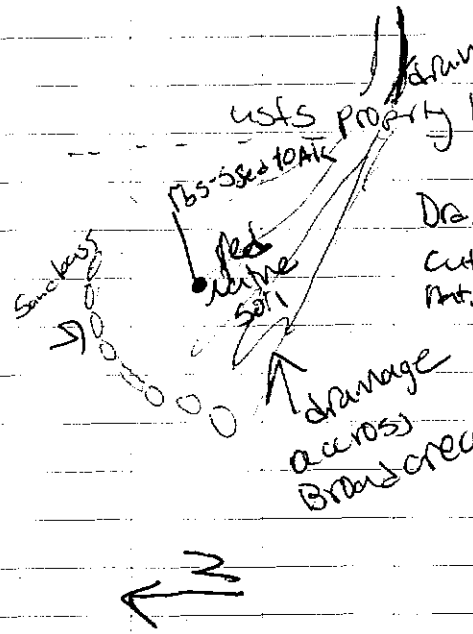
Location Ramona Burn Dump Date 10/21/13

Project / Client USFS Cleveland National forest

A. Nord

Photo #	Time		
1	1234	W	concrete culvert + allied waste fence
2	1234	E	concrete + metal culvert
3	1236	W	culvert Y from Landfill
4	1256	down	sample RBS-SSed-09AK
5	1327	down	observe no evidence of surface debris.
6	1429	N	mapped drainage - ruddy soil not fill & plants
7	1429	NW	actual drainage - mapped 10/22
8	1437	NW	drainage in native
9	1437	NW	glass upgradient of RBS
10	1437	down	sample RBS-SSed-10AK



Location Ramona Burn Dump Date 10/21/13

Project / Client USFS Cleveland National forest

A. Nord JS. Carruthers-Knight Scale

1000 ~~After~~ Checking in at Arrive at Allied Waste office to check in with Thurston (Allied waste) He will be here until 3 and at another site tomorrow. We will check back with him at 2.

Walk southernmost drainage (Drainage 1)

1256 Collect sediment sample RBS-SSed-09AK No surface water observed. Sample stakes still in place at PHS, PH4 TR-5

Upgradient of the site (NW) west of forest service property boundary is red ruddy soil that appears to be native just downstream (SE) of sandbags. South adjacent see photos see one piece of glass Debris may have previously washed away but the ~~sed~~ sediment sample RBS-SSed-10AK is a background in apparent native, clean material (1437) sediment is fine grain sand and silt.

Location Ramona BurnDump Date 10/21/13

Project / Client USFS Cleveland National Forest

A.Nord/S.Caruthers-Knight

11	1456	SE	sandbag berm along N side of RBS
12	1456	S	view along W property boundary
13	1501	dawn	sample RBS-SSed-11AL
14	1517	dawn	sample RBS-SSed-12AM
15	1525	SE	4ft wide berm

Location Ramona BurnDump Date 10/21/13

Project / Client USFS Cleveland National Forest

A.Nord/S.Caruthers-Knight Scale

Drainage appears to begin at the sandbag line. No gulley or rudding is evident above this sandbag.

1456 Majority of the site is vegetated. NW corner has little to no vegetation w rutting from surface run off. N area of RBS has little vegetation (sparse)

1501 collect upgradient (background) sediment sample RBS-SSed-11AL. Fine grain Sand and Silt, red. No evidence of surface water sediment is dry

1517 collect sediment sample RBS-SSed-12AM after clearing brush from 6 inch deep gulley sediment is moist, brown, black, sand 90%, 10% fine

1525 Approximately 4 ft wide berm previously mapped as "manmade". No vegetation on 1 ft wide ridge along NE border of burnwaste

There appears to be more vegetation than what was evident in the PA/SI photos. There are still a couple bare/thin vegetation spots with the RBS area.

1548 SCK and AN offsite. Thurston was offsite at 1450 and left us a key to lock up + gain access tomorrow when he is not on site.

Location Ramona Burn Dump Date 10/22/13

Project / Client USFS Cleveland

AN / SCK

16	720	W	bare spot along S boundary
17	724	W	drainage full of vegetation + new culvert along S property boundary
18	736	down	debris in drainage channel
19	739	NE	debris in drainage at location at east end of area marked on map as containing debris
20+21	746	down	debris in drainage
22	751	down	debris in drainage
23	758	S/down	debris in drainage wall
24	758	east	drainage flows off USFS land
25	803	down	sample RBS-SSed-13AN
26	812	down	debris in grand Ramo
27	822	E	drainage flows under Rd
28	826	down	sample RBS-SSed-14AO
29	835	E.	E of Ramo Rd culvert drainage
30	842	N	drainage S of USFS boundary
31+32	844	N	lack of vegetation on slope
33	848	N	S end of culvert opens to rd
34	848	E	culvert drains onto Dump Rd
35	848	E	Culvert
36	910	E	View of property from SW

Location Ramona Burn Dump Date 10/22/13

Project / Client USFS Cleveland

A Nord / S. Carruthers-Knight Scale

700 AN & SCK arrive on site. Conduct H&S meeting.

710 Begin marking USFS boundary flags along south property boundary.

720 Note just east of new culvert vegetation is sparse. ~~Potential~~ possible area of site work.

At GPS pt 35 fence diverges S of USFS boundary markers.

736 Just downstream (E) of confluence, drainage channel is approx 3ft deep, filled with brush and trash/debris fire

739 Visible waste in drainage (tires) at location where map marks no waste.

803 Debris still evident in drainage but since drainage flows off USFS property, collect sample RBS-SSed-13AN on USFS land just before flowing off property. No evidence of surface water. Brown, dry, fine to crs sand, trace fines.

812 Downstream of my sample a tire is buried. photo 26.

822 Debris still evident in drainage to Ramo Road where drainage runs into culvert under road. (South of USFS land)

826 Sample sediment RBS-SSed-14AO just west of Ramo Rd. Moist, med to crs gravel sand. Brown. No evidence of debris sampled at location

Location Ramona Burn Dump Date 10/22/13

Project / Client USFS Cleveland

A. Nord / S. Caruthers-Knight

37	910	N	W property boundary (from SW)
38	917	E	TR-1 + bare spot (W of USFS)
39	917	down	fire west of USFS land
40	920	SE	NW corner of RBD + drainage
41+42	921	E	vegetation free drainage in NW
43	926	E	View of N edge of RBS
44+45	927	N	beginning of NW drainage
46	935	NE	drainage w sandbags inside S of ridge
47	938	E	drainage S of ridge
48	940	down/N	ponding area
49	944	E	vegetation free area
50	918	down	concentrated waste
51	956	E	drainage along S boundary
52	956	W	drainage along S boundary
53	1000	W	west of site. from SW corner of RBS

Location Ramona Burn Dump Date 10/22/13

Project / Client USFS Cleveland

A. Nord / S. Caruthers-Knight Scale

910 Drainage from W coming onto USFS property contains glass fragments

914 By TR2 waste evident on USFS land but not west of property, farther N, debris observed west of USFS boundary

926 Highest point within area of RBD is the NW corner with bare vegetation-free slope w/ sandbags to stop erosion + rudding. This slope continues along the N of RBD as a berm + appears to be red native soil from the site. The majority of the site is generally flat with a gentle slope towards the SE where drainage runs off USFS land into a culvert under Ramo Rd and joins a much larger drainage on the E side of Ramo Rd. The majority of the site is vegetated with brush with a few bare spots including the ridge along the north, drainage just below (south) of the ridge and a bare spot to the N of the southwest USFS property line.

940 Ponding of water appears to occur where E-W sandbags stop + continue south 10 ft + continue E-W photo 48

948 Photo of concentrated waste (by #48)

956 Areas of concentrated debris were accurately mapped during the PASI + are free of vegetation. Area along the south that is mapped as free of vegetation. Is currently vegetated

Location _____ Date _____

Project / Client _____

Location Ramona Burn Dump Date 10/22/13

Project / Client USFS Cleveland

A. Nord / S. Carothers-Knight Scale

except along the drainage.
Surface water flows over the bare slope in the NW corner & joins the drainage marked on the map.

1015 AN & SCK left site.

Appendix C. Laboratory Analytical Report

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

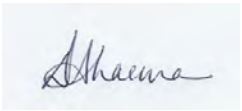
ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-53263-1
Client Project/Site: Ramona Burn Dump
Revision: 1

For:
Engineering Remediation Resources Group.
616 First Avenue
Suite 300
Seattle, Washington 98104

Attn: Annica Nord



Authorized for release by:
11/1/2013 3:45:22 PM

Dimple Sharma, Project Manager I
(925)484-1919
dimple.sharma@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Job ID: 720-53263-1

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-53263-1

Comments
No additional comments.

Receipt
The samples were received on 10/23/2013 10:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.0° C.

Metals
No analytical or quality issues were noted.

Detection Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Client Sample ID: RBS-SSED-09AJ — Lab Sample ID: 720-53263-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.75	J B	1.7	0.29	mg/Kg	4		6010B	Total/NA
Arsenic	1.6	J	3.4	0.29	mg/Kg	4		6010B	Total/NA
Barium	63		1.7	0.24	mg/Kg	4		6010B	Total/NA
Cadmium	0.054	J	0.43	0.043	mg/Kg	4		6010B	Total/NA
Chromium	52		1.7	0.18	mg/Kg	4		6010B	Total/NA
Cobalt	5.9		0.69	0.069	mg/Kg	4		6010B	Total/NA
Copper	31		5.2	2.5	mg/Kg	4		6010B	Total/NA
Lead	16		1.7	0.36	mg/Kg	4		6010B	Total/NA
Molybdenum	0.40	J	1.7	0.22	mg/Kg	4		6010B	Total/NA
Nickel	5.7		1.7	0.18	mg/Kg	4		6010B	Total/NA
Selenium	2.4	J	3.4	0.52	mg/Kg	4		6010B	Total/NA
Thallium	2.8		1.7	0.50	mg/Kg	4		6010B	Total/NA
Vanadium	230		1.7	0.23	mg/Kg	4		6010B	Total/NA
Zinc	68		5.2	2.2	mg/Kg	4		6010B	Total/NA
Mercury	0.0068	J	0.0083	0.0021	mg/Kg	1		7471A	Total/NA

Client Sample ID: RBS-SSED-11AL — Lab Sample ID: 720-53263-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.51	J B	1.7	0.28	mg/Kg	4		6010B	Total/NA
Arsenic	1.0	J	3.4	0.29	mg/Kg	4		6010B	Total/NA
Barium	80		1.7	0.24	mg/Kg	4		6010B	Total/NA
Chromium	69		1.7	0.18	mg/Kg	4		6010B	Total/NA
Cobalt	7.9		0.67	0.067	mg/Kg	4		6010B	Total/NA
Copper	26		5.0	2.4	mg/Kg	4		6010B	Total/NA
Lead	2.3		1.7	0.35	mg/Kg	4		6010B	Total/NA
Nickel	4.2		1.7	0.17	mg/Kg	4		6010B	Total/NA
Selenium	1.1	J	3.4	0.50	mg/Kg	4		6010B	Total/NA
Thallium	2.6		1.7	0.49	mg/Kg	4		6010B	Total/NA
Vanadium	240		1.7	0.23	mg/Kg	4		6010B	Total/NA
Zinc	15		5.0	2.1	mg/Kg	4		6010B	Total/NA
Mercury	0.0064	J	0.0091	0.0023	mg/Kg	1		7471A	Total/NA

Client Sample ID: RBS-SSED-12AM — Lab Sample ID: 720-53263-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	1.0	J B	1.5	0.25	mg/Kg	4		6010B	Total/NA
Arsenic	0.82	J	3.0	0.26	mg/Kg	4		6010B	Total/NA
Barium	96		1.5	0.22	mg/Kg	4		6010B	Total/NA
Chromium	14		1.5	0.16	mg/Kg	4		6010B	Total/NA
Cobalt	9.3		0.61	0.061	mg/Kg	4		6010B	Total/NA
Copper	31		4.5	2.2	mg/Kg	4		6010B	Total/NA
Lead	4.4		1.5	0.32	mg/Kg	4		6010B	Total/NA
Nickel	4.2		1.5	0.15	mg/Kg	4		6010B	Total/NA
Thallium	1.0	J	1.5	0.44	mg/Kg	4		6010B	Total/NA
Vanadium	60		1.5	0.21	mg/Kg	4		6010B	Total/NA
Zinc	49		4.5	1.9	mg/Kg	4		6010B	Total/NA
Mercury	0.0092		0.0092	0.0023	mg/Kg	1		7471A	Total/NA

Client Sample ID: RBS-SSED-13AN — Lab Sample ID: 720-53263-5

This Detection Summary does not include radiochemical test results.

TestAmerica Pleasanton

Client Sample ID: RBS-SSED-13AN (Continued)

Lab Sample ID: 720-53263-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.85	J B	1.6	0.26	mg/Kg	4		6010B	Total/NA
Arsenic	1.2	J	3.1	0.27	mg/Kg	4		6010B	Total/NA
Barium	83		1.6	0.22	mg/Kg	4		6010B	Total/NA
Cadmium	0.055	J	0.39	0.039	mg/Kg	4		6010B	Total/NA
Chromium	15		1.6	0.17	mg/Kg	4		6010B	Total/NA
Cobalt	6.2		0.63	0.063	mg/Kg	4		6010B	Total/NA
Copper	26		4.7	2.2	mg/Kg	4		6010B	Total/NA
Lead	13		1.6	0.33	mg/Kg	4		6010B	Total/NA
Nickel	3.2		1.6	0.16	mg/Kg	4		6010B	Total/NA
Thallium	1.1	J	1.6	0.46	mg/Kg	4		6010B	Total/NA
Vanadium	78		1.6	0.21	mg/Kg	4		6010B	Total/NA
Zinc	52		4.7	2.0	mg/Kg	4		6010B	Total/NA
Mercury	0.030		0.0087	0.0022	mg/Kg	1		7471A	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Client Sample ID: RBS-SSED-09AJ
Date Collected: 10/21/13 12:56
Date Received: 10/23/13 10:30

Lab Sample ID: 720-53263-1
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.75	J B	1.7	0.29	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Arsenic	1.6	J	3.4	0.29	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Barium	63		1.7	0.24	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Beryllium	ND		0.34	0.11	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Cadmium	0.054	J	0.43	0.043	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Chromium	52		1.7	0.18	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Cobalt	5.9		0.69	0.069	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Copper	31		5.2	2.5	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Lead	16		1.7	0.36	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Molybdenum	0.40	J	1.7	0.22	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Nickel	5.7		1.7	0.18	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Selenium	2.4	J	3.4	0.52	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Silver	ND		0.86	0.17	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Thallium	2.8		1.7	0.50	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Vanadium	230		1.7	0.23	mg/Kg		10/25/13 21:33	10/27/13 13:11	4
Zinc	68		5.2	2.2	mg/Kg		10/25/13 21:33	10/27/13 13:11	4

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0068	J	0.0083	0.0021	mg/Kg		10/25/13 22:15	10/28/13 12:40	1

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Client Sample ID: RBS-SSED-11AL
Date Collected: 10/21/13 15:01
Date Received: 10/23/13 10:30

Lab Sample ID: 720-53263-3
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.51	J B	1.7	0.28	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Arsenic	1.0	J	3.4	0.29	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Barium	80		1.7	0.24	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Beryllium	ND		0.34	0.11	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Cadmium	ND		0.42	0.042	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Chromium	69		1.7	0.18	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Cobalt	7.9		0.67	0.067	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Copper	26		5.0	2.4	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Lead	2.3		1.7	0.35	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Molybdenum	ND		1.7	0.22	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Nickel	4.2		1.7	0.17	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Selenium	1.1	J	3.4	0.50	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Silver	ND		0.84	0.17	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Thallium	2.6		1.7	0.49	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Vanadium	240		1.7	0.23	mg/Kg		10/25/13 21:33	10/27/13 13:15	4
Zinc	15		5.0	2.1	mg/Kg		10/25/13 21:33	10/27/13 13:15	4

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0064	J	0.0091	0.0023	mg/Kg		10/25/13 22:15	10/28/13 12:43	1

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Client Sample ID: RBS-SSED-12AM
Date Collected: 10/21/13 15:17
Date Received: 10/23/13 10:30

Lab Sample ID: 720-53263-4
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	1.0	J B	1.5	0.25	mg/Kg		10/25/13 21:33	10/28/13 19:32	4
Arsenic	0.82	J	3.0	0.26	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Barium	96		1.5	0.22	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Beryllium	ND		0.30	0.098	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Cadmium	ND		0.38	0.038	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Chromium	14		1.5	0.16	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Cobalt	9.3		0.61	0.061	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Copper	31		4.5	2.2	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Lead	4.4		1.5	0.32	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Molybdenum	ND		1.5	0.19	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Nickel	4.2		1.5	0.15	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Selenium	ND		3.0	0.45	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Silver	ND		0.76	0.15	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Thallium	1.0	J	1.5	0.44	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Vanadium	60		1.5	0.21	mg/Kg		10/25/13 21:33	10/27/13 13:19	4
Zinc	49		4.5	1.9	mg/Kg		10/25/13 21:33	10/27/13 13:19	4

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0092		0.0092	0.0023	mg/Kg		10/25/13 22:15	10/28/13 12:45	1

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Client Sample ID: RBS-SSED-13AN
Date Collected: 10/22/13 08:03
Date Received: 10/23/13 10:30

Lab Sample ID: 720-53263-5
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.85	J B	1.6	0.26	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Arsenic	1.2	J	3.1	0.27	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Barium	83		1.6	0.22	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Beryllium	ND		0.31	0.10	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Cadmium	0.055	J	0.39	0.039	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Chromium	15		1.6	0.17	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Cobalt	6.2		0.63	0.063	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Copper	26		4.7	2.2	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Lead	13		1.6	0.33	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Molybdenum	ND		1.6	0.20	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Nickel	3.2		1.6	0.16	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Selenium	ND		3.1	0.47	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Silver	ND		0.79	0.16	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Thallium	1.1	J	1.6	0.46	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Vanadium	78		1.6	0.21	mg/Kg		10/25/13 21:33	10/27/13 13:24	4
Zinc	52		4.7	2.0	mg/Kg		10/25/13 21:33	10/27/13 13:24	4

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.030		0.0087	0.0022	mg/Kg		10/25/13 22:15	10/28/13 12:47	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-147101/1-A
Matrix: Solid
Analysis Batch: 147154

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147101

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0871	J	0.50	0.083	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Arsenic	ND		1.0	0.085	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Barium	ND		0.50	0.071	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Beryllium	ND		0.10	0.033	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Cadmium	ND		0.13	0.012	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Chromium	ND		0.50	0.053	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Cobalt	ND		0.20	0.020	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Copper	ND		1.5	0.71	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Lead	ND		0.50	0.11	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Molybdenum	ND		0.50	0.064	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Nickel	ND		0.50	0.051	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Selenium	ND		1.0	0.15	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Silver	ND		0.25	0.051	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Thallium	ND		0.50	0.15	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Vanadium	ND		0.50	0.068	mg/Kg		10/25/13 21:33	10/27/13 11:25	1
Zinc	ND		1.5	0.64	mg/Kg		10/25/13 21:33	10/27/13 11:25	1

Lab Sample ID: LCS 720-147101/2-A
Matrix: Solid
Analysis Batch: 147154

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147101

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	46.8		mg/Kg		94	80 - 120
Arsenic	50.0	48.6		mg/Kg		97	80 - 120
Barium	50.0	48.3		mg/Kg		97	80 - 120
Beryllium	50.0	49.5		mg/Kg		99	80 - 120
Cadmium	50.0	47.6		mg/Kg		95	80 - 120
Chromium	50.0	51.3		mg/Kg		103	80 - 120
Cobalt	50.0	49.3		mg/Kg		99	80 - 120
Copper	50.0	51.0		mg/Kg		102	80 - 120
Lead	50.0	50.4		mg/Kg		101	80 - 120
Molybdenum	50.0	50.7		mg/Kg		101	80 - 120
Nickel	50.0	51.4		mg/Kg		103	80 - 120
Selenium	50.0	47.6		mg/Kg		95	80 - 120
Silver	25.0	24.0		mg/Kg		96	80 - 120
Thallium	50.0	51.0		mg/Kg		102	80 - 120
Vanadium	50.0	48.3		mg/Kg		97	80 - 120
Zinc	50.0	48.7		mg/Kg		97	80 - 120

Lab Sample ID: LCSD 720-147101/3-A
Matrix: Solid
Analysis Batch: 147154

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147101

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	50.0	48.1		mg/Kg		96	80 - 120	3	20
Arsenic	50.0	49.6		mg/Kg		99	80 - 120	2	20
Barium	50.0	49.2		mg/Kg		98	80 - 120	2	20
Beryllium	50.0	50.4		mg/Kg		101	80 - 120	2	20

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCSD 720-147101/3-A
Matrix: Solid
Analysis Batch: 147154

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147101

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium			50.0	48.7		mg/Kg		97	80 - 120	2	20
Chromium			50.0	52.0		mg/Kg		104	80 - 120	1	20
Cobalt			50.0	50.5		mg/Kg		101	80 - 120	2	20
Copper			50.0	52.2		mg/Kg		104	80 - 120	2	20
Lead			50.0	51.5		mg/Kg		103	80 - 120	2	20
Molybdenum			50.0	51.9		mg/Kg		104	80 - 120	2	20
Nickel			50.0	52.5		mg/Kg		105	80 - 120	2	20
Selenium			50.0	48.8		mg/Kg		98	80 - 120	2	20
Silver			25.0	24.8		mg/Kg		99	80 - 120	3	20
Thallium			50.0	52.0		mg/Kg		104	80 - 120	2	20
Vanadium			50.0	49.3		mg/Kg		99	80 - 120	2	20
Zinc			50.0	49.8		mg/Kg		100	80 - 120	2	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 720-147104/1-A
Matrix: Solid
Analysis Batch: 147173

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 147104

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.010	0.0025	mg/Kg		10/25/13 22:15	10/28/13 12:01	1

Lab Sample ID: LCS 720-147104/2-A
Matrix: Solid
Analysis Batch: 147173

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 147104

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury			0.833	0.850		mg/Kg		102	80 - 120

Lab Sample ID: LCSD 720-147104/3-A
Matrix: Solid
Analysis Batch: 147173

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 147104

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury			0.833	0.850		mg/Kg		102	80 - 120	0	20

Metals

Prep Batch: 147101

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-53263-1	RBS-SSED-09AJ	Total/NA	Solid	3050B	
720-53263-3	RBS-SSED-11AL	Total/NA	Solid	3050B	
720-53263-4	RBS-SSED-12AM	Total/NA	Solid	3050B	
720-53263-5	RBS-SSED-13AN	Total/NA	Solid	3050B	
LCS 720-147101/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 720-147101/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
MB 720-147101/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 147104

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-53263-1	RBS-SSED-09AJ	Total/NA	Solid	7471A	
720-53263-3	RBS-SSED-11AL	Total/NA	Solid	7471A	
720-53263-4	RBS-SSED-12AM	Total/NA	Solid	7471A	
720-53263-5	RBS-SSED-13AN	Total/NA	Solid	7471A	
LCS 720-147104/2-A	Lab Control Sample	Total/NA	Solid	7471A	
LCSD 720-147104/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	
MB 720-147104/1-A	Method Blank	Total/NA	Solid	7471A	

Analysis Batch: 147154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-53263-1	RBS-SSED-09AJ	Total/NA	Solid	6010B	147101
720-53263-3	RBS-SSED-11AL	Total/NA	Solid	6010B	147101
720-53263-4	RBS-SSED-12AM	Total/NA	Solid	6010B	147101
720-53263-5	RBS-SSED-13AN	Total/NA	Solid	6010B	147101
LCS 720-147101/2-A	Lab Control Sample	Total/NA	Solid	6010B	147101
LCSD 720-147101/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	147101
MB 720-147101/1-A	Method Blank	Total/NA	Solid	6010B	147101

Analysis Batch: 147173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-53263-1	RBS-SSED-09AJ	Total/NA	Solid	7471A	147104
720-53263-3	RBS-SSED-11AL	Total/NA	Solid	7471A	147104
720-53263-4	RBS-SSED-12AM	Total/NA	Solid	7471A	147104
720-53263-5	RBS-SSED-13AN	Total/NA	Solid	7471A	147104
LCS 720-147104/2-A	Lab Control Sample	Total/NA	Solid	7471A	147104
LCSD 720-147104/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	147104
MB 720-147104/1-A	Method Blank	Total/NA	Solid	7471A	147104

Analysis Batch: 147215

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-53263-4	RBS-SSED-12AM	Total/NA	Solid	6010B	147101

Lab Chronicle

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Client Sample ID: RBS-SSED-09AJ

Lab Sample ID: 720-53263-1

Date Collected: 10/21/13 12:56

Matrix: Solid

Date Received: 10/23/13 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			147101	10/25/13 21:33	ASB	TAL PLS
Total/NA	Analysis	6010B		4	147154	10/27/13 13:11	EFH	TAL PLS
Total/NA	Prep	7471A			147104	10/25/13 22:15	ASB	TAL PLS
Total/NA	Analysis	7471A		1	147173	10/28/13 12:40	EFH	TAL PLS

Client Sample ID: RBS-SSED-11AL

Lab Sample ID: 720-53263-3

Date Collected: 10/21/13 15:01

Matrix: Solid

Date Received: 10/23/13 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			147101	10/25/13 21:33	ASB	TAL PLS
Total/NA	Analysis	6010B		4	147154	10/27/13 13:15	EFH	TAL PLS
Total/NA	Prep	7471A			147104	10/25/13 22:15	ASB	TAL PLS
Total/NA	Analysis	7471A		1	147173	10/28/13 12:43	EFH	TAL PLS

Client Sample ID: RBS-SSED-12AM

Lab Sample ID: 720-53263-4

Date Collected: 10/21/13 15:17

Matrix: Solid

Date Received: 10/23/13 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			147101	10/25/13 21:33	ASB	TAL PLS
Total/NA	Analysis	6010B		4	147154	10/27/13 13:19	EFH	TAL PLS
Total/NA	Prep	7471A			147104	10/25/13 22:15	ASB	TAL PLS
Total/NA	Analysis	7471A		1	147173	10/28/13 12:45	EFH	TAL PLS
Total/NA	Prep	3050B			147101	10/25/13 21:33	ASB	TAL PLS
Total/NA	Analysis	6010B		4	147215	10/28/13 19:32	SLK	TAL PLS

Client Sample ID: RBS-SSED-13AN

Lab Sample ID: 720-53263-5

Date Collected: 10/22/13 08:03

Matrix: Solid

Date Received: 10/23/13 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			147101	10/25/13 21:33	ASB	TAL PLS
Total/NA	Analysis	6010B		4	147154	10/27/13 13:24	EFH	TAL PLS
Total/NA	Prep	7471A			147104	10/25/13 22:15	ASB	TAL PLS
Total/NA	Analysis	7471A		1	147173	10/28/13 12:47	EFH	TAL PLS

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-14

Method Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PLS
7471A	Mercury (CVAA)	SW846	TAL PLS

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-53263-1	RBS-SSED-09AJ	Solid	10/21/13 12:56	10/23/13 10:30
720-53263-3	RBS-SSED-11AL	Solid	10/21/13 15:01	10/23/13 10:30
720-53263-4	RBS-SSED-12AM	Solid	10/21/13 15:17	10/23/13 10:30
720-53263-5	RBS-SSED-13AN	Solid	10/22/13 08:03	10/23/13 10:30

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THE LEADER IN ENVIRONMENTAL TESTING

TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

Reference #: 2013-064 149547
Date 10/22/13 Page 1 of 1
11/1/2013

Report To

Attn: Annica Nord
Company ERRG
Address 115 Sansome St #200, San Francisco CA
Email Annica.Nord@ERRG.com
Bill To: ERRG
Sampled By: AN & S. Carruthers-Knight
Attn: Accounts Receivable Phone: 206-512-3170

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☐ 8270C SIM	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471)	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☐ 6020 ☐ 200.8 (ICP-MS)	W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	☐ Perchlorate by EPA 314.0	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	EPA Method 8290		Number of Containers
RBS-SSed-09AJ	10/21/13	1256	S	—										X									X		2
RBS-SSed-10AK	↓	1437	S	—										Hold									HOLD		2
RBS-SSed-11AL		1501	S	—										X									X		2
RBS-SSed-12AM		1517	S	—										X									X		2
RBS-SSed-13AN	10/22/13	803	S	—										X									X		2
RBS-SSed-14AO	↓	826	S	—										Hold									HOLD		2

Project Info.

Project Name/ Ramona Burn Dump 2013-064
PO# 2013-064
Credit Card Y/N

Sample Receipt

of Containers:
Head Space:
Temp: 5°
If yes, please call with payment information ASAP

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day | Other: Standard

Report: ☒ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID

See Terms and Conditions on reverse

1) Relinquished by: 11:49
Signature Time
Annica Nord 10/22/13
Printed Name Date
ERRG
Company

2) Relinquished by:
Signature Time
Printed Name Date
Company

3) Relinquished by:
720-53263 Chain of Custody
Company

1) Received by: FedEx
Signature Time
Printed Name Date
Company

2) Received by: 1030
Signature Time
Mullen 10-23-13
Printed Name Date
Company

3) Received by:
Signature Time
Printed Name Date
Company

Rev 10/2012

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TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

720-53263

Reference #: 2013-064 149547

Date 10/22/13 Page 1 of 1

11/1/2013

Report To

Attn: Annica Nord
Company ERRG
Address 115 Sansome St #200, San Francisco CA
Email. Annica.Nord@ERRG.com
Bill To: ERRG
Sampled By: AN & S. Carruthers-Knight
Attn: Accounts Receivable Phone 206-512-3170

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☐ 8270C SIM	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471)	Metals ☒ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☐ 6020 ☐ 200.8 (ICP-MS):	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	☐ Perchlorate by EPA 314.0	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	EPA Method 8290		Number of Containers
RBS-SSed-09AJ	10/21/13	1256	S	-										X									X		2
RBS-SSed-10AK	↓	1437	S	-										Hold									HOLD		2
RBS-SSed-11AL		1501	S	-										X									X		2
RBS-SSed-12AM		1517	S	-										X									X		2
RBS-SSed-13AN	10/22/13	803	S	-										X									X		2
RBS-SSed-14AO	↓	826	S	-										Hold									HOLD		2

Project Info

Project Name/ Ramona Burn Dump 2013-064
PO#: 2013-064

Sample Receipt

# of Containers:
Head Space:
Temp: 5°C

Credit Card Y (N): If yes, please call with payment information ASAP

TAT: 10 Day | (5 Day) | 4 Day | 3 Day | 2 Day | 1 Day | Other: Standard

Report: ☒ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID _____

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 11:49	Signature: Time:	
Printed Name: Annica Nord Date: 10/22/13	Printed Name: Date:	720-53263 Chain of Custody
Company: ERRG	Company:	

1) Received by:	2) Received by:	3) Received by
Fed Ex	[signature] 1030	
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Mullen 10-23-13	Printed Name: Date:
Company:	Printed Name: Date:	Company:
	Company:	

Rev.10/2012

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Login Sample Receipt Checklist

Client: Engineering Remediation Resources Group.

Job Number: 720-53263-1

Login Number: 53263

List Source: TestAmerica Pleasanton

List Number: 1

Creator: Gonzales, Justinn

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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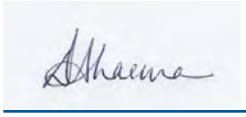
ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-53263-2
Client Project/Site: Ramona Burn Dump

For:
Engineering Remediation Resources Group.
616 First Avenue
Suite 300
Seattle, Washington 98104

Attn: Annica Nord



Authorized for release by:
11/12/2013 2:08:04 PM

Dimple Sharma, Senior Project Manager
(925)484-1919
dimple.sharma@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 720-53263-2

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-53263-2

Comments
No additional comments.

Receipt
The samples were received on 10/23/2013 10:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.0º C.

Dioxin
No analytical or quality issues were noted.

Dioxin Prep
No analytical or quality issues were noted.

Detection Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Client Sample ID: RBS-SSED-09AJ — Lab Sample ID: 720-53263-1

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,4,6,7,8-HpCDD	8.1		4.8		pg/g	1		8290	Total/NA
OCDD	57		9.7		pg/g	1		8290	Total/NA

Client Sample ID: RBS-SSED-11AL — Lab Sample ID: 720-53263-3

No Detections.

Client Sample ID: RBS-SSED-12AM — Lab Sample ID: 720-53263-4

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
OCDD	34		9.7		pg/g	1		8290	Total/NA

Client Sample ID: RBS-SSED-13AN — Lab Sample ID: 720-53263-5

Analyte	Result	Qualifier	RL	EDL	Unit	Dil Fac	D	Method	Prep Type
1,2,3,4,6,7,8-HpCDD	8.3		4.9		pg/g	1		8290	Total/NA
OCDD	62		9.8		pg/g	1		8290	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Client Sample ID: RBS-SSED-09AJ
Date Collected: 10/21/13 12:56
Date Received: 10/23/13 10:30

Lab Sample ID: 720-53263-1
Matrix: Solid

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.97		pg/g		10/24/13 18:17	11/05/13 23:31	1
2,3,7,8-TCDF	ND		0.97		pg/g		10/24/13 18:17	11/08/13 15:51	1
1,2,3,7,8-PeCDD	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,7,8-PeCDF	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
2,3,4,7,8-PeCDF	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,4,7,8-HxCDD	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,6,7,8-HxCDD	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,7,8,9-HxCDD	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,4,7,8-HxCDF	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,6,7,8-HxCDF	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
2,3,4,6,7,8-HxCDF	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,7,8,9-HxCDF	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,4,6,7,8-HpCDD	**8.1**		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,4,6,7,8-HpCDF	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
1,2,3,4,7,8,9-HpCDF	ND		4.8		pg/g		10/24/13 18:17	11/05/13 23:31	1
OCDD	**57**		9.7		pg/g		10/24/13 18:17	11/05/13 23:31	1
OCDF	ND		9.7		pg/g		10/24/13 18:17	11/05/13 23:31	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*62*		*40 - 135*	*10/24/13 18:17*	*11/05/13 23:31*	*1*
13C-2,3,7,8-TCDF	*67*		*40 - 135*	*10/24/13 18:17*	*11/08/13 15:51*	*1*
13C-1,2,3,7,8-PeCDD	*61*		*40 - 135*	*10/24/13 18:17*	*11/05/13 23:31*	*1*
13C-1,2,3,7,8-PeCDF	*58*		*40 - 135*	*10/24/13 18:17*	*11/05/13 23:31*	*1*
13C-1,2,3,6,7,8-HxCDD	*69*		*40 - 135*	*10/24/13 18:17*	*11/05/13 23:31*	*1*
13C-1,2,3,4,7,8-HxCDF	*74*		*40 - 135*	*10/24/13 18:17*	*11/05/13 23:31*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*64*		*40 - 135*	*10/24/13 18:17*	*11/05/13 23:31*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*65*		*40 - 135*	*10/24/13 18:17*	*11/05/13 23:31*	*1*
13C-OCDD	*63*		*40 - 135*	*10/24/13 18:17*	*11/05/13 23:31*	*1*

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Client Sample ID: RBS-SSED-11AL
Date Collected: 10/21/13 15:01
Date Received: 10/23/13 10:30

Lab Sample ID: 720-53263-3
Matrix: Solid

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.99		pg/g		10/24/13 18:17	11/06/13 00:15	1
2,3,7,8-TCDF	ND		0.99		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,7,8-PeCDD	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,7,8-PeCDF	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
2,3,4,7,8-PeCDF	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,4,7,8-HxCDD	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,6,7,8-HxCDD	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,7,8,9-HxCDD	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,4,7,8-HxCDF	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,6,7,8-HxCDF	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
2,3,4,6,7,8-HxCDF	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,7,8,9-HxCDF	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,4,6,7,8-HpCDD	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,4,6,7,8-HpCDF	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
1,2,3,4,7,8,9-HpCDF	ND		5.0		pg/g		10/24/13 18:17	11/06/13 00:15	1
OCDD	ND		9.9		pg/g		10/24/13 18:17	11/06/13 00:15	1
OCDF	ND		9.9		pg/g		10/24/13 18:17	11/06/13 00:15	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*60*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*
13C-2,3,7,8-TCDF	*60*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*
13C-1,2,3,7,8-PeCDD	*58*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*
13C-1,2,3,7,8-PeCDF	*56*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*
13C-1,2,3,6,7,8-HxCDD	*64*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*
13C-1,2,3,4,7,8-HxCDF	*69*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*63*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*62*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*
13C-OCDD	*61*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:15*	*1*

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Client Sample ID: RBS-SSED-12AM
Date Collected: 10/21/13 15:17
Date Received: 10/23/13 10:30

Lab Sample ID: 720-53263-4
Matrix: Solid

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.97		pg/g		10/24/13 18:17	11/06/13 00:58	1
2,3,7,8-TCDF	ND		0.97		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,7,8-PeCDD	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,7,8-PeCDF	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
2,3,4,7,8-PeCDF	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,4,7,8-HxCDD	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,6,7,8-HxCDD	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,7,8,9-HxCDD	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,4,7,8-HxCDF	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,6,7,8-HxCDF	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
2,3,4,6,7,8-HxCDF	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,7,8,9-HxCDF	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,4,6,7,8-HpCDD	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,4,6,7,8-HpCDF	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
1,2,3,4,7,8,9-HpCDF	ND		4.8		pg/g		10/24/13 18:17	11/06/13 00:58	1
OCDD	**34**		9.7		pg/g		10/24/13 18:17	11/06/13 00:58	1
OCDF	ND		9.7		pg/g		10/24/13 18:17	11/06/13 00:58	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*57*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*
13C-2,3,7,8-TCDF	*58*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*
13C-1,2,3,7,8-PeCDD	*56*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*
13C-1,2,3,7,8-PeCDF	*54*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*
13C-1,2,3,6,7,8-HxCDD	*63*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*
13C-1,2,3,4,7,8-HxCDF	*68*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*59*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*60*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*
13C-OCDD	*59*		*40 - 135*	*10/24/13 18:17*	*11/06/13 00:58*	*1*

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Client Sample ID: RBS-SSED-13AN
Date Collected: 10/22/13 08:03
Date Received: 10/23/13 10:30

Lab Sample ID: 720-53263-5
Matrix: Solid

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		0.98		pg/g		10/24/13 18:17	11/06/13 01:41	1
2,3,7,8-TCDF	ND		0.98		pg/g		10/24/13 18:17	11/08/13 16:30	1
1,2,3,7,8-PeCDD	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,7,8-PeCDF	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
2,3,4,7,8-PeCDF	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,4,7,8-HxCDD	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,6,7,8-HxCDD	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,7,8,9-HxCDD	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,4,7,8-HxCDF	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,6,7,8-HxCDF	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
2,3,4,6,7,8-HxCDF	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,7,8,9-HxCDF	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,4,6,7,8-HpCDD	**8.3**		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,4,6,7,8-HpCDF	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
1,2,3,4,7,8,9-HpCDF	ND		4.9		pg/g		10/24/13 18:17	11/06/13 01:41	1
OCDD	**62**		9.8		pg/g		10/24/13 18:17	11/06/13 01:41	1
OCDF	ND		9.8		pg/g		10/24/13 18:17	11/06/13 01:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*61*		*40 - 135*	*10/24/13 18:17*	*11/06/13 01:41*	*1*
13C-2,3,7,8-TCDF	*67*		*40 - 135*	*10/24/13 18:17*	*11/08/13 16:30*	*1*
13C-1,2,3,7,8-PeCDD	*60*		*40 - 135*	*10/24/13 18:17*	*11/06/13 01:41*	*1*
13C-1,2,3,7,8-PeCDF	*58*		*40 - 135*	*10/24/13 18:17*	*11/06/13 01:41*	*1*
13C-1,2,3,6,7,8-HxCDD	*65*		*40 - 135*	*10/24/13 18:17*	*11/06/13 01:41*	*1*
13C-1,2,3,4,7,8-HxCDF	*72*		*40 - 135*	*10/24/13 18:17*	*11/06/13 01:41*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*63*		*40 - 135*	*10/24/13 18:17*	*11/06/13 01:41*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*65*		*40 - 135*	*10/24/13 18:17*	*11/06/13 01:41*	*1*
13C-OCDD	*64*		*40 - 135*	*10/24/13 18:17*	*11/06/13 01:41*	*1*

Isotope Dilution Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (40-135)	TCDF (40-135)	PeCDD (40-135)	PeCDF1 (40-135)	HxCDD2 (40-135)	HxCDF1 (40-135)	HpCDD (40-135)	HpCDF1 (40-135)
720-53263-1	RBS-SSED-09AJ	62		61	58	69	74	64	65
720-53263-1	RBS-SSED-09AJ		67						
720-53263-3	RBS-SSED-11AL	60	60	58	56	64	69	63	62
720-53263-4	RBS-SSED-12AM	57	58	56	54	63	68	59	60
720-53263-5	RBS-SSED-13AN	61		60	58	65	72	63	65
720-53263-5	RBS-SSED-13AN		67						
LCS 320-28361/2-A	Lab Control Sample	62	62	59	57	69	68	62	63
MB 320-28361/1-A	Method Blank	62	62	61	57	68	69	62	62

		Percent Isotope Dilution Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	OCDD (40-135)
720-53263-1	RBS-SSED-09AJ	63
720-53263-1	RBS-SSED-09AJ	
720-53263-3	RBS-SSED-11AL	61
720-53263-4	RBS-SSED-12AM	59
720-53263-5	RBS-SSED-13AN	64
720-53263-5	RBS-SSED-13AN	
LCS 320-28361/2-A	Lab Control Sample	64
MB 320-28361/1-A	Method Blank	62

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF1 = 13C-1,2,3,7,8-PeCDF
HxCDD2 = 13C-1,2,3,6,7,8-HxCDD
HxCDF1 = 13C-1,2,3,4,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
HpCDF1 = 13C-1,2,3,4,6,7,8-HpCDF
OCDD = 13C-OCDD

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Lab Sample ID: MB 320-28361/1-A
Matrix: Solid
Analysis Batch: 29245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 28361

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
2,3,7,8-TCDD	ND		1.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
2,3,7,8-TCDF	ND		1.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,7,8-PeCDD	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,7,8-PeCDF	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
2,3,4,7,8-PeCDF	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,4,7,8-HxCDD	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,6,7,8-HxCDD	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,7,8,9-HxCDD	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,4,7,8-HxCDF	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,6,7,8-HxCDF	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
2,3,4,6,7,8-HxCDF	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,7,8,9-HxCDF	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,4,6,7,8-HpCDD	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,4,6,7,8-HpCDF	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
1,2,3,4,7,8,9-HpCDF	ND		5.0		pg/g		10/24/13 18:17	11/05/13 19:13	1
OCDD	ND		10		pg/g		10/24/13 18:17	11/05/13 19:13	1
OCDF	ND		10		pg/g		10/24/13 18:17	11/05/13 19:13	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*62*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*
13C-2,3,7,8-TCDF	*62*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*
13C-1,2,3,7,8-PeCDD	*61*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*
13C-1,2,3,7,8-PeCDF	*57*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*
13C-1,2,3,6,7,8-HxCDD	*68*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*
13C-1,2,3,4,7,8-HxCDF	*69*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*62*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*62*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*
13C-OCDD	*62*		*40 - 135*	*10/24/13 18:17*	*11/05/13 19:13*	*1*

Lab Sample ID: LCS 320-28361/2-A
Matrix: Solid
Analysis Batch: 29245

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 28361

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,3,7,8-TCDD	20.0	20.5		pg/g		103	60 - 138
2,3,7,8-TCDF	20.0	22.5		pg/g		113	56 - 158
1,2,3,7,8-PeCDD	100	108		pg/g		108	70 - 122
1,2,3,7,8-PeCDF	100	115		pg/g		115	69 - 134
2,3,4,7,8-PeCDF	100	115		pg/g		115	70 - 131
1,2,3,4,7,8-HxCDD	100	105		pg/g		105	60 - 138
1,2,3,6,7,8-HxCDD	100	102		pg/g		102	68 - 136
1,2,3,7,8,9-HxCDD	100	105		pg/g		105	68 - 138
1,2,3,4,7,8-HxCDF	100	115		pg/g		115	74 - 128
1,2,3,6,7,8-HxCDF	100	113		pg/g		113	67 - 140
2,3,4,6,7,8-HxCDF	100	116		pg/g		116	71 - 137
1,2,3,7,8,9-HxCDF	100	112		pg/g		112	72 - 134
1,2,3,4,6,7,8-HpCDD	100	110		pg/g		110	71 - 128
1,2,3,4,6,7,8-HpCDF	100	115		pg/g		115	71 - 134

Method: 8290 - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCS 320-28361/2-A
Matrix: Solid
Analysis Batch: 29245

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 28361

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2,3,4,7,8,9-HpCDF			100	109		pg/g		109	68 - 129		
OCDD			200	228		pg/g		114	70 - 128		
OCDF			200	239		pg/g		119	63 - 141		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C-2,3,7,8-TCDD	*62*		*40 - 135*
13C-2,3,7,8-TCDF	*62*		*40 - 135*
13C-1,2,3,7,8-PeCDD	*59*		*40 - 135*
13C-1,2,3,7,8-PeCDF	*57*		*40 - 135*
13C-1,2,3,6,7,8-HxCDD	*69*		*40 - 135*
13C-1,2,3,4,7,8-HxCDF	*68*		*40 - 135*
13C-1,2,3,4,6,7,8-HpCDD	*62*		*40 - 135*
13C-1,2,3,4,6,7,8-HpCDF	*63*		*40 - 135*
13C-OCDD	*64*		*40 - 135*

Specialty Organics

Prep Batch: 28361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-53263-1	RBS-SSED-09AJ	Total/NA	Solid	8290	
720-53263-3	RBS-SSED-11AL	Total/NA	Solid	8290	
720-53263-4	RBS-SSED-12AM	Total/NA	Solid	8290	
720-53263-5	RBS-SSED-13AN	Total/NA	Solid	8290	
LCS 320-28361/2-A	Lab Control Sample	Total/NA	Solid	8290	
MB 320-28361/1-A	Method Blank	Total/NA	Solid	8290	

Analysis Batch: 29245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-53263-1	RBS-SSED-09AJ	Total/NA	Solid	8290	28361
720-53263-3	RBS-SSED-11AL	Total/NA	Solid	8290	28361
720-53263-4	RBS-SSED-12AM	Total/NA	Solid	8290	28361
720-53263-5	RBS-SSED-13AN	Total/NA	Solid	8290	28361
LCS 320-28361/2-A	Lab Control Sample	Total/NA	Solid	8290	28361
MB 320-28361/1-A	Method Blank	Total/NA	Solid	8290	28361

Analysis Batch: 29533

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-53263-1	RBS-SSED-09AJ	Total/NA	Solid	8290	28361
720-53263-5	RBS-SSED-13AN	Total/NA	Solid	8290	28361

Lab Chronicle

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Client Sample ID: RBS-SSED-09AJ

Lab Sample ID: 720-53263-1

Date Collected: 10/21/13 12:56

Matrix: Solid

Date Received: 10/23/13 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			28361	10/24/13 18:17	GDB	TAL SAC
Total/NA	Analysis	8290		1	29245	11/05/13 23:31	SMA	TAL SAC
Total/NA	Prep	8290			28361	10/24/13 18:17	GDB	TAL SAC
Total/NA	Analysis	8290		1	29533	11/08/13 15:51	SMA	TAL SAC

Client Sample ID: RBS-SSED-11AL

Lab Sample ID: 720-53263-3

Date Collected: 10/21/13 15:01

Matrix: Solid

Date Received: 10/23/13 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			28361	10/24/13 18:17	GDB	TAL SAC
Total/NA	Analysis	8290		1	29245	11/06/13 00:15	SMA	TAL SAC

Client Sample ID: RBS-SSED-12AM

Lab Sample ID: 720-53263-4

Date Collected: 10/21/13 15:17

Matrix: Solid

Date Received: 10/23/13 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			28361	10/24/13 18:17	GDB	TAL SAC
Total/NA	Analysis	8290		1	29245	11/06/13 00:58	SMA	TAL SAC

Client Sample ID: RBS-SSED-13AN

Lab Sample ID: 720-53263-5

Date Collected: 10/22/13 08:03

Matrix: Solid

Date Received: 10/23/13 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			28361	10/24/13 18:17	GDB	TAL SAC
Total/NA	Analysis	8290		1	29245	11/06/13 01:41	SMA	TAL SAC
Total/NA	Prep	8290			28361	10/24/13 18:17	GDB	TAL SAC
Total/NA	Analysis	8290		1	29533	11/08/13 16:30	SMA	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-14

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NE-OS-22-13	01-31-14
A2LA	DoD ELAP		2928-01	01-31-14
Alaska (UST)	State Program	10	UST-055	12-18-13
Arizona	State Program	9	AZ0708	08-11-14
Arkansas DEQ	State Program	6	88-0691	06-17-14
California	NELAP	9	1119CA	01-31-14
Connecticut	State Program	1	PH-0691	06-30-15
Florida	NELAP	4	E87570	06-30-14
Guam	State Program	9	N/A	08-31-14
Hawaii	State Program	9	N/A	01-31-14
Illinois	NELAP	5	200060	03-17-14
Kansas	NELAP	7	E-10375	10-31-14
Louisiana	NELAP	6	30612	06-30-14
Michigan	State Program	5	9947	01-31-14
Nebraska	State Program	7	NE-OS-22-13	01-31-14
Nevada	State Program	9	CA44	07-31-14
New Jersey	NELAP	2	CA005	06-30-14
New York	NELAP	2	11666	04-01-14
Northern Mariana Islands	State Program	9	MP0007	02-01-14
Oregon	NELAP	10	CA200005	03-28-14
Pennsylvania	NELAP	3	68-01272	03-31-14
South Carolina	State Program	4	87014	06-30-14
Texas	NELAP	6	T104704399-08-TX	05-31-14
US Fish & Wildlife	Federal		LE148388-0	12-31-13
USDA	Federal		P330-11-00436	12-30-14
USEPA UCMR	Federal	1	CA00044	11-06-14
Utah	NELAP	8	QUAN1	01-31-14
Washington	State Program	10	C581	05-05-14
West Virginia	State Program	3	9930C	12-31-13
Wyoming	State Program	8	8TMS-Q	01-31-14

Method Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Method	Method Description	Protocol	Laboratory
8290	Dioxins and Furans (HRGC/HRMS)	SW846	TAL SAC

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Engineering Remediation Resources Group.
Project/Site: Ramona Burn Dump

TestAmerica Job ID: 720-53263-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-53263-1	RBS-SSED-09AJ	Solid	10/21/13 12:56	10/23/13 10:30
720-53263-3	RBS-SSED-11AL	Solid	10/21/13 15:01	10/23/13 10:30
720-53263-4	RBS-SSED-12AM	Solid	10/21/13 15:17	10/23/13 10:30
720-53263-5	RBS-SSED-13AN	Solid	10/22/13 08:03	10/23/13 10:30

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TESTAMERICA Pleasanton Chain of Custody

1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

Reference #: 2013-064 149547

Date 10/22/13 Page 1 of 1

11/12/2013

Report To

Attn: Annica Nord
Company ERRG
Address 115 Sansome St #200, San Francisco CA
Email Annica.Nord@ERRG.com
Bill To: ERRG
Sampled By: AN & S. Carruthers-Knight
Attn: Accounts Receivable
Phone: 206-512-3170

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☐ 8270C SIM	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides PCBs ☐ EPA 8081 ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471)	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☐ 6020 ☐ 200.8 (ICP-MS)	W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	☐ Perchlorate by EPA 314.0	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	EPA Method 8290		Number of Containers
RBS-SSed-09AJ	10/21/13	1256	S	—										X								X			2
RBS-SSed-10AK	↓	1437	S	—										Hold								HOLD			2
RBS-SSed-11AL		1501	S	—										X								X			2
RBS-SSed-12AM		1517	S	—										X								X			2
RBS-SSed-13AN	10/22/13	803	S	—										X								X			2
RBS-SSed-14AO	↓	826	S	—										Hold								HOLD			2

Project Info.

Project Name/ Ramona Burn Dump 2013-064
PO# 2013-064
Credit Card Y/N

Sample Receipt

of Containers:
Head Space:
Temp: 5°
If yes, please call with payment information ASAP

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day | Other: Standard

Report: ☒ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID

See Terms and Conditions on reverse

1) Relinquished by: 11:49
Signature Time
Annica Nord 10/22/13
Printed Name Date
ERRG
Company

2) Relinquished by:
Signature Time
Printed Name Date
Company

3) Relinquished by:
720-53263 Chain of Custody
Company

1) Received by: FedEx
Signature Time
Printed Name Date
Company

2) Received by: 1030
Signature Time
Mullen 10-23-13
Printed Name Date
Company

3) Received by:
Signature Time
Printed Name Date
Company

Rev 10/2012

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TESTAMERICA Pleasanton Chain of Custody

1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

720-53263

Reference #: 2013-064 149547

Date 10/22/13 Page 1 of 1

11/12/2013

Report To

Attn: Annica Nord
Company ERRG
Address 115 Sansome St #200, San Francisco CA
Email. Annica.Nord@ERRG.com
Bill To: ERRG
Sampled By: AN & S. Carruthers-Knight
Attn: Accounts Receivable Phone 206-512-3170

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☐ 8270C SIM	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471)	Metals ☒ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☐ 6020 ☐ 200.8 (ICP-MS)	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	☐ Perchlorate by EPA 314.0	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	EPA Method 8290		Number of Containers
RBS-SSed-09AJ	10/21/13	1256	S	-										X									X		2
RBS-SSed-10AK	↓	1437	S	-										Hold									Hold		2
RBS-SSed-11AL		1501	S	-										X									X		2
RBS-SSed-12AM	↓	1517	S	-										X									X		2
RBS-SSed-13AN	10/22/13	803	S	-										X									X		2
RBS-SSed-14AO	↓	826	S	-										Hold									Hold		2

Project Info

Project Name/ Ramona Burn Dump
2013-064
PO#: 2013-064

Sample Receipt

# of Containers:
Head Space:
Temp: 5°C

Credit Card Y (N): If yes, please call with payment information ASAP

TAT: 10 Day | (5 Day) | 4 Day | 3 Day | 2 Day | 1 Day | Other: Standard

Report: ☒ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID _____

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 11:49	Signature: Time:	720-53263 Chain of Custody
Printed Name: Annica Nord Date: 10/22/13	Printed Name: Date:	
Company: ERRG	Company:	

1) Received by:	2) Received by:	3) Received by
Fed Ex	[signature] 1030	
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Mullen 10-23-13 Printed Name: Date:	Printed Name: Date:
Company:	Company:	Company:

Rev.10/2012

Login Sample Receipt Checklist

Client: Engineering Remediation Resources Group.

Job Number: 720-53263-2

Login Number: 53263

List Source: TestAmerica Pleasanton

List Number: 1

Creator: Gonzales, Justinn

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Engineering Remediation Resources Group.

Job Number: 720-53263-2

Login Number: 53263
List Number: 1
Creator: Nelson, Kym D

List Source: TestAmerica Sacramento
List Creation: 10/24/13 03:12 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix D. Alternative Action Cost Estimate

Table D-1. Alternatives Cost Estimate Summary

Site: Ramona Burn Dump
Location: Cleveland National Forest, San Diego County, California
Phase: EE/CA (-30% / +50%)

Remedial Alternative	Total Capital Cost	Total O&M Cost (30 Years)	Total Periodic Cost	Period of Analysis[2]	Total Cost[3]	Present Value Cost[4]	Range for -30% / +50%
1	$ -	$ -	$ -	30 years	$ -	$ -	$ - to $ -
2	$ 1,752,807	$ 759,587	$ 25,320	30 years	$ 2,512,394	$ 2,756,164	$ 1,929,315 to $ 4,134,246
3	$ 1,662,276	$ 759,587	$ 25,320	30 years	$ 2,421,862	$2,665,632	$ 1,865,943 to $ 3,998,448
4	$ 9,552,088	$ 25,320	$ 25,320	1 year	$ 9,577,408	$ 9,577,132	$ 6,703,993 to $ 14,365,698

Notes:

(1) Appended tables summarize backup calculations for all cost estimates provided.

(2) Period of analysis assumes the base year is 2013.

(3) Total cost includes a 25 percent contingency factor to account for changes in scope, changes to bid quantities, and inflation.

(4) Based on a 1.1 percent discount factor for projects with a 30-year (or greater) duration, as specified for federal facility sites in Appendix C of Office of Management and Budget Circular A-94 (effective December 2012) at http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html.

Table D-2. Alternative 2 - Cost Summary

Site: Ramona Burn Dump **Description:** Alternative 2 (Cap Contaminated Soil and Burn Ash in Place) Cost Summary for the Ramona Burn Dump Site EE/CA

Location: Cleveland National Forest, San Diego County, California

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	SOURCE/NOTES[1]
Implementation Plans and Design	1	LS	$66,070.96	$66,071	Includes three weeks for technical staff to complete a design and pre-mobilization plans (including Work Plan and HASP with graphics, review, and production). Design costs include a site survey, one site visit for tech staff and geotechnical sampling and testing.
Mobilization and Demobilization	1	LS	$96,740.54	$96,741	Mobilization and demobilization of crew, materials, and equipment. Includes costs for sanitary facilities, and other project necessities. 1 superintendent, 1 engineer, 1 laborer, and 5 operators. Includes per diem for all site workers. Includes delivery of 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader).
Site Work					
Clear and Grub	3.5	Acre	$13,476.47	$47,168	Assumes the whole site (3.5 acres) will be cleared in preparation for waste consolidation and cap construction. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 5 days of work.
Consolidate Waste	500	CY	$132.36	$66,179	Assumes approximately 500 cubic yards of soil from area 10 will be consolidated. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 5 days of work.
Liner Preparation	142,589	SF	$0.35	$49,385	Assumes approximately 142,589 square feet of cap area will be prepared for cap installation. This may include installation of a clean soil veneer beneath the impermeable cap to provide a smooth surface and prevent damage to the liner materials (labor only, soil import included in import cover task). Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 5 days of work.
Liner/Demarcation Layer Installation	142,589	SF	$1.95	$277,529	Assumes a liner area of approximately 142,589 square feet. Includes materials and transportation to the site as well as an HDPE installation technician. Estimated 5 days.
Import Cover Material, Place, Compact and Grade	19,972	Ton	$23.13	$461,937	Assumes approximately 19,972 tons of clean cover soil to construct a 2 foot thick cap. Approximately 1,000 tons of soil per day will be imported, placed and compacted. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 20 days of work.
Install Erosion Controls	3.5	Acre	$15,685.35	$54,899	Includes hydroseeding and installation of erosion control measures (such as rolled erosion control mats and blankets, jute mesh, straw wattle) on the cap and all other disturbed areas, 5 days to install.
After Action Report	1	LS		$44,926.72	Includes 2 weeks for technical staff to write a completion report, including graphics, review, and production. Also includes a final site survey to provide data for as-built drawings.
SUBTOTAL				**$1,164,835**	
Contingency	25%			$291,209	15% scope + 10% bid
SUBTOTAL				**$1,456,044**	
Project Management	10%			$116,483.49	Includes project management during all phases of construction, regulatory interface, and permitting.
Construction Management	12%			$139,780.18	Includes construction management, quality control, geotechnical testing, and quality control testing.
SUBTOTAL					
Institutional Controls	1	LS	$40,500	$40,500	Forest Plan amendment, legal description for ARIC, and legal fees. Includes reproduction.
	TOTAL CAPITAL CONSTRUCTION COSTS:			**$1,752,807**	

Table D-2. Alternative 2 - Cost Summary *(continued)*

Site: Ramona Burn Dump

Description: Alternative 2 (Cap Contaminated Soil and Burn Ash in Place) Cost Summary for the Ramona Burn Dump Site EE/CA

Location: Cleveland National Forest, San Diego County, California

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	SOURCE/NOTES[1]
Inspections and Maintenance					
Biannual Inspections	2	LS	$ 4,214	$ 8,429	Biannual inspections to evaluate the integrity of all cover elements and storm water BMPs.
Minor Repairs	1	LS	$ 8,229	$ 8,229	Replace erosion control fabric or other BMPs, minor earth work to repair the cap.
SUBTOTAL				**$16,658**	
Contingency	25%			$ 4,164	10% scope + 15% bid
SUBTOTAL				**$20,822**	
Project Management	10%			$1,666	
Contractor Overhead	7%			$1,166	
Profit	10%			$1,666	
		TOTAL ANNUAL O&M COSTS:		**$25,320**	per year
		TOTAL ANNUAL O&M COSTS:		**$759,587**	Years 1-30

PERIODIC COSTS	Year					
Five-Year Review Report	5	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 5.
Significant Repairs	5	1	LS	$12,594	$12,594.20	Costs for significant cap repairs and BMPs.
SUBTOTAL (YEAR 5)					**$57,520.92**	
Five-Year Review Report	10	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 10.
Major Repairs	10	1	LS	$42,812	$42,811.97	Costs for major cap repairs
SUBTOTAL (YEAR 10)					**$87,738.69**	
Five-Year Review Report	15	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 15.
Significant Repairs	15	1	LS	$12,594	$12,594.20	Costs for significant cap repairs and BMPs.
SUBTOTAL (YEAR 15)					**$57,520.92**	
Five-Year Review Report	20	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 20.
Major Repairs	20	1	LS	$42,812	$42,811.97	Costs for major cap repairs
SUBTOTAL (YEAR 20)					**$87,738.69**	
Five-Year Review Report	15	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 25.
Significant Repairs	15	1	LS	$12,594	$12,594.20	Costs for significant cap repairs and BMPs.
SUBTOTAL (YEAR 25)					**$57,520.92**	
Five-Year Review Report	20	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 30.
Major Repairs	20	1	LS	$42,812	$42,811.97	Costs for major cap repairs
SUBTOTAL (YEAR 30)					**$87,738.69**	

Table D-2. Alternative 2 - Cost Summary *(continued)*

Site: Ramona Burn Dump

Description: Alternative 2 (Cap Contaminated Soil and Burn Ash in Place) Cost Summary for the Ramona Burn Dump Site EE/CA

Location: Cleveland National Forest, San Diego County, California

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	SOURCE/NOTES[1]

PRESENT VALUE ANALYSIS[1]:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (1.1%)	PRESENT VALUE
Capital Cost	0	$ 1,752,807	$ 1,752,807	1.000	$ 1,752,807
Annual O&M Cost	1-30	$ 759,587	$ 25,320	0.848	$ 643,991
Periodic Cost	5	$ 57,520.92	$ 57,521	0.947	$ 54,459
Periodic Cost	10	$ 87,738.69	$ 87,739	0.896	$ 78,647
Periodic Cost	15	$ 57,520.92	$ 57,521	0.849	$ 48,816
Periodic Cost	20	$ 87,738.69	$ 87,739	0.803	$ 70,497
Periodic Cost	25	$ 57,520.92	$ 57,521	0.761	$ 43,757
Periodic Cost	30	$ 87,738.69	$ 87,739	0.720	$ 63,191
		$ 2,948,172.65			$2,756,164

TOTAL PRESENT VALUE OF SELECTED REMEDY **$2,756,164**

Notes:

(1) Based on a 1.1 percent discount factor for projects with a 30-year (or greater) duration, as specified for federal facility sites in Appendix C of Office of Management and Budget Circular A-94 (effective December 2012) at http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html.

ARIC = Area Requiring Institutional Controls

BMPs = best management practices

cy = cubic yard

LS = lump sum

O&M = operation and maintenance

SF = square feet

TN = ton

Table D-3. Alternative 2 - Present Value Analysis

Year	Periodic Cost	Annual Cost	Discount Factor[1]	Actual Periodic Cost	Actual Annual Cost
1		$25,320	0.989119683		$25,044.07
2		$25,320	0.978357748		$24,771.58
3		$25,320	0.967712906		$24,502.06
4		$25,320	0.957183884		$24,235.47
5	$57,521	$25,320	0.94676942	$54,459.05	$23,971.78
6		$25,320	0.936468269		$23,710.96
7		$25,320	0.926279198		$23,452.97
8		$25,320	0.916200987		$23,197.80
9		$25,320	0.90623243		$22,945.40
10	$87,739	$25,320	0.896372335	$78,646.53	$22,695.75
11		$25,320	0.88661952		$22,448.81
12		$25,320	0.876972819		$22,204.56
13		$25,320	0.867431077		$21,962.97
14		$25,320	0.857993152		$21,724.00
15	$57,521	$25,320	0.848657915	$48,815.58	$21,487.64
16		$25,320	0.839424248		$21,253.85
17		$25,320	0.830291047		$21,022.60
18		$25,320	0.821257218		$20,793.86
19		$25,320	0.812321679		$20,567.62
20	$87,739	$25,320	0.803483362	$70,496.58	$20,343.84
21		$25,320	0.794741209		$20,122.49
22		$25,320	0.786094173		$19,903.55
23		$25,320	0.77754122		$19,687.00
24		$25,320	0.769081325		$19,472.79
25	$57,521	$25,320	0.760713477	$43,756.94	$19,260.92
26		$25,320	0.752436673		$19,051.36
27		$25,320	0.744249924		$18,844.07
28		$25,320	0.736152249		$18,639.05
29		$25,320	0.72814268		$18,436.25
30	$87,739	$25,320	0.720220257	$63,191.18	$18,235.65

Notes:

(1) Based on a 1.1 percent discount factor for projects with a 30-year (or greater) duration, as specified for federal facility sites in Appendix C of Office of Management and Budget Circular A-94 (effective December 2012) at http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html.

Table D-4. Alternative 3 - Cost Summary

Site: Ramona Burn Dump

Description: Alternative 3 (Consolidate and Cap Contaminated Soil and Burn Ash in Place)
Cost Summary for the Ramona Burn Dump Site EE/CA

Location: Cleveland National Forest, San Diego County, California

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	SOURCE/NOTES[1]
Implementation Plans and Design	1	LS	$66,070.96	$66,071	Includes three weeks for technical staff to complete a design and pre-mobilization plans (including Work Plan and HASP with graphics, review, and production). Design costs include a site survey, one site visit for tech staff and geotechnical sampling and testing.
Mobilization and Demobilization	1	LS	$96,740.54	$96,741	Mobilization and demobilization of crew, materials, and equipment. Includes costs for sanitary facilities, and other project necessities. 1 superintendent, 1 engineer, 1 laborer, and 5 operators. Includes per diem for all site workers. Includes delivery of 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader).
Site Work					
Clear and Grub	3.5	Acre	$13,476.47	$47,168	Assumes the whole site (3.5 acres) will be cleared in preparation for waste consolidation and cap construction. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 5 days of work.
Consolidate Waste	1,536	CY	$54.37	$83,515	Assumes approximately 1,536 cubic yards of soil from areas 6 and 10 will be consolidated. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 7 days of work.
Liner Preparation	126,149	SF	$0.39	$49,385	Assumes approximately 126,149 square feet of cap area will be prepared for cap installation. This may include installation of a clean soil veneer beneath the impermeable cap to provide a smooth surface and prevent damage to the liner materials (labor only, soil import included in import cover task). Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 5 days of work.
Liner/Demarcation Layer Installation	126,149	SF	$1.95	$245,532	Assumes a liner area of approximately 126,149 square feet. Includes materials and transportation to the site as well as an HDPE installation technician. Estimated 5 days.
Import Cover Material, Place, Compact and Grade	17,669	Ton	$23.49	$415,012	Assumes approximately 17,669 tons of clean cover soil to construct a 2 foot thick cap. Approximately 1,000 tons of soil per day will be imported, placed and compacted. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 18 days of work.
Install Erosion Controls	3.5	Acre	$15,685.35	$54,899	Includes hydroseeding and installation of erosion control measures (such as rolled erosion control mats and blankets, jute mesh, straw wattle) on the cap and all other disturbed areas, 5 days to install.
After Action Report	1	LS		$44,926.72	Includes 2 weeks for technical staff to write a completion report, including graphics, review, and production. Also includes a final site survey to provide data for as-built drawings.
SUBTOTAL				**$1,103,249**	
Contingency	25%			$275,812	15% scope + 10% bid
SUBTOTAL				**$1,379,061**	
Project Management	10%			$110,324.87	Includes project management during all phases of construction, regulatory interface, and permitting.
Construction Management	12%			$132,389.85	Includes construction management, quality control, geotechnical testing, and quality control testing.
SUBTOTAL					
Institutional Controls	1	LS	$40,500	$40,500	Forest Plan amendment, legal description for ARIC, and legal fees. Includes reproduction.
	TOTAL CAPITAL CONSTRUCTION COSTS:			**$1,662,276**	

Table D-4. Alternative 3 - Cost Summary *(continued)*

Site: Ramona Burn Dump

Description: Alternative 3 (Consolidate and Cap Contaminated Soil and Burn Ash in Place)
Cost Summary for the Ramona Burn Dump Site EE/CA

Location: Cleveland National Forest, San Diego County, California

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	SOURCE/NOTES[1]
Inspections and Maintenance					
Biannual Inspections	2	LS	$ 4,214	$ 8,429	Biannual inspections to evaluate the integrity of all cover elements and storm water BMPs.
Minor Repairs	1	LS	$ 8,229	$ 8,229	Replace erosion control fabric or other BMPs, minor earth work to repair the cap.
SUBTOTAL				**$16,658**	
Contingency	25%			$ 4,164	10% scope + 15% bid
SUBTOTAL				**$20,822**	
Project Management	10%			$1,666	
Contractor Overhead	7%			$1,166	
Profit	10%			$1,666	
		TOTAL ANNUAL O&M COSTS:		**$25,320**	per year
		TOTAL ANNUAL O&M COSTS:		**$759,587**	Years 1-30

PERIODIC COSTS	Year					
Five-Year Review Report	5	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 5.
Significant Repairs	5	1	LS	$12,594	$12,594.20	Costs for significant cap repairs and BMPs.
SUBTOTAL (YEAR 5)					**$57,520.92**	
Five-Year Review Report	10	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 10.
Major Repairs	10	1	LS	$42,812	$42,811.97	Costs for major cap repairs
SUBTOTAL (YEAR 10)					**$87,738.69**	
Five-Year Review Report	15	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 15.
Significant Repairs	15	1	LS	$12,594	$12,594.20	Costs for significant cap repairs and BMPs.
SUBTOTAL (YEAR 15)					**$57,520.92**	
Five-Year Review Report	20	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 20.
Major Repairs	20	1	LS	$42,812	$42,811.97	Costs for major cap repairs
SUBTOTAL (YEAR 20)					**$87,738.69**	
Five-Year Review Report	15	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 25.
Significant Repairs	15	1	LS	$12,594	$12,594.20	Costs for significant cap repairs and BMPs.
SUBTOTAL (YEAR 25)					**$57,520.92**	
Five-Year Review Report	20	1	LS	$44,927	$44,926.72	Preparation of one report at the end of Year 30.
Major Repairs	20	1	LS	$42,812	$42,811.97	Costs for major cap repairs
SUBTOTAL (YEAR 30)					**$87,738.69**	

Table D-4. Alternative 3 - Cost Summary *(continued)*

Site: Ramona Burn Dump

Description: Alternative 3 (Consolidate and Cap Contaminated Soil and Burn Ash in Place) Cost Summary for the Ramona Burn Dump Site EE/CA

Location: Cleveland National Forest, San Diego County, California

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	SOURCE/NOTES[1]

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (2.0%)	PRESENT VALUE
Capital Cost	0	$ 1,662,276	$ 1,662,276	1.000	$ 1,662,276
Annual O&M Cost	1-30	$ 759,587	$ 25,320	0.848	$ 643,991
Periodic Cost	5	$ 57,520.92	$ 57,521	0.947	$ 54,459
Periodic Cost	10	$ 87,738.69	$ 87,739	0.896	$ 78,647
Periodic Cost	15	$ 57,520.92	$ 57,521	0.849	$ 48,816
Periodic Cost	20	$ 87,738.69	$ 87,739	0.803	$ 70,497
Periodic Cost	25	$ 57,520.92	$ 57,521	0.761	$ 43,757
Periodic Cost	30	$ 87,738.69	$ 87,739	0.720	$ 63,191
		$ 2,857,641.02			$2,665,632

TOTAL PRESENT VALUE OF SELECTED REMEDY **$2,665,632**

Notes:

(1) Based on a 1.1 percent discount factor for projects with a 30-year (or greater) duration, as specified for federal facility sites in Appendix C of Office of Management and Budget Circular A-94 (effective December 2012) at http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html.

ARIC = Area Requiring Institutional Controls

BMPs = best management practices

cy = cubic yard

LS = lump sum

O&M = operation and maintenance

SF = square feet

TN = ton

Table D-5. Alternative 3 - Present Value Analysis

Year	Periodic Cost	Annual Cost	Discount Factor[1]	Actual Periodic Cost	Actual Annual Cost
1		$25,320	0.989119683		$25,044.07
2		$25,320	0.978357748		$24,771.58
3		$25,320	0.967712906		$24,502.06
4		$25,320	0.957183884		$24,235.47
5	$57,521	$25,320	0.94676942	$54,459.05	$23,971.78
6		$25,320	0.936468269		$23,710.96
7		$25,320	0.926279198		$23,452.97
8		$25,320	0.916200987		$23,197.80
9		$25,320	0.90623243		$22,945.40
10	$87,739	$25,320	0.896372335	$78,646.53	$22,695.75
11		$25,320	0.88661952		$22,448.81
12		$25,320	0.876972819		$22,204.56
13		$25,320	0.867431077		$21,962.97
14		$25,320	0.857993152		$21,724.00
15	$57,521	$25,320	0.848657915	$48,815.58	$21,487.64
16		$25,320	0.839424248		$21,253.85
17		$25,320	0.830291047		$21,022.60
18		$25,320	0.821257218		$20,793.86
19		$25,320	0.812321679		$20,567.62
20	$87,739	$25,320	0.803483362	$70,496.58	$20,343.84
21		$25,320	0.794741209		$20,122.49
22		$25,320	0.786094173		$19,903.55
23		$25,320	0.77754122		$19,687.00
24		$25,320	0.769081325		$19,472.79
25	$57,521	$25,320	0.760713477	$43,756.94	$19,260.92
26		$25,320	0.752436673		$19,051.36
27		$25,320	0.744249924		$18,844.07
28		$25,320	0.736152249		$18,639.05
29		$25,320	0.72814268		$18,436.25
30	$87,739	$25,320	0.720220257	$63,191.18	$18,235.65

Notes:

(1) Based on a 1.1 percent discount factor for projects with a 30-year (or greater) duration, as specified for federal facility sites in Appendix C of Office of Management and Budget Circular A-94 (effective December 2012) at http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html.

Table D-6. Alternative 4 - Cost Summary

Site: Ramona Burn Dump

Description: Alternative 4 (Excavation and Offsite Disposal of Contaminated Soil and Burn Ash)
Cost Summary for the Ramona Burn Dump Site EE/CA

Location: Cleveland National Forest, San Diego County, California

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	SOURCE/NOTES[1]
Implementation Plans	1	LS	$8,486.36	$8,486	Includes two weeks for technical staff to complete pre-mobilization plans (including Work Plan and HASP with graphics, review, and production). Site visit is not included.
Mobilization and Demobilization	1	LS	$94,233.98	$94,234	Mobilization and demobilization of crew, materials, and equipment. Includes costs for sanitary facilities, and other project necessities. 1 superintendent, 1 engineer, 1 laborer, and 5 operators. Includes per diem for all site workers. Includes delivery of 5 pieces of equipment (1 water truck, 1 bull dozer, 1 excavator, 1 front end loader, 1 skip loader).
Site Work					
Clear and Grub	3.5	Acre	$13,476.47	$47,168	Assumes the whole site (3.5 acres) will be cleared in preparation for waste consolidation and cap construction. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 backhoe, 1 front end loader, 1 skip loader). Assumes 5 days of work.
Excavate waste and Backfill Excavation	60,251	Ton	$18.80	$1,132,496	Assumes 37,657 cubic yards of waste will be excavated and replaced with 60,251 tons of compacted clean backfill. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 excavator, 1 front end loader, 1 skip loader). Assumes approximately 1,000 cubic yards of waste can be excavated and backfilled per day, 37 days of work.
Transportation and Disposal of Waste	55,617	Ton	$92.08	$5,121,303	Assumes 55,617 tons of non-RCRA California Hazardous waste will be off hauled. Includes a crew of 8 (1 superintendent, 1 engineer, 1 laborer, and 5 operators) with per diem for all site workers. Includes 5 pieces of equipment (1 water truck, 1 bull dozer, 1 excavator, 1 front end loader, 1 skip loader). Assumes approximately 1,000 tons of waste can be off hauled per day, 55 days of work.
Install Erosion Controls	3.5	Acre	$15,685.35	$54,899	Includes hydroseeding and installation of erosion control measures (such as rolled erosion control mats and blankets, jute mesh, straw wattle) on all disturbed areas, 5 days to install.
After Action Report	1	LS		$11,882.36	Includes 8 days for Technical Staff to write a completion report, including graphics, review, and production.
SUBTOTAL				**$6,470,468**	
Contingency	25%			$1,617,617	15% scope + 10% bid
SUBTOTAL				**$8,088,085**	
Project Management	10%			$647,046.82	Includes project management during all phases of construction, regulatory interface, permitting, and crew per diems.
Construction Management	12%			$776,456.18	Includes construction management, quality control, geotechnical testing, and quality control
SUBTOTAL					
Institutional Controls	1	LS	$40,500	$40,500	Forest Plan amendment, legal description for ARIC, and legal fees. Includes reproduction.
	TOTAL CAPITAL CONSTRUCTION COSTS:			**$9,552,088**	

Table D-6. Alternative 4 - Cost Summary *(continued)*

Site: Ramona Burn Dump

Description: Alternative 4 (Excavation and Offsite Disposal of Contaminated Soil and Burn Ash)
Cost Summary for the Ramona Burn Dump Site EE/CA

Location: Cleveland National Forest, San Diego County, California

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	SOURCE/NOTES[1]
Inspections and Maintenance					
Biannual Inspections	2	LS	$ 4,214	$ 8,429	Biannual inspections to evaluate the integrity of all cover elements and storm water BMPs.
Minor Repairs	1	LS	$ 8,229	$ 8,229	Replace erosion control fabric or other BMPs
SUBTOTAL				**$16,658**	
Contingency	25%			$ 4,164	10% scope + 15% bid
SUBTOTAL				**$20,822**	
Project Management	10%			$1,666	
Contractor Overhead	7%			$1,166	
Profit	10%			$1,666	
		TOTAL ANNUAL O&M COSTS:		**$25,320**	per year
		TOTAL ANNUAL O&M COSTS:		**$25,320**	1 Year only

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (2.0%)	PRESENT VALUE
Capital Cost	0	$ 9,552,088	$ 9,552,088	1.000	$ 9,552,088
Annual O&M Cost	1	$ 25,320	$ 25,320	1	$25,044.07
		$9,577,408			$9,577,132
TOTAL PRESENT VALUE OF SELECTED REMEDY				**$9,577,132**	

Notes:

(1) Based on a 1.1 percent discount factor for projects with a 30-year (or greater) duration, as specified for federal facility sites in Appendix C of Office of Management and Budget Circular A-94 (effective December 2012) at http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html.

ARIC = Area Requiring Institutional Controls

BMPs = best management practices

cy = cubic yard

LS = lump sum

O&M = operation and maintenance

SF = square feet

TN = ton

Table D-7. Alternative 4 - Present Value Analysis

Year	Periodic Cost	Annual Cost	Discount Factor[1]	Actual Periodic Cost	Actual Annual Cost
1		$25,320	0.989119683		$25,044.07
2		$0	0.978357748		$0.00
3		$0	0.967712906		$0.00
4		$0	0.957183884		$0.00
5		$0	0.94676942		$0.00
6		$0	0.936468269		$0.00
7		$0	0.926279198		$0.00
8		$0	0.916200987		$0.00
9		$0	0.90623243		$0.00
10		$0	0.896372335		$0.00
11		$0	0.88661952		$0.00
12		$0	0.876972819		$0.00
13		$0	0.867431077		$0.00
14		$0	0.857993152		$0.00
15		$0	0.848657915		$0.00
16		$0	0.839424248		$0.00
17		$0	0.830291047		$0.00
18		$0	0.821257218		$0.00
19		$0	0.812321679		$0.00
20		$0	0.803483362		$0.00
21		$0	0.794741209		$0.00
22		$0	0.786094173		$0.00
23		$0	0.77754122		$0.00
24		$0	0.769081325		$0.00
25		$0	0.760713477		$0.00
26		$0	0.752436673		$0.00
27		$0	0.744249924		$0.00
28		$0	0.736152249		$0.00
29		$0	0.72814268		$0.00
30		$0	0.720220257		$0.00

Notes:

(1) Based on a 1.1 percent discount factor for projects with a 30-year (or greater) duration, as specified for federal facility sites in Appendix C of Office of Management and Budget Circular A-94 (effective December 2012) at http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html.