



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MEMORANDUM

DATE: JUL 30 2013

SUBJECT: Request for a Time-Critical Removal Action at the Eureka Smelters Site, Eureka, Eureka County, Nevada

FROM: Tom Dunkelman, On-Scene Coordinator
Emergency Response Section (SFD-9-2)

TO: Peter Guria, Acting Assistant Director (SFD-9)
Superfund Division

THROUGH: Harry Allen, Chief
Emergency Response Section (SFD-9-2)

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the selected removal action described herein for the Eureka Smelters Site (the Site) located in Eureka, Eureka County, NV and to incur direct extramural costs of up to \$1,950,000. The proposed response action would mitigate threats to human health and the environment posed by the presence of arsenic and lead present in surface soils at up to twenty three residential properties and is being carried out as the initial stage of a more comprehensive removal action needed to address arsenic and lead contamination at additional residential properties, former mill and smelter sites, and slag piles.

Conditions presently exist at the Site that, if not addressed by implementing the response action documented in this memorandum, may lead to continued exposure to arsenic and lead present in soil. As discussed in this memorandum, these hazardous substances, if unaddressed, may pose an imminent and substantial endangerment to the public health or welfare or the environment.

The proposed response to the hazardous substances is consistent with removal activities authorized pursuant to Section 104(a) of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9604(a), and Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency

Plan ("NCP"), 40 C.F.R. § 300.415. This response action also incorporates Site investigation activities also authorized by Section 104(a) and (b) of CERCLA, 42 U.S.C. § 9604(a) and (b).

II. SITE CONDITIONS AND BACKGROUND

Site Status:	Non-NPL
Category of Removal:	Time-Critical
CERCLIS ID:	NVN000909500
SITE ID:	A927

A. Site Description

1. Physical location

The Town of Eureka (Eureka) is an unincorporated community, with a population of approximately 610 residents, located in Eureka County, Nevada. The town occupies approximately 480 acres of land in the southern part of Eureka County, at an elevation of approximately 6,900 feet above sea level. The geographical coordinates for the approximate center of Eureka are 39° 30' 45" Latitude North and 115° 57' 39" Longitude West. A regional site location map is provided as Figure 1.

2. Site characteristics

Eureka is situated in a historical mining district with at least seven known former ore milling and smelter operations located throughout the town (see Figure 2). Eureka is bisected by U.S. Highway 50 and a narrow intermittent creek, which are oriented north-south through the town. Eureka's creek flows down gradient to the north. The residential, commercial and public properties in Eureka are primarily situated in the hills along the east and west sides of U.S. Highway 50. The historic wind direction through the town, as documented by the Western Regional Climate Center based on Eureka Airport data, is predominately from the south to the north. The area directly to the north is hilly terrain that opens into a broad alluvial plain. The creek flows from the south through the town and on into the alluvial plain. There is a large open-pit mining operation located approximately 1 mile north-northwest of the town.

There are two large consolidated slag piles ("CSPs") located on both the north and south ends of town, and several smaller CSPs have been identified at other locations around Eureka. These CSPs are associated with former smelter sites. Based on a review of Eureka County Tax Assessor parcel information and historical land maps, there are more than 400 residential, public, and commercial parcels in Eureka that are either on, adjacent to, or in close proximity to the sites of the former ore smelters and milling operations.

According to information obtained from the United States Bureau of Land Management (BLM) document *A Historic View of the BLM Shosone-Eureka Resource Area, Nevada, Technical Report 7* (BLM, 1991), between 1866 and 1910, mining for geological deposits of silver and lead took place in the Ruby Hill area, which is located approximately 2 miles west of Eureka. During this period, over one-million tons of ore was extracted from Ruby Hill primarily by the Eureka Consolidated Mining Company and Richmond Consolidated Mining Company. The ore mined from Ruby Hill was then transported via railcar to various milling and smelter operations historically located throughout Eureka. The following historical ore milling and smelter operations were identified in Eureka and are shown on Figures 2.

- Lemon Mill
- McCoys Mill
- Eureka Consolidated Smelter
- Matamoras Smelter
- Hoosac Smelter
- Atlas Smelter
- Richmond Company Smelter
- Jackson Smelter
- Silver West Smelter
- Lemon Mill
- McCoys Mill
- Taylor Mill

As a result of ore processing at these former mills and smelter sites, waste product known as slag was produced and consolidated into a number of separate piles located throughout Eureka. The two large CSPs (Eureka Company and Richmond Company) are located along U.S. Highway 50 on the northern and southern ends of town. Additional smaller slag piles are present in town. Due to the extensive amount of historical ore processing operations in Eureka, it has been reported that air pollution caused health problems among residents and former smelter workers, during the time frame when the smelters were in operation. Reports also indicate that air pollution killed vegetation in and around Eureka (Paher 1970, BLM 1991). In the book *Nevada Ghost Towns and Mining Camps* by Stanley Paher, 1970, Nevada Publications, page 181, there is the following statement: "On the outskirts of town, 16 smelters with a daily capacity of 745 tons treated ore from over fifty producing mines. Furnaces poured forth dense clouds of black smoke which constantly rolled over the town and deposited soot, scales and black dust everywhere, giving the town a somewhat somber aspect and killing vegetation. The "Pittsburgh of the West," Eureka was indeed the foremost smelting district in the entire West."

There were several flood events, including a major flood event in 1874 that reportedly washed out much of the town and smelter facilities (NJS 1874).

3. Site evaluation

In 1978, the United States Department of Interior Geological Survey collected 593 samples that identified a 3-kilometer (km) by 6-km area of contamination within the Eureka mining district. The data were published in a 1978 report titled *Geochemical Analyses of Rock and Soil Samples, Eureka Mining District and Vicinity, Eureka and White Pine Counties* and discussed in a 2004 U.S. Geological Survey publication, *Hydrogeochemical Studies of Historical Mining Areas in the Humboldt River Basin and Adjacent Areas, Northern Nevada*.

In April 2012, EPA and Nevada Department of Environmental Protection ("NDEP") personnel collected five slag and soil samples from publically accessible locations within Eureka. These samples were analyzed by x-ray fluorescence ("XRF") instrumentation and high levels of arsenic and lead were identified. In May 2012, EPA and NDEP personnel collected 38 additional surface soil samples from publically accessible locations around Eureka for lead and arsenic analysis. The analytical results for arsenic indicated that five samples had arsenic concentrations below 60 mg/kg, 23 samples had arsenic concentrations between 60 mg/kg and 600 mg/kg, and 10 samples had arsenic concentrations above 600 mg/kg. The arsenic concentrations in samples ranged from 10 mg/kg to 6,700 mg/kg. The analytical results for lead indicated that 10 samples had lead concentrations below 400 mg/kg, 20 samples had lead concentrations between 400 mg/kg and 5,000 mg/kg, and 8 samples had lead concentrations above 5,000 mg/kg. The lead concentrations ranged from 44 mg/kg to 45,000 mg/kg. The highest lead soil concentrations were detected at the CSPs located on both the northern and southern ends of town, and at former smelter site locations.

In October 2012, EPA conducted a Removal Assessment in Eureka. Surface and shallow subsurface soil samples were collected from residential and public properties located throughout Eureka where access was granted by the owners to EPA and NDEP. A total of 268 decision units (an area where a decision to take action may be made) from 106 individual residential and public properties were sampled during this removal assessment. Conclusions from this Removal Assessment included the following:

- The majority of sampled residential properties in established town areas had significant concentrations of both arsenic and lead above background. The mean lead concentration was 1,880 mg/kg, and the mean arsenic concentration was 327 mg/kg. In contrast, the mean lead concentration for all background samples was 47 mg/kg and the mean arsenic concentration for all background samples was 25 mg/kg. Iso-concentration maps depicting the concentration of arsenic and lead in surface soils are presented in Figures 3 and 4.
- The average bio-accessibility value measured in soil samples for lead was 75 percent and the average bio-accessibility value measured in soil samples for arsenic was 40 percent.

- 7.6 percent of all soil samples collected exceeded the initial Removal Action Level (RAL) of 600 mg/kg for arsenic, and 10.3 percent of all soil samples collected exceeded the initial RAL of 3,000 mg/kg for lead.

In May 2013, EPA conducted a second Removal Assessment in Eureka to address additional properties. Surface and shallow subsurface samples were collected from an additional 19 residential and vacant properties.

- Preliminary sampling results indicated extremely high levels of arsenic and lead at four properties (arsenic in excess of 38,000 mg/kg and lead in excess of 100,000 mg/kg).

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant

Arsenic and lead are present throughout much of Eureka at elevated levels as described above. Between the October 2012 and May 2013 sampling events, 23 properties have been identified where arsenic and lead soil concentrations exceeded initial Removal Action levels of 600 mg/kg arsenic and 3,000 mg/kg lead. At each property, four decision units (representing four sides of the home) were sampled at three depths. In one or more decision unit at each property, soil concentrations exceeded the RALs. The lead concentrations in decision units, which exceeded the action levels, ranged from 3000 mg/kg to 20,500 mg/kg. The arsenic concentrations in decision units, which exceeded the action levels, ranged from 600 mg/kg to 3900 mg/kg.

5. National Priorities List ("NPL") status

The Site is not currently on the NPL.

B. Other Actions to Date

Other than the assessment activities described above, no other assessment or cleanup activities have occurred to date.

C. State and Local Authorities' Roles

1. State and local actions to date

On May 4, 2012, NDEP submitted a request for Federal assistance at the Eureka Smelters Site. To date, neither NDEP nor Eureka County has taken any cleanup actions at the Site.

2. Potential for continued state/local response

Eureka County and NDEP have been engaged in discussions regarding potential cleanup actions that might be implemented by the County or State. This removal action will provide additional time for these parties to develop a viable plan.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Conditions at the Site represent a release, and potential threat of release, of CERCLA hazardous substances threatening the public health, or welfare, or the environment based on the factors set forth in the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. § 300.415(b)(2). These factors include:

1. Actual or potential exposure to nearby populations, animals or the food chain from hazardous substances or pollutants or contaminants

High concentrations of arsenic and lead have been documented in surface and near-surface residential soils and at former mill and smelter sites, including CSPs. Limited blood lead testing has been performed by Eureka County using grant money from NDEP and EPA. Not all results from the blood lead testing have been shared with EPA. However EPA understands that several children had blood lead levels in excess of the current Centers for Disease Control (CDC) blood lead reference value of 5 micrograms per deciliter. EPA believes that adults and children living on or in close proximity to property where arsenic and lead exceed the initial removal action levels have a continued risk of exposure to these metals and likely exposures in children have been observed by EPA personnel.

Children playing in contaminated yards receive probable exposures through ingestion including mouthing contaminated toys or soil itself and inhalation through exposure to wind-blown dust. In addition, airborne contaminated dust may enter the residence through windows and doors. Foot- and domestic animal traffic through outside doors also introduces lead and arsenic contamination into the home creating indoor exposure pathways and increasing exposure likelihood and severity.

The Department of Health and Human Services (DHHS) and EPA have determined that arsenic is a known human carcinogen. Studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood

cells, abnormal heart rhythm, and damage to blood vessels. Ingesting or breathing low levels of inorganic arsenic for a long time can cause darkening of the skin and appearance of small corns or warts.

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ in the human body. The main target for lead toxicity is the nervous system, both in adults and children. Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels, lead can affect a child's mental and physical growth. Exposure to lead is more dangerous for young and unborn children. Harmful effects include premature births, smaller babies, and decreased mental ability in the infant, learning difficulties, and reduced growth in young children.

2. Actual or potential contamination of drinking water supplies

Actual or potential contamination of drinking water supplies has not yet been adequately assessed. Most of the town of Eureka is serviced by a municipal drinking water system. Periodic testing is performed. To EPA's knowledge there have not been exceedances of drinking water standards for lead, but there have been past exceedances for arsenic. There are also private drinking water wells, and EPA has no knowledge of water quality issues associated with these private wells.

3. High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate

High levels of arsenic and lead in surface and near surface soils and in slag have been documented during the Removal Assessment process. Aerial transport of contaminated soil and slag has occurred in the past and is currently ongoing. Sampling performed during the Removal Assessment has documented aerial deposition of high levels of arsenic and lead downwind of the smelter sites. As described above, contamination in residential yards also has the potential to migrate indoors.

In addition, the two large CSPs are located along a stream that flows through town. Sampling performed during the Removal Assessment documented migration of arsenic and lead in the floodplain downstream of the CSPs. The potential for migration of lead and arsenic to groundwater has not been adequately assessed, but certainly the potential exists.

4. Weather conditions may cause hazardous substances or pollutants or contaminants to migrate or be released

The Site is located in an area of Nevada that is characterized by extremely variable winds with high velocities throughout much of the year. High winds could contribute to enhanced migration of arsenic and lead present in surface and near surface soil. Sampling performed during the Removal Assessment has documented aerial deposition of high levels of arsenic and lead downwind of the smelter sites.

5. Availability of other appropriate federal or state response mechanisms to respond to the release

There are no other Federal or State response mechanisms available to address high levels of arsenic and lead present in surface and near-surface soils in a manner timely enough to prevent exposures.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may present a release or substantial threat of release of hazardous substances into the environment that are appropriate for response actions as authorized by Section 104(a) of CERCLA, 42 U.S.C. § 9604(a).

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

The following response actions will be conducted as part of this removal action:

- (a) Removal and/or covering of arsenic or lead contaminated surface and near-surface soil at residential properties.

Based on extensive discussions with NDEP, EPA has identified initial Removal Action levels of 600 ppm arsenic and 3,000 ppm lead. These initial Removal Action levels are interim values intended to address only the most contaminated residential sites between now and the onset of the winter season when work is expected to be curtailed. To date, EPA has identified up to twenty three residential properties that have soil contamination in excess of these initial Removal Action levels. Work to be performed would include excavation (to a depth of one foot and/or covering of any decision units within a property where contamination levels exceed the initial Removal Action levels for either arsenic or

lead. The decision to excavate versus cover would be made by the On-Scene Coordinator (OSC) in conjunction with the property owner.

Excavated soil would be transported to an appropriate landfill or repository. In the event that an appropriate repository could not be identified this field season, excavated soil would be temporarily stockpiled.

Excavated areas would be covered with clean fill. Necessary repairs to the landscaping and infrastructure would be performed, as determined by the OSC in conjunction with the property owner.

Given the lateness of the season, it is likely that remediation of all properties that require clean up may not be possible this construction season. As necessary, the OSC will make appropriate decisions regarding the prioritization of properties where excavation/covering occurs. This prioritization will take into account properties with signed access agreements, the levels of arsenic and lead present in soil, the presence of children or women of child-bearing age, and blood lead levels.

- (b) Indoor sampling and remediation of homes with elevated levels of arsenic or lead in surface and near-surface soils.

As determined by the OSC, indoor sampling and remediation of homes may be performed at houses where arsenic or lead occur in surface or near surface soils in excess of the initial Removal Action levels of 600 ppm arsenic and 3,000 ppm lead.

Given the lateness of the season, it is likely that indoor sampling and remediation of all properties that require clean up may not be possible this construction season. As necessary, the OSC will make appropriate decisions regarding the prioritization of properties where indoor sampling and remediation occurs.

2. Contribution to remedial performance

The long-term cleanup plan for the Site:

It is likely that this initial removal action will be the first phase of cleanup work to be performed in Eureka. It is anticipated that there will be a need for cleanup of additional residential properties, as well as remediation of former mill and smelter sites and CSPs.

Threats that will require attention prior to the start of a long-term cleanup:

Sampling of soil on multiple properties in Eureka revealed concentrations of arsenic and lead well in excess of 60 ppm arsenic and 400 ppm lead that EPA considers

safe for residential use. EPA's goal for the remaining season, 2013, is to address the most contaminated residential properties where soil levels were found to exceed 3,000 ppm lead and 600 ppm arsenic. Due to the fact that actual exposures are likely occurring now, it is important to deal with these contaminated residential properties now in advance of a long-term cleanup that will have to wait until next season.

The extent to which the removal will ensure that threats are adequately abated:

By conducting the actions described in this Action Memorandum, this removal action will reduce the threat of exposure to hazardous substances at the properties identified as having arsenic and lead soil concentration in excess of the initial Removal Action Levels. Due to the lateness of the season, the OSC may have to prioritize which properties are remediated.

Consistency with the long-term remedy:

It is anticipated that there will be a need for cleanup of additional residential properties, as well as remediation of former mill and smelter sites and CSPs. The work performed as part of this initial removal action will be consistent with any additional long-term cleanup work performed at the Site.

3. Applicable or relevant and appropriate requirements (ARARs)

Section 300.415(j) of the NCP provides that removal actions must attain ARARs to the extent practicable, considering the exigencies of the situation.

Section 300.5 of the NCP defines applicable requirements as cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site.

Section 300.5 of the NCP defines relevant and appropriate requirements as cleanup standards, standards of control and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular Site.

Because CERCLA on-site response actions do not require permitting, only substantive requirements are considered as possible ARARs. Administrative requirements such as approval of, or consultation with administrative bodies, issuance of permits, documentation, reporting, record keeping and enforcement are not ARARs for the CERCLA response actions confined to the Site.

The following ARARs have been identified for the proposed response action. All can be attained.

Federal ARARs: Potential federal ARARs may include the RCRA Land Disposal Restrictions, 40 C.F.R. § 268.40 Subpart D; and the CERCLA Off-Site Disposal Restrictions, 40 C.F.R. § 300.440.

State ARARs: Potential state ARARs may include the Action Levels for Contaminated Sites regulations at Nevada Administrative Code 445A.226 to 445A.22755.

5. Project schedule

The removal action is anticipated to start after the approval of the action as indicated by the signature on this memorandum. Depending on the number of properties mitigated, the removal activities will require approximately six to eight weeks to complete.

B. Estimated Costs

Cost estimates are based on existing Emergency and Rapid Remedial Response Services (ERRS) rates for the EPA Region 9 contracts.

Extramural Costs

Regional Removal Allowance Costs

Cleanup Contractor (ERRS)	\$ 1,500,000
ERRS Contingency (20%)	\$ 300,000
TOTAL, Removal Action Project Ceiling	\$ 1,800,000
START Contract Costs	\$ 150,000
TOTAL, Extramural Costs	\$ 1,950,000

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the Site conditions, the nature of the hazardous substances documented on-Site and the potential exposure pathways to nearby populations described in Sections III and IV above, actual or threatened releases of hazardous substances from the Site, if

not addressed by implementing the response actions selected in this memorandum, present a release or substantial threat of release of hazardous substances into the environment. If no action is taken, residents in the town of Eureka, particularly those residents living at properties where arsenic and lead levels have been documented in excess of initial Removal Action levels, will continue to be exposed to high levels of arsenic and lead. Arsenic is a known human carcinogen and lead is known to cause irreversible neurological impacts on children.

VII. OUTSTANDING POLICY ISSUES

This removal action addresses residential properties where arsenic and lead contamination are in excess of initial Removal Action levels. This action would address up to twenty-three residential properties. It is likely that more residential properties as well as former mill and smelter sites will also require remediation in the future.

VIII. ENFORCEMENT

Please see the attached Confidential Enforcement Addendum for a discussion regarding potentially responsible parties and enforcement. In addition to any extramural costs estimated for the proposed action, a cost recovery enforcement action also may recover the following intramural costs:

Intramural Costs¹

U.S. EPA Direct Costs	\$ 50,000
U.S. EPA Indirect Costs (36.19% of Direct Costs (\$2,000,000))	\$ <u>723,800</u>
TOTAL Costs	\$ 2,723,800

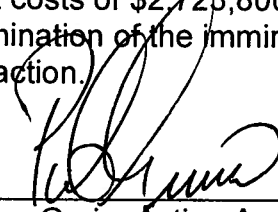
The total EPA extramural and intramural costs for this removal action, based on full-cost accounting practices, that will be eligible for cost recovery, are estimated to be \$2,723,800 of which 1,950,000 from the Regional Removal Allowance.

1. Direct costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual costs from this estimate will affect the United States' right to cost recovery.

IX. RECOMMENDATION

This memorandum proposes a removal action for the Eureka Smelters Site, located in Eureka, Nevada, as developed in accordance with CERCLA and not inconsistent with the NCP. This decision is based on the Administrative Record for the Site. Because conditions at the Site meet the NCP criteria for a time-critical removal, I recommend that you concur on the determination of imminent and substantial endangerment, the proposed removal action and the anticipated intramural and extramural direct costs of \$2,723,800. Your approval below will establish as agency action the determination of the imminent and substantial endangerment and the selection of the response action.

Approve: _____


Peter Guria, Acting Assistant Director
Superfund Division

7-30-13
Date

Disapprove: _____

Peter Guria, Acting Assistant Director
Superfund Division

Date

Attachments

Index to the Administrative Record
Confidential Enforcement Addendum

Appendices

- Figure 1. Area map
- Figure 2. Map depicting locations of former mill and smelter sites
- Figure 3. Arsenic Soil Iso-Concentration Map
- Figure 4. Lead Soil Iso-Concentration Map

cc: Colleen Cripps, Administrator, Nevada Division of Environmental Protection
Greg Lovato, Nevada Division of Environmental Protection

Index to the Administrative Record

ATSDR ToxFAQ, Arsenic, CAS # 7440-38-2. August 2007.

ATSDR ToxFAQ, Lead, CAS # 7439-92-1. August 2007.

Request for Federal Assistance, from Greg Lovato, May 4, 2012.

Nevada Ghost Towns and Mining Camps by Stanley Paher, 1970, Nevada Publications.

Geochemical Analyses of Rock and Soil Samples, Eureka Mining District and Vicinity, Eureka and White Pine Counties, 1978

U.S. Geological Survey publication, Hydrogeochemical Studies of Historical Mining Areas in the Humboldt River Basin and Adjacent Areas, Northern Nevada. 2004.

A Historic View of the BLM Shosone-Eureka Resource Area, Nevada, Tech. Report 7 (BLM, 1991),

GUIDANCE FOR THE SAMPLING AND ANALYSIS OF LEAD IN INDOOR RESIDENTIAL DUST FOR USE IN THE INTEGRATED EXPOSURE UPTAKE BIOKINETIC (IEUBK) MODEL, U.S. EPA, OSWER 9285.7-81, DECEMBER 2008

MEMORANDUM: OSWER DIRECTIVE: REVISED INTERIM SOIL LEAD GUIDANCE FOR CERCLA SITES AND RCRA CORRECTIVE ACTION FACILITIES, EPA OSWER Directive #9355.4-12 August 1994

National Toxicology Program, DHHS, NTP Monograph, Health Effects of Low-level Lead, June 2012

Superfund Lead-Contaminated Residential Sites Handbook, U.S. EPA, OSWER 9285.7-50, August 2003

Assessing Intermittent or Variable Exposure at Lead Sites, U.S. EPA, EPA-540-R-03-008, OSWER #9285.7-76, undated.

Sampling and Analysis Plan, Eureka Smelter Site, Assessment Phase 2. Prepared for U.S. EPA Region 9 by Ecology and Environment Inc., September 2012.

Eureka Smelter Site, Removal Assessment Report, prepared for U.S. EPA Region 9 by Ecology and Environment Inc., March 2013.

Sampling and Analysis Plan, Eureka Smelter Site, Assessment Phase 2. Prepared for U.S. EPA Region 9 by Ecology and Environment Inc., May 2013.

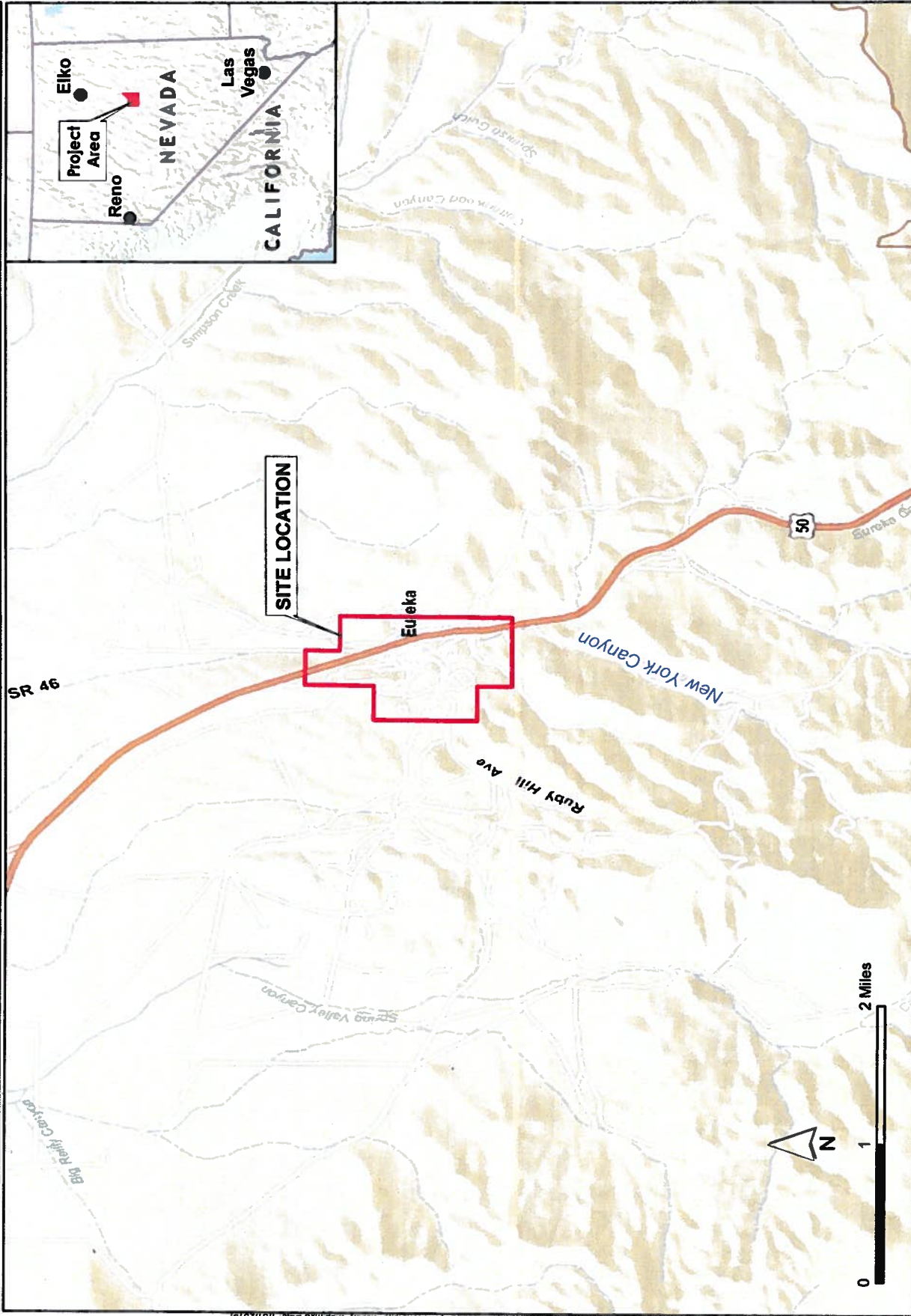


Figure 1
Site Location Map
Eureka Smelter Sites
Eureka, Eureka County, Nevada

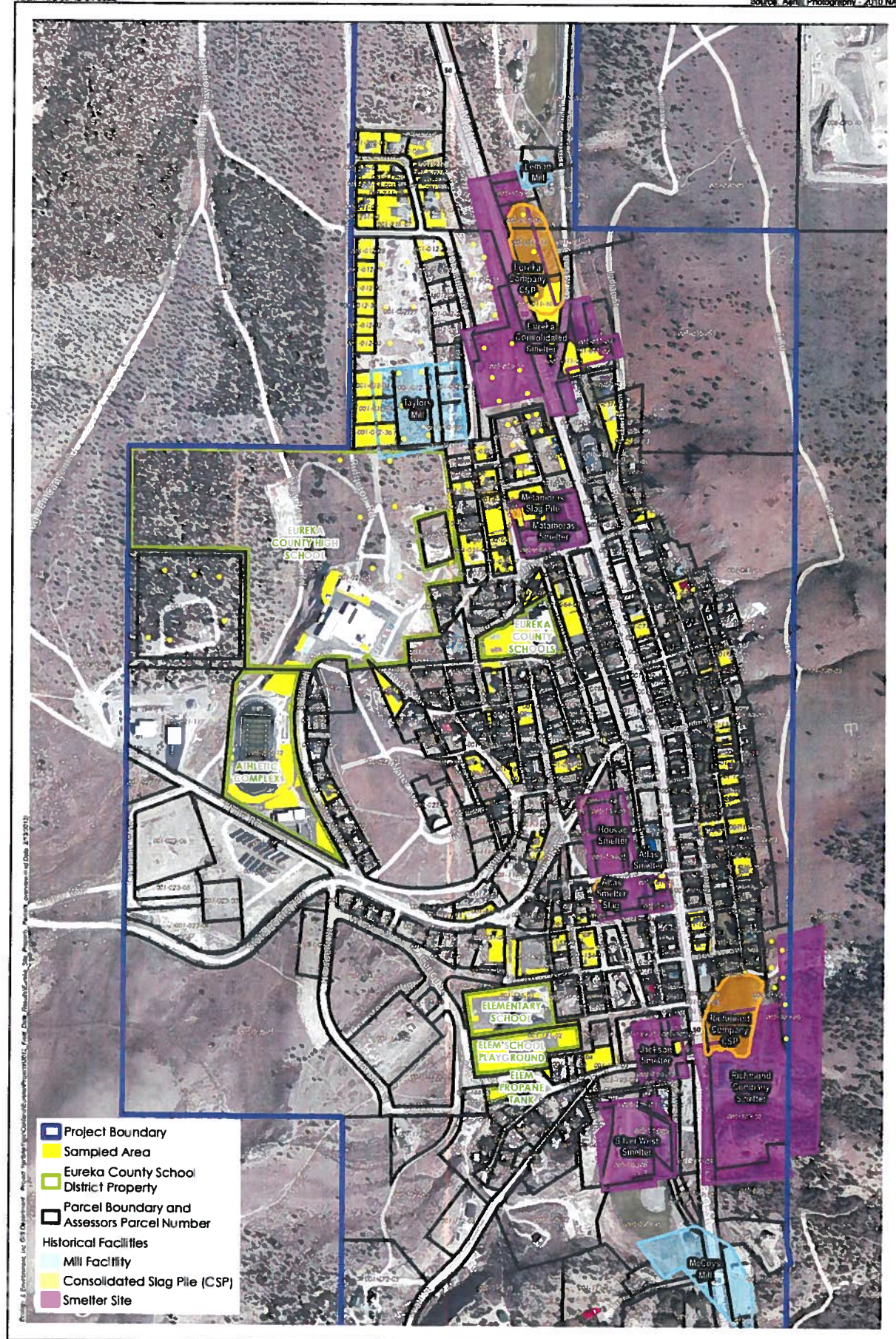
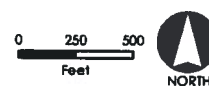


Figure 2
Property Parcels in Eureka, Nevada
Eureka Smelters Sites
Eureka, Eureka County, Nevada



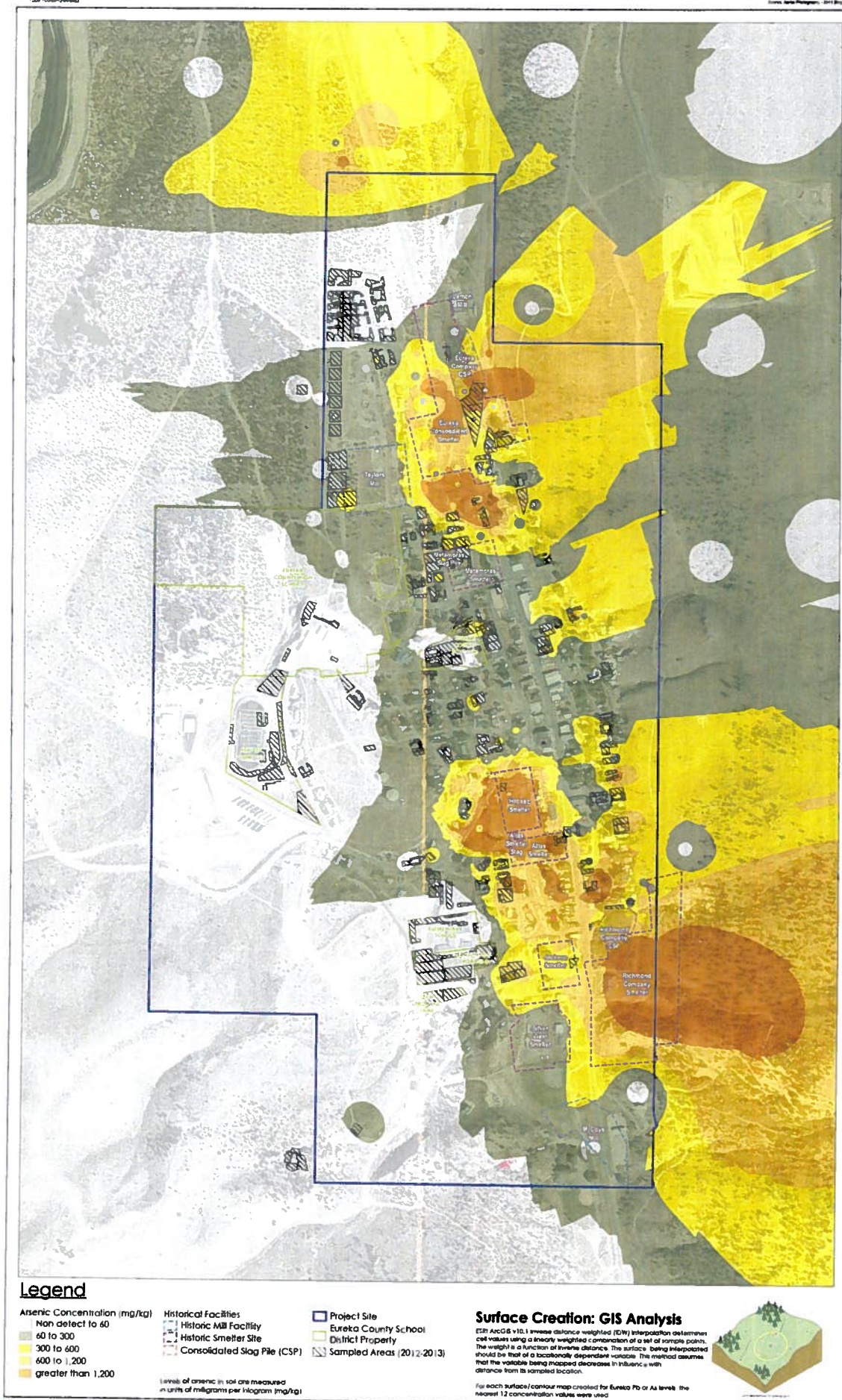
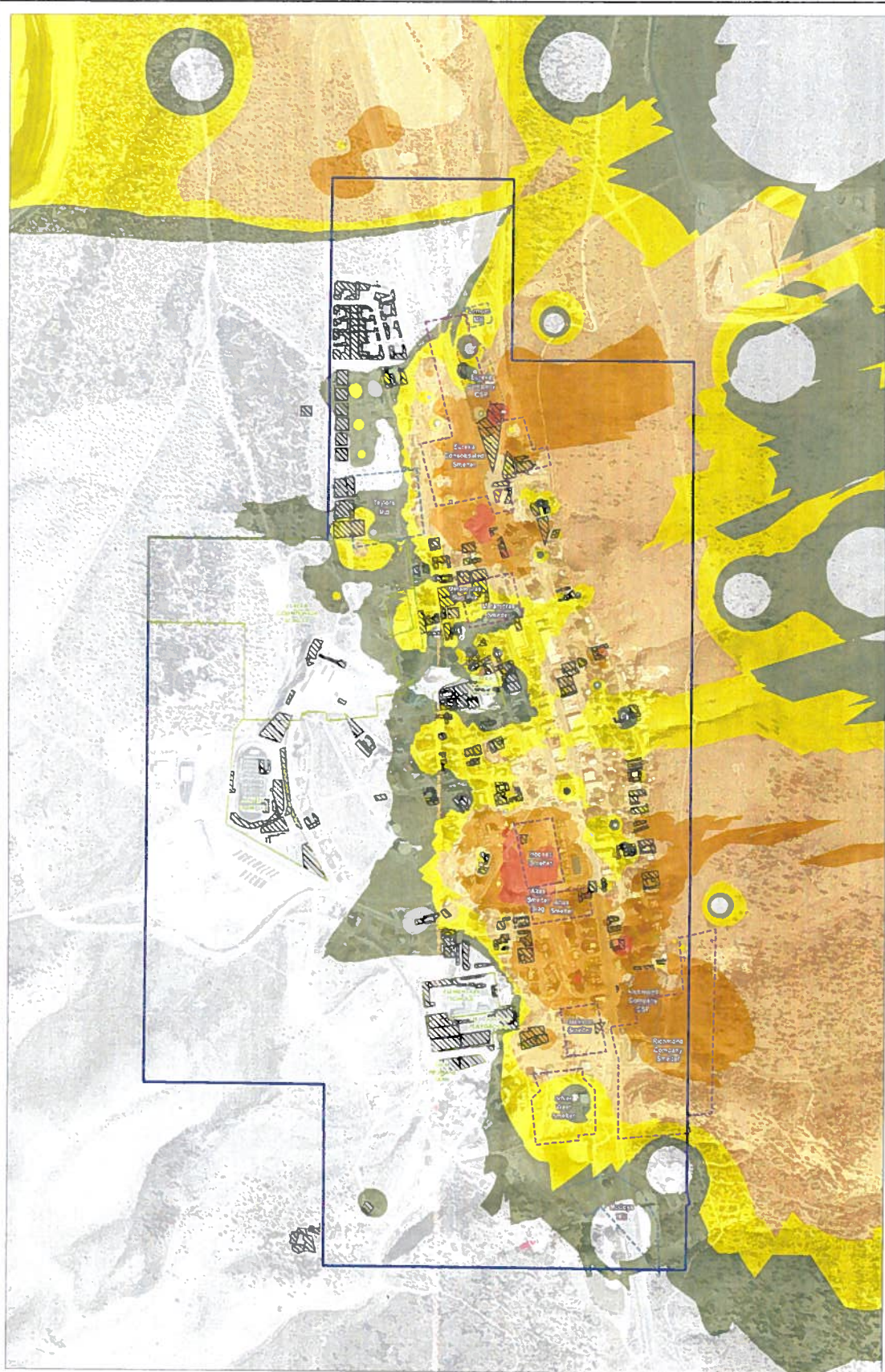


Figure 3
Town of Eureka
Iso-Concentration Map
For Arsenic



Legend

Lead Concentration (mg/kg)
 Non detect to 400
 400 to 800
 800 to 1,500
 1,500 to 3,000
 3,000 to 10,000
 greater than 10,000

Historical Facilities
 Historic Mill Facility
 Historic Smelter Site
 Consolidated Slag Pile (CSP)
 Levels of lead in soil are measured in units of milligrams per kilogram (mg/kg)

Project Site
 Eureka County School
 District Property
 Sampled Areas (2012-2013)

Surface Creation: GIS Analysis

ESRI ArcGIS v10.1 Inverse distance weighted (IDW) interpolation determines cell values using a linearly weighted combination of a set of sample points. The weights are a function of inverse distance. The surface being interpolated should be that of a locally dependent variable. The method assumes that the variable being mapped decreases in influence with distance from its sampled location.

For each surface/contour map created for Eureka Pb or As levels, the nearest 12 concentration values were used.



Figure 4
Town of Eureka
Iso-Concentration Map
For Lead