



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

FEB 26 2014

TO: Daniel Meer, Assistant Director  
Superfund Division

THRU: Harry Allen, Chief *HA*  
Emergency Response Section (SFD9-2)  
Superfund Division

FROM: Tom Dunkelman *HA or TD*  
On-Scene Coordinator (SFD9-2)

Bret Moxley  
On-Scene Coordinator (SFD9-2)

SUBJECT: EE/CA Approval Memorandum for Proposed Non-Time Critical Removal  
Action at Eureka Smelters Site

The purpose of this memorandum is to request approval to proceed with an Engineering Evaluation/Cost Analysis (EE/CA) for a non-time critical removal action for lead and arsenic contaminated soil and slag material at the Eureka Smelters Site (Site) located in Eureka, Nevada.

### I. Site Background

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 1). 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 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 significantly sized 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 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 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 historic ore milling and smelter operations were identified in Eureka and are shown on Figure 1 (labeled as Figure 7 on the base of the Figure).

- Lemon Mill
- McCoys Mill
- Eureka Consolidated Smelter
- Matamoras Smelter
- Hoosac Smelter
- Atlas Smelter
- Richmond Company Smelter
- Jackson Smelter
- Silver West Smelter
- 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 largest CSPs (Eureka Consolidated Smelter and Richmond Company Smelter) are located along U.S. Highway 50 at the north and south ends of Eureka. Additional smaller slag piles are present in town. Due to the extensive amount of historic ore processing operations in Eureka, it has been reported that air pollution contributed to health problems among residents and former smelter workers, during the time frame when the smelters were in operation. The documents also indicated the 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. The intermittent creek in Eureka,

which reportedly flooded in 1874, flows from south to north and eventually discharges to a flat, alluvial plain located approximately 5 miles north of Eureka.

## **II. Threat to Public Health, Welfare, or the Environment**

In 1978, the United States Department of the 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 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 north and south ends of Eureka, 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 owner to EPA and NDEP. A total of 268 decision units 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 2 and 3 (labeled as Figures 17a and 16a on the base of the Figures). 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. Approximately 20 properties were identified

where arsenic and lead soil concentrations exceeded initial Removal Action levels of 600 mg/kg arsenic and 3,000 mg/kg lead. 7.6 percent of all soil samples collected exceeded the initial Removal Action level for arsenic, and 10.3 percent of all soil samples collected exceeded the initial Removal Action level for lead.

In May 2013, EPA conducted a second Removal Assessment in Eureka. Surface and shallow subsurface samples were collected from an additional 20 residential and vacant properties. 18 of the 20 properties sampled contained soils with lead or arsenic concentrations that exceeded the initial Removal Action levels.

In September and October 2013, EPA conducted a removal action to address soil contamination at 17 residential properties containing greater than 3,000 mg/kg lead and 600 mg/kg arsenic. EPA also conducted removal activities at a portion of the Eureka Elementary School. Removal operations were discontinued in early November due to weather. It is anticipated that removal operations will resume in April 2014. Concurrent with the removal action, EPA also sampled 29 additional residential properties. The results of the additional sampling were consistent with previous assessment activities, showing elevated levels of lead and arsenic in residential soil.

In July 2013, the Nevada State Health Division, in coordination with the Eureka County Health Clinic, conducted initial blood lead level testing using finger stick methodology. Of the 158 people that participated in the initial testing, 101 live in the Town of Eureka and of these 101 participants, 10 were less than five years of age. Results showed 25 people with blood lead levels between 2 and 5 ug/dL, 6 people with blood lead levels between 5 and 10 ug/dL and 3 people with lead levels greater than 10 ug/dL. Subsequently EPA was informed of a four year old resident of Eureka that had a blood lead level of 9.9 ug/dL. Testing of soil at the residence showed contamination at 19,000 mg/kg lead. EPA conducted an emergency removal action at the property to mitigate exposure. In December 2013, six additional Eureka residents had blood lead levels measured. These individuals ranged in age from 3 to 41 years, with five of the six individuals being under 10 years of age. The blood lead levels measured were as follows:

Age	Blood Lead (ug/dL)
3	8.8
6	5.8
7	low
9	low
9	3.8
41	3.5

### **III. Statutory Basis for Action**

The information presented in this memorandum indicates that actual or threatened releases of hazardous substances from the Eureka Smelters Site may present an imminent and substantial endangerment to public health and the environment. Through this evaluation of possible clean up actions, EPA will minimize and further reduce potential harm to public health and the environment.

#### **IV. Factors for Determining Appropriateness of a Removal Action**

Section 300.415(b)(2) of the National Contingency Plan (NCP) provides factors for determining the appropriateness of a removal action. The factors most applicable to current conditions at the Eureka Smelters Site include: high levels of hazardous substances (e.g. lead and arsenic) in soils largely at or near the surface that may migrate, and actual or potential exposure to nearby human populations or the food chain from hazardous substances or pollutants.

In accordance with 300.415(b)(4) of the NCP, EPA has determined that a planning period of at least six months exists before on-site activities could be initiated; therefore, an EE/CA must be conducted for a non-time critical removal action.

#### **V. Scope of the EE/CA**

The purpose of the EE/CA is to identify a preferred removal action alternative that cost-effectively controls or reduces the threat of release of contaminants from the subject areas to the environment, thereby reducing the potential risk posed by the threatened releases to human health and the environment. The EE/CA will consider alternatives which meet the following general removal action objectives:

Reduce exposures and achieve health protective surface soils concentrations on residential properties based on voluntary participation from property owners

Reduce or eliminate source contribution or re-contamination of residential properties from source areas.

Reduce future use of currently undeveloped contaminated properties to minimize human health risk.

Pursuant to EPA guidance on NTCRA's, alternatives will be evaluated based upon effectiveness, implementability, cost and compliance with ARARs to the extent practicable.

In developing the range of alternatives to be evaluated in the EE/CA Report, EPA will consider 300.415(d) of the NCP as well as relevant guidance. It is anticipated that the selected response action will be completed within eighteen months to twenty-four months after the signing of the Action Memorandum. The EE/CA Report will form the basis of the Action Memorandum which will document the selected response action approach.

#### **VI. Enforcement/Proposed Actions/Cost Estimates**

With input from other Site stakeholders, EPA will prepare the EE/CA and EPA will issue an Action Memorandum memorializing the selection of a removal response action. In accordance with Agency policy, EPA will endeavor to address this Site through a PRP performed response action using an appropriate enforcement mechanism (See Enforcement Confidential Addendum).

EPA anticipates evaluating a full range of removal response alternatives in the EE/CA including removal of contaminated soil from residential properties, onsite and offsite disposal of contaminated soil, capping of source areas, etc.

Currently, EPA estimates that the cost of these various removal responses could range from four to twenty million dollars. Detailed cost estimates will be presented and documented in the EE/CA.

The State of Nevada has generally been opposed to placing Sites on the National Priorities list where there may be alternative approaches to achieving health protective cleanup levels. In addition, the County has informally expressed concern regarding the scope and duration of EPA involvement. Performing an EE/CA will facilitate identification of protective remedies in a timely fashion and may allow for greater flexibility in leveraging enforcement opportunities in coordination with the State.

#### **VI. Public Involvement**

An EPA Community Involvement Coordinator (CIC) has been assigned to the Site. The CIC, in coordination with the Site OSCs and RPM, will conduct community interviews. Pursuant to 40 CFR 300.415(m), a Community Involvement Plan (CIP) will be issued prior to finalization of the EE/CA. EPA will establish an information repository for the EE/CA and use the EPA Region 9 website to facilitate the transfer of Site information to the public.

#### **VII. Approval/Disapproval**

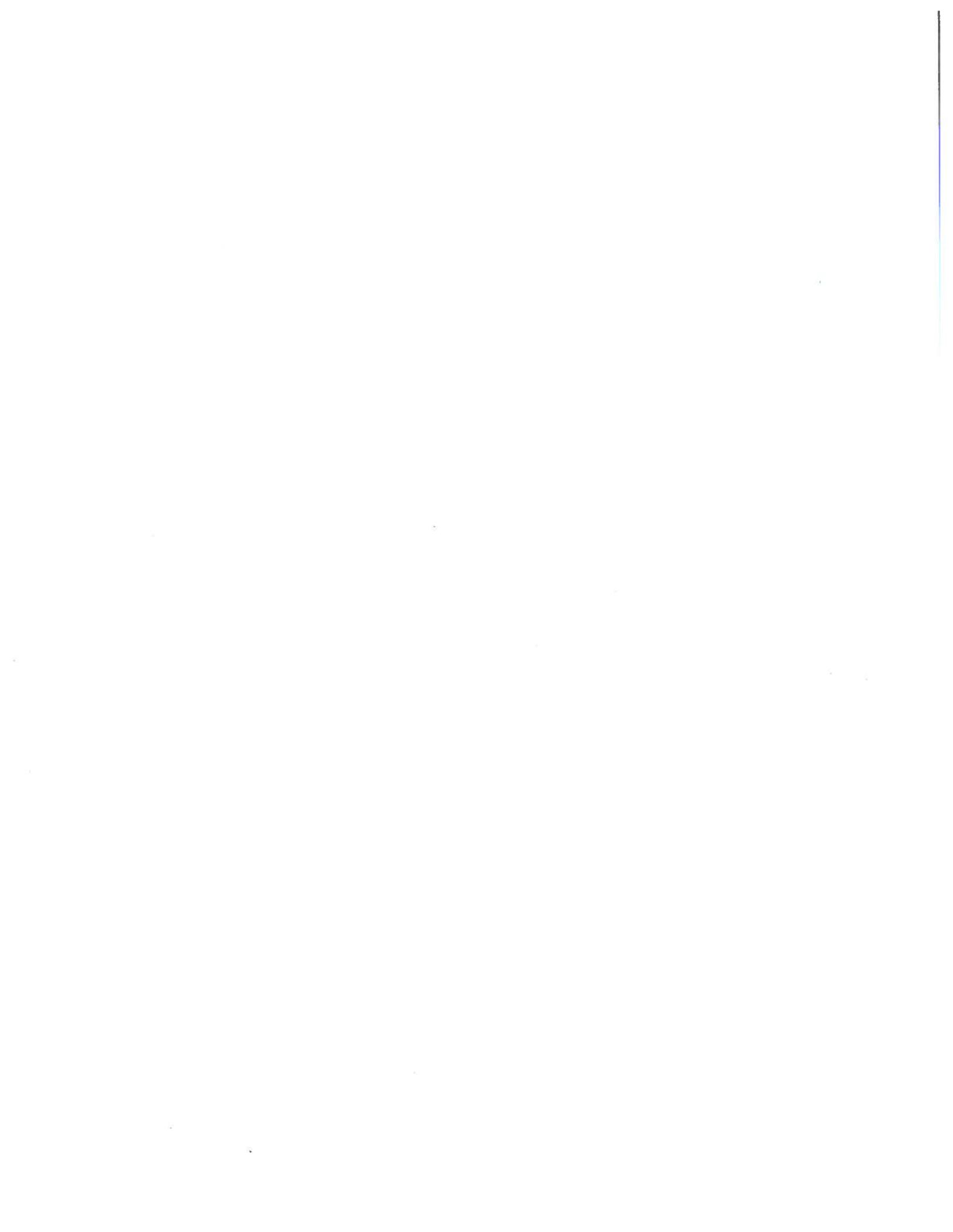
The conditions at the Eureka Smelters Site meet the NCP criteria for a removal action. Therefore, I am requesting approval to proceed with an EE/CA. Your approval or disapproval should be indicated below.

Approve:  Date: 26 February 2014

Disapprove: \_\_\_\_\_ Date: \_\_\_\_\_

- Attachments:
- Figure 1. Site Map
  - Figure 2. Arsenic Isoconcentration Map
  - Figure 3. Lead Isoconcentration Map







**Legend**

**Arsenic Concentration (mg/kg)**  
 Non detect to 60  
 60 to 300  
 300 to 600  
 600 to 1,200  
 greater than 1,200

**Historic Facilities**  
 Historic Mill Facility  
 Historic Smelter Site  
 Consolidated Slag Pile (CSP)

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

Levels of arsenic in soil are measured in units of milligrams per kilogram (mg/kg)

**Surface Creation: GIS Analysis**

ESR ArcGIS v10.1 inverse distance weighted (IDW) interpolation determines cell values using a linearly weighted combination of a set of sample points. The weight is a function of inverse distance. The surface being interpolated should be that of a locationally dependent variable. This 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 E-2**  
**Town of Eureka**  
**Iso-Concentration Map For Arsenic With Data Points**  
**Eureka Smelter Sites**  
**Eureka, Eureka County, Nevada**

