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United States Environmental Protection Agency

COLORADO
Hazardous Materials & Waste Management Division
Department of Public Health & Environment

Proposed Plan – Early Interim Action Residential Property Cleanups

Operable Unit 1 - Community Properties

Colorado Smelter Superfund Site

Pueblo, Colorado

July 13, 2017

Pueblo City-County Health Department Lead Education Billboard - Santa Fe Avenue 2016

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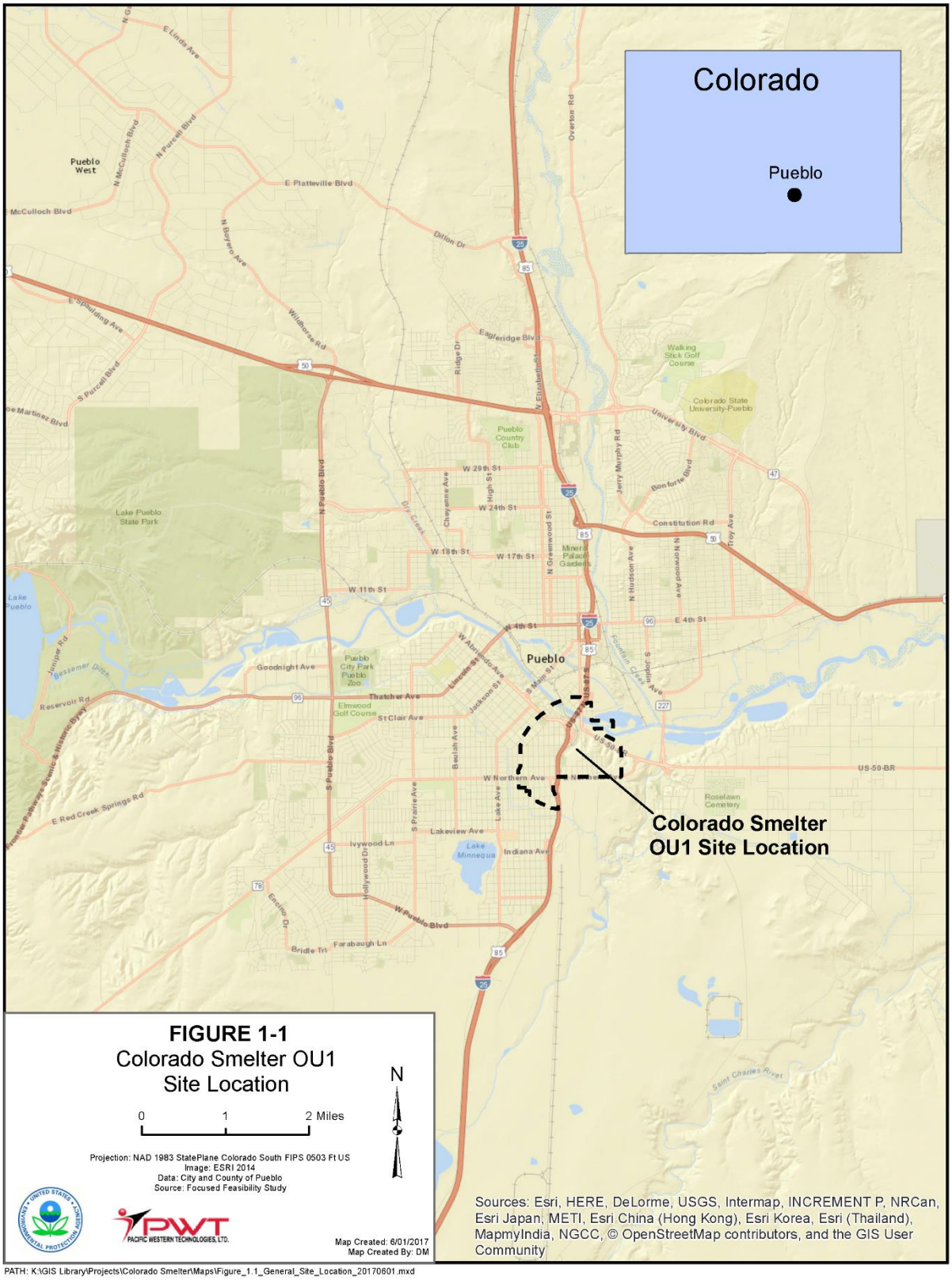
Introduction

A proposed plan is a document to facilitate public involvement in a site's remedy selection process. A proposed plan presents EPA's preliminary recommendation of how to best address contamination at a site, presents alternatives that have been evaluated, and explains the reasons EPA recommends the Preferred Alternative.

This proposed plan presents EPA's early interim action cleanup plan for contaminated soils (including transported slag) and indoor dust contamination at residential properties within the Colorado Smelter Superfund Site (the Site) Operable Unit 1 – Community Properties (OU1), in Pueblo, Colorado (Figure 1). This plan includes summaries of cleanup alternatives evaluated for use at this initial portion of OU1 and is based on Remedial Investigation (RI) data from 302 homes' soil samples and 102 homes' dust samples collected from May 2015 – June 2016. This document is issued by the U.S. Environmental Protection Agency (EPA), Region 8, the lead agency for Site activities, and the Colorado Department of Public Health and Environment (CDPHE, or the State health department), the support agency. EPA believes this early interim action is necessary because data collected from May 2015 through June 2016 show there is an increased risk of exposure to elevated levels of smelter-related lead and arsenic in residential soils and indoor dust at some homes. Additionally, an early interim action is necessary to reduce the likelihood that homes which received indoor dust cleanups will be re-contaminated from outdoor soils tracked in and also to reduce human exposure to lead and other heavy metals in soils and indoor dust at other residential properties in the study area.

During 2016 and the first half of 2017, EPA completed indoor dust cleanups at 27 homes within the OU1 study area as part of an emergency action. Residential yard soil cleanups at these locations should occur as soon as possible to minimize recontamination. It is also critical that additional dust and soil cleanups begin as soon as possible at additional properties in the study area, based on RI data that shows the potential for residents to have unacceptable risks due to exposure to lead and arsenic contamination which warrants action under Superfund. While not the basis for this EPA action, elevated blood lead levels in some residents and community interest also resulted in starting the RI and this early interim action prior to RI completion.

Figure 1: Site Location



The Preferred Alternative discussed in the Proposed Plan will address contaminated soils and indoor dust at residential properties in the study area where arsenic and lead levels exceed the Preliminary Remediation Goals (PRGs). The goal of the preferred remedy is to reduce residents' exposure to unacceptable levels of lead and arsenic at these properties. EPA's Preferred Alternative is Alternative 3: Soil Removal and Replacement to 18 Inches Below Ground Surface with Indoor Dust cleanups. The Alternative includes the following components:

- Soil removal and replacement for areas that exceed the PRGs for lead and arsenic.
- Offsite transport, and disposal of contaminated soils in compliance with all applicable Federal and State requirements.
- Cleaning contaminated surfaces, or removing and replacing contaminated exposed surfaces (for example, carpets) in indoor spaces that have levels of contamination in the dust above the cleanup levels.
- An additional component of Alternative 3 includes in-situ characterization of the soil at the final excavation depth (18 inches) to determine if institutional controls (ICs) will be necessary as part of the final residential soils remedy.
- Indoor cleaning of contaminated surfaces, or removal and replacement of contaminated exposed surfaces that have levels of contamination in the dust above the PRGs.
- Residents and property owners will receive a cleanup completion letter, which will describe the work done, whether any contamination exceeding the PRGs or Not to Exceed (NTE) levels was left in place for any portion of the yard, the yard restoration requirements and warranty period for new grass, trees, shrubs, other vegetation and landscaping materials, and recommendations or requirements, if needed, to maintain long-term protectiveness of the cleanup. ICs will be needed for properties where waste is left in place above levels safe for unlimited use and unrestricted exposure. The need for ICs at specific properties and what kind of ICs may be needed will be developed during implementation of the early interim action residential property cleanups, and the public will have an opportunity to review and comment on that portion of the remedy as part of the final ROD for OU1. Institutional controls developed for OU1 will comply with the Colorado Environmental Covenant Statute, C.R.S. §§ 25-15-317 et seq.
- EPA will monitor the cleanups for a minimum of one year to ensure compliance with the restoration requirements and warranty.
- If contaminated soil is left in place above levels considered acceptable for unlimited use and unrestricted exposure, EPA will conduct five year reviews in cooperation with the state and local authorities to evaluate the long-term effectiveness of the cleanup.

EPA is asking the public to review the OU1 early interim action documents and provide comments on the proposed cleanup plan and preferred alternative as well as the other alternatives considered. EPA, in consultation with CDPHE, will prepare an interim Record of Decision (i-ROD) and select an interim remedy for the Site after reviewing and considering all information submitted during the 30-day public comment period. Public involvement, review, and feedback are encouraged on all of the alternatives under consideration for the Site.

The public comment period runs from **Friday, July 14, 2017 to Monday, August 14, 2017**. At the end of that period, EPA will review and consider all comments provided and develop a responsiveness summary. Information on how to provide your comments or questions to EPA is provided on page 33, along with details on where you can get more information and attend a public meeting. To help you better understand the plan, pages 34 to 38 provide a list of supporting documentation, references, a glossary of useful terms, acronyms, and units of measurement that appear in this proposed plan.

EPA is asking the public to review and comment on the OU1 early interim action proposed plan, preferred alternative and the other alternatives. considered.

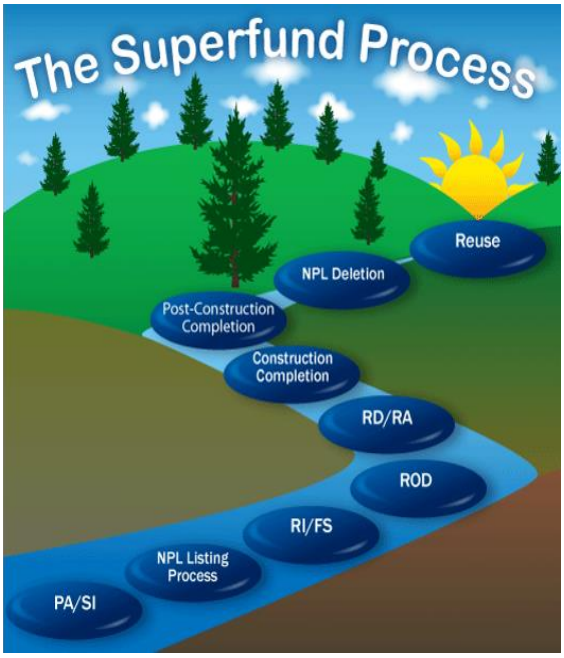
The public comment period runs from Friday, July 14, 2017 to Monday, August 14, 2017.

The Proposed Plan includes the following sections:

- *Understanding the Superfund Process* – Provides information about how the Superfund Process works in general and how EPA investigates a site and makes cleanup decisions. It also includes information about how the public's comments inform EPA's decision process.
- *Site History* – Provides facts about the Site which provide the context for the subsequent sections of the Proposed Plan;
- *Community Involvement* – Describes the community engagement activities, timeframes, and materials developed to provide status updates to the community and other stakeholders;
- *Site Characteristics* – Describes the nature and extent of contamination at the Site;
- *Scope and Role* – Describes how this early interim action fits into the overall response at the Site;
- *Summary of Site Risks* – Summarizes the results of the remedial investigation and provides a summary of the risks associated with lead and arsenic in residential soils and indoor dust;
- *Remedial Action Objectives* – Describes what the proposed Site cleanup is expected to accomplish;
- *Summary of Alternatives* – Describes the options that EPA considered to meet the objectives for this early interim action;
- *Evaluation of Alternatives* – Explains EPA's decision for selecting the Preferred Alternative for the early interim action;
- *Preferred Alternative* – Describes the Preferred Alternative and identifies that the Preferred Alternative will meet statutory and regulatory requirements; and,
- *Community Participation* – Provides information on where the public can access information in the Administrative Record for the Site and identifies how the public can provide a response to this Proposed Plan and the Preferred Alternative.

This Proposed Plan summarizes information that can be found in greater detail in the Administrative Record for the Site.

Understanding the Superfund Process



Issuance of this proposed plan is part of a step-by-step process that includes everything from site discovery through cleanup. The remedial investigation (RI) characterizes site conditions as well as determines the nature of contamination to assess risk to human health and the environment. The feasibility study (FS) uses information from the RI to develop, screen and evaluate the remedial alternatives (that is, cleanup options) that can address the risks to human health and the environment. Following the completion of the RI/FS, EPA presents to the public a preferred alternative for this Site in a proposed plan (this document). This plan for the residential properties portion of the Colorado Smelter Site is part of an early interim action Record of Decision process, called an interim-ROD (i-ROD). A final ROD will take place as part of the normal Superfund process.

The proposed plan provides a summary of the alternatives from the RI/FS and, highlights the key factors that led to identifying the preferred alternative. The 30-day public comment period allows the State of Colorado, and the community to provide comments on the preferred alternative. EPA carefully reviews the public's comment, then proceeds to select and documents the remedy for the site in a ROD.

EPA is issuing this proposed plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Site History

Pueblo, Colorado was once home to five ore smelters and one steel mill. The Colorado Smelting Company smelter (also known as Colorado Smelter, Boston Smelter, Boston & Colorado Smelter, and Eilers Smelter) began operating in 1883. It was constructed on a mesa and waste slag was deposited in a ravine between Santa Fe Avenue and the Denver & Rio Grande railroad tracks. The owners of the Madonna Mine, located in Monarch, built the Colorado Smelter in order to smelt their extracted silver-lead ore in a cost-effective manner. The Colorado Smelter operated eight blast furnaces, two calcining furnaces, one fusing furnace and twenty kilns.

The Colorado Smelting Company merged into the American Smelting and Refining Company (ASARCO) in 1899. The Colorado Smelter closed in 1908. Some of the slag was used as track ballast for the D&RG track constructed between Florence and Cañon City. In 1923, bricks from the blast furnace smoke stack were used to construct St. Mary School.

The Colorado Smelter historical footprint is bound by Santa Fe Avenue to the east, Mesa Avenue to the south, Interstate 25 to the west, and the Arkansas River and the Grove neighborhood to the north. The Bessemer and Eilers neighborhoods are adjacent to the former Colorado Smelter site, which now consists of building remains and an approximately 700,000-square-foot slag pile where access is not completely restricted (Figure 3 – Site Base Map and Study Area)

In 2011, an EPA and State health department site assessment found elevated levels of lead and arsenic in residential soils and large slag piles in the vicinity of the Site. These results indicated that comprehensive sampling and cleanup is necessary to more fully characterize the contamination and reduce health risks for current and future residents.

On May 12, 2014, EPA proposed adding the former Colorado Smelter to the National Priorities List (NPL) of Superfund sites. Superfund is the federal program that investigates and cleans up the most complex, uncontrolled or abandoned hazardous waste sites to protect public health and the environment. This proposal was published in the Federal Register, initiating a 60-day comment period which ended on July 11, 2014.

EPA received numerous comments regarding the NPL proposal, and published a responsiveness summary to the comments received. On December 11, 2014, EPA listed the Site on the National Priorities List.

ASARCO last operated the Colorado Smelter in 1908. After the smelter facility was damaged in the Pueblo Flood of 1921, ASARCO conveyed the property to the Newton Lumber Company. The lumber company operated the Site as a lumber yard into the 1960s. After Newton Lumber Company ownership, facility property was transferred to a number of individuals and mostly small to medium sized companies.
Given the legacy nature of ASARCO's specific smelter emissions, and given that none of the current or post-ASARCO owners or operators of facility property conducted any smelter-related activities, few if any property owners other ASARCO can be considered responsible parties. Nonetheless, Region 8 continues to seek and review information concerning potentially responsible parties. If viable PRPs are identified, Region 8 will promptly evaluate its available enforcement options. As a result, EPA is performing the investigations and cleanup at the Site with federal funding.

Community Involvement

Since early 2012, EPA has been actively engaged in the community. Meetings with the community between 2012 and early 2014 involved, EPA, the State and local health departments, and the Agency for Toxic Substances and Disease Registry (ATSDR) and described the levels of arsenic and lead contamination identified in the 2011 Site Inspection Analytical Results Report which qualified the Site for the National Priorities List (NPL) (CDPHE 2011). Proposal to the NPL in May 2014 allowed EPA to receive larger amounts of funding for much more detailed characterization of the nature and extent of smelter-related contamination through the RI/FS process. EPA established a local information repository at:

Pueblo City County Library
Rawlings (Main Branch)
100 E. Abriendo Avenue
Pueblo, CO 81004
719-562-5600

Site records are also available at:

EPA Superfund Records Center
1595 Wynkoop Street
Denver, CO 80202-1129

To request copies of administrative record documents, call: 303-312-7273 or 800-227-8917 ext. 312-7273 (toll free Region 8 only)

In December 2014, the Site was finalized to the NPL and by April 2015, the initial Community Involvement Plan (CIP) interviews and documentation were completed. The CIP ensures communication between the community (in and around the Site), EPA, the State health department, and local health department, and encourages community involvement in Site activities.

Listing of the Site also provided support for the community-led development of a Community Advisory Group (CAG), a CAG facilitator, Technical Assistance Support for Communities (TASC) support, and the participation of the Superfund Redevelopment Initiative and federal Partnership for Sustainable Communities in the Colorado Smelter Revitalization Project. Monthly CAG meetings are advertised in the local paper and are attended by community members, EPA, State and local health department representatives, city and county representatives, and congressional representatives. Those meetings provide updates on:

- sampling and analysis status,
- cleanup status,
- outreach materials/Fact Sheets
- health education, outreach, blood lead screenings and in-home lead risk assessments, and
- the Colorado Smelter Revitalization Project

The CAG is an independent, non-partisan group consisting of a balance of diverse interests affected by and concerned about the Site and the cleanup process. The overarching goal of the group is to have an effective cleanup completed by 2019.

Currently, CAG meetings are typically held on the second Tuesday of each month from 5:30-7:30 p.m. at the Steelworks Museum, 215 Canal St., Pueblo, Colo. These meetings are open to the public and are typically advertised in the Pueblo Chieftain the Friday before each meeting, see the example display ad, right.

CIP interviewees defined an effective cleanup as:

- Not causing unacceptable health risk to residents or animals, regardless of their age or desire to play in the parks, garden in their yards, or dig for pirate treasure in the neighborhood;
- Restoring the habitat and preventing future ecological risk;
- Promoting the economic vitality of the neighborhood;
- Preserving the historical structures and integrity of the neighborhood; and
- Limiting personal liability related to the smelter remediation.

The community advisory group intends to assist in achieving this goal of an effective cleanup by 2019 by:

- Providing input to EPA and other government entities that play a role in the cleanup to improve decision making for all;
- Sharing information, ideas, and concerns; and
- Serving as a conduit to the larger community.

CAG members also provide information and feedback to EPA and State and local health departments as well as provide CAG workgroup updates to the larger CAG.

EPA United States Environmental Protection Agency

CO CDPHE COLORADO
Hazardous Materials & Waste Management Division
Department of Public Health & Environment

You are invited to:
Colorado Smelter Community Advisory Group Meeting

Tuesday
March 14, 2017
5:30 – 7:30 p.m.
The Steelworks Center of the West
215 Canal St
Pueblo, CO 81004

Topics Include:

1. EPA Updates: Indoor and Outdoor Sampling and Site Activities
2. Cancer Study Update from Colorado Department of Public Health and Environment (CDPHE)
3. Community Advisory Group (CAG) Work Groups Updates

Lead Prevention Tip of the Month: Spring is just around the corner—as we spend more time outdoors remember to wash hands often, clean children's toys and wear garden gloves when working in the yard.

For more information contact:

V. Jasmin Guerra
EPA Community Involvement Coordinator
303-312-6508
800-227-8917 ext. 312-6508 (toll free)
guerra.valeria@epa.gov
Hablo español

Jeannine Natterman
State Public Involvement Coordinator
303-692-3303
888-569-1831 ext. 3303 (toll-free)
jeannine.natterman@state.co.us

Or visit our websites at:
www.epa.gov/superfund/colorado-smelter -OR-
www.colorado.gov/pacific/cdphe/colorado-smelter-superfund-site-public-information

Display Ad for CAG Meetings

June 2015 Pueblo City County Health Department Lead Education

EPA and the local health department also provides routine updates to city, county and congressional representatives. Updates include charts such as the one in Figure 2 which summarizes the local health department's outreach efforts and blood lead screening summary data for various age groups in the OU1 Study Area.

Figure 2: Pueblo City-County Health Department Screening and Outreach Summary – November 2016

Pueblo City-County Health Department
Environmental Health and Emergency Preparedness Division
101 W. 9th St. Pueblo, CO 81003
(719) 583-4307
www.pueblohealthdept.org

Lead Testing			Outreach	
	Range of blood lead levels (µg/dL)	**Total Number of Screenings in Superfund Study Area**	**Meetings**	
Age 0-6		**20**		CSEPP Sustainability Group
Detectable	3.5 – 4.7	4		NeighborWorks
Reportable	6.8-10.1	2		Housing and Human Services
Age 7 up to age 15		**28**		Latino Chamber and Pueblo Chamber
Detectable	3.4-4.6	7		Parkview Medical Center
Reportable	5.2-7.5	3		St. Mary Corwin Hospital
Age 16 up to age 64		**60**		Pueblo City Schools
Detectable	3.6-4.4	10		Father Ben Bacino
Reportable	5.5-6.6	2		Community Members
Senior Citizens age 65+		**8**	**Door-to-door**	**9 times**
Detectable	3.7-4.5	2		Eiler's/Bojon Town neighborhood
Reportable	N/A			Bessemer
Women of childbearing age between 11-44		**30**		The Grove
Detectable	3.6-4.1	3		Santa Fe Dr.
Reportable	5.8-6.5	3		Runyon Lake area
				The Blocks
Healthy Homes Screenings			**Advertisement**	
Lead hazard risk home screenings		15		Postcards – sent to 1,900 homes three times
Elevated Blood Lead Level Investigations		3		Billboard – 2 - Santa Fe Ave., 1 - Northern Ave.
				Kiosk – located on Northern Ave. & Eilers
				Newspaper Advertisement – The Pueblo Chieftain

Education			
Presentations		**Events**	
	Catholic Charities		Community Resource Day
	Physicians at PCHC and Southern Colorado Clinic		Summer Safety and Fun Fair
	Medical Residents		Latch on at Pueblo Mall
	Southern Colorado Residential Renter Association		National Night Out (2x's)
	Pueblo City County Health Department		ATSDR Community Presentation
	Women Infants and Children		Veterans Day Parade
	Pueblo Board of Health		Pueblo Early Childhood Council Healthy Halloween
	Southern Colorado Press Club		Kids in the Kitchen
	Catholic Charities		Police Safety
	Physicians at PCHC and Southern Colorado Clinic		Bessemer Clean up
	Medical Residents		Spring Safety and Fun Fair
			Bessemer Academy – Family Night & Health Night
			Bessemer Academy – Blood Lead Clinic
Provider and Case Management Education and follow-up			
Clients	24	**Physicians**	24

Year 4 Plan	
Blood Screenings ○ Community ○ Pre and Post cleanup in homes with elevated dust levels for EPA **Healthy Homes Screenings** ○ EBLL Investigations ○ Risk Assessment	**Staff Education** ○ New EHS staff will become certified in RRP ○ Continuing education for all staff **Proposed Activities** ○ Hold a Community Event ○ RRP Rule Training ○ Attend Community Events ○ Post a New Billboard/Maintain kiosk

Site Characteristics

The OU1 study area includes 2,400 properties in a half-mile radius around the smelter, of which 1,900 are residential properties. The residential soils investigation (RI) began in spring 2015 at 12 properties. In November 2015, EPA expanded the residential soil investigation to begin sampling additional properties within the preliminary study area.

The neighborhoods that are adjacent to the former Colorado Smelter historical footprint and most impacted by Site contaminants are the Bessemer, Eilers, and Grove neighborhoods. Bessemer is directly west of I-25 and the Rocky Mountain Steel Mill, formerly CF&I, and is bound by Northern Avenue to the south and the Arkansas River to the north. The Eilers neighborhood is located directly east of I-25 and bound by Northern Avenue and the Rocky Mountain Steel Mill to the south, the Arkansas River to the north, and School Street to the east. A portion of the Grove neighborhood lies at the northern edge of the study area, just north of the Arkansas River. These neighborhoods have long been shaped by immigrant families moving to Pueblo to work in the smelters, coal mines and CF&I steel mill.

Eilers, also known as Bojon Town or Eiler Heights, is one of the neighborhoods shaped by the rich history of many immigrant families. Its story is shared in *Potica, Pints, and Prayers in Old Bojon Town* (Historitecture, LLC 2014). All three neighborhoods are dominated by single-family homes, and land use is unexpected to change.

Site Climate

Pueblo, Colorado is located at about 4,700 feet above mean sea level in a high desert region of southern Colorado at the confluence of the Arkansas River and Fountain Creek. Precipitation is generally low, with the winter months receiving very little moisture (NOAA 2014). Winds are variable, although the prevailing winds at the Colorado Smelter during the time of operation were out of the north and northwest as noted on Sanborn Fire Insurance Maps for the years 1883-1904. Wind rose diagrams from a meteorological station located just south of the Colorado Smelter on the Rocky Mountain Steel Mill for the time period January 1, 2003 – December 31, 2005 and March 1, 2008 – February 28, 2009 show prevailing winds out of the west-northwest.

The region is arid and at times windy, thus bare soils are prone to movement creating dusty conditions in the study area and throughout Pueblo. These dry conditions in the study area increase the mobility of metals-contaminated soils throughout the community. RI sampling was prioritized for the residential areas in OU1 because people generally spend about 87% of their time indoors, and about 69% of that time being inside their own homes (NHAPS 2001). Following 20 emergency indoor removal actions in the summer of 2016, sampling was focused in the primary downwind direction of the study area, which is to the southeast of the former Colorado Smelter in the Eilers neighborhood. As noted above, most of the properties within the one-half mile radius study area are residential and that residential land use is not expected to change with the early interim action cleanups.

Principal Threat Wastes

Principal Threat Wastes are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present significant risk to human health or the environment should exposure occur. EPA has not identified any Principal Threat Wastes in the soils or indoor dust at the residential areas of OU1.

Scope and Role

The Site comprises two operable units: OU1, Community Properties, and OU2, the Former Smelter Area. OU1 consists of a preliminary study area (Figure 3) based on a one-half mile radius surrounding the former smelter stack location on OU2. There are approximately 1,900 homes and another 400 parcels that include vacant properties, commercial businesses, schools, parks and city-owned alleys within the OU1 study area. OU2 consists of an approximately 700,000 square-foot (16-acres) slag pile and several more acres of active commercial businesses that overlie the former smelter footprint.

This proposed early interim action cleanup approach for residential properties in the OU1 study area identifies a Preferred Alternative. The purpose of the Preferred Alternative is to prevent people from being exposed to lead and arsenic contamination in the soils and indoor spaces at residential properties in the OU1 study area. EPA will select a final remedy for the residential properties and remaining areas of OU1, as well as a final remedy for OU2, after additional investigations are concluded at the Site.

Summary of Site Risks

Site Risks

Elevated blood lead data in some members of the community provided EPA with evidence that residents are being exposed to lead contamination. As a result, EPA conducted investigations at residential properties within the Site Study Area to measure the amount of smelter-related lead and other contaminants in soil and dust. The local health department also helped residents and families by providing additional blood lead screening, healthy home risk assessments and health education and outreach materials to help people identify other sources of lead in and around their homes so they will be aware of them and avoid or manage contact with them.

EPA's residential soil and indoor dust sample results show concentrations of arsenic and lead above health-based screening levels. EPA evaluated these samples and made a determination that the levels of arsenic and lead found in the OU1 residential properties posed an unacceptable risk to human health. EPA will perform a baseline human health risk assessment (HHRA) when the full RI dataset is available to help us evaluate other risk pathways at the Site and to decide if additional cleanup is required for OU1. EPA will also re-evaluate the Contaminants of Potential Concern (COPCs) and Preliminary Remediation Goals (PRGs) with the full RI dataset.

Figure 3: Site Base Map and Study Area

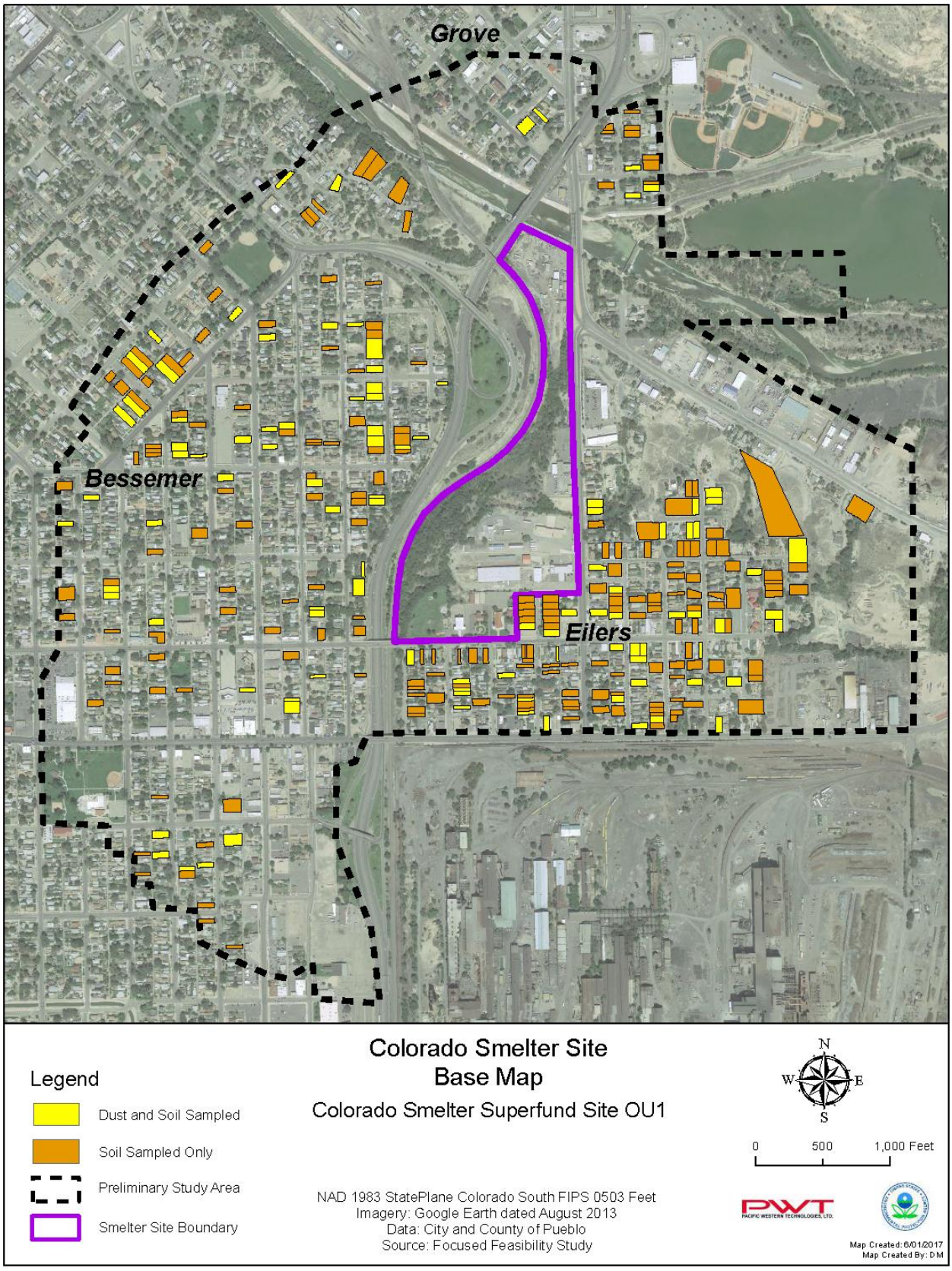
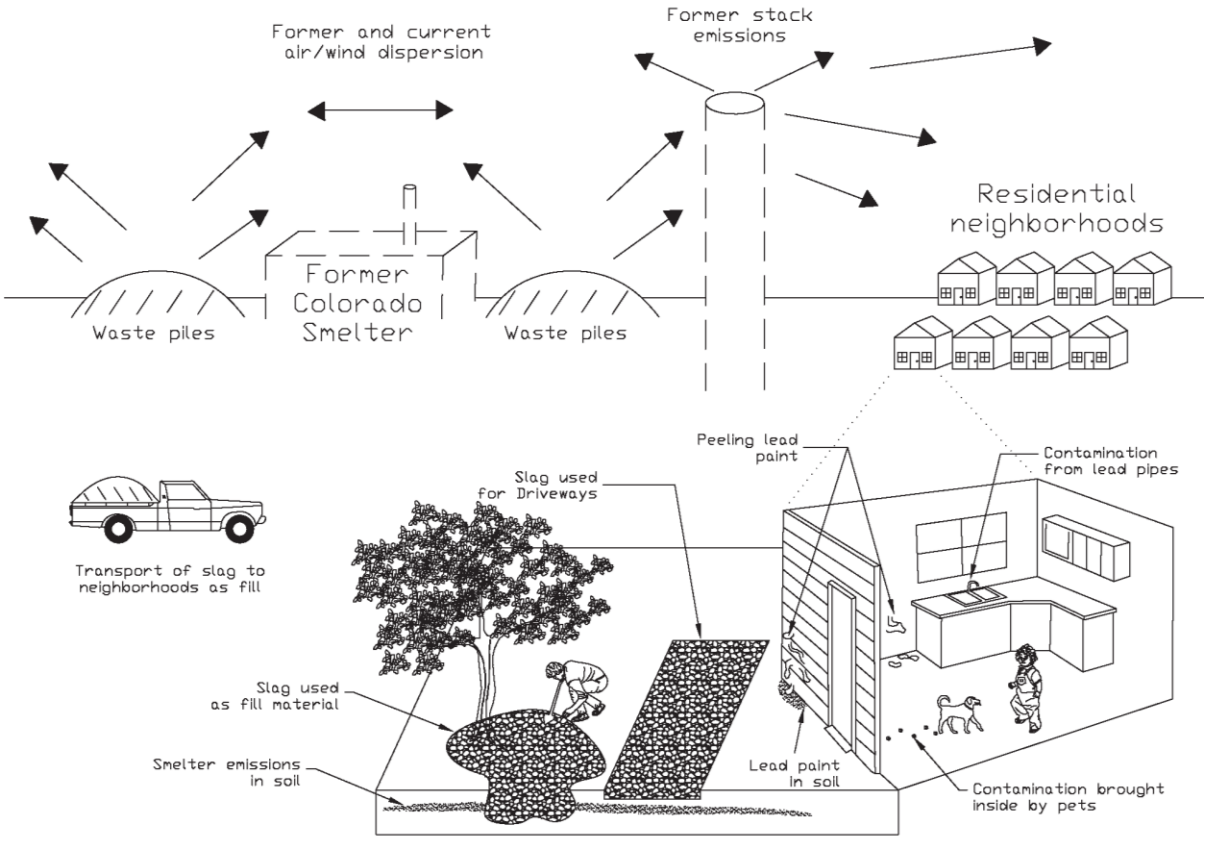


Figure 4 shows the Conceptual Site Model (CSM) for the Site. The CSM identifies the primary sources of contamination and how residents may be exposed to this contamination. The primary smelter sources of contamination that EPA identified in the risk evaluation include:

- Fugitive dust and particulate air emissions from the historic smelter stack.
- Solid wastes such as slag and slag-impacted soils.
- Liquid wastes such as process solutions, acids, and rinsates from historic facility operations.

Figure 4: Conceptual Site Model Operable Unit 1, Pacific Western Technologies, June 2017



In addition, EPA included information about other sources of lead and arsenic that may contribute to the overall risk for residents at the Site. EPA included the effects of these other sources of lead and arsenic in the risk evaluation but the Superfund cleanup authority is only able to address those sources of contamination that result from historic smelter operations. EPA's risk evaluation takes a more conservative approach to account for other sources of contamination that may affect residents. These other non-smelter sources of lead and arsenic in the community may include:

- The historic use of leaded gasoline;
- Household paint made before 1978; and
- The potential historic use of arsenical pesticides.

Lead contamination & effects

Sampling results from EPA's investigation of residential soils and indoor dust show elevated levels of lead. The Pueblo field laboratory analyzed soils samples using a X-Ray Fluorescence Spectrophotometer (XRF). The average concentrations of lead in all depths of soils collected from the first 302 homes sampled ranged from 7.27 to 3,910 milligrams per kilogram (mg/kg or parts per million [ppm])[1]. Dust samples from 102 homes were sent to an offsite laboratory and the lead concentrations in indoor dust from living areas have ranged from 8.2 to 2,060 ppm (See the Focused Feasibility Study (FFS), Appendices C, D, and E for more information; EPA 2017).

Individuals may be exposed to Site contaminants through inhalation of particles of dust in the air; ingestion (eating or drinking); and dermal contact (direct physical contact). Long-lasting (chronic) exposure to lead, even at low levels, may cause subtle but harmful impacts to the central nervous system, which can affect learning and behavior. Over time, lead may cause more severe nervous system damage, anemia, kidney damage, brain damage, or at extremely high levels, seizures and even death. Children below 7 years of age, unborn children and pregnant women are especially susceptible to the toxic effects of lead; however long-term exposure in adults may contribute to high blood pressure, kidney problems, and cognitive dysfunction.

EPA uses a model called the IEUBK (Integrated Exposure Uptake and Biokinetic model) and other site-specific information to predict the levels of lead contamination in children's blood. At the Site, the levels of lead in the soils and indoor dust may result in levels of lead in the blood that EPA has determined to be unacceptable. EPA measures the amount of lead in blood as the predicted Blood Lead Level (BLL). With the current levels of contamination, children in the Colorado Smelter study area may develop a BLL above 20 micrograms per deciliter (µg/dL) due to exposure to lead in soils and indoor dust.

Current scientific literature provides evidence that adverse health effects are associated with blood lead levels less than 10 µg/dL. For this reason and to provide Colorado Smelter Superfund Site with the most thorough and health protective lead cleanup as possible, a PRG of 350 ppm and 275 ppm has been selected for lead in soil and dust respectively (FFS, Appendix B and F). Using the IEUBK model and site-specific exposure parameters, the predicted blood lead level to be associated with 350 ppm in soil is 6.24 µg/dL.

Arsenic contamination & effects

EPA's investigations also found elevated levels of arsenic contamination in residential soils and indoor dust in homes above the State of Colorado Background levels of 11 ppm. Arsenic concentrations ranged from very low levels (4.3 ppm) to over 323 ppm in residential soil samples and from 1 to 47 ppm in indoor dust samples (FFS, Appendix A, C, and D). Exposure to arsenic through inhalation of particles of dust in the air, and ingestion of, and dermal contact with soils, can cause a variety of health problems. Health effects linked with being around

[1] EPA technical supporting documents show lead and arsenic in milligrams per kilogram (mg/kg); however, parts per million (ppm) has been more commonly used in public meetings and presentations and is being used for the proposed plan. Both mg/kg and ppm are the same ratios and can be used inter-changeably. For example, if you had 20 ppm, it would be like having 20 white marbles and 999,980 black marbles out of 1,000,000 total marbles.

arsenic for a long time are an increased risk for some types of cancer such as skin, lung, bladder, kidney, and liver cancers.

The soil PRG for arsenic is 61 ppm, which is the noncarcinogenic risk-based concentration (RBC), was selected because the carcinogenic RBC of 12 ppm is below the calculated natural background threshold value (BTV) of 12.7 ppm and is anticipated to also be below the site-specific urban background.

For indoor dust, the noncarcinogenic RBC of 61 ppm was selected as the PRG for arsenic. This level of 61 ppm was selected because the cancer risk (RBC) of 12 ppm is lower than the natural background (BTV) (12.7 ppm). It is also expected to be below the site-specific urban background. This level, 61 ppm is protective and conservative when compared to 120 ppm, which is the cancer risk of approximately 1 additional instance of cancer in 10,000 people (10^{-4}) (See the Focused Feasibility Study (FFS), Appendix A for more information).

Table 1: Chronic Exposure RBCs for Arsenic

COPC	Chronic Exposure Carcinogenic RBC (mg/kg or ppm)			Chronic Exposure Noncarcinogenic RBC (mg/kg or ppm) [a]	Overall Chronic Exposure Carcinogenic RBC (mg/kg or ppm) [a]
	TR = 1E-06	TR = 1E-05	TR = 1E-04		
Arsenic	1.2	12	120	61	12

Notes:

a The overall chronic exposure RBC is the lower of the chronic exposure RBCs for carcinogenic and noncarcinogenic exposure, and assumes a target risk of 1E-05 (carcinogenic) and the target hazard quotient of 1 (noncarcinogenic); however 12 ppm is lower than natural background, therefore 61 ppm was selected.

COPC Contaminant of potential concern

mg/kg milligrams per kilogram (ppm)

RBC Risk-based concentration

TR Target risk

Other Contaminants of Potential Concern

At this time, arsenic and lead appear to be the main Contaminants of Concern (COCs) for the residential properties portion of OU1 at the Site; however, the initial RI dataset identified 17 metals that were considered to be of potential concern at the Site. After additional analysis, EPA determined that 9 of these Contaminants of Potential Concern (COPCs) apply to OU1 because they exceeded the risk-based concentrations and background for one or more depth ranges in the soil. These include: antimony, cadmium, cobalt, copper, manganese, nickel, thallium, vanadium, and zinc.

Table 2: Chronic Exposure PRGs for COPCs other than Lead and Arsenic

COPC	BTV (mg/kg or ppm)	RSL (mg/kg or ppm)	Chronic Exposure Carcinogenic RBC (mg/kg or ppm)[a]	Chronic Exposure Noncarcinogenic RBC (mg/kg or ppm)[a]	Chronic Exposure PRG (mg/kg or ppm)[b]	Source of Selected PRG
Antimony	1.99	39	NA	48	48	NC PRG
Cadmium	2.23	160	21,000	100	100	NC PRG
Cobalt	16.0	23	4,200	36	36	NC PRG
Copper	33.3	3,100	NA	4,800	4,800	NC PRG
Manganese	2,650	1,800	NA	2,800	2,800	NC PRG
Nickel	30.8	1,500	150,000	2,400	2,400	NC PRG
Thallium	0.900	0.78	NA	1.2	1.2	NC PRG
Vanadium	135	390	NA	600	600	NC PRG
Zinc	143	23,000	NA	36,000	36,000	NC PRG

Notes:

a The chronic carcinogenic RBC is calculated at a risk of 1E-05.

b The chronic exposure PRG for each target risk level is generally the larger of the BTV or the chronic exposure RBC for that risk level.

BTV Background threshold value

CA Carcinogenic

COPC Contaminant of potential concern

NA Not applicable

NC Noncarcinogenic

PRG Preliminary remediation goal

RBC Risk-based concentration in soil

RSL Regional Screening Level

Although there are nine preliminary COPCs based on this analysis, the uncertainty analysis in Section 5 of the COPC technical memo indicates that several of the COPCs are unlikely to contribute to unacceptable site risk based on a comparison of the upper 95% confidence limit (95UCL) to Risk-based screening levels (RBSLs).

COPC selection is traditionally done at the end of the sample collection process, with the complete RI dataset. However, due to ongoing exposure that may be occurring at the Site, it was deemed appropriate to take an early interim action for the residential properties portion of OU1. At the conclusion of the data collection process, a COPC selection process will again be undertaken on the full dataset to better characterize the COPCs associated with the Site.

Uncertainties Assessment

This section provides a preliminary discussion of uncertainties associated with the approach to the risk assessment. The discussion focuses on issues likely to have the greatest effects on the results of the risk analyses. The HHRA will provide a more detailed discussion of uncertainties.

Data Uncertainties

Sources of uncertainty in the data and Site characterization include:

- Selection of locations and depths of samples for analysis
- Spatial coverage of the Site
- The heterogeneity (i.e., diversity) of chemical concentrations in the Site soil.

It is not possible to completely characterize all affected media. Estimates of concentrations in affected media must be based on a limited number of samples, literature values, interpolation, or extrapolation. The possibility exists that the sampling results do not completely and thoroughly characterize the contaminants in soil and dust will be an uncertainty in the HHRA.

Exposure Assumptions Uncertainties

Exposure assumptions generally involve much uncertainty. Exposure parameters are selected using a combination of available guidance values and professional judgment. Both sources of information include considerable uncertainty. The exposure assumptions that were presented are generally conservative. The uncertainty associated with exposure scenarios is also considered small because the data used to derive these exposure parameters and conditions are conservatively adequate.

Toxicity Assumptions Uncertainties

Several aspects of the toxicological data employed in calculating PRGs contain a high degree of uncertainty that may result in an overestimate of potential risk. The toxicity factors used in this assessment, which are established by state and federal policy, are deliberate overestimates of the potential dose-response. This means that actual risks are unlikely to be higher than the potential risk estimates calculated in this assessment and are likely to be lower.

Uncertainties in Risk Characterization

The HHRA will present a discussion of the cumulative effect of the uncertainties in the assumptions and methodology on the risk estimates.

Site uncertainties include unknown contaminant concentration ranges over the course of RI data collection and the use of a regional natural background for the early interim action rather than site-specific background levels, which help account for human-made influences in metals concentrations throughout Pueblo.

Since EPA collected samples within the one-half mile OU1 preliminary study area that were adjacent to, farther away, and in all directions from the Former Smelter Area (OU2) smoke stack, EPA is confident that the arsenic, lead, and other COPC concentration ranges observed thus far in the RI are representative of minimum and maximum levels of contamination likely to be present throughout OU1. The use of regional background values is an acceptable method for calculating PRGs and EPA Region 8 Superfund program has significant experience with determining appropriately conservative and protective cleanup levels for residential areas that have been impacted by historic smelters.

These PRGs are preliminary, and if needed, may be updated/changed based on additional data collected during the RI. This includes, but is not limited to, the results of a site-specific background study that is anticipated to be completed, any additional relative bioavailability data

collected, and changes to the IEUBK, default assumptions, or changes to the actual model itself, if they occur during the RI process. Final soil and dust cleanup levels are not anticipated to change but will be selected as part of the final OU1 ROD.

Ecological Risk

The evaluation of ecological risk at OU1 will be considered in part of a comprehensive evaluation with the OU2 investigation. A determination of risk and any cleanup related to ecological receptors will be made in the OU2 Record of Decision.

Remedial Action Objectives

Based on the investigations at the Site and the risk evaluation, EPA has determined that the risks related to lead and arsenic contamination from the historic smelter are unacceptable and action is warranted under Superfund. EPA developed these Remedial Action Objectives (RAOs) to protect human health from lead and arsenic at the Site and to describe what the cleanup will accomplish. The principle RAO for the Colorado Smelter Site is to protect human health from Site-related contaminants, namely lead and arsenic. EPA considers current and future use of the site when determining RAOs. Based on current zoning of the Site, plausible future uses at most properties include residential use. Therefore, EPA has determined that residentially zoned property within OU1 should be remediated to meet residential land use criteria. Non-residential properties will be evaluated as part of future actions.

Institutional controls will be needed for properties where waste is left in place above levels safe for unlimited use and unrestricted exposure. The need for ICs at specific properties and what kind of ICs may be needed will be developed during implementation of the early interim action residential property cleanups, and the public will have an opportunity to review and comment on that portion of the remedy as part of the final ROD for OU1. Institutional controls developed for OU1 will comply with the Colorado Environmental Covenant Statute, C.R.S. §§ 25-15-317 et seq.

The following OU1-specific RAOs were developed for arsenic and lead in soil and indoor dust:

RAOs for Arsenic and Lead in Soil

Reduce exposure to soils exceeding health based PRGs for arsenic and lead. The arsenic PRG is 61 milligrams per kilogram (ppm) and the lead PRG is 350 ppm.

RAOs for Arsenic and Lead in Indoor Dust

Reduce exposure to indoor dust exceeding the health based PRGs for arsenic and lead in indoor dust. The indoor dust arsenic PRG is 61 ppm and the indoor dust lead PRG is 275 ppm.

RAOs have not been developed for animals, plants and other such ecological receptors at the Site at this time. They will be developed as part of the Operable Unit 2 (OU2 – Former Smelter Area) RI and documented in a future OU-specific ROD.

Although not part of the RAOs above, the RI includes a grant to the Pueblo City-County Health Department (PCCHD) lead program for on-going lead screening, health education and outreach.

Summary of Early Interim Action Remedial Alternatives

Below are the limited alternatives considered and analyzed for the early interim action cleanup at the Site. These alternatives are based on a practical range of cleanup options that might be used to address contamination in residential soils and indoor dust.

Institutional Controls

For the early interim action, EPA will communicate with the public regarding the cleanup process, any contamination that may be left at depth, and limitations, if any, following residential cleanups completed as part of the early interim action. EPA will evaluate the need for, and types of ICs needed during implementation of the early interim action to limit human exposure to, and improper handling of, these soils in the future.

Alternative 1

Alternative 1 is described as "No Action." This alternative is included to use as a baseline for comparison to other alternatives. No remediation of residential soils or indoor dust within the Site would occur under a no action alternative, meaning there were would be approximately 817 yards and 578 homes of 1,900 properties exceeding proposed cleanup levels.

This alternative is readily implementable, and the least expensive. However, the no action alternative is not protective of human health and the environment and is therefore not effective.

Costs
Capital Cost: $0
Monitoring Costs/Year: $0
Present Value: $0

Alternative 2

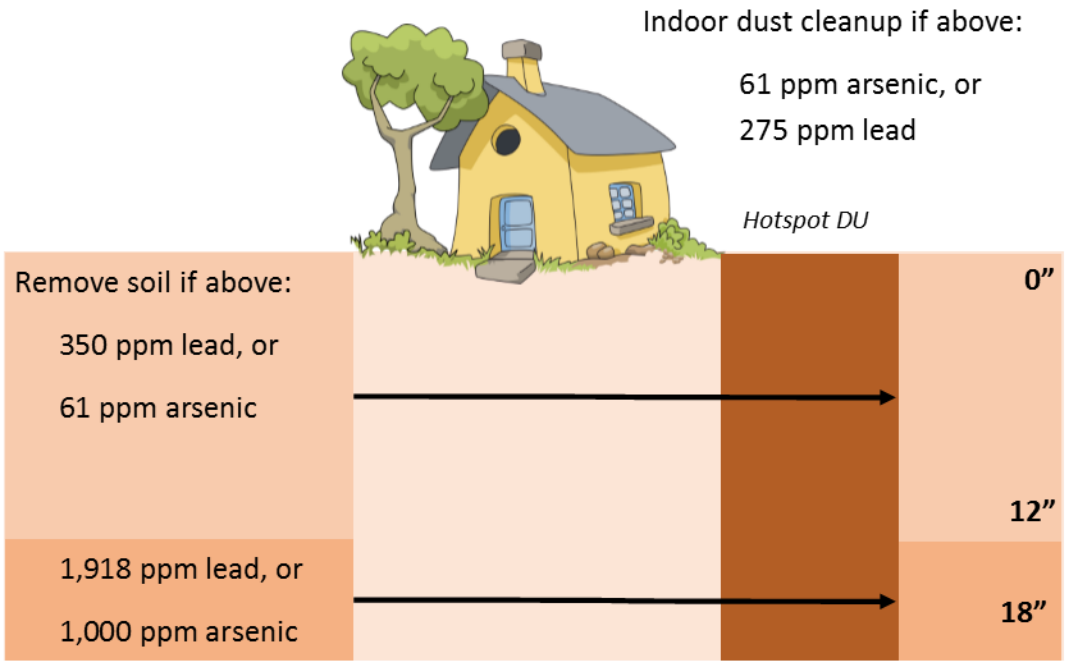
Alternative 2 is described as "Soil Removal and Replacement to 12 Inches Below Ground Surface and Hotspot[2] Remediation with Indoor Dust Cleanup." This option consists of two main components, including the residential soil remedy and the indoor dust remedy.

Alternative 2 – Residential Soil Remedy

Soil removal and replacement is a three-stage process involving:

1. Excavation of contaminated soils,
2. Disposal of excavated materials at an appropriate offsite location, and
3. Replacement with clean soils. In cases where contamination that exceeds the PRGs is left in place below the depth of the excavation, a visible barrier/marker material will be placed, such as snow fence or geotextile.

[2] A Hotspot is defined as areas having high levels of contamination. This is also being used interchangeably with Not-to-Exceed (NTE) levels for this proposed plan



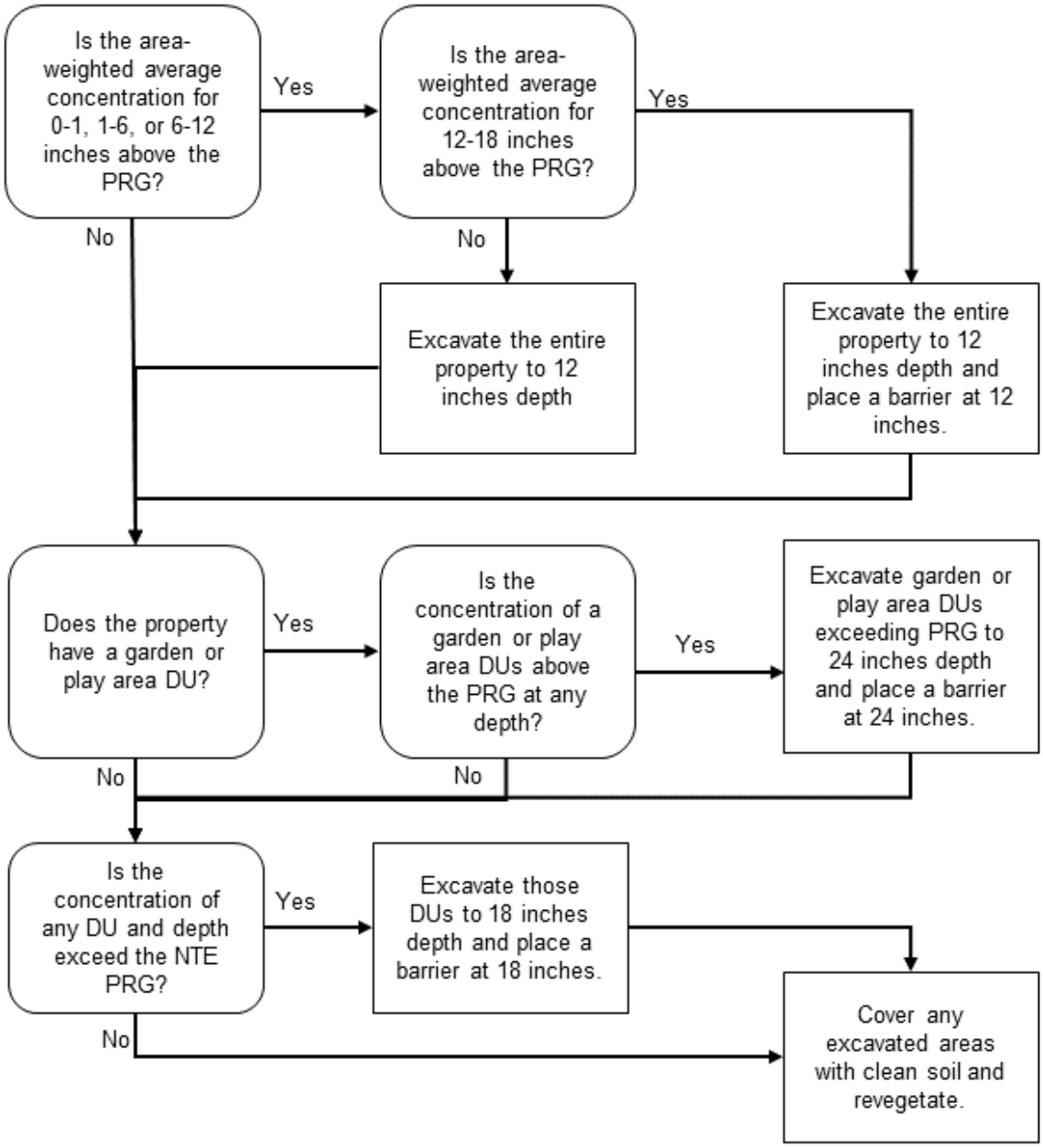
Alternative 2

Figure 5 provides a flowchart to help describe the Alternative 2 soil cleanup.

Under Alternative 2, residential soils would be evaluated and removed if concentrations exceed the PRGs for lead or arsenic. The first step is to evaluate contamination levels down to 18 inches, and look at each area-weighted average contamination level at 0-1, 1-6, 6-12 and 12-18 inches across the entire yard (i.e., exposure unit (EU)). Soil cleanup will be done when the area-weighted average for any interval from 0-12 inches exceeds the corresponding arsenic or lead Preliminary Remediation Goal (PRG). If the area-weighted average contamination level for the 12-18-inch interval exceeds the lead or arsenic PRG, a barrier (geotextile or snow fence) would be placed at the bottom of the 12-inch excavation prior to covering the area with clean soils. Play areas and gardens are initially included in the area-weighted averaging but are also evaluated separately when comparing to PRGs. If gardens or play areas exceed the PRGs, soils in those DUs will be removed down to the depth of contamination or up to 24 inches (EPA 2003). A visible barrier also will be placed at the final excavation level of 18 inches for Hotspot/NTE DUs, or 24 inches for gardens and play areas, if confirmation soil sample results are greater than PRGs.

Based on data to date, approximately 817 yards out of 1,900 properties may require cleanup to 12 inches.

Figure 5: Alternative 2 - Soil Cleanup Flowchart



Equation for calculation of area-weighted average concentration:

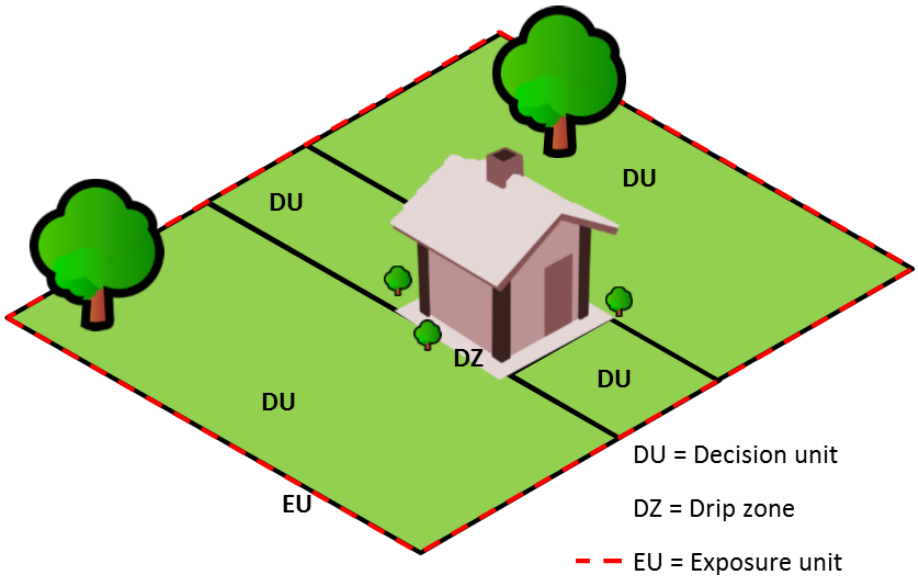
$$C_{AA} = \frac{(C_{DU1} \times A_{DU1} + C_{DU2} \times A_{DU2} + \cdots + C_{DUn} \times A_{DUn})}{(A_{DU1} + A_{DU2} + \cdots + A_{DUn})}$$

Where

C_{AA} = the area-weighted average concentration for a property with n DUs
C_{DUX} = the concentration of the DU, where X is 1, 2, etc. up to n
A_{DUX} = the surface area of the DU, where X is 1, 2, etc. up to n

In addition, any Decision Units (DUs)[3] (e.g., side yard, front yard, back yard, play area, garden, etc.) having soil contamination above the Hotspot/Not to Exceed (NTE) level of 1,000 ppm of arsenic or 1,918 ppm lead at any depth sampled will be removed to a maximum depth of 18 inches. Based on data to date, approximately 5-6 yards out of 1,900 properties may require a Hotspot or NTE cleanup; however, these properties may be cleaned up anyway due to the yard average concentrations exceeding the PRG.

Subsurface soils between 12 inches and 18 inches where averages exceed the PRGs, but are less than the Hotspot/NTE would remain in place beneath the visible barrier (geotextile or snow fence). ICs would be required for these properties but would be waived due to the interim nature of the remedy.



Decision Unit/Exposure Unit Description

Alternative 2 – Indoor Dust Remedy

Under Alternative 2, indoor dust would be evaluated and cleaned up if concentrations exceed the dust PRGs for lead or arsenic. Removal of contamination from indoor surfaces may be accomplished by cleaning contaminated surfaces or by removing and replacing contaminated surfaces. Cleaning interior surfaces is accomplished by a variety of conventional wet cleaning techniques, including wet mopping floors, washing walls, wiping down or washing counters, furniture, and decorations, shampooing carpets, etc. and high-efficiency particulate air (HEPA) vacuuming. Further, if the contamination in contaminated carpets or other permeable floor surfaces cannot be cleaned, it will be addressed by removal and replacement or other best management practices. (No flowchart was developed for the dust cleanup.)

In many cases, indoor lead dust cleanups will take place in coordination with a soil cleanup; however, a small percentage of homes which receive indoor dust cleanups will not require outdoor soil cleanups because arsenic and lead in soils do not exceed the soil PRGs. This is

[3] A typical residential property is comprised of 5 decision units (DU) – one for each side yard, one for each of the front and backyards, and one for the drip zone.

because people generally spend a significant time indoors, so the overall risk of exposure to smelter-related contamination may be higher in some homes from dust than soil.

Based on data to date, an estimated 30% of the properties, approximately 578 homes, in the study area will require an indoor dust cleanup.

Costs
Capital Cost: $41,196,000
Monitoring Costs/Year: $1,792,000
Present Value: $ 34,371,000

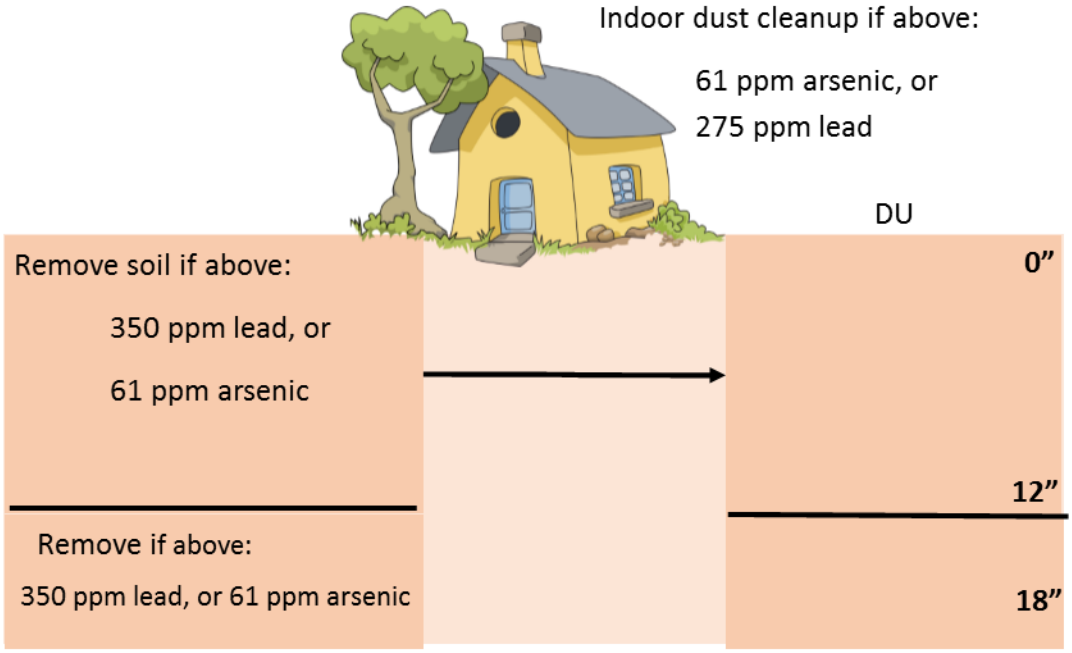
Alternative 3

Alternative 3 is described as "Soil Removal and Replacement to 18 Inches Below Ground Surface with Indoor Dust Cleanup." This option consists of two main components, including the residential soil remedy and the indoor dust remedy.

Alternative 3 – Residential Soil Remedy

Soil removal and replacement is a three-stage process involving:

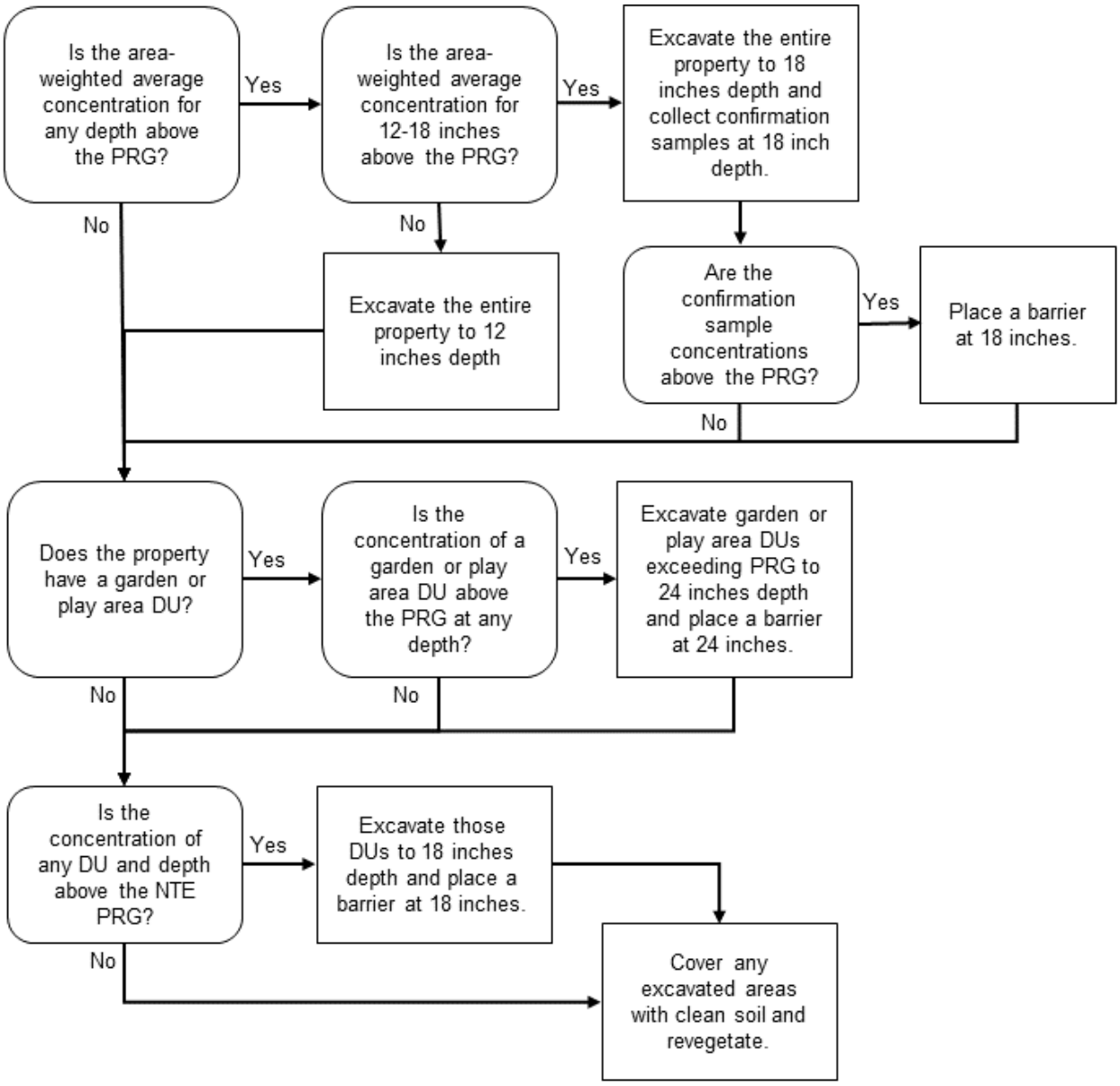
1. Excavation of contaminated soils,
2. Disposal of excavated materials at an appropriate offsite location, and
3. Replacement with clean soils to either 12 or 18 inches. In cases where contamination that exceeds the PRGs is left in place below 18 inches, a visible barrier/marker material will be placed, such as snow fence or geotextile.



Alternative 3

Figure 6 provides a flowchart to help describe the Alternative 3 soil cleanup.

Figure 6: Alternative 3 - Soil Cleanup Flowchart



Equation for calculation of area-weighted average concentration:

$$C_{AA} = \frac{(C_{DU1} \times A_{DU1} + C_{DU2} \times A_{DU2} + \cdots + C_{DUn} \times A_{DUn})}{(A_{DU1} + A_{DU2} + \cdots + A_{DUn})}$$

Where

C_{AA} = the area-weighted average concentration for a property with n DUs
C_{DUX} = the concentration of the DU, where X is 1, 2, etc. up to n
A_{DUX} = the surface area of the DU, where X is 1, 2, etc. up to n

Under Alternative 3, residential soils would be evaluated and removed if concentrations exceed the PRGs for lead or arsenic. The first step is to evaluate contamination levels down to 18 inches, and look at each area-weighted average contamination level at the different sampling intervals, that is, 0-1, 1-6, 6-12, and 12-18 inches across the whole yard. Soil cleanup will be done where the area-weighted average for any interval from 0-18 inches across the entire yard (i.e. EU) exceeds the corresponding arsenic or lead PRG. For properties where the area-weighted average contamination level for any of the sampling intervals above 12-18 inches require cleanup, but the 12-18-inch interval does not, excavation would extend only to 12 inches.

For properties where the area-weighted average contamination level for the 12-18-inch interval exceeds the PRGs, excavation would extend to 18 inches. In addition, confirmation sampling would be performed at the 18-inch depth and a visible barrier (geotextile or snow fence) would be placed where concentrations still exceed PRGs. Play areas and gardens are initially included in the area-weighted averaging but are also evaluated separately when comparing to PRGs. In addition, any DUs having soil contamination above the Hotspot/NTE level of 1,000 ppm of arsenic or 1,918 ppm lead at any depth sampled will be removed to a maximum depth of 18 inches. A visible barrier also will be placed at the final excavation level of 18 inches for Hotspot/NTE DUs, or 24 inches for gardens and play areas, if confirmation soil sample results are greater than PRGs. Based on data to date, approximately 5-6 yards out of 1,900 properties may require a Hotspot or NTE cleanup; however, these properties may be cleaned up anyway due to the yard average concentrations exceeding the PRG.

Based on data to date, this alternative would result in removing and replacing all soil from 817 yards to 12 inches, with excavation to 18 inches at 195 of the 817 yards.

Alternative 3 – Indoor Dust Remedy

Under Alternative 3, indoor dust would be evaluated and cleaned up if concentrations exceed the dust PRGs for lead or arsenic. Removal of contamination from indoor surfaces may be accomplished by cleaning contaminated surfaces or by removing and replacing contaminated surfaces. Cleaning interior surfaces is accomplished by a variety of conventional wet cleaning techniques, including wet mopping floors, washing walls, wiping down or washing counters, furniture, and decorations, shampooing carpets, etc. and high-efficiency particulate air (HEPA) vacuuming. Further, if the contamination in contaminated carpets or other permeable floor surfaces cannot be cleaned, it will be addressed by removal and replacement or other best management practices. (No flowchart was developed for the dust cleanup.)

In many cases, indoor lead dust cleanups will take place in coordination with a soil cleanup; however, a small percentage of homes which receive indoor dust cleanups will not require outdoor soil cleanups because arsenic and lead in soils do not exceed the soil PRGs. This is because people generally spend a significant time indoors, so the overall risk of exposure to smelter-related contamination may be higher in some homes from dust than soil.

Based on data to date, an estimated 30% of the properties, approximately 578 homes, in the study area will require an indoor dust cleanup.

Costs

Capital Cost: $43,829,000
Monitoring Costs/Year: $1,792,000
Present Value: $36,463,000

Evaluation of Early Interim Action Alternatives

Nine criteria are used to evaluate the different remediation alternatives, individually, and against each other. The nine evaluation criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. During the evaluation of remedial alternatives, the alternatives are initially evaluated according to the threshold criteria, which must be met. Then the alternatives are compared with each other to identify relative advantages and disadvantages among the different balancing criteria and modifying criteria. The purpose of the comparative analysis is to provide information for a balanced review of each alternative prior to remedy selection. Because this is an early interim action, it must also be consistent with the final remedy.

Threshold Criteria

Alternatives must, at a minimum, meet the first two criteria to be eligible for selection as the preferred alternative.

1. **Overall Protection of Human Heath and the Environment** considers whether or not an alternative provides adequate protection by eliminating, reducing, or controlling unacceptable risks.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARS)** considers whether or not an alternative will meet all federal or state standards required by environmental laws or whether there is justification for waiving the standards.

Primary Balancing Criteria

The primary balancing criteria are used to weigh effectiveness and cost tradeoffs among alternatives and the main technical criteria upon which the alternative evaluation is based.

3. **Reduction of Toxicity, Mobility, and Volume through Treatment** indicates EPA's preference for alternatives that include treatment processes to lower or eliminate the hazardous nature of material, its ability to move in the environment, and the amount left after treatment.
4. **Long-Term Effectiveness and Permanence** considers the long-term effectiveness and permanence of maintaining the protection of human health and the environment after implementing each alternative.
5. **Short-Term Effectiveness** considers the effect of each remedial alternative on the protection of human health and the environment during the construction and implementation phase.
6. **Implementability** considers the technical and administrative feasibility of implementing each alternative and the availability of the services and materials required during implementation.
7. **Cost** considers construction costs as well as long-term operation and maintenance costs of each alternative by considering whether costlier alternatives provide additional public health benefits for the increased cost.

Modifying Criteria

The last two criteria are used to determine whether the concerns of the State and the public should modify EPA's approach to the early interim action cleanup of OU1.

8. **State Acceptance** considers whether the State agrees with, disagrees with, or has no comment on EPA's preferred alternative.
9. **Community Acceptance** considers the concerns or support the public may offer regarding each alternative. EPA will evaluate community acceptance of cleanup alternatives after receiving public comment on the propose plan.

Table 3: Summary of Early Interim Action Cleanup Evaluation Criteria

	Criterion	Considerations	Alternative[1]		
			1 (No Action)	2 (Soil Removal to 12")	3 (Soil removal to 18")
Threshold Criteria	Overall Protection of human health and the environment	Does an alternative eliminate, reduce or control threats to public health and the environment through ICs, engineering controls, or treatment?	Not Protective	Protective	Protective
	Compliance with ARAR's	Does an alternative meet Federal, State and Tribal environmental statutes, regulations, and other requirements relevant to the Site, or is a waiver justified?		Complies with, or waives ARARs	Complies with ARARs
Balancing Criteria	Long Term Effectiveness and Permanence	Does an alternative maintain protection of human health and the environment over time?	Not effective	Adequately effective	Highly effective
	Reduction of toxicity, mobility, or volume through treatment	Does an alternative use treatment to reduce a contaminants harmful effects or ability to move in the environment and the amount of contamination remaining after cleanup?		No	No
	Short-Term Effectiveness	How much time is needed to implement an alternative and the risk the alternative poses to workers, residents and the environment during implementation?		Highly effective	Highly effective
	Implementability	What is the technical and administrative feasibility of implementing the alternative, including factors such as availability of materials and services?		Readily implementable	Readily implementable

Table 3: Summary of Early Interim Action Cleanup Evaluation Criteria

			Alternative[1]		
	Cost	What are the estimated capital and annual operations and maintenance costs, as well as present value cost?		Capital Cost: $41,196,000 Monitoring Costs/Year: $1,792,000 Present Value: $ 34,371,000	Capital Cost: $43,829,000 Monitoring Costs/Year: $1,792,000 Present Value: $36,463,000
Modifying Criteria	State / Support agency acceptance	Does the State agree with EPA's analyses and recommendations?			
	Community Acceptance	Does the community agree with EPA's analyses and preferred alternative?			

1 – Indoor dust cleanups are included as components of Alternatives 2 and 3.

Preferred Alternative and Comparative Analysis

Analysis of Alternative 1

Alternative 1 is readily implementable and least expensive. However, the no action alternative is not protective.

Analysis of Alternative 2

Alternative 2 is readily implementable and is of reasonable cost. In addition, this remedy is protective of human health and the environment and is highly effective in the short term and adequately effective for the long term (EPA 2003). Alternative 2 complies with, or waives ARARs, including but not limited to Colorado Regulations pertaining to solid waste management and disposal and fugitive dust emissions resulting from remedial action. This alternative reduces the mobility of contaminants to move in the environment since Alternative 2 provides for removal of soil exceeding PRGs to a depth of 12 inches, but does not provide this reduction through treatment. The removal and replacement of contaminated surficial yard soils only partially satisfies the regulatory preference for remedies which reduce the toxicity, mobility, or volume of contaminants through permanent solutions or alternative treatments.

Alternative treatments such as phosphate amendments were considered, but not included due to technical limitations of the treatments and the presence of both lead and arsenic in soil. For example, lead could potentially be immobilized through phosphate treatment of the soils; however, phosphate treatment also increases the potential for leaching of arsenic from the soils. Therefore, treatment of soils was not selected as part of Alternative 2. Although this option may leave some contaminants in place where concentrations are greater than PRGs, but less than Hotspot/NTE levels below 12 inches, the risk is considered low due to the limited exposure time to these deeper soils.

State and community acceptance cannot be determined until after the comment period.

Analysis of Alternative 3

Alternative 3 is readily implementable and is of slightly higher cost than Alternative 2. In addition, this remedy is protective of human health and the environment and is highly effective in the short term and long-term. Alternative 3 complies with ARARs, including but not limited to Colorado Regulations pertaining to solid waste management and disposal and fugitive dust emissions resulting from remedial action. This alternative reduces the mobility of contaminants to move in the environment and provides additional reduction in volume of contamination since Alternative 3 provides for:

1. Removal of soil exceeding PRGs to the full sampled depth of 18 inches (24 inches in play areas and gardens) and
2. DU removal to 18 inches if that DU exceeds the Hotspot/NTE levels (24 inches in play areas and gardens).

Like Alternative 2, Alternative 3 also does not provide the reduction of mobility or volume through treatment. Removal to 18 inches may also prevent the need for placing subsurface barriers or markers, or for obtaining environmental covenants or easements. Removal down to 18 inches may allow the remediated yard to return to unrestricted use (EPA 2003).

State and community acceptance cannot be determined until after the comment period.

Preferred Alternative

Based on the comparative analysis of Alternatives 1, 2, and 3, EPA hereby proposes Alternative 3 as the preferred cleanup option. Alternative 3 meets the standards of the threshold criteria, primary balancing criteria, and modifying criteria and provides for the most balanced remedy selection. See Table 3: Summary of Early Interim Action Cleanup Evaluation Criteria.

Based on the information available at this time, EPA believes the Preferred Alternative would be protective of human health and the environment, would comply with the chemical-, action-, or location-specific ARARs as outlined in Table 3.1 of the Focused Feasibility Study, would be cost effective, and would utilize permanent solutions to the extent practicable. The remedy does not meet the statutory preference for the selection of a remedy that involves treatment as a principal element because of technical limitations related to treatment technologies for lead and arsenic. The Preferred Alternative can change in response to public comment or new information.

Figure 7: Public notice of comment period and public meeting about proposed plan

EPA United States Environmental Protection Agency

CDPHE COLORADO Department of Public Health & Environment

NOTICE OF PUBLIC COMMENT OPPORTUNITY

The United States Environmental Protection Agency and Colorado Department of Public Health and Environment announce the availability for public review and comment on proposed plan for early interim action residential property clean ups in Operable Unit 1, Community Properties, for the Colorado Smelter Superfund site in Pueblo, CO. This proposed plan summarizes early interim action clean up alternatives and presents a preferred alternative to address soil and indoor dust contamination at the Colorado Smelter Superfund site.

The following are the three alternatives that are presented in the proposed plan:

Alternative 1: No Action, this alternative is included to use as a baseline for comparison to other alternatives.

Alternative 2: Soil Removal and Replacement to 12 Inches Below Ground Surface and Hotspot Remediation with Indoor Dust Cleanup

Alternative 3: Soil Removal and Replacement to 18 Inches Below Ground Surface with Indoor Dust Cleanup

PROPOSED PLAN PUBLIC MEETING

August 9, 2017 - 6 p.m. to 9 p.m
Pueblo City-County Health Department

101 W 9th St.
Pueblo, CO 81003
3rd Floor Conference Room

The 30-day public comment period starts **Friday July 14, 2017 and goes through Monday August 14, 2017.** Written comments will be accepted anytime during the comment period, but must be postmarked by close of business **August 14, 2017.**

The proposed plan and supporting documents are available for review at the following locations:

Pueblo City County Library
Rawlings Branch
100 East Abriendo Ave.
Pueblo, CO 81004
719-562-5600

or the EPA website at
www.epa.gov/superfund/colorado-smelter

Please Submit Comments to:

Write Us: V. Jasmin Guerra, Community Involvement Coordinator
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street (8OC-PAI), Denver, CO 80202
Email: guerra.valeria@epa.gov

Questions? Contact:

V. Jasmin Guerra
Community Involvement Coordinator
Environmental Protection Agency
303-312-6508
Email: guerra.valeria@epa.gov

Sabrina Forrest
Project Manager
Environmental Protection Agency
303-312-6484
Email: forrest.sabrina@epa.gov

Proposed Plan Supporting Documentation

Focused Feasibility Study (FFS) for Operable Unit 1 and Appendices

Appendix A – Preliminary Identification of Chemicals of Potential Concern (COPC)

Appendix B – Preliminary Remediation Goals

Appendix C – Action Memorandum – Approval and Funding for an Emergency Removal Action Involving the Cleanup of Lead-Contaminated Indoor Dust in Residential Areas of Pueblo, CO, as a result of Smelting Activities at the Colorado Smelter Site

Appendix D – Bioavailability Technical Memorandum – Colorado Smelter Superfund Site, Pueblo, Pueblo County, Colorado

Appendix E – Evaluation of the Contribution of Outdoor Lead in Soil to Indoor Lead in Dust at Colorado Smelter Superfund Site

Appendix F – Agency for Toxic Substances and Disease Registry Technical Assistance for Lead and Arsenic in Indoor Dust Related to Colorado Smelter NPL Site, Pueblo, Colorado

Appendix G – American Academy of Pediatrics. Recommendations on Medical Management of Childhood Lead Exposure and Poisoning

Appendix H – Comparison of Total Cost of Remedial Alternatives

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- 1883, Index and Sheet 8 showing Colorado Smelter;
- 1886, Index and Sheet 12 showing Colorado Smelter, Sheet 13 showing Pueblo Smelter;

- 1889, Index and Sheet 23 showing Colorado Smelter, Sheet 24 showing Pueblo Smelter, Sheet 26 showing Philadelphia Smelter.
- 1904/1905, Indexes (2) and Sheet 71 showing Pueblo Smelter, Sheet 157 showing Colorado Smelter, Sheet 189 showing Philadelphia Smelter.

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Glossary of Useful Terms

Applicable or Relevant and Appropriate Requirements (ARARs) – Federal and state environmental and public health statutes; an analysis to determine which statutes apply to the cleanup action.

Background Concentrations – naturally occurring: ambient concentrations of lead present in the environment that have not been influenced by humans vs. human-made: lead concentrations that are present in the environment due to human-made, non-site sources (e.g., automobile exhaust)

Best Management Practice (BMP) – A combination of practices that are determined to be the most effective and practicable means of controlling point and nonpoint pollutants at levels compatible with environmental quality goals. In this document, BMPs specifically refer to measures taken during construction activities on properties where contamination has been left at depth to prevent the transfer of those contaminants to other media. It also includes measures taken by homeowners to reduce their exposure to potential sources of lead the cleanup cannot address, such as housekeeping and home maintenance practices to reduce exposure to lead-based paint and lead in plumbing systems.

Cleanup Level – Cleanup levels generally are based on PRGs and are refined by considering the cost and implementability of remedial alternatives, including the technical feasibility of achieving the risk-based PRG, and other criteria outlined in the National Contingency Plan (NCP). The cleanup level generally is a chemical-specific concentration chosen by the risk manager as appropriate for likely future land use based on the PRG and other practical considerations. In some cases, the cleanup level is the same as the PRG. Cleanup levels are documented in the Record of Decision (ROD) (EPA 2001).

Colorado Smelter Superfund Site (the Site) - The Colorado Smelter was a silver and lead smelter that operated in the Eilers and Bessemer neighborhoods from 1883 to 1908. EPA listed the Site

on the National Priorities List in December 2014, due to its concern about high levels of arsenic and lead (metals) that have been identified in smelter slag and neighborhood soils.

Colorado Department of Public Health and Environment (CDPHE) – State health department: The State health department works collaboratively as a support agency to EPA and provides technical and community involvement oversight and support, including drafting and reviewing various Site documents for the Administrative Record.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) – Informally called Superfund, was established by Congress in 1980 and amended in 1986. Act which gives EPA the authority to address uncontrolled releases of hazardous substances, contaminants, and pollutants.

Decision Units (DU) – A small area within a larger area where a sample is collected. The result of the sample will inform the cleanup.

Exposure Unit (EU) – The area where exposure occurs, in the case of the Colorado Smelter, this is the yard and home.

Feasibility study (FS)/Focused Feasibility Study (FFS) – Uses information from the RI to develop, screen and evaluate the remedial alternatives (that is, cleanup options) that can address the risks to human health and the environment.

Hotspot – Areas having high levels of contamination, also being used interchangeably with Not-to-Exceed (NTE) levels for this Proposed Plan

Human Health Risk Assessment (HHRA) – The process to estimate the nature and probability of adverse health effects in humans who may be exposed to chemicals in contaminated environmental media, now or in the future.

Institutional Controls (ICs) – Are non-engineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. ICs accomplish these objectives by directly limiting land or resource use, and/or by providing information that modifies behavior.

The Integrated Exposure Uptake Biokinetic Model (IEUBK) – A model designed to model exposure from lead in air, water, soil, dust, diet, and paint and other sources to predict blood lead levels in children 6 months to 7 years old.

Interim Record of Decision (i-ROD) – Take quick action to protect human health and the environment from an imminent threat in the short term, while a final remedial solution is being developed

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) – The federal government's blueprint for responding to both oil spills and hazardous substance releases.

National Priorities List (NPL) – The list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories.

Not to Exceed (NTE) – A number defining the acute level by which contamination should not exceed. For this proposed plan, it is also being called Hotspot.

Operable Unit 1 (OU1) – Community properties for this early interim action, residential community properties at the Colorado Smelter Site

Preliminary Remediation Goal (PRG) –A chemical-specific initial cleanup goal that (1) is protective of human health and the environment and (2) complies with Applicable or Relevant and Appropriate Requirements (ARARs).

Proposed Plan – A proposed plan presents EPA's preliminary recommendation of how to best address contamination at a site, presents alternatives that have been evaluated, and explains the reasons EPA recommends the Preferred Alternative

Record of Decision (ROD) – An EPA decision document to facilitate public involvement in a site's remedy selection process.

Remedial Action Objectives (RAOs) –Cleanup goals developed by EPA to protect human health and the environment and describe what a cleanup will accomplish.

Remedial Investigation (RI) – characterizes site conditions as well as determines the nature of contamination to assess risk to human health and the environment.

Removal Actions – Short-term responses actions to address more immediate threats.

X-Ray Fluorescence Spectrophotometry (XRF) – a non-destructive (i.e., does not consume the sample) analytical technique used to determine the elemental composition of materials. XRF analyzers determine the chemistry of a sample by measuring the fluorescent (or secondary) X-ray emitted from a sample when it is excited by a primary X-ray source.

Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
ASARCO	American Smelting and Refining Company
ATSDR	Agency for Toxic Substances and Disease Registry
BTV	Background threshold value
CDPHE	Colorado Department of Public Health and the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
CSM	conceptual site model
COPCs	contaminants of potential concern
D&RG	Denver & Rio Grande
DU	Decision Unit
EPA	United States Environmental Protection Agency
EU	Exposure Unit
FS	Feasibility Study
FFS	Focused Feasibility Study

HHRA	human health risk assessment
ICs	Institutional Controls
i-ROD	interim Record of Decision
NA	Not applicable
NC	Noncarcinogenic
NTE	Not to Exceed
OU	Operable Unit
PCCHD	Pueblo City-County Health Department
PRG	Preliminary Remediation Goal
PWT	Pacific Western Technologies, Ltd.
RAOs	remedial action objectives
RBC	Risk-based concentration in soil
RBSL	Risk-based screening level
RSL	Regional Screening Level
RI	Remedial Investigation
ROD	Record of Decision
Site	Colorado Smelter Superfund Site, Pueblo, Pueblo County, Colorado
XRF	X-Ray Fluorescence spectrophotometry

Units of Measurement

µg – microgram:	Unit of mass equal to one millionth of a gram (1×10^{-6}) or one thousandth of a milligram (1×10^{-3}).
dl – deciliter:	A metric unit of volume equal to one-tenth of a liter.
µg/dL – micrograms per deciliter:	For example, 6.24 micrograms of lead per deciliter of blood
mg/kg – milligrams per kilogram:	The mass of a chemical per unit of weight or volume. It is the same as parts per million (ppm), which has been more commonly used in public meetings and presentations and is being used for the Colorado Smelter proposed plan. Both mg/kg and ppm are the same ratios and can be used inter-changeably. For example, if you had 20 ppm, it would be like having 20 white marbles and 999,980 black marbles out of 1,000,000 total marbles.
ppm - parts per million:	Parts out of a million – usually used to describe concentration of something in water or soil.