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Smeltertown Superfund Site
Former Koppers Wood Treating Site
Salida, Colorado
Record of Decision

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List of Acronyms

AOC - Administrative Order on Consent
ARARs - Applicable or Relevant and Appropriate Requirements
CDPHE - Colorado Department of Public Health and Environment
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC - Chemical of Concern
CTE - Central Tendency Exposure
DNAPL - Dense, Non-Aqueous Phase Liquids
EPA - Environmental Protection Agency
FFS - Focused Feasibility Study
HHBRA - Human Health Baseline Risk Assessment
HRS - Hazard Ranking System
MCLs - Maximum Contaminant Levels
MCLGs - Maximum Contaminant Level Goals
MRA - Mining Restriction Area
NCP - National Contingency Plan
NPL - National Priorities List
PAH - Polynuclear Aromatic Hydrocarbons
PCB - Polychlorinated Biphenyl
ppb - parts per billion
ppm - parts per million
PRG - Preliminary Remediation Goals
PRP - Potentially Responsible Party
POTWs - Publicly Owned Treatment Works
PWC - Present Worth Cost
RA - Remedial Action
RAO - Remedial Action Objectives
RCRA - Resource Conservation and Recovery Act
RD - Remedial Design
RI - Remedial Investigation
RME - Reasonable Maximum Exposure
ROD - Record of Decision
SARA - Superfund Amendments and Reauthorization Act of 1986
TBC - To be considered
TPH - Total Petroleum Hydrocarbon
TSCA - Toxic Substances Control Act

The Glossary of Terms

Administrative Order on Consent (AOC): A legal agreement between EPA and one or more potentially responsible parties whereby the potentially responsible party or parties agree to perform or pay the cost of site investigations or cleanup.

Administrative Record: A file established and maintained by the lead agency that contains all the documents used by EPA to make a decision on the selection of a remedial action. The administrative record is available for public review and a copy is established at or near the site, usually at one of the information repositories.

Alternative: A cleanup option for reducing site risk by limiting or eliminating the exposure pathway by reducing, removal, containment or treatment of the contamination.

Applicable Requirements: Those cleanup standards, standards or control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and are more stringent than federal requirements may be applicable.

Aquifer: A geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.

Capital Costs: The costs of items such as buildings, equipment, engineering, and construction. Construction costs include labor, equipment and material costs.

CERCLA: The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986.

Chemicals of Concern: The most prevalent and toxic site-related chemicals identified and released at a Site.

Chemicals of Potential Concern: Potentially, the most prevalent and toxic site-related chemicals identified and released at a Site.

Colorado Hazardous Waste Act (CHWA): The Colorado law regulating the procedures used in the generation, treatment, transportation, storage and disposal of hazardous wastes.

Compliance Boundary: The boundary at the Site where chemical-specific remediation levels and performance standards must be met. Not necessarily equivalent to the physical ownership or site boundary, but rather defined by the nature and extent of the contamination at the site.

Contingency Measures: Measures that detail the action to be taken in response to a remedy component failure.

Dense, Non-Aqueous Phase Liquids (DNAPL): A group of compounds which are heavier than water. When released to the environment, they often form a "plume" which sinks to a less permeable surface within the groundwater. Includes or may include, hazardous substances or contaminants, as the primary material or trapped within a matrix.

Excess Lifetime Cancer Risk: The incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. A cancer risk of 1×10^{-6} is one additional case of cancer (over background levels) per million people exposed (a one in a million chance of having cancer). The NCP specifies the 1×10^{-4} to 1×10^{-6} risk level as a "target range" within which to manage risk at Superfund sites.

Exposure: Contact of a chemical with the outer boundary of a human (skin, nose, mouth, skin punctures and lesions) to include dermal, ingestion and inhalation exposures.

Exposure Parameter: Factors such as body weight, breathing rate, or time/activity that may be needed to quantify (calculate) human exposure to a contaminant.

Exposure Pathway: The course a hazardous substance (including chemicals of concern) takes from a source to a receptor. An exposure pathway describes a unique mechanism by which an individual or population is exposed to chemicals or physical agents at or originating from a site. Exposure pathway includes a source or release from a source, an exposure point, and an exposure route.

Exposure Point: A geographical location of potential contact between a receptor and a chemical or physical agent, e.g., an industrial worker ingesting soil containing PCBs.

Exposure Point Concentration: Concentration at the point where receptors may be exposed.

Exposure Route: The way a chemical or physical agent comes in contact with a receptor, that is, inhalation, ingestion, dermal contact, e.g., ingestion of pentachlorophenol in the groundwater by a hypothetical future residential worker.

Exposure Setting: A combination of potential land uses and exposure routes that describe the ways by which a specific type of receptor can contact contaminants, for example, residential setting, occupational setting, recreational setting.

Feasibility Study (FS): A study undertaken to develop and evaluate options for remedial action. The FS emphasizes analysis of alternatives and is generally performed concurrently and in an interactive fashion with the remedial investigation (RI), using data gathered during the RI. The study results are published in a report referred to as the Feasibility Study.

Fund or Trust Fund: The Hazardous Substance Superfund established by Section 9507 of the Internal Revenue Code of 1986.

Groundwater: As defined by Section 101(12) of CERCLA, water in a saturated zone or stratum beneath the surface of land or water.

Hazard Ranking System (HRS): The method used by EPA to evaluate the relative potential of hazardous substance releases to cause health or safety problems, or ecological or environmental damage.

Human Health Baseline Risk Assessment (HHBRA): A study used by EPA to evaluate the potential risks to human health if nothing is done to remediate a site or eliminate the risks. The BRA considers current use and hypothetical future use of the site.

Hydrogeologic: Relating to the science of hydrogeology, which studies the interactions of groundwater and geologic formations.

Intake: The measure of exposure expressed as the mass of a chemical that crosses an outer boundary of a human or the chemical per unit body weight per unit time, i.e., milligrams of chemical per kilogram of body weight per day.

Institutional Controls: Rules, regulations, laws, or covenants that may be necessary to assure the effectiveness of a cleanup alternative. Examples of institutional controls include, but are not limited to, deed restrictions, water use restrictions, zoning controls, and access restrictions.

Maximum Contaminant Levels (MCLs): Standards established under the Safe Drinking Water Act, which identify the highest allowable levels of contaminants in drinking water sources. MCLs are often used to determine when remedial action would be appropriate to address a release of hazardous substances.

Mining Restriction Area (MRA): Represents an area of 6.6 acres where the waste exceeds the Preliminary Remediation Goals (PRGs) which are based upon the industrial scenario.

National Contingency Plan (NCP): The EPA's regulations governing all cleanups under the Superfund program. Published at 40 CFR Part 300.

National Priorities List (NPL): The list, compiled by EPA pursuant to CERCLA Section 105, of uncontrolled hazardous substance released within the United States that are priorities for long-term remedial evaluation and response.

Offsite: The area located outside of the physical boundaries of the Smeltertown site.

Onsite: The area within the physical boundaries of the Smeltertown site.

Operation and Maintenance: Measures required to maintain the effectiveness of the selected remedy including the cost of operating labor, maintenance, materials, energy, disposal, and administrative activities.

Parts per billion (ppb)/parts per million (ppm): Units commonly used to express concentrations of contaminants. For example, one ounce of trichloroethylene (TCE) in one million ounces of water is one ppm; one ounce of TCE in one billion ounces of water is one ppb.

Performance Standards: The standards, specified by EPA, that the remedy must meet. For treatment, these standards are concentrations that the treatment must achieve for identified contaminants. For disposal, these standards define the concentrations of wastes to be removed (in volume). For containment, these standards are the concentrations of wastes that are monitored at the containment boundaries to ensure the integrity of the containment system.

Polycyclic Aromatic Hydrocarbons (PAH): A class of organic (carbon-based) compounds which are associated with manufacturing and petrochemical wastes.

Polychlorinated Biphenyl (PCB): A class of organic (carbon-based) compounds which are widely found mixed with transformer oils. PCBs have been identified as a cancer-causing agent, or carcinogen.

Potentially Responsible Party (PRP): An individual or company (such as owners, operators, transporters, or generators of hazardous waste) potentially responsible for, or contributing to, the contamination problems at a Superfund site, pursuant to CERCLA.

Preliminary Remediation Goals (PRGs): The goals set during the development of the feasibility study for the chemicals of concern at a site. These goals can be derived from policy, regulations, risk-based science, technology, or to-be-considered guidance or criteria. These goals become performance standards when presented in the Record of Decision.

Present Worth Cost (PWC): An analysis of the current value of all costs. Also known as Net Present Worth, the PWC is calculated based on a 30-year time period and a predetermined interest rate.

Proposed Plan: A document that summarizes EPA's preferred cleanup strategy, the rationale for the preference, and all of the alternatives presented in the detailed analysis of the feasibility study. The Proposed Plan solicits review and comment on all alternatives under consideration.

Publicly Owned Treatment Works (POTW): A municipal or local facility that collects, manages, and treats wastewater.

Reasonable Maximum Exposure (RME): The RME is the highest exposure that is reasonably expected to occur at a site. It is the product of a few upper-bound exposure parameters with primarily average or typical exposure parameters so that the result represents an exposure that is

both protective and plausible. The exposure includes exposure point concentration and exposure frequency and duration, with a mixture of distributions (averages, 95th percentile, etc.) to reflect a 90th percentile.

Receptor: Any organism (such as humans, terrestrials, wildlife, or aquatic) potentially exposed to chemicals of concern.

Record of Decision (ROD): A public document that explains the remedial action plan for a Superfund site. A ROD serves several functions:

- It certifies that the remedy selection process was carried out in accordance with CERCLA and with the NCP;
- It describes the technical parameters of the remedy, specifying the treatment, engineering, and institutional components, as well as remediation goals;
- It provides the public with a consolidated source of information about the site and the chosen remedy, including the rationale behind the selection; and
- The ROD also provides the framework for the transition into the next phase of the remedial process, Remedial Design (RD).

Relevant and Appropriate Requirements: Those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to a particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

Remedial Action (RA) or Remedy: Those actions consistent with a permanent remedy taken instead of, or in addition to, a removal action in the event of release or threatened release of a hazardous substance into the environment to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment.

Remedial Action Objectives (RAOs): Objectives developed by EPA, after providing the State with a meaningful and substantial involvement, at individual Superfund sites that, in connection with chemical-specific remediation goals and performance standards, define acceptable levels of risk.

Remedial Design (RD): The technical analysis and procedures which follow the selection of

remedy for a site and result in a detailed set of plans and specifications for implementation of the remedial action.

Remedial Investigation (RI): A study undertaken to determine the nature and extent of the problem presented by a release of hazardous substances at a Site. The RI emphasizes data collection and site characterization, and is generally performed concurrently and in an interactive fashion with the feasibility study. The RI includes sampling and monitoring, as necessary, and the gathering of sufficient information to determine the necessity for remedial action and to support the risk assessment evaluation of remedial alternatives.

Resource Conservation and Recovery Act (RCRA): A Federal law that requires safe and secure procedures to be used in treating, transporting, storing and disposing of hazardous wastes and solid wastes.

Respondent: Identifies the party entering into an Administrative Order on Consent (AOC or Consent Order) with EPA.

Subtitle C: A program under RCRA that regulates the management of hazardous waste from the time it is generated until its ultimate disposal.

Subtitle D: A program under RCRA that regulates the management of solid waste.

Superfund Amendments and Reauthorization Act of 1986 (SARA): Amendments to CERCLA, enacted on October 17, 1986.

Total Extractable Hydrocarbons (THE): A measure of the amount of petroleum-based contaminants present.

Total Petroleum Hydrocarbon (TPH): A measure of the amount of petroleum-based contaminants present.

Toxic Substances Control Act (TSCA): A Federal law which regulates the manufacture, processing, import, distribution, use, and disposal of toxic substances.

Vertical Migration: The ability of media such as water, to move vertically upwards or downwards through various subsurface strata.

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Section 1.0
DECLARATION FOR THE RECORD OF DECISION

1.1 Site Name and Location

Smeltertown Superfund Site
Chaffee County
Colorado

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action (RA) for the former Koppers Wood Treating Operable Unit (OU2) at the Smeltertown Superfund Site (the Site), which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the basis and the purpose of the selected remedy and is based on the administrative record file for this Site.

The Colorado Department of Public Health and the Environment (CDPHE) concurs on the selected remedy.

1.3 ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present a current or potential threat to public health, welfare, or the environment.

1.4 DESCRIPTION OF THE SELECTED REMEDY

The Former Koppers Woodtreating Operable Unit is the second of three operable units. The first operable unit (OU1) at this Site addresses the contamination from the smelting activities conducted by the Ohio and Colorado Smelting and Refining Company from 1902 to 1919 and is identified as the Historic Smelting Operable Unit. The third operable unit (OU3) addresses the contamination from the active Colorado Zinc Company (CoZinCo) industrial facility. The United States Environmental Protection Agency (EPA) and the State of Colorado Department of Public Health and Environmental are currently negotiating with the potentially responsible parties (PRPs) of OU1 to implement the selected response action documented in the Action Memorandum dated September 27, 1996. CDPHE currently oversees the active CoZinCo Site (OU3) under the State Resource Conservation and Recovery Act (RCRA). CDPHE anticipates a selected corrective action for OU3 in early summer 1998. This action addresses the wood-treating contaminants from the tie treating operations at the former Koppers Wood Treating Operable Unit that were conducted by Koppers Company, Inc. (now known as Beazer East, Inc.) from 1924 through

1953. This remedy calls for the containment of soils contaminated at low levels and monitors the effect of the contaminants in the soils, dissolved polycyclic aromatic hydrocarbons (PAHs) and dense non-aqueous phase liquids (DNAPL) within the groundwater.

The major components of the selected remedy include the following:

- Institutional controls (deed restrictions) and engineering controls (fence) to ensure that the contaminated area remains undisturbed and the Site is not developed for residential use. A mining restriction would be imposed upon 6.6 acres where subsurface impacts from wood-treating activities remain.
- Groundwater monitoring will be conducted to ensure no further migration of the dense non-aqueous phase liquid or dissolved PAH constituents and to measure the long-term effectiveness of the remedy.

1.5 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action (or justifies a waiver of any Federal and State applicable or relevant and appropriate requirements that will not be met), and is cost-effective. This remedy utilizes institutional and engineering controls for the containment of low-level contaminants as preferred by the National Contingency Plan.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Max H. Dodson — 6/4/98

Max H. Dodson
Assistant Regional Administrator
Ecosystems Protection and Remediation
U.S. Environmental Protection Agency, Region VIII

Date

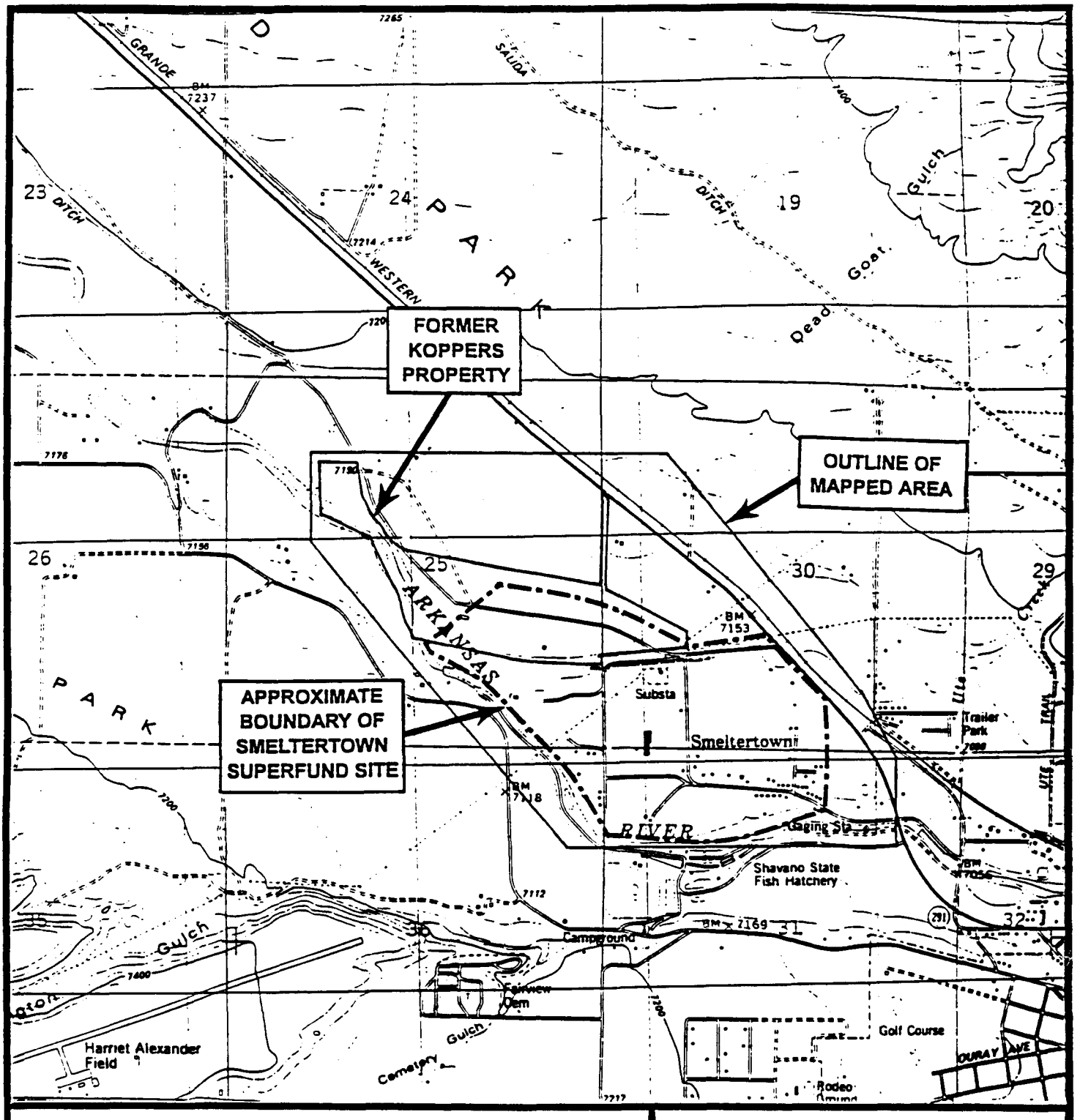
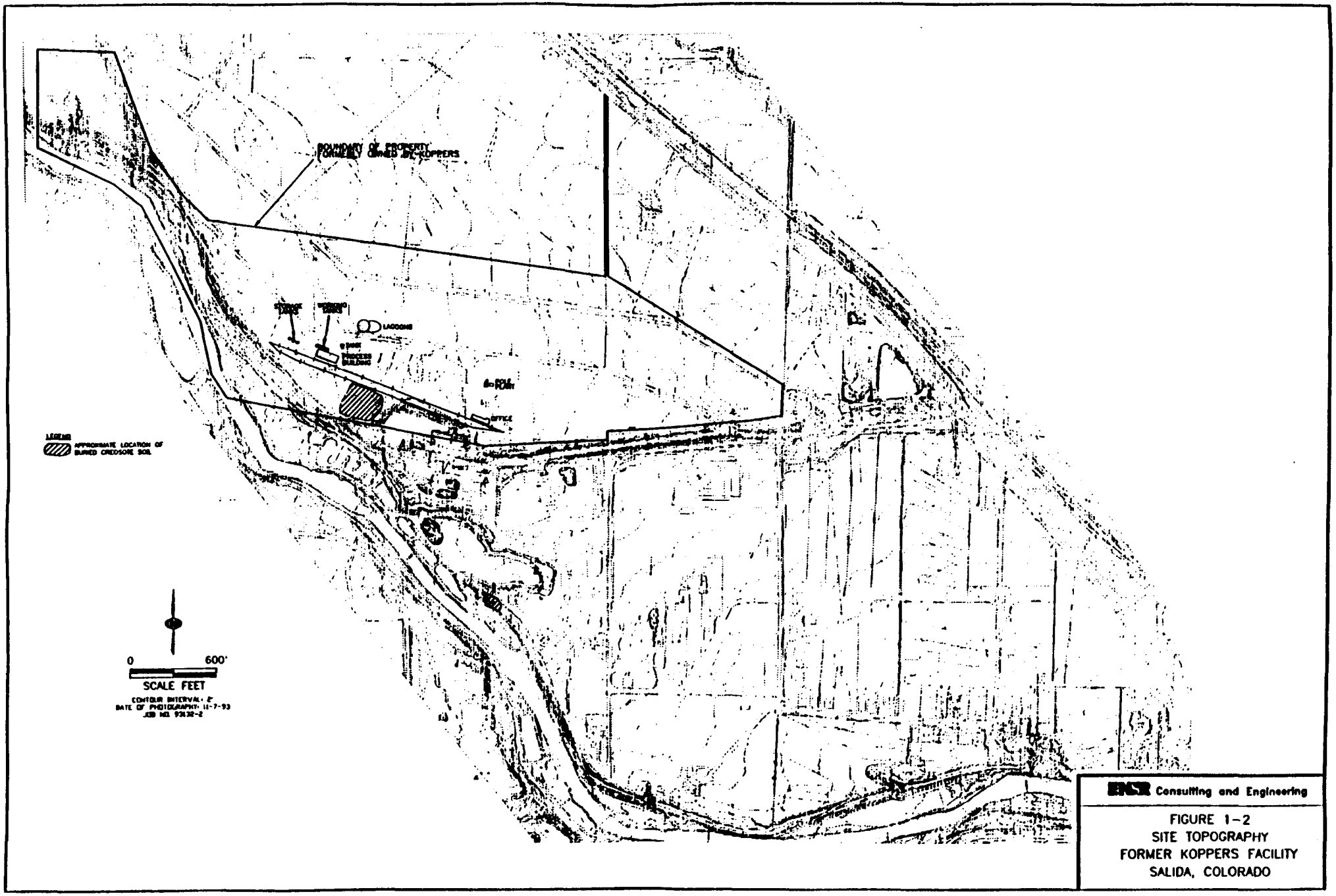


Figure 1-1. Location Map of Smeltertown Superfund Site and Former Koppers Property

ENSR Consulting and Engineering



ERSE Consulting and Engineering

FIGURE 1-2
SITE TOPOGRAPHY
FORMER KOPPERS FACILITY
SALIDA, COLORADO

Section 2.0
Site Summary

The Smeltertown Superfund Site (SMT) is located in Township 50 North, Range 9 East, in the southeast quarter of Section 25 approximately one mile northwest of Salida in Chaffee County, Colorado. The 118-acre site is situated south of Chaffee County Highway 150, west of County Highway 152. See Figure 1-1 location map of Smeltertown Superfund Site and Former Koppers Property. A predominant feature of the area is the 365-foot smokestack, which stands just outside the southeast boundary of the former Koppers property and was placed on the National Register of Historic Places in 1976. The Smeltertown Superfund Site is subdivided into three subsites based on historical and current industrial operations. These subsites or operable units are not mutually exclusive and there is considerable overlap between them. The Smelter subsite (operable unit one) of the historic Ohio and Colorado Smelting and Refinery Company occupies the Site's central region. The CoZinCo subsite (operable unit three) lies in the Site's eastern region and is occupied by the active CoZinCo, Inc. facility. The former Koppers Wood Treating subsite (operable unit two) in the western region was occupied by the former Kopper's creosote treatment facility and is the focus of this decision document. This subsite is currently used by Butala Construction for storage of sand and gravel material and includes approximately 60 acres of the 118-acre site.

SMT is surrounded by residences and a variety of industries operate on or adjacent to SMT. Colorado-Ute Electric Association operates a substation located approximately midway along the northern border of SMT. Butala Construction is actively quarrying gravel from the valley fill in the west and northwest portion of SMT. E&R Trucking, Inc. (E&R), which is currently not active, occupied part of the smelter subsite. E&R was a hauling operation which used the property as a staging area for semi-trailers. A peat moss packaging facility, which uses peat hauled in from elsewhere, is located southwest of the zinc facility operated by CoZinCo Incorporated (CoZinCo). Salida Auto Salvage operates a facility open to the public south of CoZinCo. There are two residential properties within the area of study, the Kimmett family residence and the Graff rental properties. As of the spring of 1996, the ownership of the Graff rental properties changed to Poncha Development Company, and the new owner has no tenants.

SMT is generally zoned industrial. However, Chaffee County's industrial zoning allows residential development, as evidenced by the continued approval for construction of new homes in the area.

Land use in the general area of SMT consists of the following:

- Residential;
- Industrial operations (CoZinCo);
- Quarrying and rock-crushing related activities (Butala Construction);
- Commercial activities, such as river rafting, a bed and breakfast, an automobile salvage yard, and a peat moss packaging and sales

company;
- o Public use (fish hatchery);
- o Recreational use (fishing);
- o Agricultural use, such as fields, livestock, horse farms; and,
- o A utility company (Colorado-Ute Electric Association, which operates a substation immediately north of SMT).

Although SMT is largely industrial in character, there are approximately 50 homes located adjacent and within the southern and eastern portions of SMT. The homes within SMT include private homes and at least three mobile homes. Much of SMT is readily accessible to the public. During a site visit conducted September 1st and 2nd of 1992, the Agency for Toxic Substances and Disease Registry (ATSDR) staff observed that there was little evidence of small children in the immediate area. This observation was supported by community resident statements during the "public availability session" held during an SMT visit. According to a census conducted in 1990, the town of Salida had a population of about 4,700 people. The block group in the census tract encompassing SMT had a 1990 population of 332 people. It should be noted, however, that this block group comprises an area much larger than SMT; it is estimated that about one third of the block group's population resides in the immediate SMT vicinity. Approximately 5,200 people live within four miles of SMT, and about 200 people live within one mile of SMT.

The chief topographic features of the area are two parallel, northwest trending mountain ranges that border the Arkansas River Valley. The Sawatch Range rises to over 14,000 feet in elevation and borders the western margin of the Valley. The Mosquito Range rises to over 10,000 feet in elevation and borders the eastern margin of the Valley.

The Site is on a relatively flat terrace on the northeast bank of the Arkansas River, about 90 to 100 vertical feet above the river. The Arkansas River flows southward from its headwaters near Leadville, Colorado, approximately 50 miles to the north. Locally, the river flows southeastward along the west side of the Site and then turns to the east along the south edge of the Site approximately two miles upstream of Salida, Colorado.

Land-surface elevation at the Site ranges from approximately 7,050 to 7,200 feet above mean sea level (MSL). The majority of the Site is on a river terrace about 90 vertical feet above the river at an approximate elevation of 7180 feet. Annual precipitation in the area is approximately 10 to 12 inches/year. Native grasses are the only vegetation on the terrace surface. No trees and few buildings are present, and several large boulders, approximately 6 to 8 feet in nominal diameter, lie on the terrace surface. Between the terrace surface and the Arkansas River, there is a steep bluff that is vegetated with cottonwood trees and various species of underbrush. Approximately 30 to 40 vertical feet below the terrace surface along the bluff face (at an elevation of approximately 7,140 to 7,150 feet above MSL) there are several areas of diffuse seepage and springs of very low flow rate. An old slag pile is located about another 10 to 15 vertical feet down the bluff face. The upper surface of the slag pile is relatively flat, and extends about 5 to 10 feet horizontally outward toward the river from the bluff face. The slag is from the former smelter operation and is not related to wood-treating activities.

A Colorado Division of Water Resources streamflow gauging station is located 0.75 mile downstream from the site. Based on a period of record from 1909 to 1980, the average annual discharge at the gauging station is 634 cubic feet per second (ft^3/sec). The average annual discharge from 1991 to 1993 is approximately 590 ft^3/sec. Streamflow is characterized as high in the spring and early summer due to runoff of snowmelt from the surrounding high mountains, and relatively moderate flows for the rest of the year.

Most of the water used for irrigation of hay meadows in the area is obtained by direct diversion of Arkansas River water via unlined ditches that flow across the river valley, rather than from the pumping of groundwater from wells. Two such canals, the Salida Ditch and the Williams Hamm Ditch, are present to the northwest, north, and northeast of the Site and flow southeasterly across the valley. Infiltration from these ditches is probably a source of shallow groundwater beneath the Site. The irrigation season occurs from approximately May through September of each year.

Four distinct hydrologic units have been identified at the Site within the valley-fill deposits: upper terrace aquifer, lower terrace aquifer, Arkansas River alluvial aquifer and underlying all three of these aquifers are the glacial and basin-fill deposits. Groundwater beneath the Site in the Upper Terrace Aquifer moves to the south. Water levels in monitoring wells on Site completed in this aquifer have been measured on a quarterly basis from April of 1994 to January of 1995 and show that the direction of groundwater movement (perpendicular to potentiometric contours) is generally from north to south across most of the former Koppers Wood Treating Operable Unit. However, on the western edge of the area of investigation (i.e., near the bluff), the groundwater flow direction has a southwesterly component, due to the fact that the Upper Terrace Aquifer is truncated at the bluff, thus inducing flow toward the bluff where it discharges as springs and seeps. The general direction of groundwater movement in the Lower Terrace Aquifer, the Arkansas River Alluvial Aquifer, and the glacial/basin-fill deposits is toward the Arkansas River and parallel to it.

Groundwater in the Upper Terrace Aquifer, which moves generally to the south, discharges predominantly:

- To a series of springs and diffuse seeps at various locations along the 90-foot high bluff at the southwestern edge of the Site; and
- To the Lower Terrace Aquifer and/or a series of springs and diffuse seeps at various locations along the 40-foot bluff that separates the upper terrace from the lower terrace along the south and southeastern edges of the Site.

An estimate of the volumetric flow through the Upper Terrace Aquifer indicates that all the springs and diffuse seeps, together, discharge about one gallon per minute (gpm) of groundwater. Some of this water is likely consumed through evapotranspiration by vegetation growing on the bluff. Field observations in April 1994 indicate that no discrete streams of water were observed emanating from spring discharge locations and flowing down the slope of the bluff.

Section 3.0
Site History, Studies and Enforcement Activities

Industrial activity at the Smeltertown Superfund Site began in 1902 with the construction of a lead-zinc smelter by the Ohio and Colorado Smelting and Refining Company. The smelter operated from 1902 to 1919, was dismantled in 1920, and the area was cleared of most structures except two buildings and a 365-foot smokestack. A portion of the property, including the smelter office building, was utilized by a series of railroad tie-treating companies (Koppers and its predecessors), beginning in 1926 and ending in 1953 when the wood-treating plant was closed. Koppers sold the property in 1962 to the H.E. Lowdermilk Company (Lowdermilk).

The former Koppers Wood Treating Operable Unit (OU 2) was purchased from Lowdermilk by Butala Construction, a sand and gravel mining and processing company, which continues to operate a sand and gravel quarry including producing decorative residential and commercial rock. Operable Unit 2 adjoins other property owned by Butala to the south where most of the active sand and gravel mining activity occurs. Operable Unit 2 has been cleared of most remnants of past activity. The only structures remaining are the plant office building and a water storage tank, both on the upper terrace, and a gutted pump house near the Arkansas River. Butala Construction uses portions of the Site for stockpiling of sand, gravel, and other materials.

The remaining portion of the Smeltertown Superfund Site was not used for wood-treating activities and includes the former site of lead-zinc smelter operations and the active Colorado Zinc Company (CoZinCo) industrial facility. The 365-foot smokestack, which still stands just outside the southeast boundary of the former Koppers property, was placed on the National Register of Historic Places in 1976.

SMT was proposed for inclusion on the National Priorities List (NPL) in February 1992. The United States Environmental Protection Agency (EPA) has not taken any final action at this time to include SMT on the NPL.

EPA first focused its attention on the Site in 1986 as the result of delivery of creosote-impacted soil from the Site to the Chaffee County Landfill by Butala Construction. Thereafter, Beazer removed over 5,000 tons of creosote-stained soil from the Site and disposed of the soils in a permitted hazardous waste management facility. In October 1995 Beazer signed an Administrative Order on Consent (AOC) to conduct a Remedial Investigation/Focused Feasibility Study (RI/FFS) (EPA Docket No.: CERCLA-VIII-96-11) of the former Koppers Wood-Treating Subsite (Operable Unit 2) at the Smeltertown Superfund Site. The AOC became effective in January 1996.

Butala Construction is the current owner of Operable Unit 2 and operates a sand and gravel mining operation. Butala scraped much of the creosote-stained surface soil from OU 2 and reportedly buried portions of this material both on OU 2 and on adjacent Butala property. Two

specific burial locations were identified: one location on the upper terrace and one on the lower terrace adjacent to the Arkansas River. The upper terrace location was reported by Butala Construction to include six trenches roughly 100 feet long, 10 feet deep, and 12 to 14 feet wide. On the basis of earlier investigations, USEPA speculated that the lower terrace location may potentially hold the same volume of creosote-stained soil. Beazer conducted investigation activities in both areas.

Numerous investigations have been conducted on OU2 and the CoZinCo portions of the Smeltertown Superfund Site. In 1987, Water, Waste & Land, Inc. (WWL) was retained by a group of homeowners in the Salida area to investigate the current extent and potential for future pollution of soil, water, and air in the immediate area due to the zinc-sulfate manufacturing facility, CoZinCo, which is located near their homes. WWL collected groundwater, spring water, soil, and air particulate samples in the area of CoZinCo, and produced a report of results that included a preliminary conceptual model of groundwater flow in the area of CoZinCo.

Ecology and Environment, Inc. conducted investigations for both the CoZinCo and the Koppers portions of the Smeltertown Superfund Site on behalf of the USEPA. These investigations included extensive sampling of surface and subsurface soils, the installation and sampling of 7 monitoring wells, extensive spring water sampling, and presentations of the results with interpretations of the impact to soil and groundwater.

Roy F. Weston, Inc. conducted additional investigations on behalf of USEPA involving additional soil and water sampling. The purpose of these investigations was to characterize the sources of potential environmental degradation, evaluate the pathways for movement of these compounds, and collect data for the assessment of human health risk.

CH2M Hill prepared a work plan report on behalf of USEPA that evaluated the procedures for continued investigation of the nature and extent of constituents at the Smeltertown Superfund Site. The investigation conducted by CH2M Hill was focused on those portions of the Smeltertown Superfund Site not being addressed by a Potentially Responsible Party (PRP).

ENSR prepared a companion work plan report on behalf of Beazer East, Inc. that enumerated plans for continued investigations at the Site. The work plan focused only on those portions of the Site potentially impacted by wood-treating constituents (creosote) used by Koppers. ENSR submitted a draft Remedial Investigation (RI) Report in October 1994 which was finalized in March 1996. ENSR submitted two drafts and a final Focused Feasibility Study dated July 1996, November 1996, and August 7, 1997, respectively, with replacement pages submitted at the request of EPA and CDPHE on September 4, October 15, October 23, and December 17, 1997.

A fund-lead emergency removal action (Removal Action #1) was initiated on May 26, 1993, to provide bottled water to five rental units due to zinc in the groundwater beneath the CoZinCo subsite. The Action was completed on May 23, 1994.

EPA issued a unilateral administrative order (UAO) (Removal Action #2, CERCLA 94-09) on

April 28, 1994, to CoZinCo for the purposes of providing replacement water supplies to residents where water was contaminated by zinc; however, violations of the UAO led EPA to take over the work. The UAO was in effect from May 24, 1994 to November 1, 1995.

Phase I of a time-critical removal action (Removal Action #3) was initiated on September 27, 1993, to remove the creosote-contaminated sludge from four residential driveways; lead-contaminated soil from five residential yards; a slag, cinder, and debris pile from one residential property; and metal-contaminated soil next to the smelter. The contaminated soils were stockpiled on SMT, previously referred to as the existing waste pile. Two homes were decontaminated from lead and arsenic dust.

Phase II of a time-critical removal action (Removal Action #3) continued the actions initiated under Phase I. These actions included constructing a fence around the stockpiled waste pile on-site; reapplying a dust suppression polymer to the on-site waste pile; removing creosote-contaminated sludge from one more residential property; decontaminating rails removed and stockpiled by the landowner near a residence; removing the surface lead and creosote contamination on the upper terrace of SMT; and removing the mixture of cinder (high lead content) and creosote-contaminated material that was located on the banks of the Arkansas River. Phase II was completed on November 1, 1995.

To assist in the activities of Removal Action #3, EPA signed an Administrative Order on Consent (AOC) (CERCLA 95-08) (Removal Action #4) with Butala Construction on January 10, 1995, to provide in-kind services. Butala provided equipment and personnel to assist in the excavation and stockpiling on-site of contaminated soils. Butala Construction's involvement began on February 27, 1995, and ended on June 8, 1995.

EPA initiated a fund-lead time-critical removal action (Removal Action #5) on November 1, 1995, to provide alternative water supplies to residences affected by the spread of zinc in the groundwater from the CoZinCo facility. The action was completed February 8, 1996.

EPA and CDPHE released a Cleanup Proposal, describing the results of the Engineering Evaluation/Cost Analysis (EE/CA) of the smelter subsite and EPA's preferred alternative, to the public in a fact sheet dated September 1995. Public comment period ended on October 5, 1995. The Action Memorandum, dated September 27, 1997, describes EPA's selection of the response action for the smelter subsite, creosote contaminants within the existing on-site waste pile and soils contaminated with metals within the areal extent of the wood treating subsite. The Response Action for the smelter subsite calls for containment of contaminated soils under an engineered cap with groundwater monitoring to assist in determining the effectiveness of the cap.

While in negotiations with EPA and CDPHE to perform the smelter subsite removal action, Cyprus Amax Minerals Company volunteered to investigate and evaluate the nature and extent of the slag pile bordering the Arkansas River to determine if further action was warranted. PTI Environmental Services (PTI) conducted the investigation and evaluation, on behalf of Cyprus Amax Minerals Company, and submitted a report titled *Data Summary and Risk Evaluation*

Report: River Corridor Exposure Unit at the Smeltertown Site dated January 1998. The exposure scenario was based upon the frequency and time that a future recreational user would be exposed to contaminants at the site. The recreational user was considered to be a fisherman. This report concludes that action is not warranted for either the current (industrial) and the reasonable maximum exposure (RME) future use of the area.

The CoZinCo facility is currently under a CHWA order issued by CDPHE to monitor and mitigate releases from the operating units at the facility. A number of source areas at the facility have been closed under CHWA orders. The State is currently reviewing a Corrective Measures Plan to address the CoZinCo contaminants within the soils and groundwater.

Section 4.0
Highlights of Community Participation

EPA conducted community interviews on September 1 -2, 1992. A Community Relations Plan was developed, based, in part, upon the results of the community interviews, and finalized on December 15, 1993. Several fact sheets have been published and distributed to the local area to inform the citizenry of EPA's activities at the Smeltertown Site. Other public outreach activities included numerous formal and informal meetings with citizens and town officials, responses to telephone inquiries and informative conversations with local media.

EPA established a local repository at the Salida Public Library to make available to local residents documents that detail the investigations conducted at the site. These documents represent the information EPA has considered to make the remedy selection described in this decision document. EPA has also set up a repository at the EPA Superfund Records Center located within the Regional Office in Denver, Colorado.

The Notice of Availability for the RI/FS report and other documents in the administrative record, and the Proposed Plan were published in The Salida Mountain Mail in October 20, 1997. A public meeting was held in the Salida Senior Citizens Center. The nature and extent of contamination and the developed alternatives were presented to the public by EPA and CDPHE. The public meeting was well attended, and many participated by asking questions and providing opinions and comments regarding the remedies. A transcript of the public meeting is provided with this decision document. A public comment period was held from October 22 to November 21, 1997. Six comment letters were received. Responses to each of the comments are found in the Responsiveness Summary, which is part of this Record of Decision.

Section 5.0
Scope and Role of Operable Units

The operable units at the Smeltertown Superfund site were derived from the distinctly different activities that lead to the Site being contaminated by different contaminants. These operable units are:

- OU One: Smelter subsite
- OU Two: Former Koppers Wood-Treating subsite
- OU Three: CoZinCo subsite

As discussed above, EPA has already selected a response action for OU 1, and CDPHE anticipates selecting a corrective action for OU 3 in the summer of 1998. These actions will occur within the areal extent of each operable unit with some overlap of contamination.

The remaining former Koppers Wood Treating operable unit's remedy is described in this Record of Decision. The contaminants within this operable unit include dioxin isomers, pentachlorophenol (penta) and the major components of wood-treating which are primarily polycyclic aromatic hydrocarbons (PAHs) from creosote. The purpose of this response is to prevent current and future exposure to the contaminated soils and to reduce contaminant migration into the groundwater by ensuring no further migration of the DNAPL plume or dissolved PAHs in the Upper Terrace Aquifer.

Section 6.0
Summary of Site Characteristics

This section provides an overview of contamination at the former Koppers Wood Treating Operable Unit Two (OU2), including the source, nature and extent, concentrations, and volumes of contamination. Actual routes of exposure and exposure pathways are discussed in Section 7.0. A general overview of the OU2 is presented in Section 2.0.

6.1 Extent of Contamination in Affected Media

Releases of hazardous substances within operable unit two occurred during the wood-treating operation of Koppers and its predecessors from 1926 to 1953. Tie treating operations at the Site included a creosote treating retort, drip tracks, storage tanks, pole plant and lagoons. In the retort building, railroad ties and other lumber products were pressure-treated with creosote in steel cylinders. The treated materials were then moved from the retort building onto drip tracks where they were temporarily stored until subsequent storage was arranged elsewhere on the Site. Historical drawings of the Site indicate four storage tanks were located west of the retort building, and an additional three working tanks were located adjacent to the north side of the building. At the pole plant, located north of the office building (still standing) and east of the retort, the butt-ends of telephone poles were dipped in creosote to preserve the wood. Historical aerial photographs also suggest the presence of two lagoons, northeast of the retort building, on the north side of the old Chaffee County Road 150.

The principal source areas of contamination were the former process area and the lagoons. Figure 1-2 identifies the location of the source areas from the former Koppers Facility activities. As mentioned earlier, the Site has been cleared of most remnants of past activity including the process building, retort and storage tanks. The lagoons were backfilled but are still identifiable from aerial photographs. In the process area, soils impacted with creosote were found in the location of the former drip tracks, process building and near the storage tanks. The fluids historically present in the lagoons were probably process waters which consisted of an emulsion containing droplets of creosote and water with near-saturation concentrations of dissolved wood-treating constituents. The active sources of creosote and process waters were eliminated in the early 1950s when the Koppers facility was permanently closed. Approximately 5,000 tons of creosote impacted soils were removed from the Site by Beazer in 1992. Soils containing wood-treating constituents were excavated and buried on-site or removed to the county landfill by Butala.

From the historic sources in the process area and the lagoons, wood-treating constituents moved downward through the vadose zone to the water table within the perched Upper Terrace Aquifer. Creosote, a dense non-aqueous phase liquid (DNAPL), which is denser than water, continued to move downward to the bottom of the Upper Terrace Aquifer leaving a residual coating of DNAPL on the surface of the aquifer material. The remaining DNAPL at the base of the aquifer migrated along the upper surface of the glacial/basin fill deposits that generally slopes to the east. Dissolved wood-treating constituents, on the other hand, moved in the direction of groundwater

flow to the south and southwest towards the bluff (see figure 2-7).

DNAPL is present in Spring No. 5 which is located on the west side of the Site about one third of the distance down the bluff from the top. This spring and the soils in the immediate vicinity (within 15 feet) are currently the only location where visible, free phase DNAPL is found at the ground surface. The source of this DNAPL is probably the former storage tanks west of the process building.

Soil

Surface soil collected from gridded sampling locations contained less than 100 mg/kg total PAHs (TPAH) with the exception of one location near the lagoons. Near-surface soil (2 to 5 feet in depth) collected from the gridded sampling locations contained lower levels of TPAH with the exception of one location on the east side of the Site where the grid location is on or near a former railroad grade.

Visually impacted soils were found in the process areas and the lagoons extending from just beneath the ground surface to the bottom of the upper terrace aquifer at a depth of about 40 feet. No visually impacted soils were seen within the glacial/basin-fill deposits which underlie the upper terrace aquifer. Visually unimpacted soils immediately adjacent to both areas contained TPAH at levels less than 100 mg/kg.

The pole plant was an isolated facility for treating the butt ends of power/telephone poles and was located east of the main process area. With the exception of two samples, all soil samples contained less than 15 mg/kg TPAH. TPAH concentrations of approximately 15,000 mg/kg were found in the sample associated with wood fragments and a sample from the base of the Upper Terrace Aquifer contained 121 mg/kg TPAH.

Investigation of the upper terrace area where Butala has reportedly buried creosote-impacted surface soil revealed the presence of at least four trenches containing buried soil impacted with wood-treating constituents. The trenches do not extend beyond a depth of about 20 feet, and thus are above the water table. Available evidence suggests that constituents have not migrated from the base of the trenches. In the lower terrace area where Butala also reportedly buried creosote-impacted soil, stained soils were encountered at shallow depths. Maximum TPAH concentrations were 144 mg/kg found in subsurface soil.

A statistical summary of individual PAH concentrations by area are found in Tables A-1 through A-13 in the appendix A of Focused Feasibility Study Former Koppers Wood Treating Site, Salida, Colorado dated August 1997.

Groundwater

Three groundwater monitoring wells were installed by USEPA at the Site (KRMW-1, KRMW-2, and KRMW-4) and seven wells were installed by Beazer (KRMW-5, KRMW-6, KRMW-7S,

KRMW-7D, KRWM-8, KRMW-9, and KRMW-10) for a total of 10 wells on or adjacent to the Site. KRMW-4 and KRMW-9 were completed in the Arkansas River Alluvial Aquifer, KRMW-7D was completed within the glacial/basin-fill deposits, and all other wells were completed in the Upper Terrace Aquifer. Chemicals of Potential Concern (COPCs) were not detected in wells KRMW-1, KRMW-4, and KRMW-9. Low levels of COPCs were detected in all other wells with the exception of KRMW-6 in which high levels were detected and small droplets of floating product were observed during sampling of the well. KRMW-6 is located down gradient of the lagoons. Low levels of COPCs were detected in KRMW-7D within the glacial/basin-fill deposits at the elevation of the river. The levels of COPCs detected in water from KRMW-7D collected during two sampling events do not exceed MCLs; not all compounds, however, have corresponding MCLs.

COPCs were detected within the uppermost, perched aquifer beneath the Site (known as the Upper Terrace Aquifer). Benzo(a)pyrene (B(a)P) was detected at four locations within the Upper Terrace Aquifer at levels in excess of the MCL (0.2 ug/l). B(a)P was detected at Spring No. 5 (7.9 ug/l to 310 mg/l) and KRMW-7S (1.1 to 2.0 ug/l). B(a)P was also detected in wells KRMW-5 (1.1 to 1.9 ug/l) and KRMW-6 (16 to 18 ug/l). Both KRMW-5 and KRMW-6 are down gradient of the lagoon area. B(a)P was not detected in well KRMW-10 which is located about 400 feet down gradient of wells KRMW-5 and KRMW-6. The Upper Terrace Aquifer is currently not used as a drinking water supply and is not a potentially useable drinking water supply.

Available evidence from one deep well suggests it is unlikely that Site activities have impacted either the Lower Terrace Aquifer or the Arkansas River Alluvial Aquifer. Low-level concentrations of a limited number of COPCs were observed at one location in the glacial/basin-fill deposits that occur beneath the Upper Terrace Aquifer.

The movement of COPCs dissolved in groundwater is likely to be very slow due to their tendency to adsorb to aquifer and soil solids. This slow rate of transport in groundwater is likely to result in demonstrable biodegradation of the COPCs along a transport flow path of any great length. At other wood-treating sites fate and transport analyses and groundwater sampling has shown that COPCs dissolved in groundwater are below detectable levels within 150 feet of DNAPL source materials. Historically, past migration of COPCs in pure phase was likely the predominant mechanism of transport. Not only is pure-phase velocity higher than dissolved-phase transport velocity, but attenuation mechanisms (e.g., biodegradation) are not significant in the pure phase. Based on available data and the length of time since operations ceased at the former Koppers facility, significant migration of pure-phase DNAPL does not appear to be occurring today.

Residual DNAPL from past migration probably is a continuing source of dissolved COPCs to groundwater in the perched Upper Terrace Aquifer. Consistent with this, the highest concentrations of dissolved COPCs were observed in the immediate vicinity of Spring No. 5 and in monitoring well KRMW-6 immediately down gradient from the lagoon area. Historically, the tank area located near Spring No. 5 and the lagoon area located near KRMW-6 are the source areas of concentrated creosote .

6.1.1 Preliminary Remediation Goals

Constituents of concern (COCs) are a subset of the COPCs which were identified in the Human Health Baseline Risk Assessment (HHBRA). In identifying COCs, only those potentially carcinogenic wood-treating compounds in a particular scenario that significantly contribute to a total risk of more than 1 in 10,000 for each exposure pathway were considered. Individual compounds that were calculated to contribute an incremental risk of less than 1 in 1,000,000 were not considered to be COCs.

For non-carcinogenic compounds the Hazard Quotient (HQ) is used as a guide in evaluating the effects of a single non-carcinogenic compound. The HQ is the estimated daily intake of a compound based upon Site-specific exposure point concentration data divided by the reference dose for the compound above which health effects are observed. An HQ greater than one indicates the potential for an adverse health effect. The sum of all HQs for a particular pathway provides the Hazard Index (HI) which, if greater than one, indicates the potential for adverse health impacts from a mixture of compounds through a single exposure pathway.

As noted in EPA's Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-30 "where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 1 in 10,000, and the non-carcinogenic hazard quotient is less than 1, action generally is not warranted unless there are adverse environmental impacts." The HHBRA identified only one exposure scenario which could lead to human health risks that exceed the criteria set forth above:

- Incidental ingestion of surface soil by a potential future resident leading to an excess cancer risk of 5 in 10,000 due primarily to exposure to arsenic and, to a lesser extent, dioxin, benzo(a)pyrene, and dibenzo(a,h)anthracene.

A full description of the current land use is in Section 7.1.2.2. Under the current and most likely future land use scenario (industrial) considered by the HHBRA, there would be no unacceptable risks from wood-treating constituents. However, the HHBRA did not consider risk, if any, to a hypothetical future sand and gravel worker due to exposure to subsurface soils should the Site be mined. Neither did the HHBRA evaluate the risk to users of subsurface soils mined from the Site. Therefore, because Butala may seek to expand mining activities into the Site, preliminary remediation goals (PRGs) were established for subsurface soils. The PRGs were established for only those COPCs that were observed at the Site in concentrations equal to or greater than that which presents a risk greater than 10^{-6} under the current sand and gravel worker scenario. The PRGs were calculated as the concentration that presents a risk of 1 in 10,000 under USEPA's default industrial scenario.

Table 1: Preliminary Remediation Goals (PRGs) for Soil	
Constituent	**Concentration (mg/kg)[1]**
Benzo(a)anthracene	780
Benzo(a)pyrene	78
Benzo(b)flouranthene	780
Dibenzo(a,h)anthracene	78
Indeno(1,2,3-ed)pyrene	780
Pentachlorophenol	4,768
HpCDD	0.2
HxCDD	0.02
HxCDF	0.02
OCDD	2.0

[1] Concentrations were calculated for a 1 in 10,000 target risk level under an industrial worker scenario.

6.1.2 Subunits

Based on the nature and extent of the COPCs, the fate and transport of these constituents, and the potential exposure pathways, three subunits have been identified for evaluation of the alternatives. Subunits are defined as areas of the Site that exhibit similar characteristics and require similar remedial alternatives. The subunits for the Site are described below including a discussion of the logic behind inclusion of each subunit.

Subunit 1 - Spring No. 5

Subunit 1 consists of discharge from Spring No. 5 located about one-third of the way down the steep bluff on the west side of the Site. Available data suggest flow to this spring is isolated from other groundwater aquifers and represents the down gradient termination of the perched aquifer. Because the aquifer discharging at the Spring is isolated, of limited aerial extent and has a low volumetric flow rate, exposure through use as a drinking water source is unlikely. Access to Spring No. 5 is poor due to the steep, rocky, wooded slope and, therefore, exposure is unlikely. The Spring is identified as a subunit of the Site because the Human Health Baseline Risk Assessment (HHBRA) and the Ecological Risk Assessment (ERA) have identified the potential for exposure to Spring No. 5 and because:

- It includes the only area of the Site where DNAPL is found on the surface;
- The discharge at Spring No. 5 (about 1.0 gpm) contains detectable PAH concentrations; and
- DNAPL in Spring No. 5 is not readily visible due to vegetative cover from grasses and shrubs; however, the DNAPL can be seen if leaf litter is moved in the area of the Spring. Spring No. 5 is intermittent (seasonal) and the low flow of water results in a small wet area on the side of the bluff.

The volume of contaminated soil surrounding Spring No. 5 is estimated at 100 cubic yards (cy).

Subunit 2 - Surface and Subsurface (0 to 30 feet) Soils

Subunit 2 consists of soil in the vadose zone above the level of the perched aquifer (approximately 30 ft in depth) which is impacted by contaminants exceeding the PRGs. The majority of impacted soil in this subunit is made up of soils primarily from the process area and the former lagoons. The majority of impacted soil in this subunit is found below the ground surface and may continue to affect the perched aquifer. The process area includes visually impacted soils exceeding the PRGs and extending to depths of 15 to 40 feet below ground surface including areas along the former rail line, drip tracks, process building, working and storage tanks. The total estimated volume of the material exceeding PRGs is approximately 61,000 tons (assuming 1.80 tons/bank cubic yard [BCY]) from 0 to 30 feet below ground surface.

These soils are categorized as a subunit solely in order to identify and evaluate alternatives and technologies should a mining permit be sought for the Site in the future.

Subunit 3 - Saturated (30 to 40 feet) Soils

Subunit 3 consists of those soils that are beneath the upper level of the perched aquifer, saturated by water and bounded below by a confining layer. This subunit includes soils impacted by migration of constituents from source areas assumed to be the process area and the former lagoons. These soils may continue to affect the perched aquifer as well as the Upper Terrace Aquifer. The process area includes visually impacted soils exceeding the PRGs and extending to depths of 15 to 40 feet below ground surface including areas along the former rail line, drip tracks, process building, working and storage tanks. The total estimated volume of the material exceeding PRGs is approximately 15,000 tons (assuming 1.80 tons/bank cubic yard [BCY]) from 30 to 40 feet (saturated zone). As with Subunit 2, these soils are categorized as a subunit solely in order to identify and evaluate alternatives and technologies should a mining permit be sought for the Site in the future. Because these are saturated soils, mining would require additional activities over those for Subunit 2 including de-watering, possible treatment and effluent discharge. For these reasons, these soils are included as a separate subunit.

Section 7.0
Summary of Site Risks

A Human Health Baseline Risk Assessment was developed and finalized April 1995, by CH2M Hill on behalf of EPA. An Ecological Risk Assessment for the Site was developed and finalized in April 1995 by CH2M Hill on behalf of EPA. The following describes the development and results of these studies.

7.1 Human Health Risks

CERCLA and EPA guidance delineates the role of the Human Health Baseline Risk Assessment (HHBRA) in the Superfund remedy selection process. The HHBRA is initiated to determine whether the contaminants of concern at the site pose a current or potential risk to human health and the environment in the absence of any remedial action. A site conceptual model for the site was developed and included potential current and future exposure pathways. Carcinogenic and noncarcinogenic cumulative risk resulting from multiple contaminants, and/or multiple pathway exposure scenarios were evaluated. The evaluation of the risk involves the selection of the chemicals of concern; identification of an exposure (to include receptor and pathway); an assessment of the toxicity of the COCs; and a calculation of the risk for each COC and exposure pathway typically referred to as the risk characterization of the site.

7.1.1 Chemicals of Concern

COCs were selected from a list of all potentially site-related chemicals using specific guidelines developed by Region VIII EPA in the HHBRA. The list of potentially site-related chemicals included chemicals detected at least once in any site-specific sample from data collected as part of the EPA ERT investigations, EPA's RI/FS investigation (as summarized in the RI Report for the smelter subsite), and Beazer East investigation of the historic wood treating subsite. Selection criteria were as follows:

- Evaluating if the chemical concentration in each sample is greater than the chemical concentration expected under natural background conditions;
- Determining the frequency with which a particular chemical is detected;
- Using the toxicity-concentration screen, identifying those chemicals, by media, that have concentrations that exceed generic preliminary remediation goals;
- Exceedance of applicable or relevant and appropriate requirements (ARARs); and
- Historical evidence

Chemicals of Potential Concern (COPCs) retained in surface and subsurface soil from wood-treating include acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene, pentachlorophenol, phenanthrene, HpCDD, HpCDF, HxCDD, HxCDF, OCDD, OCDF, and PeCDD. COPCs

retained in perched and Regional groundwater from wood-treating include acenaphthene, acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, pentachlorophenol, phenanthrene and pyrene.

7.1.2 Summary of Exposure Assessment

7.1.2.1 Current Exposure

Under current zoning and land use, most of the Site is used for industrial purposes. Butala Sand and Gravel, Colorado Ute Electric Association, CoZinCo, Glacier View Peat Company, Salida Auto Salvage, Samara Restaurant, and an auto repair shop are examples of industrial and commercial activities present on and adjacent to the Site.

Zoning places few restrictions on area land use. Residential development can and does occur on property the County has zoned for industrial use. This includes a number of homes located on Chaffee County Highway 150, on both the east and west sides of the road. Current zoning regulations restrict industrial development on land zoned for residential use. There are no residences within the areal extent of operable unit 2 - Historical Woodtreating subsite.

No child care facilities, schools, hospitals, or senior care facilities are located in the vicinity of the Site or immediate surrounding area.

Groundwater resource use in the area falls under the jurisdiction of the State Engineer's Office due to over appropriations in the Arkansas Valley. Private groundwater wells supply many households in the area; however the only private groundwater well within SMT is the former Graff rental property groundwater well which has been abandoned. A household well permit is currently required for household use of groundwater on parcels smaller than 35 acres in size. A domestic well permit is required for groundwater use on parcels 35 acres or more and includes the right to irrigate 1 acre of land and provide water supply for animals. The following exposure pathway was evaluated in the HHBRA:

Current Sand and Gravel Worker

- Incidental ingestion of surface soil
- Inhalation of particulates from surface soil

7.1.2.2 Potential Future Exposure

Future land use is not considered to be substantially different than current land use conditions. The HHBRA assumes that future residential development could hypothetically occur on the Site. Zoning does not prohibit residential land uses on land zoned for industrial use. It is not likely that the demand for housing will displace currently operating industrial facilities. The following exposure pathways were evaluated in the HHBRA:

Potential Future Construction Workers

- Incidental ingestion of subsurface soil
- Inhalation of particulates from subsurface soil

Potential Future Residents

- Ingestion of surface soil
- Inhalation of particulates from surface soil
- Ingestion of groundwater from the regional aquifer
- Ingestion of seeps/springs originating from the perched aquifer

To estimate risks from media evaluated in the baseline HHBRA based on assumed exposure to COPCs, concentrations of COPCs were estimated based on sampling data, and for dust inhalation exposures, using a simple, conservative air transport model. Exposure point concentrations were used in combination with assumptions associated with daily intake of media containing COPCs, the frequency of contact with the media and the duration of contact.

Conservative exposure assumptions were used to estimate a reasonable maximum exposure (or RME). The RME exposure point concentration represents the highest exposure that could reasonably occur at the site. The RME is a conservative estimate of exposure that is within the range of possible exposures, but is higher than the typical exposure.

The central tendency exposure (or CTE) was estimated by combining the 95 upper confidence level (UCL) of the average concentration of a COPC with CTE exposure conditions.

7.1.3 Summary of Toxicity Assessment

The toxicity assessment describes the association between cause and effect of exposure to the chemicals of concern discussed in Section 7.1.1. The detection of a chemical in soil, groundwater, or air does not, by its presence alone, represent a risk. Whether or not a toxic response occurs following exposure depends on the chemical, the physical properties of the chemical and the susceptibility of an individual to a toxic effect.

Some individuals are more sensitive to the toxic effects of chemicals than others. For example, children, the elderly, or the sick may be more susceptible to toxic effects than the general healthy population. Other sensitive individuals include pregnant women and nursing mothers. EPA accounts for these individuals when developing critical toxicity values. Critical toxicity values tend to be conservative to protect sensitive individuals.

The toxicity assessment contains two parts: (1) hazard identification, and (2) dose-response evaluation. Hazard identification is the process of identifying adverse health effects resulting from chemical exposure. Dose-response evaluation examines the relationship between the level of exposure and the occurrence of adverse health effects.

Health effects from chemical exposure are divided into two broad groups: those chemicals that elicit carcinogenic effects and those that elicit noncarcinogenic (or systemic) effects.

Compounds classified as carcinogenic by EPA have the potential to cause cancer as a result of exposure. Systemic toxicants, or those that cause noncarcinogenic effects, may adversely impact organs or organ systems. Even though chemicals are classified as carcinogens or systemic toxicants, some chemicals are associated with both types of effects. Therefore, the risks from exposure can be expressed both as carcinogenic risk and the potential for adverse effects due to systemic impacts.

The dose-response relationship for carcinogens and noncarcinogens is expressed in terms of critical toxicity values. Values used in this HHBRA to evaluate human health impacts were developed by EPA. Two kinds of critical toxicity values are used: (1) cancer slope factors for carcinogens, and (2) reference doses (RfD) to assess the potential for noncarcinogenic effects.

EPA defines the cancer slope factor as the plausible upper-bound estimate of the probability of a carcinogenic response per unit intake of chemical over a lifetime. The RfD is an estimate (with uncertainty spanning perhaps as much as an order of magnitude or more) of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of adverse effects during a lifetime.

EPA estimates the excess lifetime cancer risk by multiplying the chemical intake times the cancer slope factor. EPA assumes that if exposure to more than one carcinogen occurs, the resulting risks can be added to account for the multiple exposures.

Excess lifetime cancer risk is estimated by multiplying the chemical dose by the cancer slope factor. If exposure to more than one carcinogen occurs, the resulting risks are assumed to be additive to account for exposure to multiple chemicals. Excess lifetime cancer risk is the incremental increase in the probability of developing cancer during one's lifetime over the background probability of developing cancer (i.e., if no exposure to site-related COPCs occurred). For example, a 10^{-6} excess lifetime cancer risk means that for every 1 million people exposed to the carcinogen at the defined exposure conditions, the average incidence of cancer is increased by one case of cancer.

Table 2: Historic Wood Treating Summary of Estimated Cancer Risks		
Scenario/Exposure Pathway	**RME**	**CTE**
Current Sand & Gravel Worker Scenario		
- Incidental Ingestion of Surface Soil	1×10^{-4}	9×10^{-6}
- Inhalation of Particulates from Surface Soil	2×10^{-6}	1×10^{-7}
CUMULATIVE TOTALS	1×10^{-4}	9×10^{-6}
Potential Future Construction Worker Scenario		
- Incidental Ingestion of Subsurface Soil	5×10^{-6}	7×10^{-7}
- Inhalation of particulates from Subsurface Soil	2×10^{-8}	5×10^{-9}
CUMULATIVE TOTALS	5×10^{-6}	7×10^{-7}
Potential Future Residential Scenario		
- Incidental Ingestion of Surface Soil	5×10^{-4}	5×10^{-5}
- Inhalation of particulates from Surface Soil	6×10^{-6}	1×10^{-6}
- Ingestion of Groundwater from the Regional Aquifer	7×10^{-7}	1×10^{-7}
CUMULATIVE TOTALS	5×10^{-4}	5×10^{-5}

The potential for occurrence of any adverse systemic effects is estimated by dividing the chemical intake by its RfD. If the resulting "hazard quotient" is less than one, the potential for toxic effects is low. If the quotient exceeds one, this is an indicator that toxic effects may occur.

To assess multiple chemical exposure using the RfD, EPA developed the "hazard index." This involves adding up the individual hazard quotients. If the sum exceeds one, it indicates a higher potential for adverse effect. Any single chemical with a hazard quotient greater than one will cause the hazard quotient to exceed one.

Table 3: Historic Wood Treating Summary of Estimated Noncancer Hazard Index		
Scenario/Exposure Pathway	**RME**	**CTE**
Current Sand & Gravel Worker Scenario		
- Incidental Ingestion of Surface Soil	2.4E-01	1.1E-01
- Inhalation of Particulates from Surface Soil	3.2E-02	8.9E-03
CUMULATIVE TOTALS	**2.7E-01**	**1.2E-01**
Potential Future Construction Worker Scenario		
- Incidental Ingestion of Subsurface Soil	2.1E-02	2.9E-03
- Inhalation of particulates from Subsurface Soil	1.4E-02	4.3E-03
CUMULATIVE TOTALS	**3.5E-02**	**7.2E-03**
Potential Future Residential Scenario		
- Incidental Ingestion of Surface Soil	9.1E-01	3.0E-01
- Inhalation of particulates from Surface Soil	7.7E-02	5.1E-02
- Ingestion of Groundwater from the Regional Aquifer	2.3E+01	1.1E+01
- Ingestion of Seeps/Springs originating from the Perched aquifer (child)	2.1E-02	4.9E-03
CUMULATIVE TOTALS	**2.4E+01**	**1.1E+01**

The HHBRA identifies a risk from ingestion of lead in groundwater within the Regional Aquifer at an average concentration of 746 ug/L resulting in more than 99 percent of the exposed population (future residential) having a blood-lead level greater than 10 ug/dL. The data from the shallow well located near the slag on the banks of the Arkansas River (MW-4) was found to be the major contributor to the risk with an arithemetic mean of 896 ug/L for total lead. The other monitoring wells (MW-1, MW-6 and MW-3) have an arithemetic mean of 6.27 ug/L for total lead. Upon further sampling of MW-4 after the HHBRA was completed, EPA found that the dissolved concentration of lead within MW-4 was 6.2 ug/L which is below the action level of 15 ug/L. Therefore EPA has determined that no further action will be taken with respect to the remediation of lead within the Regional Aquifer beneath the Site.

7.1.4 Uncertainty in the Risk Assessment

HHBRAs are associated with a number of inherent uncertainties. Uncertainty can also be added when making simplifying assumptions. The HHBRA is subject to uncertainty for various sources including:

- Sampling, analysis, and data evaluation

- Fate and transport estimation
- Exposure estimation
- Toxicological data

One of the major areas of uncertainty in the risk assessment process is the prediction of human activities that lead to contact with environmental media and exposure to contaminants. Activities that differ from those used in the exposure assumptions could lead to higher or lower intakes than those estimated in the HHBRA. If the activities do not occur or occur for a shorter period of time than used to estimate exposure, the chemical intake would be lower than that calculated, and consequently, the risk would be lower. The degree to which the exposure parameters assumed in this assessment actually represent real-world conditions is a major factor that influences the degree of uncertainty associated with the risk estimates.

Risks estimated in this assessment are conservative and likely to overestimate actual risk. Actual risk from exposure to COPCs detected onsite could range from the estimated value to zero.

7.2 Summary of Environmental Risks

A quantitative evaluation of risk to the terrestrial and aquatic ecology within the Smeltertown Superfund Site (the site) was conducted in accordance with EPA guidance as described within EPA, 1989 and 1993. The ecological risk assessment (ERA) was prepared in order to meet the applicable regulatory requirements and provide the information needed to evaluate whether remedial action is warranted at the site, based on actual or potential ecological risks.

The ecological risk assessment addresses and quantifies, where possible, the effects to the biotic environment caused by exposure to contaminants from the site. The ecological risk assessment was conducted as part of the RI/FS process to evaluate if the contaminants of concern (COCs) from the site pose a risk to the environment in the absence of remedial action.

The ERA was conducted for the segment of the Arkansas River that spans the length of the site, as well as for the immediately surrounding riparian, wetland and terrestrial environments. The riparian area was emphasized since it provides the most suitable habitat for terrestrial organism occurrence. An evaluation of the smelter subsite, smelter subsite downwind soils area and the former Koppers Wood Treating subsite was also conducted as a future exposure area for terrestrial organisms.

A "site-wide" ERA was conducted since the aquatic and terrestrial habitat areas overlap operable unit boundaries, and thereby allow receptors to potentially become exposed to site-related contamination from all contaminant sources. Each media type (surface soil, surface water, sediment and seep/spring water) was addressed as a potential exposure media. The ERA evaluated specifically, the potential impact of surface soil (from the riparian area, smelter subsite downwind area, and the former Koppers wood treating subsite), surface water and seep/spring contaminant exposure to terrestrial life. An evaluation of surface water and sediment, as well as confluence areas between seep/springs to the Arkansas river was conducted for aquatic

organisms.

Direct ingestion of soil was evaluated for terrestrial organisms. The dermal and inhalation pathways were considered highly uncertain and incomplete, and were not addressed. All routes of exposure to aquatic organisms was considered for the ERA.

Results of the terrestrial evaluation indicated the following:

- Surface water, sediment, and seep/spring COCs contribute little to no risk;
- Polycyclic aromatic hydrocarbon (PAH) compounds in soil do not contribute risk;
- In general, the riparian soils do not appear to cause as great a risk to terrestrial receptors as the smelter subsite soils. The smelter subsite downwind soils contribute risk to plants due to the presence of aluminum and zinc. The smelter subsite downwind soils also contribute risk to birds due to the presence of zinc, and risk to small herbivores due to the presence of lead; and
- The presence of lead and zinc from the historic wood treating subsite is of potential concern to small mammals.

In conjunction with the exposure/toxicity assessment, bioassay analysis of surface water and sediment was conducted to support the findings of the assessment. The bioassays were conducted at the confluence points between seep/springs and the Arkansas River. These seep/springs were determined to potentially contribute the majority of the site-related contaminant source to the aquatic ecosystem.

Section 8.0
Description of Remedial Alternatives

A Focused Feasibility Study (FFS) was conducted to develop and evaluate remedial alternatives for soils, DNAPL and groundwater. Several alternatives were assembled from the applicable remedial technology process options and were screened for their effectiveness, implementability and cost. The alternatives passing this screening were then evaluated in further detail based on the nine criteria required by the NCP. This section provides a description of each alternative that was retained for the detailed screening analyses in the FFS. The no further action alternative, required by the NCP, was evaluated against the nine criteria to provide a point of comparison for the other alternatives.

The selected remedy for the Site must adequately reduce or eliminate the risks to human health and the environment. Actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred alternative or other measures considered, may present a current or potential threat to public health, welfare, or the environment. The EPA and CDPHE has developed chemical-specific cleanup goals for the Site. These objectives and goals define acceptable levels of risks. The cleanup goals include prevention of human exposure to contaminants and prevention of offsite migration of contaminants in excess of the cleanup goals. These goals were based on the results of the Human Health Baseline Risk Assessment (HHBRA) and an evaluation of the Applicable or Relevant and Appropriate Requirements (ARARs) specified in Federal and State environmental laws and regulations. Both the objectives and goals were analyzed to identify the selected alternative. In addition, the EPA and CDPHE's detailed analysis considered eight remedial alternatives, including the "No Further Action" Alternative (Alternative A). EPA and CDPHE are required to evaluate a no action alternative in order to provide a basis for comparing the benefits of other alternatives.

8.1 Remedial Action Objectives

Remedial action objectives (RAOs) are Site-specific goals that define the extent of action required and are based largely on the results of the risk assessment and on the Applicable or Relevant and Appropriate Requirements (ARARs) evaluation. RAOs form the basis for developing and evaluating remedial action alternatives. RAOs for the Site are developed and described below. As part of the development, a number of important factors on the nature of the Site have been considered. This information includes:

- The Site is zoned industrial and, while not currently permitted for mining, is used as a storage area in support of a gravel mining operation on adjacent property;
- Significant amounts of material impacted by wood treating constituents have already been moved off-Site and disposed of at a hazardous waste landfill;
- The risk assessment prepared for the Site indicates that under an industrial scenario wood treating constituents in the surface soils do not represent a threat to human

health or the environment; and

- Soils in the subsurface exceed the PRGs and would represent a threat to human health or the environment if mined.

The RAOs identified for the Operable Unit 2- former Koppers Wood-Treating Subsite formed the basis for the development of remedial alternatives and are as follows:

Subunit 1: Spring No. 5

- Prevent human contact with Spring No. 5;
- Prevent off-Site migration of water from Spring No. 5; and
- Prevent additional impact to soils around Spring No. 5.

Subunit 2: Surface and Subsurface Soils

- Prevent public exposure to surface soils with concentrations of COCs in excess of risk levels; and
- Protect human health and the environment from COCs in excess of the risk levels in the event that mining of DNAPL-impacted soils occurs.

Subunit 3: Saturated Soils and Upper Terrace Aquifer Groundwater

- Protect human health and the environment from COCs in excess of the risk levels in the event that mining of DNAPL-impacted soils occurs; and
- Prevent public use of the perched aquifer as a drinking water supply.

8.2 Preliminary Remediation Goals

Under the current and most likely future land use scenario (industrial) considered by the HHBRA, there would be no unacceptable risks from wood-treating constituents. However, the HHBRA did not consider risk, if any, to a hypothetical future sand and gravel worker due to exposure to subsurface soils should the Site be mined. Neither did the HHBRA evaluate the risk to users of subsurface soils mined from the Site. Therefore, because the owner of the property may seek to expand mining activities into the Site, preliminary remediation goals (PRGs) were established for subsurface soils. The PRGs were established for only those Chemicals of Potential Concern (COPCs) that were observed at the Site in concentrations equal to or greater than that which presents a risk greater than 1 in 1,000,000 under the current sand and gravel worker scenario. The PRGs were calculated as the concentration that presents a risk of 1 in 10,000 under USEPA's default industrial scenario. A table within Section 6.1.1 lists the Preliminary Remediation Goals

for Soil.

8.3 ARARs

Section 121(d)(2) of CERCLA, 42 U.S.C. § 9621(d)(2), provides that for "any hazardous substance, pollutant or contaminant that will remain onsite . . . the remedial action selected . . . shall require, at the completion of the remedial action, a level or standard of control for such hazardous substance or pollutant or contaminant which at least attains such legally applicable or relevant and appropriate standard, requirement, criteria, or limitation." Thus, this section of CERCLA requires that applicable and relevant and appropriate requirements (ARARs) be identified and attained during the development and implementation of remedial actions. For contaminants that will be transferred offsite, Section 121(d)(3) of CERCLA requires that the transfer be to a facility which is operating in compliance with applicable federal and state laws. Offsite activities contemplated under each alternative must comply with the Revised Procedures for Implementing Offsite Response Actions, OSWER Directive 9834.11, dated November 13, 1987 (the "Offsite Policy").

Onsite actions need comply only with the substantive aspects of ARARs, not with the corresponding administrative requirements, unless otherwise specified. Permit applications and other administrative procedures such as administrative reviews and reporting and record keeping requirements are not considered ARARs for actions conducted entirely onsite. Offsite actions must comply with all legally applicable requirements, both substantive and administrative.

"Applicable" requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. State standards that are more stringent than Federal requirements may be applicable. Applicable requirements must be met to the full extent required by the law, unless a waiver has been applied for and is granted.

"Relevant and appropriate" requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that, while not "applicable" to a hazardous substance, pollutant, or contaminant at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site such that their use is well suited to the particular site. State standards that are more stringent than Federal requirements may be relevant and appropriate.

EPA's guidance classifies ARARs into three types: chemical-specific, action-specific, and location-specific requirements. Chemical-specific requirements are health-, risk-, or technology-based values that establish an acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. Action-specific requirements are performance- or activity-based requirements or limitations on actions taken with respect to hazardous substances. Action-specific requirements set controls on particular kinds of activities related to the management of hazardous substances, pollutants, or contaminants. Location-specific

requirements are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations.

While ARARS are promulgated, enforceable requirements, other types of information may be useful for designing the remedial action or necessary for determining what is protective of public health or the environment. Non-promulgated advisories or guidance issued by the Federal or State government that provides useful information is termed criteria "to be considered" (TBC). TBCs will be considered along with ARARs in determining the necessary levels of cleanups and are enforceable when selected as part of the remedy.

The remedial alternatives presented for detailed analysis in the FFS were assessed to determine whether they would attain applicable or relevant and appropriate requirements under Federal environmental and State environmental and facility siting laws or provide grounds for invoking an ARARs waiver.

With the exception of the No Further Action Alternative, each of the alternatives meets ARARs.

Table 4: CHEMICAL-SPECIFIC ARARS
Operable Unit #2, Smeltertown Site

cific ARAR	Requirement	Citation	Comments
ional Primary Drinking ter Regulations orado Primary nking Water ulations	Establishes health based standards for drinking water supplies in public water systems. Standards are established as Maximum Contaminant Level Goals (MCLGs), Maximum Contaminant Levels (MCLs) and Secondary MCLs (protects water aesthetics). Colorado has primacy.	40 CFR Part 141, including Subparts B and G. 5 CCR 1003-1	See below.
orado Groundwater ndards	Establishes a system for classifying groundwater and adopting water quality standards to protect existing and potential beneficial uses.	5 CCR 1002-8, Sec. 3.11.0	Applicable; the Colorado Department of Public Health & Environment (CDPHE), Hazardous Materials and Waste Management Division (HMWMD) has determined that their groundwater organic chemical standards found in Table A, Regulation No. 41 (Basic Standards for Groundwater) are applicable to water within the Upper Terrace Aquifer (perched aquifer) and the Regional Aquifer (Arkansas River Alluvial Aquifer and glacial/basin fill deposits) at the site. The following standards are applicable for the following compounds detected in the groundwater monitoring program: • Pentachlorophenol - 0.001 mg/l • Benzo(a)pyrene - 0.0002 mg/l
nary and Secondary bient Air Quality ndards orado Air Quality trol Regulations	Clean Air Act - National Ambient Air Quality Standards Colorado Air Quality Control Act - Requires that a source not exceed NAAQS or State AAQS.	40 CFR Part 50, National Primary and Secondary Ambient Air Quality Standards Colorado Air Quality Control Regulations, 5 CCR 1001-3, Regulation 3, Section IV D.	Air pollution regulations are applicable to the control of fugitive dust and particulate emissions at the Site. The NAAQS standards are not enforceable in and of themselves, but rather the emission standards, which are promulgated to attain the NAAQS, are directly enforceable as ARARs. Those standards and requirements include the fugitive dust standard, standards as to particulate emissions, and an analysis to assure that any emissions will not cause the air quality to degenerate beyond any pertinent level. Ongoing gravel mining and future construction could release particulates to the air at the Site. Additionally, there are air issues with the recycling alternative. These are addressed in the Action-Specific ARARs.

Table 5: ACTION-SPECIFIC ARARS
Operable Unit #2, Smeltertown Site
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ion	Requirement	Prerequisite	Citation	Comments
ntification of ardous wastes.	Requires the identification of hazardous wastes as listed wastes or testing to determine characteristic hazardous waste.	Generation of solid waste that may be a listed or characteristic hazardous wastes.	40 CFR 261, Subparts B-D, 6 CCR 1007-3, Part 261, B-D.	Applicable to asphalt recycling alternative. No action or institutional controls will not result in the generation of hazardous waste. It has been determined by USEPA that listed hazardous wastes are not present at the site. Excavated material will be evaluated to determine whether RCRA characteristic wastes are present.
ieration of hazardous ites.	Sets out requirements for generators of hazardous waste.	Generation of listed or characteristic hazardous wastes.	40 CFR 262, Subparts A, C and D. 6 CCR 1007-3 Part 262, A, C and D.	Relevant and appropriate requirements. Applicable if testing demonstrates the presence of RCRA characteristic waste. May be applicable to sampling and investigation-derived wastes.
nsportation of ardous waste.	Sets standards and requirements for transporters of hazardous waste.	Transport of hazardous waste.	40 CFR 263, Subparts A-D 6 CCR 1007-3 Part 263, A-D.	Relevant and appropriate requirements. Applicable if testing demonstrates the presence of RCRA characteristic waste. May be applicable to sampling and investigation-derived wastes.
-site treatment and age of hazardous ite.	General, preparedness/prevention and contingency/emergency standards for owners and operators of hazardous waste treatment, disposal and storage facilities.	Storage and treatment of hazardous waste on site.	40 CFR 264, Subparts A-C 6 CCR 1007-3, Part 264, A-C.	Applicable, if material is characteristic hazardous waste, to cold-mix asphalt production (excavation and recycling) alternative which will recycle impacted creosote soils on site. Relevant and appropriate if it is not.
-site storage of ardous waste in ite piles.	Establishes requirements to protect releases to groundwater from waste piles. Requires liner to prevent migration to groundwater and leachate collection and removal system.	Non-containerized accumulation of solid, nonflammable hazardous waste or substance in piles which are unprotected from precipitation or run-on and contains free liquids.	40 CFR 264, Subpart L 6 CCR 1007-3, Part 264, L.	Applicable if testing demonstrates the presence of RCRA characteristic waste. Relevant and appropriate if it is not.

Table 5: ACTION-SPECIFIC ARARS
Operable Unit #2, Smeltertown Site
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ion	Requirement	Prerequisite	Citation	Comments
site treatment in :s.	Establishes requirements for tanks used for storage or treatment. Tanks must have sufficient strength to prevent collapse or rupture. Tanks must have controls to prevent overfilling and maintain sufficient freeboard. Sets out inspection and closure requirements.	Hazardous waste temporarily held in tanks before treatment, storage or disposal.	40 CFR 264, Subpart J 6 CCR 1007-3, Part 264, J.	Applicable if testing demonstrates the presence of RCRA characteristic waste. Relevant and appropriate if it is not.
charge of water to ace water bodies	Requires National Pollution Discharge Elimination System ("NPDES") permit and substantive requirements for discharges to waters of the State of Colorado. If discharge is contained on-site no permit is required; however, the substantive requirements will apply. All surface discharges must be in compliance with Colorado discharge standards.	Protection of surface waters against degradation by on-site discharges.	40 CFR 122, 125, 129, 133 and 443. 5 CCR 1002-8, Sec. 6.1.0 (NPDES for point sources and stormwater regulations) and 5 CCR 1002-8, Sec. 10.1.0 (State Effluent Regulation).	Colorado has been delegated to administer the federal NPDES program. These requirements would be applicable if cold-mix asphalt production (excavation and recycling) alternative results in generation of either groundwater which must be discharged or in the production of process waste water. Applicable too, to stormwater discharges from asphalt facility.
charge to licly-Owned atment Works OTW")	Prohibits discharge of pollutants that pass through POTW without treatment, interfere with POTW operations, contaminate POTW sludge, and endanger the health and safety of POTW workers. Must comply with local industrial pretreatment ordinance including specific permit provisions, reporting and monitoring requirements. RCRA permit-by-rule requirements must be complied with for discharges of RCRA hazardous waste to POTWs.	Discharge of waste water to POTW. Transport of RCRA hazardous waste by dedicated pipe from CERCLA site to POTW.	40 CFR 403.5 5 CCR 1002-20 Chaffee County Wastewater Ordinance	Applicable if the cold-mix asphalt production (excavation and recycling) alternative discharges wastewater to POTW from excavation or recycling.

Table 5: ACTION-SPECIFIC ARARS
Operable Unit #2, Smeltertown Site
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tion	Requirement	Prerequisite	Citation	Comments
w Source formance ndards ("NSPS")	These are source specific standards which apply to new sources and which limit the amount of criteria pollutants, including particulates which the new source may discharge. The Colorado regulations supplement the federal requirements.	Emissions from new sources.	New Source Performance Standards (NSPSs) 40 CFR Part 60, Chapter 1 5 CCR 1001-6	If cold-mix asphalt production (excavation and recycling) alternative is initiated, an evaluation must be conducted to determine whether there is a NSPS which is applicable or relevant and appropriate.
iission of zardous Air llutants ("HAPs")	These are source specific standards which apply to sources of HAPs which limit the amount of HAPs which may be discharged to the atmosphere. The Colorado regulations supplement the federal requirements.	Discharge of hazardous air pollutants.	National Emissions Standards for Hazardous Air Pollutants (HAPs) 40 CFR Part 60 5 CCR 1001-8.	If cold-mix asphalt production (excavation and recycling) alternative is initiated, an evaluation must be conducted to determine whether there are HAP standards which are applicable or relevant and appropriate.
r emissions	Regulates particulates, smoke and opacity limits for new and existing stationary sources.	Emissions from stationary source	Emission Control 40 CFR Part 60 5 CCR 1001-1	Applicable to cold-mix asphalt production (excavation and recycling) alternative, if initiated.
iission of odors	Restricts the emission of odorous air contaminants based on detection in residential and industrial areas.	Emission of odorous air to atmosphere	5 CCR 1001-2	Applicable to cold-mix asphalt production (excavation and recycling) alternative, if initiated.

Table 6: POTENTIAL LOCATION-SPECIFIC ARARS
Operable Unit #2, Smeltertown Site
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Standard, Requirement, Criteria or Limitation	Description	Evaluation
Endangered Species Act 50 CFR Part 200 50 CFR Part 482 Wildlife, Nongame Endangered, and Threatened Species Act and Wildlife Act CRS 33-2-101 to 108 CRS 33-1-101 to 120	The Endangered Species Act (ESA) requires protection for any threatened or endangered species and their habitats that may be impacted by onsite activities.	Applicable; however, threatened and endangered species were not observed during the field investigations. Observations of the bald eagle, golden eagle and osprey have been noted in the Salida area. Any proposed action is not likely to affect the habitat for any of the noted threatened and endangered species.
Executive Order on Floodplain Management, EO 11988 40 CFR Part 6.302(a)	Executive Order 11988 requires all federal agencies and any entity seeking approval from a federal agency for a proposed action to avoid long- and short-term adverse impacts associated with occupancy and modification of floodplains.	Relevant and appropriate; however, OU #2 is not located in a floodplain.
Executive Order on Protection of Wetlands, EO 11990 40 CFR Part 6.302(b)	Executive Order 11990 requires all federal agencies and associates to minimize the destruction, loss, or degradation of wetlands, to preserve and enhance the natural and beneficial values of wetlands, and to consider factors relevant to the survival and quality of the wetlands.	Relevant and appropriate; however, any proposed action will not affect any of the delineated areas of wetlands, potential historical wetlands or constructed ponds.
National Historic Preservation Act 16 USC Section 470	This Act requires preservation of any historic properties included in, or eligible for inclusion in, the National Register of Historic Places.	Applicable; however, any proposed action will not affect the adjacent smelter stack and property which was placed on the National Register of Historic Places in 1976. No other historic structures, items or features have been identified at the Smeltertown Superfund Site.
Archaeological and Historic Preservation Act 40 CFR Section 6.301© Colorado Historical, Prehistorical, and Archaeological Resources Act; Historic Places Register; and State Historical Society CRS 24-80-401 to 410 CRS 24-80.1-101 to 108	The Archaeological and Historic Preservation Act establishes procedures for preservation of historical and archaeological data that might be destroyed through alternation of terrain.	Applicable; however, any proposed action will not affect the adjacent smelter stack and property which was placed on the National Register of Historic Places in 1976. No other historic or archaeologic structures, items or features have been identified at Smeltertown Superfund Site.

Table 6: POTENTIAL LOCATION-SPECIFIC ARARS
Operable Unit #2, Smeltertown Site
Page 2 of 2

Standard, Requirement, Criteria or Limitation	Description	Evaluation
Historic Site, Buildings, and Antiquities Act 16 USC Section 461-467	The Historic Sites, Buildings, and Antiquities Act states that the existence and location of landmarks of the National Registry of Natural Landmarks be considered to avoid adverse impacts on such landmarks.	Applicable; however, any proposed action will not affect the adjacent smelter stack and property which was placed on the National Register of Historic Placed in 1976. No other historic landmarks or properties exist on or near Smeltertown Superfund Site.
Colorado Mined Land Reclamation Act CRS 37-90-101-141	Establishes requirements for mined lands and mine generated waste piles.	Applicable for the recycling/cold-mix asphalt production option and for any mining operations at the site.

Table 7: TO BE CONSIDERED CRITERIA ADVISORIES, AND GUIDANCE
Operable Unit #2, Smeltertown Site
Page 1 of 3

The following table identifies those criteria, advisories and guidance which are not ARARs but which have been used, or may be used in the future, to provide useful information and recommended procedures for developing cleanup standards for the Smeltertown Site. The draft guidance document entitled "CERCLA Compliance with Other Laws" (EPA/540/G-89/006 August 1988) contemplates the need to supplement standards relating to remedial alternatives throughout the feasibility study process.

CHEMICAL-SPECIFIC

- Health Effects Assessments (HEAs) and Proposed HEAs, ("Health Effects Assessment for Specific Chemicals", ECAO, U.S. EPA, 1985).
- Reference Doses (RfDs), ("Verified Reference Doses of U.S. EPA", ECAO-CIM-475, January 1986). See also Drinking Water Equivalent Levels (DWELs), a set of medium-specific drinking water levels derived from RfDs. (See U.S. EPA Health Advisories, Office of Drinking Water, March 31, 1987).
- Carcinogenic Potency Factors (CPFs) (E.g., q_1^*, Carcinogen Assessment Group (CAG) Values), (Table ii, "Health Assessment Document for Tetrachloroethylene (Perchloroethylene), "U.S. EPA, ONEA/6008-82/005F, July 1985).
- Public health criteria on which the decision to list pollutants as hazardous under Section 112 of the Clean Air Act was based.
- Guidelines for Groundwater Classification under the EPA Groundwater Protection Strategy.
- EPA Groundwater Protection Strategy (August 1984). EPA Guidelines for Groundwater Classification (December 1986).
- Designation of a Usable Source for Drinking Water (USDW) (October 1979).
- Elements of aquifer identification (October 1979).
- OSHA health and safety standards that may be used to protect public health (non-workplace).
- EPA Water Quality Advisories, EPA office of Water, Criteria and Standards Division.
- U.S. EPA, Superfund Public Health Evaluation Manual (October 1986), EPA/540/1-86-060. Provide Acceptable Intake Concentration (AIC) reference Dose (RfD) and Minimum Effective Dose (MED).
- Health Advisories (EPA Office of Drinking Water)
- Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final, December 1989, EPA/540/1-89-002. Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A) EPA 540/1-89/002, December 1989. Human Health Evaluation Manual (Part B: "Development of Risk-based Preliminary Remediation Goals") OSWER Directive 9285.7-01B. December 13, 1991. Human Health Evaluation Manual (Part C: Risk Evaluation of Remdial Alternatives). OSWER Directive 9285.7-01C, December 13, 1991.
- Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors", OSWER Directive 9285.6-03, March 25, 1991.
- U.S. EPA Integrated Risk Information System (IRIS).
- EPA Carcinogen Assessment Group (CAG) potency factors.
- Federal Sole Source Aquifer requirements.

Table 7: TO BE CONSIDERED CRITERIA ADVISORIES, AND GUIDANCE
Operable Unit #2, Smeltertown Site

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ACTION-SPECIFIC

- CERCLA off-site Policy. (May 12, 1986), Revised November 1, 3 1987, OSWER Dir. 9834.11. Revised September 22, 1993, 1 Fact Sheet Update, Procedures for Planning and Implementing Off-Site Response Actions, OSWER 9834.11FSA.
- EPA's RCRA Design Guidelines for Surface Impoundments, Land Treatment Units and Landfill Design - Liner System and Final Cover.
- RCRA Facility Permit Writer's Guidance Manual for Hazardous Waste Land Treatment, Storage and Disposal Facilities, Phase I (February 15, 1985), EPA 530-SW-85-024.
- RCRA Permit Guidance Manual on Hazardous Waste Land Treatment Demonstrations, EPA OSWER 9486.00-2 (July, 1986).
- RCRA Permit Guidance on Hazardous Waste Land Treatment Demonstrations, EPA OSWER 9523.00-8D, (June, 1986).
- RCRA Facility Permit Writers Guidance Manual for Subpart F (October 1983).
- RCRA Facility Permit Applicant's Guidance Manual for the General Facility Standards (October 15, 1983) EPA/OSW/00-00-968).
- RCRA Facility Waste Analysis Plan Guidance Manual (October 15, 1984), EPA/530/SW-84-012.
- Draft Minimum Technology Guidelines on Double Liner Systems for Landfills and Surface Impoundments (May 1985) PB 87151072-AS.
- Draft Minimum Technology Guidelines on Single Liner Systems for Landfills and Surface Impoundments (May 1985) PB 8711731159.
- Hazardous Waste Land Treatment (April 1983) OSW-00-00-874.
- Soil Properties, Classification, and Hydraulic conductivity testing (March 1984) OSW-00-00-925, OSWER Dir. 9480.00.70.
- Solid Waste Leaching Procedure Manual (1984) OSW-00-00-924.

Table 7: TO BE CONSIDERED CRITERIA ADVISORIES, AND GUIDANCE
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CHEMICAL-SPECIFIC

- Methods for the Prediction of Leachate Plume Migration and Mixing.
- Test Methods for Evaluating Solid Wastes, Third Edition (November 1986) SW-846.
- A Method for Determining the Compatibility of Hazardous Wastes. EPA/600-02-80-076.
- Guidance Manual on Hazardous Waste Compatibility.
- Federal Clean Water Act, Section 304(g) Guidance Document, Revised Pretreatment Guidelines (3 volumes).
- Guidance for POTW Pretreatment Program Manual (October 1983).
- CERCLA Site Discharges to POTWs Treatability Manual, EPA 540/2-90/007 (August 1990).
- Guidance for Implementing RCRA Permit by Rule Requirements at POTWs.
- Application of Corrective Action Requirements at Publicly Owned Treatment Works.
- Draft Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program (1987).
- Water-Related Environmental Fate of 129 Priority Pollutants (1979).
- Water Quality Standards Handbook (1983).
- Technical Support Document for Water Quality-Based Toxics Control (1991, 1985, 1983).
- NPDES Best Management Practices Guidance manual (June 1981).
- Case Studies on Toxicity Reduction Evaluation (May 1983).
- Clean Water Act Guidance Strategy (August 1986).
- U.S. EPA Manuals from the Office of Research and Development - Lab Protocols Developed Pursuant to the Clean Water Act.
- State of Colorado - Technical Guidelines for Control of Water from Mine Drainage. WQCC Guideline 9.2.0.
- State of Colorado - Guidelines for the Design, Operation, and Maintenance of Mill Tailings Ponds to Prevent Water Pollution. WQCC Guideline 9.1.0.
- State of Colorado - Passive Treatment of Mine Discharge. WQCC Guideline 4.5.0.

8.4 Description of Alternatives for Current and Future Uses

This section describes the alternatives selected for further evaluation under the current and most likely future land use. Mining is not currently restricted at the Site. However, certain portions of the Site may contain soils with COCs in excess of the PRGs for protection of off-Site users of mined material. Therefore, a mining restriction area (MRA) shown in Figure 5-1 has been delineated at the Site within which soils may potentially contain levels of COCs above the PRGs. This area has been delineated based upon available information from the Remedial Investigation. The MRA as currently defined encompasses about 6.6 acres and extends from the location of the former lagoons, west to the bluff near the former storage tanks (process area), east around the upper terrace soil burial area, and north to the lagoons. Additional sampling within the MRA may be conducted to further refine the boundaries of the MRA potentially reducing the area to less than 6.6 acres.

The entire upper terrace is underlain by a 40-foot thick alluvial deposit that is composed of boulders, cobbles, gravel, sand and fines that can be mined employing methods currently utilized by the property owner to mine portions of the lower terrace. There are two areas similar in size to the current active operation south of the Site that are located to the east and northwest of the MRA in which mining would not be precluded. Mining in these areas could be conducted despite the restriction of mining in the area shown on Figure 5-1.

Soils from the MRA will require processing in order to segregate material that could potentially exceed PRGs from that which is below PRGs. Based on existing information from the RI (ENSR 1996), material which is not visually impacted is consistently below PRGs. Therefore, visual criteria will be used as an initial screen during mining and processing. After segregating material by visual criteria and placing into stockpiles, representative samples from both the visually impacted and visually clean stockpiles, representative samples from both the visually impacted and visually clean stockpiles will be collected for laboratory analysis of SVOCs to confirm whether the materials meet PRGs. If the excavated materials are determined to be a characteristic hazardous waste, then they must be managed in accordance with the substantive requirements of RCRA and CHWA. It is assumed that visually clean stockpiles will be sampled for a period of 6 months at which point sufficient data will be available to determine whether visual criteria can adequately serve as an objective means of segregating materials for sampling. In addition it is assumed that approximately 10 percent of the samples analyzed for SVOCs also will be tested for dioxin compounds. Dioxin analyses will be conducted on soil samples with pentachlorophenol concentrations in excess of 10 mg/kg. These estimated sample numbers are based on limited available data from the RI and may require modification as additional data becomes available. One composite sample will be taken from every 500 cubic yards (900 tons) of stockpiled materials. Stockpiles that contain material below the PRGs could be sold for use as industrial aggregate. Processed materials that exceed the PRGs could then be managed as described in each of the alternatives.

If mining is undertaken, several precautions and regulations must be followed to ensure the health and safety of workers and the public during implementation of mining and reuse activities. These precautions include:

- **Air Quality Permit and Monitoring**: During excavation of impacted soils volatile constituents may be released that could pose a risk to off-Site receptors; the mining operator will need to consult with the Colorado Department of Public Health & Environment (CDPHE) to determine the need for or the sampling requirements for the proposed activity;

- **Health & Safety Plan**: Workers may be exposed to unacceptable levels of constituents during excavation, transportation, and processing of impacted soils; the mining operator will need to evaluate potential exposures, determine appropriate personal protective equipment to be used, and develop a monitoring program to ensure that workers are protected;

- **Discharge Permit**: In the event that groundwater within the Upper Terrace Aquifer is encountered during excavation and subsequently discharged to surface water such as the Arkansas River or to groundwater recharge wells, the mining operator will be required to obtain a discharge permit from CDPHE. Depending on the condition of the water encountered, treatment may be required; and

- **Mining Permit**: Mining and reuse operations will require modification of the existing permit for mining and reclamation of the Site on file with the Colorado Mined Land Reclamation Division (MLRD). Addition of an asphalt plant on permitted mine property would be achieved through a Technical Revision to the existing permit.

A description of six alternatives that flow from No Action to mining of soils that exceed PRGs follows.

8.4.1 Alternative A- No Action

Under this alternative no further action will be taken for subunits 1, 2 or 3, and the Site will be left in its current condition. No monitoring will be conducted and no institutional controls will be put in place to control the future use of the Site. If a permit to extend mining activities to the Site is obtained, such mining will not be specifically restricted from excavation of impacted soil. However, if gravel mining is conducted in impacted areas of the Site, exposure to subsurface constituents would occur. Accidental exposure to subunit 1 or Spring No. 5 will be controlled by the steep, rocky nature of the slope on which it is located and by the existing vegetative cover.

8.4.2 Alternative B - Limited Action

Based on the location of subunit 1 or Spring No. 5, continued long-term exposure to the COCs found at this location is not likely. Spring No. 5 is located approximately one-third of the way down a steep slope. Under the limited-action scenario, the rocky slope and vegetative cover will provide protection against accidental contact with impacted material and allow for the natural biodegradation of the COCs over time. As a protective measure, fencing will be placed around the immediate area of the spring (Figure 5-3). Groundwater monitoring will be used to determine long-term effectiveness of this alternative by monitoring potential changes in groundwater quality and quantity to ensure that constituent levels remain the same or decrease.

This alternative includes institutional controls (deed restrictions and fencing) within subunits 2 and 3 to ensure that the MRA is not mined and the Site is not developed for residential use. A 6-foot cyclone fence would be constructed around Spring No. 5. This would require approximately 100 linear feet of fencing and would include a locked access gate to allow monitoring of Spring No. 5.

The Limited Action Alternative as it applies to Subunits 2 and 3 is premised on the HHBRA and ERA results that indicate that as long as the Site is not used or developed for residential purposes and the subsurface soils within the MRA are left undisturbed, the risk to human health and the

environment is not unacceptable. Therefore, this alternative includes institutional controls (deed restrictions) to ensure that the area is not used for residential development and remains designated for industrial use only.

In addition to the deed restrictions to eliminate future residential development of the Site, this alternative includes a deed restriction preventing mining in an area within subunits 2 and 3 of potentially about 6.6 acres in size (the MRA) where subsurface impacts (soils above PRGs) from wood-treating activities remain. This restriction will prevent exposure to material in excess of PRGs during mining and during use of the materials as a result of sand and gravel extraction.

Groundwater monitoring would be conducted at existing well locations, with new well locations plus two springs on an annual basis. Groundwater samples will be analyzed for semi-volatile organic compounds (SVOCs). Results will be used to evaluate whether there is an increased risk beyond that defined in HHBRA and to monitor potential migration of constituents toward the Arkansas River.

A monitoring plan, which would be finalized during Remedial Design, is proposed to include sampling and/or observations of the following:

- Groundwater: Upper Terrace Aquifer (KRMW-1 [up gradient], KRMW-5, KRWM-6, and KRMW-10), deep/regional aquifer (KRMW-7D); and alluvial aquifer (KRMW-4), including two new wells: two wells down gradient of Spring No. 5; and one well up gradient of this well within the alluvial aquifer;

- Point of Compliance: A well (or wells) within the Arkansas River Alluvial Aquifer down gradient of the perched (or Upper Terrace Aquifer) is proposed to be the point of compliance (POC) for monitoring levels of B(a)P and penta;

- DNAPL: thickness of DNAPL in the bottom of KRMW-7S and volumetric flow from Spring No. 5, to include measuring springs up gradient (spring 3) and down gradient (spring 6); and

- Impacted soil: visual extent of impact surrounding Spring No. 5.

Figure 5-2 shows the locations of existing monitoring wells, proposed monitoring wells and springs that will be included in the groundwater monitoring program at the Site.

The monitoring/institutional controls alternative would be conducted for perpetuity or until the contaminants no longer present a risk to human health and the environment. For purposes of estimating the cost, the remedial time frame of 30 years and interest rate of 5% was used to derived at a Present Value Cost of $255,000.

8.4.3 Alternative C - Reuse as Asphalt Aggregate

This alternative consists of the reuse of soil within subunits 2 and 3 (or more specifically the MRA), market conditions permitting, in which soil above PRGs would be reused as aggregate for a cold-mix asphalt batch plant. The material stockpiles that exceed PRGs would be used as feedstock for a cold-mix asphalt batch plant that could be setup at the Site. Under favorable market conditions, the asphalt material would then be sold for use as paving material. Material that tests below PRGs and material that was not visually impacted could be sold as aggregate for unrestricted use in industrial settings.

Cold-mix asphalt batching is a process whereby crushed aggregate is mixed with asphalt oil without heating of the aggregate. The process is simple and generates an asphalt product that is useful for base coating roadways, paving low traffic areas such as parking lots and driveways, as patching material, and potentially for other paving purposes.

If materials at the Site are determined to be a characteristic hazardous waste, then they will be managed in accordance with the substantive requirements of RCRA and CHWA. Final use will be determined by testing the excavated material to determine whether constituent levels are above or below PRGs set forth in this ROD, and whether it is feasible for the mine operator to operate an asphalt batch plant at the Site based on an assessment of market conditions.

Asphalt typically consists of an aggregate material such as crushed rock, mixed with either a petroleum-based or coal tar-based asphalt oil. The distillation of asphalt oil from coal tar is similar to the process that produces creosote, also a coal tar distillate. As such, asphalt oils contain percentages of PAHs, similar to those found in creosote. Since the Site contains creosote-impacted gravel and rock, recycling of the material as asphalt aggregate appears to be a technically feasible alternative.

Groundwater management will be required if mining continues from the vadose zone into the 30 to 40 feet deep saturated zone (or subunit 3). Groundwater impacted by PAHs may require treatment prior to discharge under an NPDES permit, or application as a dust suppressant. Costs included for this alternative assume that water will be directed to an oil/water separator and thence to a lined surface impoundment for partial evaporation. A treatment system will be required to treat groundwater to within state water quality criteria. For costing purposes, the total volume of water to be treated was assumed to be 4.8 million gallons based on the aquifer storage capacity over the 6.6 acres of the MRA, assuming 25 percent porosity, an evaporative loss of 10 percent, and a treatment cost of $0.10/gallon. Groundwater volume estimates assume that perimeter control would eliminate recharge of groundwater to the area of mining restriction.

The estimated remedial time frame for this alternative and present value cost is 11 years and $770,000, respectively.

8.4.4 Alternative D - On-Site Containment

This alternative consists of the on-Site containment of subunits 2 and 3 soil above the PRGs. These soils will be stockpiled and covered with a 1-foot thick layer of clean sand, gravel, and cobbles from elsewhere on the Site to prevent direct contact and wind-blown movement of the soils. If any of the soils are determined to be a characteristic hazardous waste, then they shall be managed according to the substantive requirements of RCRA and CHWA. The soils in on-Site containment may be accessed in the future for reuse as aggregate for a cold-mix asphalt batch plant.

As with Alternative C, if mining is continued through the vadose zone and into the saturated zone (30 to 40 feet deep), groundwater management will be required including treatment of groundwater from the MRA prior to discharge under NPDES permit or reinjection.

The estimated remedial time frame for this alternative and present value cost is 11 years and $851,000.

8.4.5 Alternative E - On-Site Disposal

Subunits 2 and 3 soils that exceed the PRGs would be placed in an on-Site landfill engineered to contain either hazardous or non-hazardous materials. The type of landfill would be based upon analytical results to determine whether the material is a characteristic hazardous waste.

If existing mining operations are expanded into the MRA (see Figure 5-1), which is currently not permitted for mining, excavated soils that exceed the PRGs would be permanently disposed in either a solid-waste landfill or a hazardous waste landfill to be constructed on-Site. The characteristics of the excavated soil will determine the type of disposal unit. Soils below the PRGs would be sold as aggregate for industrial use. This alternative combines the volume of soils within each of the subunits for a total of 76,000 tons to be disposed on-Site. This volume is a very conservative estimate as some of the impacted soil is likely to be below PRGs. Costing for this alternative only includes estimates for the additional estimated cost of constructing a land disposal unit permitting, health and safety considerations, and soil analyses.

The hazardous waste landfill would meet the design requirements of the Resource Conservation and Recovery Act (RCRA) 40 CFR 264 Subpart N and state CHWA regulations, if more stringent. The design has a liner system which includes a composite bottom liner and a cover section. The bottom section includes three feet of compacted clay under a Leak Detection, Collection and Removal System. The cover section includes two feet of compacted clay, a geomembrane, one foot of drainage medium, and a soil cover of 30 inches.

The non-hazardous or solid waste landfill would include two feet of compacted clay, a simplified drainage system and a cover system identical to the hazardous waste unit with the exception of no geomembrane. The operating cost of mining within the MRA has not been estimated. It is assumed that the current or future owner would evaluate the potential revenues from the sale of

products against the cost of on-Site disposal of soils exceeding the PRGs to determine whether future mining will occur. The O&M and PWC is based upon the estimated mine life of 11 years.

The estimated remedial time frame and present value cost for on-site disposal in a non-hazardous landfill is 30 years and $2,129,000, respectively. The estimated remedial time frame and present value cost for on-site disposal in a hazardous landfill is 30 years and $3,099,000, respectively.

8.4.6 Alternative F - Off-Site Disposal

Subunits 2 and 3 soils that exceed the PRGs would be disposed of in an off-Site hazardous waste (RCRA Subtitle C) landfill or a non-hazardous (RCRA Subtitle D) landfill. The type of landfill would be based upon analytical results to determine whether the material is a characteristic hazardous waste.

If existing mining operations expand into the MRA, which is currently not permitted for mining, the excavated soils that exceed the PRGs would be disposed off-Site in a permitted solid-waste facility (RCRA subtitle D) or hazardous waste facility (RCRA subtitle C). The characteristics of the excavated soil will determine whether the excavated soil should be disposed in an off-Site subtitle D or C facility. Soils below the PRGs would be sold as aggregate for industrial use. This alternative combines the volume of soils within each of the subunits for a total of 76,000 tons to be disposed off-Site. Costing of this alternative only includes estimates for the additional cost of loading, transport and disposal to a permitted facility, soil and water analyses, and groundwater treatment. The operating cost of mining has not been estimated as it is assumed that the current or future owner would evaluate the potential revenues from the sale of products against the cost of disposal to determine whether future mining will occur. The O&M and PWC is based upon the estimated mine life of 11 years.

The estimated remedial time frame and present value cost for off-site disposal at a non-hazardous disposal facility is 11 years and $2,104,000. The estimated remedial time frame and present value cost for off-site disposal at a hazardous disposal facility is 11 years and $18,604,000.

Section 9.0
Summary of the Comparative Analysis of Alternatives

In this section, alternatives developed for the Site are evaluated and compared to each other using the nine evaluation criteria required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR § 300.430) to identify the alternative that provides the best balance among the criteria. The comparative analysis provides the basis for determining which alternative presents the best balance between the EPA's nine evaluation criteria listed below. The first two cleanup evaluation criteria are considered threshold criteria that must be met by the selected remedial action. The five primary balancing criteria are balanced to achieve the best overall solution. The final two modifying criteria that are considered in remedy selection are State acceptance and community acceptance.

- **Threshold Criteria**

1. **Overall Protection of Human Health and the Environment** assesses the protection afforded by each alternative, considering the magnitude of the residual risk remaining at the site after the response objectives have been met. Protectiveness is determined by evaluating how site risks from each exposure route are eliminated, reduced, or controlled by the specific alternative. The evaluation also takes into account short-term or cross-media impacts that result from implementation of the alternative remedial activity.

2. **Compliance with Applicable or Relevant and Appropriate Requirements** addresses whether a remedy will meet all Federal and State environmental laws and/or provides grounds for a waiver. Section 121(d) of the Superfund Amendments and Reauthorization Act (SARA) mandates that for all remedial actions conducted under CERCLA, cleanup activities must be conducted in a manner that complies with ARARs. The NCP and SARA have defined both applicable requirements and relevant and appropriate requirements as follows:

- Applicable requirements are those federal and state requirements that would be legally applicable, either directly, or as incorporated by a federally authorized state program.

- Relevant and appropriate requirements are those federal and state requirements that, while not legally "applicable," are designed to apply to problems sufficiently similar to those encountered at CERCLA sites that their application is appropriate. Requirements may be relevant and appropriate if they would otherwise be "applicable," except for jurisdictional restrictions associated with the requirement.

- Other requirements to be considered are federal and state nonregulatory

requirements, such as guidance documents or criteria. Advisories or guidance documents do not have the status of potential ARARs. However, where there are no specific ARARs for a chemical or situation, or where such ARARs are not sufficient to be protective, guidance or advisories should be identified and used to ensure that a remedy is protective.

- Primary Balancing Criteria

3. **Long-Term Effectiveness and Permanence** refer to the ability of a remedy to provide reliable protection of human health and the environment over time. The focus of this evaluation is to determine the effectiveness of each alternative with respect to the risk posed by treatment of residuals and/or untreated wastes after the cleanup criteria have been achieved. Several components were addressed in making the determinations, including:

- Magnitude of residual risk from the alternative;
- Likelihood that the alternative will meet process efficiencies and performance specifications;
- Adequacy and reliability of long-term management controls providing continued protection from residuals; and
- Associated risks in the event the technology or permanent facilities must be replaced.

4. **Reduction of Toxicity, Mobility, or Volume Through Treatment** refers to the preference for a remedy that reduces health hazards of contaminants, the movement of contaminants, or the quantity of contaminants at the Site through treatment. This criterion evaluates the ability of the alternatives to significantly achieve reduction of the toxicity, mobility, or volume of the contaminants or wastes at the site, through treatment. The criterion is a principal statutory requirement of CERCLA. This analysis evaluates the quantity of contaminants treated and destroyed, the degree of expected reduction in toxicity, mobility, or volume measured as a percentage of reduction, the degree to which the treatment will be irreversible, the type and quantity of residuals produced, and the manner in which the principal threat will be addressed through treatment. The risk posed by residuals will be considered in determining the adequacy of reduced toxicity and mobility achieved by each alternative.

5. **Short-Term Effectiveness** addresses the period of time needed to complete the remedy, and any adverse effects to human health and the environment

that may be caused during the construction and implementation of the remedy. Measures to mitigate releases and provide protection is central to this determination.

6. **Implementability** refers to the technical and administrative feasibility of an alternative or a remedy. This criterion analyzes technical feasibility, administrative feasibility, and the availability of services and materials. Technical feasibility assesses the difficulty of construction or operation of a particular alternative and unknowns associated with process technologies. The reliability of the technologies based on the likelihood of technical problems that would lead to project delays is critical in this determination. The ability to monitor the effectiveness of the alternative is also considered.

   Administrative feasibility assesses the ease or difficulty of obtaining permits or rights-of-way for construction. Availability of services and materials evaluates the need for off-site treatment, storage, or disposal services, and the availability of such services. Necessary equipment, specialists, and additional resources are also evaluated in determining the ease by which these needs could be fulfilled. It also includes coordination of Federal, State, and local government efforts.

7. **Cost** evaluates the estimated capital, operation, and maintenance (O&M) costs of each alternative in comparison to other equally protective alternatives. Alternatives are evaluated for cost in terms of both capital costs and long-term O&M costs necessary to ensure continued effectiveness of the alternatives. Capital costs include the sum of the direct capital costs (materials, equipment, labor, land purchases) and indirect capital costs (engineering, licenses, or permits). Long-term O&M costs include labor, materials, energy, equipment replacement, disposal, and sampling necessary to implement the alternative.

- **Modifying Criteria**

8. **State Acceptance** indicates whether the State agrees with, opposes, or has no comment on the preferred alternative.

9. **Community Acceptance** includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose.

The strengths and weaknesses of the alternatives were weighed to identify the alternative providing the best balance among the nine evaluation criteria.

9.1 Detailed Analysis of Alternatives

9.1.1 Threshold Criteria

Overall Protection of Human Health and the Environment

The overall protection of human health and the environment is a threshold criterion that must be met for EPA to select the alternative. Protectiveness is achieved by the remedies if residential development is prohibited and exposure pathways are either eliminated, reduced to acceptable exposures or controlled through treatment or containment.

All of the alternatives, with the exception of the No Action Alternative (A), protect human health and the environment.

Alternatives B, C, D, E and F are protective of human health and the environment.

Alternative B provides protectiveness by restricting access to impacted soils and groundwater. Alternative C provides protectiveness by recycling impacted soils in a cold-asphalt batch plant. Alternative D provides protectiveness by temporarily containing soils exceeding PRGs on-Site until recycling occurs in a cold-asphalt batch plant. Alternative E provides protectiveness by permanently containing the soils exceeding PRGs on-Site. Alternative F provides protectiveness by disposing the soils exceeding PRGs off-Site.

Alternative A does not address the existing contamination that would be unprotective to a resident.

Compliance with Applicable or Relevant and Appropriate Requirements

Compliance with applicable or relevant and appropriate requirements (ARARs) is a threshold criteria that must be met by the selected remedy. Compliance with ARARs requires that the remedy comply with the substance of the environmental Federal and State laws that address the circumstances of the site and the remediation.

All of the alternatives, with the exception of alternative A, comply with Applicable or Relevant and Appropriate Requirements (ARARs).

9.1.2 Balancing Criteria

The balancing criteria include long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. The remedial alternatives were evaluated and ranked as to how the balancing criterion are achieved with respect to the response actions taken within each of the subunits.

Long-term Effectiveness and Permanence

Long-term effectiveness and permanence are evaluated as the reliability of protection over time. The alternatives will be ranked as to the time it takes to achieve long-term effectiveness and permanence, the permanence of the treatment, effectiveness of the technology and the amount of residuals left onsite.

Alternatives C, D and F achieve the highest overall level of long-term effectiveness and permanence by permanently removing the contaminants and potential source of the groundwater contamination through direct mining of the impacted soils and treatment through recycling or off-site disposal of contaminants.

Alternatives B and E achieve a lower level of long-term effectiveness and permanence by restricting exposure to the contaminants through use of institutional and engineering controls. The natural fate of the COCs under alternative B is expected to be sufficient to address the risk through natural degradation.

All of the alternatives, with the exception of alternative A, achieve the same level of groundwater long-term effectiveness.

Reduction of Toxicity, Mobility and Volume Through Treatment

The alternatives are ranked according to the reduction of toxicity, mobility, or volume through treatment. Those remedies that include treatment of the larger quantities of contaminants are ranked higher than other alternatives.

Alternatives C and D are the only alternatives that have a component that may be considered as treatment. Both of these alternatives recycle the impacted soils into a cold-asphalt batch plant.

Alternatives E and F reduce the mobility and volume of contaminated soils, respectively, by containing the contaminants on-site or disposing of the contaminants off-site. The reduction of mobility and volume is achieved through other means than treatment.

Short-term Effectiveness

All of the alternatives are designed to be protective of both the community and workers during implementation of the remedies. The alternatives will be ranked by how quickly the remedies are implemented and the amount of mitigating components that are needed to ensure protectiveness or reduce exposure during implementation. The alternatives that are achieved quickly will be rated as having the highest degree of short-term effectiveness. The alternatives that require more mitigating components than others shall be ranked lower than those that require few mitigating components to ensure protectiveness during implementation.

Alternative B provides the greatest overall degree of short-term effectiveness because exposure is

restricted by institutional and engineering controls.

Alternatives C, D, E and F provide a lower level of short-term effectiveness by exposing workers to approximately 76,000 tons of contaminated soils. Mining of the MRA will increase truck traffic for a number of years and will increase the accident hazard potential to the community.

Implementability

The alternatives are ranked according to difficulty of construction or operation of the remedy; the available site-specific data to support the likelihood of success of the remedy; the reliability of the technologies (to include likelihood of technical problems in the field); the ability to monitor the effectiveness of the alternative; the reliance upon institutional controls to maintain protectiveness; and the availability of services, equipment and materials.

The alternatives are ranked with respect to each other and not to other technologies that are not being considered at the site.

All of the alternatives have access restrictions to the site which may include fencing, signs, security checks, etc. during the implementation of the remedies.

Alternative B is the most easily implemented, as restricting access to the site through engineering controls can be completed in much less time than the other alternatives, i.e., in less than one year. The fence and well drilling materials and equipment to construct are readily available.

Alternative F is readily implemented because subtitle C and D disposal facilities are available. Heavy equipment to perform the excavation and transport the waste to the off-site disposal facility is locally available.

Alternatives C, D, and E are more difficult to implement due to the complexity of designing and operating a cold-asphalt batch plant, and designing and constructing a landfill.

Cost

The alternatives will be ranked in accordance with their Present Worth Cost (PWC) which includes Capital, and Operation and Maintenance (O&M) Costs for the alternatives. Estimated costs for alternatives associated with mining and reuse of soils from the area with creosote-impacted soils in the historic wood-treating subsite were developed. The costs for these alternative set forth herein are those associated only with those activities which would be undertaken due to the presence of creosote-impacted soil (i.e., hazardous waste management).

Whether to pursue this alternative will be based upon a business decision by the current owner or any future landowner. Such a decision will take into consideration mining and processing costs, the potential revenues from sale of asphalt or aggregate for industrial use, and/or the value of the property upon completion of the mining operation. Current mining costs were requested from the

current landowner but have not been provided. An attempt to estimate the operating costs of the current mining operation without the knowledge of such records is beyond the scope of this analysis. An estimate of potential revenues from the sale of products comprised of impacted soil requires an evaluation of current and potential future market conditions which also is beyond the scope of CERCLA.

Assumptions made in the costing of the alternative associated with mining are as follows:

- Costs for equipment (asphalt batch plant) and materials (fuel and emulsion) for producing asphalt may be offset by revenue from the sale of asphalt;

- Health and safety precautions for sand and gravel workers will be required to mitigate exposure to creosote-impacted soils during mining. This will include the development of a written health and safety plan, OSHA training of workers, monitoring, and periodic briefings;

- Costs for water treatment are based on an estimated treatment cost of $0.10 per gallon. Treated water would be discharged under NPDES permit to the Arkansas River.

- Mining of the saturated zone can only be implemented if mining of the unsaturated zone is conducted first;

- Mining within the MRA will occur at the permitted mining rate (70,000 tons/year) for the current operation; and

- Costs for a mining permit, engineering, and other related activities that would be implemented in the course of mining in the absence of creosote impact were not considered in this analysis.

Incremental costs for the alternatives associated with mining of soils within the MRA were estimated separately for both the unsaturated and saturated zones.

The following are the costs for each of the alternatives:

- Alternative A
  - Capital Costs: $ 0
  - Annual O&M $ 0
  - 30-year PWC $ 0

- Alternative B
  - Capital Costs: $ 40,500
  - Annual O&M $ 13,800
  - 30-year PWC $ 253,000

- Alternative C
  - Capital Costs: $ 735,000
  - Annual O&M $ 7,060
  - 30-year PWC $ 770,000

- Alternative D
  - Capital Costs: $ 814,000
  - Annual O&M $ 7,060
  - 30-year PWC $ 851,000

- Alternative E

  Non-Hazardous
  - Capital Costs: $ 2,038,000
  - Annual O&M $ 5,900
  - 30-year PWC $ 2,129,000

  Hazardous
  - Capital Costs: $ 2,932,000
  - Annual O&M $ 10,900
  - 30-year PWC $ 3,099,000

- Alternative F

  Non-Hazardous
  - Capital Costs: $ 2,063,000
  - Annual O&M $ 4,900
  - 30-year PWC $ 2,104,000

  Hazardous
  - Capital Costs: $ 18,547,000
  - Annual O&M $ 6,900
  - 30-year PWC $ 18,604,000

9.1.3 Modifying Criteria

State and community acceptance are modifying criteria that shall be considered in the remedy selection.

State Acceptance

The State supports the selection of alternative B as described in this Record of Decision. However, in addition, the State of Colorado would like to encourage and facilitate the implementation of Alternative C which calls for the mining and reuse of creosote impacted materials as a feedstock for asphalt. The State believes Alternative B, combined with Alternative C would provide greater long-term effectiveness and permanence to the remedy.

Community Acceptance

Community input on the alternatives was solicited by EPA and CDPHE during the public comment period from October 22, 1997 through November 21, 1997. Comments received from the public were mixed in their support for different alternatives.

Responses to the community and PRP comments are found in the Responsiveness Summary in Section 13.0 of this ROD.

Section 10.0
Selected Site Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and State and public comments, the EPA, in consultation with CDPHE, has determined that the most appropriate remedy for the Site is Alternative B - Monitoring/Institutional Controls.

The purpose of this response action is to eliminate the risk by eliminating the potential pathways through restricting residential development and restricting mining into the impacted soils.

All specified volumes are estimates derived from the data collected during the RI/FS and are intended to be approximate volumes for the development of the remedial alternatives. The actual volumes will be determined during the RA and will include the extent of contamination as defined by the performance standards.

Components of the Selected Site Remedy

The components of the selected remedy are described and are detailed below:

- Institutional Controls to include a restriction that runs with the land to restrict residential development and to restrict mining of approximately 6.6 acres of impacted soils.
- A 6-foot cyclone fence would be constructed around Spring No. 5 to include a locked access gate.
- A groundwater monitoring plan to determine the effectiveness of the remedy over the long-term and to ensure no further migration of dissolved PAHs or DNAPL.

Performance and Compliance Monitoring

A performance and compliance monitoring program shall be developed for the groundwater to determine the effectiveness of natural attenuation of the groundwater.

A groundwater monitoring plan shall be developed to monitor groundwater contaminants and ensure no further migration of groundwater contaminants and DNAPL.

The compliance boundary shall be established during the remedial design to ensure that the contaminants within the groundwater do not migrate at concentrations above the groundwater performance standards beyond this boundary.

The frequency, locations, constituents, sampling methods, detection limits, analytical methods, etc. and explicit details of the groundwater monitoring plan for performance and compliance, and for long-term groundwater monitoring will be determined during Remedial Design (RD) to ensure

protection of the groundwater outside the area of contamination. The compliance boundary is a physical boundary that is delineated as the present extent of migration of the site contaminants at concentrations defined by the groundwater performance standards. The precise location of the compliance boundary shall be delineated during remedial design.

The Region VIII Superfund performance monitoring guidance for groundwater remedies will be used to develop the groundwater monitoring plan.

Institutional Controls

Institutional controls are non-engineering methods for preventing or limiting access to or use of a site. Such controls shall be implemented as part of the selected remedy to ensure the effectiveness and protectiveness of the remedy and to prevent or prohibit all activities that would in any way reduce or impair the effectiveness and protectiveness of the remedy. All measures shall be effectively administered, maintained and enforced.

Institutional controls include restricting residential development on the Site and mining in the MRA. Engineering controls include a fence and warning signs around Spring No. 5. Access and land use restrictions, to ensure no future activity takes place at the Site that is incompatible or inconsistent with the selected remedy, shall be established that will run with the land. Water use restrictions will include coordination with the Colorado State Engineer to restrict water usage and prohibit well drilling on the site and in the vicinity of the DNAPL plume, with the exception of wells needed for monitoring purposes.

10.1 Final Remediation Levels and Compliance Boundary During Remediation

The selected remedy for soils and groundwater shall fully comply with, achieves, and maintain the final remediation levels described in this subsection. A listing of the final remediation levels for the selected remedy is located in this section.

Soil Final Remediation Levels

The soil final remediation levels are as follows:

Table 8: Final Remediation Levels for Soil	
Constituent	**Concentration (mg/kg)[1]**
Benzo(a)anthracene	780
Benzo(a)pyrene	78
Benzo(b)flouranthene	780
Dibenzo(a,h)anthracene	78
Indeno(1,2,3-ed)pyrene	780
Pentachlorophenol	4,768
HpCDD	0.2
HxCDD	0.02
HxCDF	0.02
OCDD	2.0

[1] Concentrations were calculated for a 1 in 10,000 target risk level under an industrial worker scenario.

Groundwater Final Remediation Levels

The final remediation levels based upon a 1 in 1,000,000 residential scenario for groundwater are:

- Arsenic - 0.06 ug/l
- Lead - 0.05 mg/l(MCL)(0.015 mg/l-action level/SDWA)
- Manganese - 840 mg/l
- Antimony - 15 ug/l
- Pentachlorophenol - 0.56 ug/l
- Benzo(a) pyrene - 0.0092 ug/l
- Benzo(b) fluoranthene - 0.092 ug/l
- Benzo(k) fluoranthene - 0.92 ug/l
- Chyrsene - 9.2 ug/l
- Dibenz(a,h) anthracene - 0.0092 ug/l
- Indeno (1, 2, 3-cd) pyrene - 0.092 ug/l
- Benz(a) anthracene - 0.092 ug/l

Many of these levels are more stringent than the associated MCL. A more stringent standard may be needed if multiple contaminants within the groundwater or multiple pathways of exposure present an extraordinary risk. The existing contamination in the groundwater monitoring wells at the Site is limited to one or two constituents with the exception of the isolated DNAPL plume. The constituents specified above have been identified as site-specific constituents that may migrate from the DNAPL plume or leach from contaminated soils on site. Typically, the accumulative risk of multiple contaminants or pathways results in site-specific health-based values that may be more stringent than the regulatory standard set by promulgated regulations. The potential for multiple contaminants or multiple pathways does not exist at this site therefore the MCL shall be used when there is a discrepancy between the site-specific health-based value and the regulatory standard (For example: Pentachlorophenol - 0.001 mg/l and Benzo(a)pyrene - 0.0002 mg/l).

The selected remedy for groundwater shall meet these groundwater final remediation levels.

10.2 ARARs

Colorado Groundwater Standards, 5 CCR 1002-8, Section 3.11.0 establishes a system for classifying groundwater and adopting water quality standards to protect existing and potential beneficial uses. This regulation is applicable in that the groundwater organic chemical standard found in Table A, Regulation No. 41 (Basic Standards for Groundwater) are applicable to water within the Upper Terrace Aquifer (perched aquifer) and the Regional Aquifer (Arkansas River Alluvial Aquifer and glacial/basin fill deposits) at the Site. The following standards are applicable for the following compounds detected in the groundwater monitoring program:

- Pentachlorophenol - 0.001 mg/l
- Benzo(a)pyrene - 0.0002 mg/l

10.3 Five-Year Reviews

Five-Year Review: As specified in §121 of CERCLA, as amended by SARA, and Section 300.430(f)(4)(ii) of the NCP, EPA will review the remedy no less often than every 5 years after the initiation of the remedial action to assure that human health and the environment are being protected by the implemented remedy (this review will ensure that the remedy is protective and that institutional controls necessary to ensure protections are in place). An additional purpose for the review is to evaluate whether the performance standards specified in this ROD remain protective of human health and the environment. EPA will continue the reviews until no hazardous substances, pollutants, or contaminants remain at the Site above the levels that allow for unrestricted and unlimited use of the land and groundwater.

10.4 Cost of the Selected Remedy

A detailed cost table has been developed for the selected remedy and is organized by capital costs, O&M costs and Present Worth Cost (PWC).

Table 9: Cost of Remedy - Monitoring and Institutional Controls

Description	Unit Cost Method				Material and Labor Method								Costs
					Material				Labor				
	Quantity	Unit	Unit Price	Cost	Quantity	Unit	Unit Price	Cost	Quantity	Unit	Unit Price	Cost	
Legal Fees	2	ls	10000.00	20,000				0				0	20,000
Monitoring Well Installation	2	ea	2500.00	5,000				0				0	5,000
Fence Installation	1	ea	2000.00	2,000				0				0	2,000
Subtotal				27,000				0				0	27,000
Health and Safety	10%			2,700				0				0	2,700
Mobil/Demobil	5%			1,350				0				0	1,350
Legal/Permits	25%			6,750				0				0	6,750
Constr. Admin/Supervision	10%			2,700				0				0	2,700
Engineering and Design	0%			0				0				0	0
Total				40,500				0				0	40,500

Table 9: Annual Operation and Maintenance Cost Estimate													
Description	Unit Cost Method				Material and Labor Method								Annual O&M Costs
					Material				Labor				
	Quantity	Unit	Unit Price	Cost	Quantity	Unit	Unit Price	Cost	Quantity	Unit	Unit Price	Cost	
GW Sampling & Analysis (5 wells, 2 springs)	7	ea	1500.00	10,500				0				0	10,500
Annual Report	1	ea	3000.00	3,000				0				0	3,000
Fence Repair Labor	12	hour	25.00	300				0				0	300
Subtotal				13,800				0				0	13,800
Present Worth Cost													253,000

Section 11.0
Documentation of Significant Changes

To fulfill the requirements of CERCLA Section 117(b), this section discusses the reasons for the selection of a remedy other than the preferred remedy in the Proposed Plan. EPA has selected one of the alternatives identified as a preference in the Proposed Plan.

Section 12.0
Statutory Determinations

EPA's primary responsibility at Superfund sites is to undertake remedial actions that protect human health and the environment. In addition, CERCLA § 121 establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for a site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver has been granted. The selected remedy must also be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatments that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as their principal element.

12.1 Protection of Human Health and the Environment

EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (1988) indicates that protectiveness may be achieved by reducing exposure through actions such as containment, limiting access, or providing an alternative water supply. The remedial actions described for the selected remedy reduces the exposure to the impacted soil by restricting residential development and mining in the MRA.

Short-term and cross-media impacts due to implementation of the selected remedy are expected to be minimal. Potential risks to human health and environment through exposure to contaminated groundwater and soil during well installation and sampling will be minimized by the use of appropriate preventive and protective measures. Potential cross media impacts will be minimized by proper well construction methods.

Contaminated groundwater at the Site does not currently pose a significant human health risk because the groundwater is not presently being used for drinking water or other domestic uses. Thus, there are no completed exposure pathways. The groundwater monitoring will ensure that migration of contaminated groundwater and DNAPL plume does not migrate further. Groundwater monitoring will allow for evaluating the performance of the selected remedy and the need for additional action.

12.2 Compliance with ARARs

Under Section 121(d)(1) of CERCLA, remedial actions must attain standards, requirements, limitations, or criteria that are "applicable or relevant and appropriate" under the circumstances of the release at the site. All ARARs would be met upon completion of the selected remedy at the Site.

12.3 Cost Effectiveness

Section 300.430(f)(1)(ii)(D) of the NCP requires that the selected remedial action meet the threshold criteria of protection of human health and the environment and compliance with the ARARs, and be cost-effective. Cost-effectiveness is determined by evaluating the following three of the five balancing criteria to determine overall effectiveness: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost-effective. A remedy is cost-effective if its costs are proportional to its overall effectiveness. This remedy allows the current gravel and sand operations to continue with a restriction of mining in a small area of the Site. The restriction of residential development will ensure that exposures do not occur that would render risk.

12.4 Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

Section 300.430(f)(1)(ii)(E) of the NCP requires that the selected remedy shall utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This requirement shall be fulfilled by selecting the remedy that satisfies the threshold criteria and the balancing criteria and provides the best balance of tradeoffs among alternatives in terms of the five balancing criteria. The balancing shall emphasize long-term effectiveness and reduction of toxicity, mobility, or volume through treatment. The balancing shall also consider the preference for treatment as a principal element and the bias against off-site land disposal of untreated waste. In making the selection, the modifying criteria of state acceptance and community acceptance shall also be considered.

This remedy prevents the activities that would be unprotective to human health and the environment by ensuring that residential development and mining into the impacted soils is prohibited. This remedy is a practical approach to prevent exposure that relies upon institutional controls.

12.5 Preference for Treatment as a Principal Element

The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable at the Site.

The groundwater monitoring program will allow for evaluation of changes in groundwater quality, the detection of any offsite migration of contaminated groundwater, and the need for further action at the Site if contaminants migrate offsite.

Because the selected remedy will result in hazardous substances remaining on the site, a review will be conducted at least every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

12.6 EPA's Selection of the Remedy

Of the alternatives that are protective of human health and the environment and comply with ARARs, EPA believes that the selected remedy provides the best balance in terms of long-term effectiveness and permanence; reduction in toxicity, mobility, or volume achieved through treatment; short-term effectiveness; implementability; and cost. The NCP states that EPA expects to use engineering controls, such as containment, for waste that poses a relatively low long-term threat, and that the selected remedy shall be cost-effective. The containment of the soils onsite satisfies the NCP expectation. The containment of low-level contaminated waste, cost-effectiveness and receipt of public comment supporting alternative B were important criterion in selecting alternative B as the selected remedy.

Section 13.0
Responsiveness Summary

13.1 Public Meeting Transcript

The transcript of the Public Meeting conducted on October 27, 1997 at the Senior Citizens Center located at 305 F Street in Salida, Colorado regarding the presentation of EPA's preferred cleanup alternative for the Wood-Treating Subsite is enclosed with this decision document.

13.2 Comments to the former Koppers Wood Treating Operable Unit Two for the Smeltertown Superfund Site October 1997

13.2.1 Comments from Jack E. Watkins, President of Poncha Sports Inc., Marketing-Management-Financial Consulting

1) Comment

It was clear that the data used for arriving at decisions regarding the Site was questionable for many at the meeting. This was especially true regarding the individual who had worked at the Site when creosote prevailed, with no ill effects to him or anyone else within his knowledge. I can only say that to the best of my knowledge, there has never been an illness or fatality assigned to the creosote situation at the Site.

Response

EPA uses the latest scientific information available from studies conducted with people and laboratory animals to assess the risk presented by creosote and constituents within creosote. The preliminary remediation goals (PRGs) are based upon the use of this scientific information in determining what concentrations of these constituents one could be exposed to under an industrial exposure and not have more than a 1 in 10,000 additional chance (or 10^{-4}) of acquiring cancer. In short, EPA is protecting the one person in 10,000 persons who might acquire cancer through exposure to the contaminants at the Site.

2) Comment

Notwithstanding the designation of creosote as a toxic material, I can't help but feel that the danger effect assigned to it at the Site is too severe. Asphalt has many of the properties of creosote, and it has not been designated as a toxic material. The extreme number of railway cross-ties, and telephone type poles that have been impregnated with creosote has not been considered dangerous. In my opinion, if creosote is as dangerous as the EPA deems it to be, every creosote contaminated railway cross-tie, and every creosote contaminated telephone type pole, should be condemned and destroyed. Avoiding the issue regarding cross-ties and telephone type poles should not be allowed.

Response

This is a very good comment. Toxicity is based upon dose and dose is directly associated with concentration and quantity. The reason that this Site is being investigated by EPA is because there is residue creosote from the massive use of creosote used to treat railway cross-ties. As a result of the cross-tie treating operations, there is a large concentrated quantity of creosote at this Site. It is the concentration and quantity of the creosote at this Site that renders risk.

3) Comment

The information provided by the EPA is extremely contrary to the opinions of those at the public meeting. I suggest that a serious review be made of the entire situation.

Response
EPA and CDPHE has taken into consideration all the comments received and believe that the selection of alternative B which restricts mining in 6.6 acres of the Site is the appropriate alternative for this Site.

13.2.2 Comments from Frank C. McMurry, Chairman, Chaffee County Board of Commissioners, The Board of County Commissioners of Chaffee County

4) Comment
Commissioner Glenn Everett and Max Rothschild attended the public meeting and with support of the Board of County Commissioners of Chaffee County support Alternative C Reuse as Asphalt Aggregate as the most acceptable alternative. Alternative D Reuse and On Site Containment is also acceptable.

Response
Thank you for your letter and support of alternatives C and D. EPA has determined that alternative B is the most cost-effective alternative. Alternative B restricts mining of the contaminated soils on 6.6 acres of the 118-acre site. Mining would be allowed to continue elsewhere at the site.

13.2.3 Comments from Colonel David C. Williams, U S Army, Retired

5) Comment
There was no public notice of this meeting. One County Commissioner and I found out about it by word of mouth. If adequate notice had been given, the building would have been full of people. This, along with the insufficient number of hand-outs, leads me to conclude that you wanted to slip this by without any real knowledgeable people in attendance.

Response
The meeting was announced in the local newspaper (The Mountain Mail) on October 20, 1997. The local radio station was also notified of the meeting. EPA maintains a mailing list of people who have expressed interest in the project and this includes local elected officials. EPA sent the proposed plan describing the site and the alternatives being considered to the persons on this mailing list. This mailing list consists of more than 100 people. EPA believes strongly in public outreach and believes that the actions described above to announce the meeting attest to our commitment.

6) Comment
Your presentation of the material was very unprofessional to say the least. The room was equipped with a speakers rostrum, complete with amplifier and mike and although in plain sight, was not used until it was pointed out at almost the end of the meeting. The stenographer was located in the wrong position, causing many interruptions during the presentation. The slides were adequate, but were not presented or explained to the satisfaction of the attendees. I suggest that taking a course in public speaking would be helpful to you.

Response
Due to unfortunate circumstances, EPA did not have an opportunity to complete a walk-through of the facility with a person knowledgeable with the facilities prior to the meeting. EPA was not familiar with the facilities and equipment available (e.g., the audio equipment). EPA apologizes for the inconvenience of the interruptions from the stenographer during the presentation. With respect to the slides, ample opportunity was afforded to all attendees to ask questions. Your suggestion regarding a public speaking course is so noted.

7) Comment
Your knowledge of the various types of earth removal were wrong. The term mining was used where open pit should have been used. There are quite a number of types of earth removal, i.e., quarry, glory hole, etc. It was obvious to us who grew up with these types of operations that you had no practical experience in the field.

Response
EPA's interest in the Smeltertown Superfund Site is focused toward characterizing the nature and extent of contaminants, pollutants and hazardous substances that may present a risk to human health or the environment...not to mine the site. The intent of the presentation was to describe to the public the findings of our investigation and numerous alternatives that would mitigate the risk that these contaminants present. Several of the alternatives discussed included a description of the precautions and actions that would have to be taken if mining of contaminated soils occurred. The actual mining plans would have to be developed by the owner to include the precautions and activities deemed appropriate by EPA to be protective. The methods of mining, whether open pit, quarry, bench, etc. were not the focus of the discussion and would not change the measures described in the meeting to protect the workers and determine the final disposition of the waste.

8) Comment
None of your suggested solutions were acceptable to local people. It was obvious that your major thrust was to assign blame to the present land owner. It seems to me that your goals are as follow, in order of precedence:
a. Bankrupt Mr. Butala
b. Create an even bigger mess of the property
c. Establish job security for yourself and staff.

Response
EPA's goal is the protection of human health and the environment. All of the alternatives presented at the public meeting, with the exception of the no action alternative, will meet this goal. Our expressed purpose of the meeting was to gather public comment regarding which alternative the public prefers.

9) Comment
There are solutions to this entire problem.
a. Hire an open pit expert with at least 30 years experience in the field.
b. Follow his advice for the safe removal and USE of the earth around the property.

c. Allow Mr. Butala to do this work and let him remain as a productive member of the business community.

Response
EPA's focus is the protection of human health and the environment by managing or eliminating the exposure to the contaminants, pollutants and hazardous substances at the site. Several of the alternatives describe protective actions that must be conducted to mine contaminated soils. Under these alternatives, if the owner of property chooses to mine the contaminated soils, the owner would be responsible for hiring qualified persons and would be accountable for the protectiveness of the workers and the final disposition of the contaminated soils.

EPA, CDPHE and the potentially responsible parties (PRPs), have worked with Mr. Butala to find solutions that would allow mining while also achieving protectiveness.

10) Comment
Superfund was established to SOLVE problems--instead is rapidly becoming THE PROBLEM. I suggest you take an inward look at your operation and re-focus your efforts to a more productive type operation.

Response
The alternatives within the Focused Feasibility Study (FFS) present solutions. EPA, CDPHE and Beazer East Incorporated have worked with Mr. Butala to make the investigations and remediation as non-intrusive as possible while providing protectiveness.

13.2.4 Comments from Shannon K. Craig, Program Manager of Beazer East, Incorporated

11) Comment
Beazer believes that some additional information or clarifications are necessary with respect to EPA's Proposed Remedial Action Plan ("PRAP").

Page 3 - Second full paragraph. It should be noted that the approximately 5,000 tons which Beazer removed to a permitted landfill originally had been scraped from the surface and left in a pile at the Site by Butala Construction Company.

Response
So noted.

12) Comment
Beazer believes that some additional information or clarifications are necessary with respect to EPA's Proposed Remedial Action Plan ("PRAP").

Page 3- Third full paragraph. Beazer would like to clarify that the soil which was removed by EPA under an emergency removal was removed because of the presence of metals, not because of the presence of creosote. In addition, it should be clarified that the stockpile is not located on the

"upper terrace" rather it is located on a terrace above the lower terrace.

Response
EPA initiated the emergency removal to remove metals, however, during the course of the removal, the OSC made a command decision to remove creosote contaminated soils from the banks of the Arkansas River for the protection of human health and the environment. The location of the stockpile is on a terrace above the lower terrace.

13) Comment
Assessment of Site Risks- Beazer recommends that the Record of Decision more clearly reflect the conclusions of the Baseline Risk Assessment ("BRA") that the Wood Treating Site does not pose an unacceptable risk to human health under the current use. The ROD should also indicate that the risk to workers arising from the implementation of mining can be addressed by health and safety measures.

Under the section entitled ASSESSMENT OF SITE RISKS, third paragraph, last sentence, it is stated that soils in the Pole Plant exceed PRGs. One of the soil samples reported in the RI does exceed the PRGs; however, this sample was collected at a depth of one foot and, based upon field observations of the EPA removal action, was most likely removed from the Site along with soils identified as containing elevated metals. The remaining 5 soil samples collected at the Pole Plant from depths ranging from 2 to 38 feet do not contain constituents at levels in excess of the PRGs. Hence, the reference to the Pole Plant should be deleted.

Response
The Proposed Remedial Action Plan is a brief description of the Site history, characterization, nature and extent of contamination and remedial alternatives. Thus some general statements are made. The ROD will have more specific information to include an entire section dedicated to the description of the risks posed by the contamination at the Site.

14) Comment
Beazer believes that some additional information or clarifications are necessary with respect to EPA's Proposed Remedial Action Plan ("PRAP").

Page 3 - It appears that the list of Remedial Alternatives set forth at the beginning of this section is incomplete. If a similar section is included in the ROD, Beazer recommends that the list reflect all the remedial alternatives which were considered.

Response
The alternatives in the PRAP are the same that will be described in the ROD. The ROD provides more specificity, but the alternatives are the same. Note that only alternatives that survive the initial screening are discussed in the ROD.

15) Comment
Beazer believes that some additional information or clarifications are necessary with respect to

EPA's Proposed Remedial Action Plan ("PRAP").

Page 4- **"No Action (Alternative 1)"** - This section references the entire 118 acre property which was formerly owned by Koppers Company, Inc. ("Koppers"); however, the Wood Treating Site consists of only approximately 60 acres. The remainder of the property formerly owned by Koppers is not part of the Wood Treating Site or the Superfund Site. Beazer believes that this discussion should be changed to refer solely to the 60 acre area. This may be particularly important in light of apparent strong community concern that limitations on land use be minimized to the extent possible. Such a change may help the community better understand the area involved.

Response
So noted.

16) Comment
Beazer believes that some additional information or clarifications are necessary with respect to EPA's Proposed Remedial Action Plan ("PRAP").

Page 4 - **"Subunit 1 - Spring 5"** - This discussion states that "Springs located up gradient (Spring 2) and down gradient (Spring 6) flows will be measured as well as Spring 5." Beazer suggests that Spring 3 be monitored instead of Spring 2. The purpose of monitoring Springs along the bluff is to observe any change in the lateral impact to the perched aquifer. Spring 2 is located approximately 1,200 feet northwest of Spring 5 and is too far away to be an effective measure of lateral migration from Spring 5. Spring 3 is located only 100 feet northwest of Spring 5 and, although it already contains low levels of dissolved constituents, would be a better indicator of lateral migration of DNAPL.

Response
So noted. EPA has accepted the change of measured springs from Spring 2 to Spring 3.

17) Comment
Beazer believes that some additional information or clarifications are necessary with respect to EPA's Proposed Remedial Action Plan ("PRAP").

Page 5 - **Reuse as Asphalt Aggregate (Alternative C in FFS)** - The remedial time frame should be 11 years rather than 8 years.

Response
So noted.

18) Comment
Beazer believes that some additional information or clarifications are necessary with respect to EPA's Proposed Remedial Action Plan ("PRAP").

recycling the waste into a cold asphalt mix. These alternatives mitigate the potential risk posed by the contaminants. These alternatives do not restrict or limit Mr. Butala's permitted uses as the Mining Restriction Area (MRA) is currently not permitted.

Restrictions on the land would be sought with Mr. Butala's consent. Mr. Butala, as owner and operator of the Site, is a potentially responsible party and is liable for the cost of the cleanup of his property.

22) Comment
With respect to the PRAP, Page 3, second full paragraph: The operations of Butala are referred to as a "sand and gravel operation." As we have commented in the past with regard to the DFFS, Butala produces various rock products, including decorative residential and commercial rock.

Response
So noted.

23) Comment
With respect to the PRAP, Page 3, paragraphs 6 and 7: There is no basis for limiting the evaluation of the remedial alternatives to an industrial use scenario. The Butala property is currently used for the production of various rock products, including decorative residential and commercial rock. Additionally, the Butala property is currently zoned as industrial under the Chaffee County Zoning Resolution, which allows for residential, recreational and commercial uses. The limitation of the evaluation of remedial alternatives to an industrial use scenario results in a proposed remedial alternative that unnecessarily restricts the future use of the Butala property.

Response
The existing use of the property is industrial. The projected life of the mining operation is ten plus years thus the reasonable maximum exposure (RME) is industrial. The alternatives addressed in the FFS are based upon the property remaining industrial. There is no compelling reason or evidence to believe that the future use of property would change to residential. Since the property is currently industrial and expected to remain industrial, the use of the industrial scenario does not unnecessarily restrict the use of the property. In addition, the industrial scenario allows for less stringent cleanup standards than residential scenario and thus is less costly.

24) Comment
With respect to the PRAP, Page 8, second column: EPA's selection of Alternative 2 - Institutional Controls and Monitoring and Alternative D if mining is expanded into the MRA - arbitrarily restricts the use of the Butala property.

If Alternative 2 is selected in the Record of Decision as the remedial alternative, it should be modified to reduce the substantial adverse impact on Butala and the use of the Butala property. Alternative 2 should be modified so that it applies only to the 6.6 acre MRA, based on the following rationale: First, there is no basis for subjecting the entire Butala property to a deed

Page 6 - First complete paragraph - The time frame for the mine life is not given and should be 11 years.

Response
So noted.

19) Comment
Finally, Beazer would like to address a question which came up in the public meeting. At the public meeting, a local resident asked about groundwater (either from Spring 1 or from KRMW-1, it was not clear to which she was referring). She stated that the Spring or well is located on her father's property and that it is used for domestic purposes. Beazer does not understand this, since all the wells and Springs sampled and reported in the Remedial Investigation are located on Butala property. Furthermore, neither Spring 1 nor KRMW-1 have been developed for use with the installation of piping or pumps. Therefore, Beazer believes that the resident must have been mistaken about the source of the domestic water. In any event, both Spring 1 and KRMW-1 are located up gradient from the impacts of the wood treating operations and sampling has demonstrated that the water from each source does not contain wood-treating constituents.

Response
So noted.

20) Comment
Beazer supports the two proposed remedial alternatives set forth in the PRAP.

Response
Thank you for your letter and support of alternatives B and C. EPA has determined that alternative B is the most cost-effective alternative. Alternative B restricts mining of the contaminated soils on 6.6 acres of the 118-acre site. Mining would be allowed to continue elsewhere at the site.

13.2.5 Comments from Randy L. Sego, Tilly & Graves Attorneys at Law, on behalf of Butala Construction Company.

21) Comment
As a general matter, EPA's preferred alternatives unnecessarily restrict and limit the permitted uses of the Butala property, without Butala's consent. Butala continues to strongly oppose any unnecessary restriction or limitation imposed by EPA on the property. Additionally, at the public meeting held on October 27, 1997, there was strong community opposition to limitations on land use. The selected remedial alternative should not restrict or limit Butala's use of the property without his consent and/or just compensation.

Response
The alternatives presented in the Focused Feasibility Study (FFS) address the contamination at the Site by eliminating exposure through either restricting access, containing on- or off-site, or

restriction or other institutional control. The former Koppers site was approximately 60 acres, and it is our understanding that this site includes any areas of potential concern. Secondly, within that 60 acres, we believe minimal sampling would show that virtually all of this area, with the exception of the MRA, would meet residential, recreational and commercial PRGs. To the extent that small areas do not meet PRGs, the soils can be removed and consolidated into the MRA. This modest change to Alternative 2 would greatly limit the adverse impacts on Butala and the Butala property.

Response

EPA is interested in your suggestion and would be willing to work with Beazer East Incorporated and Mr. Butala, during settlement negotiations, to develop a plan to limit the residential development restriction only to the area that is contaminated.

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