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**FEASIBILITY STUDY
REPORT**
Part 1, Overview

**Coeur d'Alene Basin
Remedial Investigation/Feasibility Study**

October 2001

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in association with
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**FINAL
FEASIBILITY STUDY REPORT FOR THE
COEUR D'ALENE BASIN REMEDIAL INVESTIGATION/FEASIBILITY STUDY**

Part 1, Overview

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PREFACE

This preface provides a condensed overview of the feasibility study (FS) portion of the Coeur d'Alene Basin Remedial Investigation/Feasibility Study (RI/FS). The FS develops and evaluates potential remedial action alternatives to protect human health and the environment. The RI/FS has been conducted by the U.S. Environmental Protection Agency (EPA), the lead agency for site activities, in response to human health and environmental threats created by historic mining activity.

Site Definition

The Coeur d'Alene Basin site has been defined for the RI/FS to include the Coeur d'Alene River and associated tributaries (the "basin," including portions of the river that run through the Bunker Hill Superfund Site [BHSS]), Coeur d'Alene Lake (the "lake"), and the Spokane River downstream to the Washington State Highway 25 bridge at the Spokane Arm of Lake Roosevelt. The basin and lake are in northern Idaho and the upper Spokane River is in northwestern Idaho and eastern Washington. Although part of the NPL facility, the 21-square-mile BHSS is the subject of its own RI/FS and therefore not included in this RI/FS. (Figure 1.0-1 provides a map of the site area.)

The FS does not include the entire site. Specifically, the FS includes the basin except for the North Fork of the Coeur d'Alene River, the lake, and the upper Spokane River from the Washington-Idaho border to Upriver Dam in Spokane, Washington.

Site Land Use

Site land uses include residential, recreational, agricultural, and light urbanization or industrialization. Human habitation is primarily concentrated in communities along the South Fork Coeur d'Alene River and population centers in the cities of Coeur d'Alene and Post Falls, Idaho, and Spokane, Washington.

Most of the site is undeveloped and includes large areas of federal and state land. Undeveloped areas include upland forest habitats and lowland floodplains with riverine, riparian, wetland, and lake habitats as well as agricultural areas. The quality of these habitats and their ability to support natural populations of flora and fauna have been impacted to varying degrees by historic mining activity in the basin.

Basis of the FS

EPA has conducted the FS in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and in compliance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

In developing the FS, EPA has worked with various stakeholders. These include the Coeur d'Alene Tribe, the Idaho Department of Environmental Quality (IDEQ), the Washington State Department of Ecology (Ecology), the U.S. Fish and Wildlife Service (USFWS), and other federal, state, tribal, and local agencies.

Site Contamination Conditions Framing the FS

The remedial alternatives in the FS have been developed in response to historic mining practices in the basin that, beginning in the late 1880s, have resulted in widespread and significant contamination of various environmental media within the site. These contaminated media threaten human health and the environment.

Site contaminants are primarily metals, including antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury, silver, and zinc. The metals considered of principal concern include lead and arsenic for human health and lead, cadmium, and zinc for protection of ecological receptors. Concentrations of metals in contaminated media vary throughout the site but generally exceed, or greatly exceed, levels that are considered protective of human health and the environment, based on environmental laws or regulations or site-specific risk assessments.

Metal-contaminated media include the mining-related "primary" metal sources: mine tailings, mine adit discharges, and mine waste rock. These mining-related primary metal sources are located in the upper Coeur d'Alene River Basin and include approximately 900 identified separate source areas.

The primary metal sources in the upper basin have impacted other media throughout the site. These impacted, metal-contaminated media include sediments in site floodplains, including riverbanks, riparian areas, wetlands and lakes; soils in upland areas of the site; site groundwater; site surface water; residential dust; and tap water. The impacted floodplain sediments, in particular, also act as "secondary" metal sources that impact the other media.

Directly or indirectly, the impacted floodplain sediments are the major source of metals in basin waters, the major source of metal exposure risks to ecological receptors and a major source to humans, and a major source of potential future recontamination of downstream areas that are cleaned up. The estimated mass and extent of impacted site media—primarily sediments—exceeds 100 million tons dispersed over thousands of acres. These impacted areas include

private and public lands, which complicates accessibility for remedial actions, and extensive areas of natural habitat.

Previous and Current Cleanup Actions

Various cleanup actions, conducted by public, tribal, and private entities, have been ongoing in the basin since before 1989. Under CERCLA, EPA, the State of Idaho, and the mining companies have conducted extensive remedial actions in the BHSS. Beginning in 1997, EPA collected data and conducted an RI/FS for the basin.

Purpose of the FS

Consistent with its purpose to provide information needed in the remedy selection process, the FS has developed and evaluated a range of potential remedial action alternatives that can protect human health and the environment and achieve compliance with applicable or relevant and appropriate requirements (ARARs). In doing this, the FS used information from the remedial investigation (RI), the human health risk assessment, the ecological risk assessment, and numerous other documents describing conditions in the site area.

In the process of developing alternatives, the FS identified potential ARARs, proposed remedial action objectives (RAOs), and preliminary remediation goals (PRGs). It identified and screened possible remedial technologies to develop alternatives that were then evaluated against CERCLA criteria. The criteria include overall protection of human health and the environment, compliance with ARARs, long-term and short-term effectiveness, treatment preferences (for reduction of contaminant toxicity, mobility, or volume), implementability, and cost.

The FS only supports the remedy selection process. It does not recommend or choose a preferred alternative or select a remedy. It is a planning-level document, and provides no design recommendations. ARARs and remediation goals are not finally established until the end of the remedy selection process.

Remedial Alternatives and Structure of the FS

Reflecting the inherent differences between human health and ecological exposure pathways from metal-contaminated media, the FS has been structured into three parts:

- **Part 1, Overview**—Part 1 is an introduction and overview of Parts 2 and 3 that provides an extended summary of the FS.
- **Part 2, Human Health Alternatives**—Part 2 develops human health alternatives for the Coeur d'Alene River Basin based on four environmental media: soil,

drinking water, house dust, and aquatic food sources. The alternatives for each medium were assembled independently of the other media to allow maximum flexibility in future decisionmaking, including integration with the ecological alternatives, as developed in Part 3.

- **Part 3, Ecological Alternatives**—Part 3 considers human health and the environment, but emphasizes the environmental or ecological component, to develop “ecological alternatives” that deal with both “local” site-specific effects and “global” site-wide effects. Six ecological alternatives were developed for the Coeur d'Alene River Basin, not including the North Fork. Five separate alternatives were developed for selected sites in Washington along the upper Spokane River upstream of Upriver Dam. Two separate ecological alternatives were identified for Coeur d'Alene Lake.

These human health and ecological alternatives represent a range of potential remedial actions that can be used to protect human health and the environment. The alternatives range in successive levels of cleanup aggressiveness and completeness from “no action” to comprehensive removal, containment, and treatment of contaminated media. The potential of meeting cleanup objectives or goals increases with the aggressiveness of the alternatives, as does the cost and the difficulty of implementing the cleanup.

Use of the FS in the Remedy Selection Process

EPA is currently integrating the human health and ecological alternatives from the FS into a “preferred alternative” for the Proposed Plan. Following public review of the Proposed Plan, EPA will select and document a remedy in a Record of Decision (ROD). The ROD will also legally establish the ARARs and remediation goals for the remedy. The ROD will form the basis for remedial design and construction, termed remedial action. The FS and its relationship within the remedy selection process are illustrated in Figure 1.2-1.

The alternatives developed in the FS do not limit the choice of a remedy. The preferred alternative in the Proposed Plan or the selected remedy in the ROD can combine elements of the various alternatives developed in the FS, refine or modify those elements, or add to them. Although the FS supplies information for helping select a remedy, information supplementing the FS may be incorporated into the remedy selection process at any time.

Key Technical Issues

Key technical issues associated with the remedial alternatives that are addressed in the FS and that will be further considered in the remedy selection process include the following:

- Impacted sediments—Large-scale cleanup of impacted sediments would be difficult and costly, presenting major technical and administrative challenges as well as significant adverse short-term impacts to the local communities and natural environment.
- Recontamination—Periodic flooding can recontaminate previously remediated areas where storm, snow melt, or flood waters have caused erosion and subsequent redeposition of contaminated sediments. This is a particular concern for community recontamination in smaller basin communities. Many of these communities do not have surface water control systems (e.g., curbs, gutters, and ditches) that effectively control runoff during snowmelt and storm events. For residents living in or near flood plains, uncontrolled surface water runoff, especially during flood events, has a high likelihood of recontaminating properties where remediation has previously been conducted.
- Long times to meet ambient water quality criteria (AWQC)—The widespread occurrence of impacted sediments, which would be difficult to completely remediate, will likely result in relatively long periods of time to reach AWQC, particularly for zinc. As would be expected, the probable time period decreases with the aggressiveness and completeness of the alternative.
- Availability of materials—There are potential shortages in the basin of both available topsoil (either natural or manufactured) for covering waste piles or engineered repositories and available clean soil for backfill of sediment removal areas. These shortages would affect cost and implementability. Harvesting of native topsoil could also create environmental impacts at off-site locations.
- Repository siting—There are limitations on the availability of suitable sites for large engineered repositories for disposal of excavated or dredged contaminated media.
- Remedy Planning—Any comprehensive remedy would include numerous site-specific remedial actions implemented over some time period. Planning these actions would require the phasing, sequencing, and linking of the individual

actions. Besides engineering and construction factors, this effort would involve numerous risk management, cost/benefit, and administrative considerations.

- Long-term management and associated costs—Any effective remedy would likely require substantial long-term management with associated costs. Institutional control programs to protect human health and the environment would be needed. Depending on the remedy, long-term management may include operation and maintenance of engineering controls, such as repositories, and water treatment systems. Required periodic cleanups of remediated areas that are recontaminated by subsequent flood events would add to long-term management costs, as would required long-term monitoring and periodic site reviews.
- Metal loading from the BHSS—Although undergoing remedial actions, the BHSS has historically been a major source of zinc, cadmium, and lead loading to the South Fork Coeur d'Alene River. While it remains to be seen how much the BHSS remedial actions will reduce future metal loading, the remedial alternatives developed for this FS have not included additional actions in the BHSS.

Comprehensive Summary of the FS

This preface provides a condensed summary of the FS. A comprehensive summary is provided in Part 1.

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ABBREVIATIONS AND ACRONYMS

ARAR	applicable or relevant and appropriate requirements
Asarco	Asarco Incorporated (formerly American Smelting and Refining Co.)
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	ambient water quality criteria
BHSS	Bunker Hill Superfund Site
BLM	Bureau of Land Management
CAD	confined aquatic disposal
CDC	Centers for Disease Control
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
cfs	cubic feet per second
COPC	chemical of potential concern
CSM	conceptual site model
CT	central tendency
dL	deciliter
DOI	U.S. Department of the Interior
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FS	feasibility study
FSPA	field sampling plan addendum
GIS	geographic information system
GRA	general response action
HELP	hydrologic evaluation of landfill performance
HEPA	high efficiency particulate air
I-90	Interstate Highway 90
ICP	Institutional Controls Program
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDHW	Idaho Department of Health and Welfare
ITD	Idaho Transportation Department
km ²	square kilometers
MCL	maximum contaminant level
µg	microgram
µg/L	microgram per liter
mg/kg	milligrams per kilogram

ABBREVIATIONS AND ACRONYMS (Continued)

NCP	National Oil and Hazardous Substances Contingency Plan
North Fork	North Fork Coeur d'Alene River
NPL	National Priorities List
PHD	Panhandle Health District
PRG	preliminary remediation goal
RAO	remedial action objective
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
RME	reasonable maximum exposure
ROD	Record of Decision
South Fork	South Fork Coeur d'Alene River
SVNRT	Silver Valley Natural Resource Trustees
TBC	to be considered
TMDL	total maximum daily load
U of I	University of Idaho
UPRR	Union Pacific Railroad
URSG	URS Greiner, Inc.
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey