

EXPLANATION OF SIGNIFICANT DIFFERENCES

for the

REMEDY PROTECTION SELECTED REMEDY

in the

2012 INTERIM ROD AMENDMENT

Silver, Slaughterhouse, Blackcloud, McCarthy & Boulder Creeks

**BUNKER HILL MINING AND METALLURGICAL COMPLEX
SUPERFUND SITE**

EPA ID NUMBER: IDD048340921

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1.0 INTRODUCTION

1.1 Site Name and Location

The Bunker Hill Mining and Metallurgical Complex Superfund Site (“the Bunker Hill Superfund Site”, or “the Site”) is located primarily in northern Idaho. The Site includes mining-contaminated areas in the Coeur d’Alene River corridor, adjacent floodplains, downstream water bodies, tributaries, and fill areas, as well as the 21-square-mile Bunker Hill “Box” where historical ore-processing and smelting operations occurred. The U.S. Environmental Protection Agency (EPA) has divided the Bunker Hill Superfund Site into three Operable Units (OUs):

- OU 1 includes the populated areas of the Bunker Hill Box.
- OU 2 comprises the non-populated areas of the Bunker Hill Box.
- OU 3 includes all areas of the Coeur d’Alene Basin outside the Bunker Hill Box where mining-related contamination is located. OU 3 extends from the Idaho-Montana border into the State of Washington and contains floodplains, populated areas, lakes, rivers, and tributaries. OU 3 includes areas surrounding and including the South Fork of the Coeur d’Alene River (SFCDR) and its tributaries, and areas surrounding and including the main stem of the Coeur d’Alene River down to the depositional areas of the Spokane River, which flows from Coeur d’Alene Lake into Washington State.

The EPA identification number for the Site is IDD048340921.

1.2 Lead and Support Agencies

The lead agency for this action is the U.S. Environmental Protection Agency (EPA). The State of Idaho Department of Health and Welfare, Division of Environmental Quality (DEQ) is the support agency.

1.3 Statement of Purpose

EPA issued a Record of Decision (ROD) for OU1 in August 1991 (USEPA, August 1991), a Record of Decision (ROD) for OU3 in September 2002 (USEPA, September 2002), and an Interim ROD Amendment (IRODA) in August 2012 (USEPA, August 2012(b)). The 2012 IRODA amended both the 1991 OU1 ROD and the 2002 OU3 ROD. Specific components of the remedy selected by the 1991 ROD, the 2002 ROD, and the 2012 IRODA are summarized in Section 2.3. This Explanation of Significant Differences (ESD) sets forth additional details which represent a significant, but not fundamental change to the Selected Remedy. This ESD impacts OU1 and OU3 only and is issued in accordance with §117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9617(c), and the National Contingency Plan (NCP), 40 CFR §300.435(c)(2)(i).

Analyses completed for the *Final Focused Feasibility Study Report* (FFS Report) (USEPA August 2012(a)) found that portions of the clean human health barriers installed as part of the existing Selected Remedies for OU1, OU2, and the Upper Basin portion of OU3 are vulnerable to damage resulting from relatively small storm events. Consequently, additional actions were included in the 2012 IRODA to enhance the long-term effectiveness and permanence of the existing remedies by providing protection from erosion and recontamination caused by storm water runoff, tributary flooding, and heavy rain and snowfall. The 2012 IRODA provided a preliminary list of side gulches that may require additional remedial actions to protect the human health barrier containment remedy (Remedy Protection actions), with provisions for refining the list through one or more ESDs. This ESD describes in detail five locations at which the selected Remedy Protection actions will be implemented (see Figure 1) and specifies technologies identified for these locations based on information developed since the IRODA was issued. This information includes desktop analyses, field investigations and measurements, hydrologic and hydraulic modeling, and flooding, scour, and deposition evaluation. Collectively, this information was used to refine scour and deposition impacts and together with some preliminary engineering calculations is the basis for the changes described in this ESD.

1.4 Administrative Record

This ESD and supporting documents will become part of the 2012 IRODA Administrative Record file, in accordance with the NCP, Section 300.825 (a)(2). The Administrative Record is available for review at the following locations:

USEPA Seattle Office
Superfund Records Center
1200 Sixth Avenue
Seattle, WA 98101
206-553-4494 or 800-424-4372

Kellogg Public Library
16 West Market Avenue
Kellogg, ID 83827
208-786-7231

St. Maries Library
822 W. College Avenue
St. Maries, Idaho 83861
208-245-3732

Coeur d'Alene Field Office, USEPA
1910 NW Boulevard, Suite 208
Coeur d'Alene, ID 83814
208-664-4588

Wallace Public Library
415 River Street
Wallace, ID 83873
208-752-4571

Molstead Library (North Idaho
College) Library
1000 Garden Avenue
Coeur d'Alene, ID 83814
208-769-3355

Spokane Public Library
906 West Main Avenue
Spokane, WA 99201-0976
509-444-5336 (reference desk; ask
for Dana Dalrymple)

2.0 BACKGROUND

2.1 Summary of Site History

The Bunker Hill Superfund Site is within one of the largest historical mining districts in the world. Commercial mining for lead, zinc, silver, and other metals began in the Silver Valley in 1883. Heavy metals contamination in soil, sediment, surface water, and groundwater from over 100 years of commercial mining, milling, smelting, and associated modes of transportation has affected both human health and environmental resources in many areas throughout the Site.

The most significant contaminants are antimony, arsenic, cadmium, copper, lead, mercury, and zinc. The principal sources of metals contamination were tailings generated from the milling of ore discharged to the South Fork Coeur d'Alene River (SFCDR) and its tributaries or confined in large waste piles onsite, waste rock, and air emissions from smelter operations within OU2. Tailings were frequently used as fill for residential and commercial construction projects. Spillage from railroad operations also contributed to contamination across the Site.

EPA conducted a risk assessment for OU1 in 1990 and Idaho Department of Health and Welfare conducted a risk assessment for OU3 in 2001. Major exposure pathways identified by the risk assessments included, among others, ingestion of house dust and residential and community soils.

2.2 Summary of 1991 OU1 ROD, 2002 OU3 ROD and 2012 RODA

Both the 1991 OU1 ROD and the 2002 OU3 ROD selected remedies consisting of, among other elements, excavation of contaminated soil and installation of visual barrier fabric and protective soil, vegetative, or asphalt barriers in residential, commercial, and right-of-way areas. These "human health barrier" remedies were selected to preclude direct contact with underlying contaminated materials. The remedial action objective established for OU1 is to decrease human exposure to lead-contaminated residential soils such that 95% or more of the children have blood lead levels below 10ug/dl and that less than 1% have blood leads levels greater than 15ug/dl. The remedial action objectives established for OU3 include, among other things, reduce human exposure to contaminated soils, sediments, and house dust and reduce mechanical transportation of contaminated soils and sediments into residential areas and structures.

In the 2012 IRODA, EPA recognized that certain precipitation and flood events may cause sufficient scour and/or deposition of contaminated sediments to adversely affect the long-term effectiveness and protectiveness of the human health barriers. To address this concern, EPA's Selected Remedy includes "Remedy Protection" actions - specific technologies (standard engineering practices for stormwater and drainage management) applied to specific locations throughout the Upper Basin portion of OU3 to reduce the potential for adverse impacts to installed human health barriers due to scour and

deposition of contaminated sediments. The range of storm water management options as well as selected community locations warranting Remedy Protection actions were identified during investigation and hydrologic and hydraulic modeling work conducted to support the FFS Report.

The Selected Remedy also identified certain side gulches outside the more populated communities that may warrant Remedy Protection actions to enhance long-term effectiveness and protectiveness of the human health barriers. The Selected Remedy deferred identification of specific locations within these side gulches and deferred selection of specific storm water management options to be applied at these locations until more detailed investigation and modeling information was available.

Because Remedy Protection actions are essentially improvements to existing infrastructure, EPA intends for these actions to be implemented one time only and that appropriate operation and maintenance (O&M) of these actions will ensure their effectiveness in the long term. Prior to construction, agreements will be completed with the appropriate state or local entity to perform O&M tasks associated with the Remedy Protection actions. Easements and/or restrictive covenants may also be necessary components of these remedies to ensure long-term access and functionality of the Remedy Protection actions.

2.3 Actions to Date

The human health barrier component of the 1991 OU1 ROD's Selected Remedy was certified complete by EPA in 2008. The human health barrier component of the 2002 OU3 ROD's Selected Remedy is ongoing with remediation complete at a majority of the parcels requiring remediation.

Over half of the Remedy Protection actions selected in the 2012 IRODA for community areas have been completed and turned over to local governments for long-term O&M. Design and construction of the remaining selected community Remedy Protection actions continues.

3.0 BASIS OF ESD

As contemplated in the 2012 RODA, the hydraulic analyses and remedy threats analysis and characterization results presented in the 2012 FFS Report have been expanded to include side gulches through additional desktop analyses, limited field investigations and measurements, analytical computations, and ground-truthing via field reconnaissance (TerraGraphics, January

2015). Implementing the same process applied to community areas and supporting the 2012 RODA, the following detailed information has been developed for the side gulches:

- Hydrologic Analysis – hydrologic conditions, including the 5-, 25-, and 50-year 24-hour storm events were computed.
- Hydraulic Analysis – simplified Hydrologic Engineering Centers (HEC) models were developed.
- Characterize Risk – Impact maps depicting estimated scour and deposition areas were developed along with an estimated quantity of human health barriers at risk.

Upon completion of scour and deposition risk characterization for the side gulches, hydrologic and hydraulic models were updated for Silver Creek, Slaughterhouse Gulch, Blackcloud Creek, McCarthy Creek, and Boulder Creek (TerraGraphics, February 2015(a), (b), (c), and (d)) to:

- Predict peak flow conditions for the 50-year design flood event,
- Evaluate the capacity of the existing system, and
- Develop a conceptual design chosen from the list of technologies and process options presented in FFS Table 9-4 *Technologies and Process Options for Remedy Protection*.

Results of this work identified five locations at which certain precipitation and flood events would likely cause sufficient scour and/or deposition of contaminated sediments to adversely affect the long-term effectiveness and protectiveness of the human health barriers (TerraGraphics, January 2015).

4.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES

With this ESD, and as envisioned by the 2012 IRODA, EPA is refining the preliminary list of side gulches that may require Remedy Protection actions in the IRODA to identify five specific locations warranting Remedy Protection actions (see Figure 1) along with their appropriate remedial technology and process options (standard engineering practices for stormwater and drainage management)(see Table 1). Additional Remedy Protection projects within side gulches will be selected via additional ESD(s).

This ESD does not change the scope of the remedial actions selected in the 1991 and 2002 RODs as amended by the 2012 IRODA but rather provides greater detail on the specific locations and associated storm water management actions of the Remedy Protection component of the Selected Remedy.

The level of protection provided by, and the design criteria used for, these five actions are consistent with those presented in the 2012 IRODA. These actions will meet Applicable or Relevant and Appropriate Requirements which are listed in the 2012 IROD and remain unchanged.

The IRODA did not specify costs for individual projects but rather estimated that Remedy Protection actions within the side gulches would total \$10,900,000 in capital costs and \$4,180,000 in O&M costs over a 30-year period calculated at net present value (see FFS Table D-36). The projects detailed in this ESD are estimated to cost a total of \$276,000 and are five of a currently unknown total number of Remedy Protection actions to be constructed within the side gulches.

5.0 SUPPORT AGENCY ACCEPTANCE

The Idaho Department of Environmental Quality (IDEQ) and EPA were close partners in developing the Remedy Protection component of the 2012 IRODA. IDEQ and EPA continue to work together to plan, design, and construct the Remedy Protection projects, including the five addressed by this ESD.

6.0 STATUTORY DETERMINATIONS

The remedy for OU1 and OU3, as modified by this ESD, continues to satisfy the requirements of §121 of CERCLA to:

- Protect human health and the environment, through a combination of treatment, engineering controls, and institutional controls,
- Comply with applicable or relevant and appropriate requirements, and
- Be cost-effective.

7.0 PUBLIC PARTICIPATION COMPLIANCE

The public participation requirements for an ESD set out in the NCP §300.435(c)(2)(ii), will be met as follows:

- The ESD and supporting information will be added to the 2012 RODA's Administrative Record established under §300.815 and available at the locations listed in Section 1.4 of this ESD.
- The ESD will be made available on the EPA's Website.
- When this ESD is issued, a public notice of its availability will be published in the *Shoshone News Press*.

8.0 REFERENCES

TerraGraphics Environmental Engineering. January 2015. *Upper Basin Side Gulches Addendum to the Human Health Remedy Protection Hydrologic Risk Characterization and Project Development*. Prepared for IDEQ and USEPA Region 10.

TerraGraphics Environmental Engineering. February 2015(a). *TECHNICAL MEMORANDUM
Remedy Protection Side Gulches – Silver Creek ESD DC.*

TerraGraphics Environmental Engineering. February 2015(b). *TECHNICAL MEMORANDUM
Slaughterhouse Gulch Remedy Protection Conceptual Design.*

TerraGraphics Environmental Engineering. February 2015(c). *TECHNICAL MEMORANDUM
Remedy Protection Side Gulches – Ninemile Creek ESD DC.*

TerraGraphics Environmental Engineering. February 2015(d). *TECHNICAL MEMORANDUM
Remedy Protection Side Gulches – Boulder Creek ESD DC.*

TerraGraphics Environmental Engineering. April 2015(a). *TECHNICAL MEMORANDUM
Silver Creek Remedy Protection Project Final Design.*

TerraGraphics Environmental Engineering. April 2015(b). *TECHNICAL MEMORANDUM
Slaughterhouse Gulch Remedy Protection Project Final Design.*

TerraGraphics Environmental Engineering. September 2015. *Ninemile Side Gulches Remedy
Protection Near Wallace, Idaho Final Design Report.*

U.S. Environmental Protection Agency (USEPA). August 1991. *Record of Decision, Bunker Hill
Mining and Metallurgical Complex Residential Soils Operable Unit, Shoshone County, Idaho.*

U.S. Environmental Protection Agency (USEPA). September 12, 2002. *Record of Decision,
Bunker Hill Mining and Metallurgical Complex Operable Unit 3 (Coeur d'Alene Basin),
Shoshone County, Idaho.*

U.S. Environmental Protection Agency (USEPA). August 2012(a). *Focused Feasibility Study
Report Upper Basin of the Coeur d'Alene River, Bunker Hill Mining and Metallurgical Complex
Superfund Site.* Final. Prepared by CH2M HILL.

U.S. Environmental Protection Agency (USEPA). August 2012(b). *Interim Record of Decision
(ROD) Amendment, Upper Basin of the Coeur d'Alene River, Bunker Hill Mining and
Metallurgical Complex Superfund Site.*

Table 1 – Refined Remedy Protection Actions

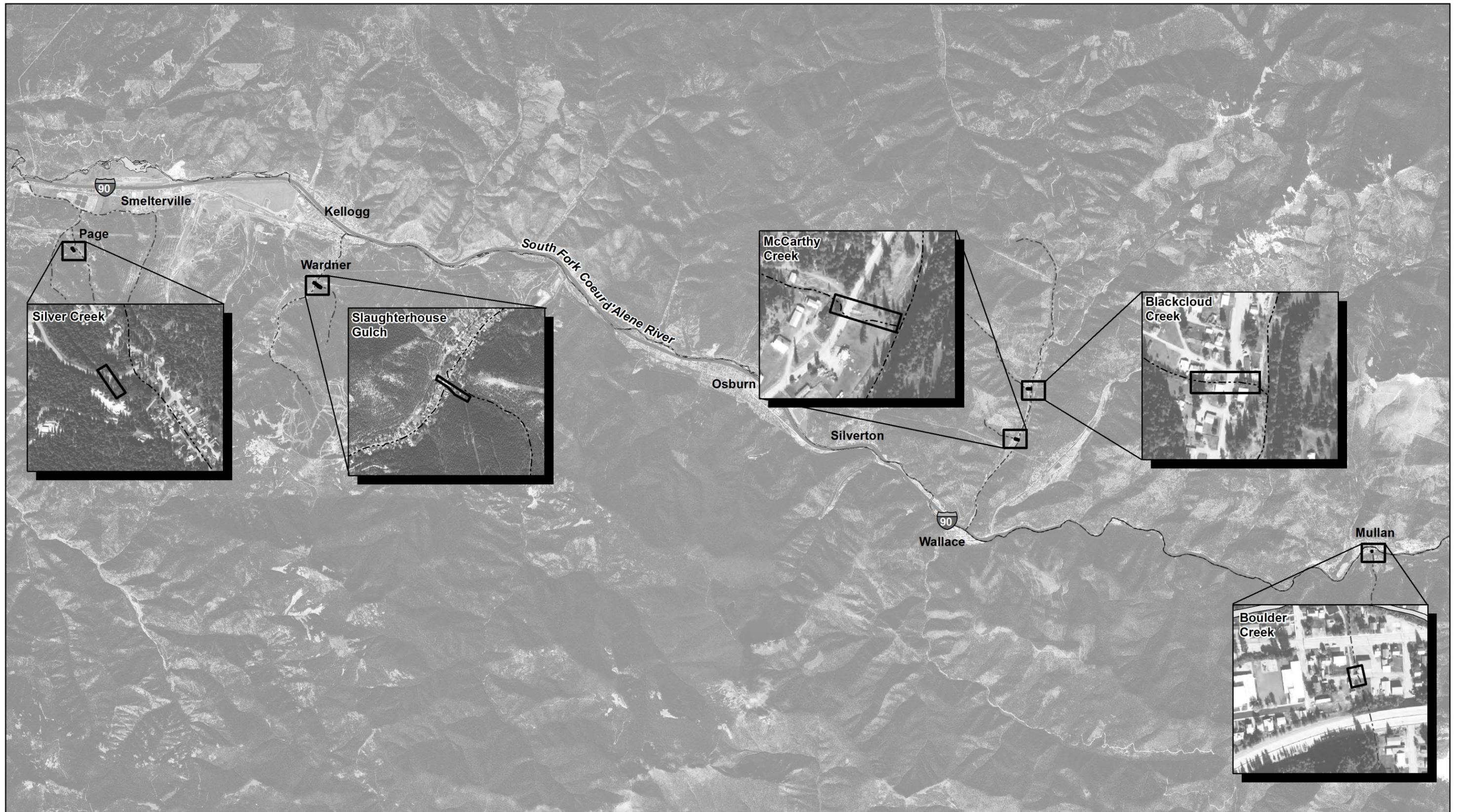
NAME	LOCATION	TECHNOLOGIES ^a	PROCESS OPTIONS ^a	PROJECT DESCRIPTION ^b	CAPITAL COST ESTIMATE
Silver Creek	Community of Page	Creek Channel Modifications	Creek Culvert- Pipe	Replacement of a damaged culvert.	\$13,300 ^c
Slaughterhouse Gulch Road	Wardner	1) General Drainage Improvements 2) Road Shoulder Drainage Improvements	1) Rolling Dip 2) Road Shoulder Armoring	Installation of two rolling dips on Slaughterhouse Gulch Road, two rock chutes from the Road to Slaughterhouse Creek, and armoring of Slaughterhouse Creek.	\$12,200 ^c
Blackcloud Creek	Approximately 2.4 miles north of I-90 on Ninemile Road	Creek Channel Modifications	1) Creek Culvert – Pipe 2) Channel Hydraulic Capacity Improvements 3) Channel Stabilization - Concrete	Replacement of an existing culvert under Ninemile Road with a larger culvert, installation of a new retaining wall and increasing the capacity of Blackcloud Creek directly downgradient of Ninemile Road.	\$143,000 ^c
McCarthy Creek	Approximately 1.6 miles north of I-90 on Ninemile Road	Creek Channel Modifications	1) Creek Culvert – Pipe 2) Channel Hydraulic Capacity Improvements 3) Channel Stabilization - Concrete	Replacement of an existing culvert under Ninemile Road with a larger culvert, upgrading an existing retaining wall and increasing the capacity of McCarthy Creek directly downgradient of Ninemile Road	\$46,900 ^c
Boulder Creek	School Street in Mullan	Creek Channel Modifications	Creek Culvert - Box	Replacement of two damaged side-by-side culverts under School Street with an upgraded, larger culvert.	\$60,600 ^d
TOTAL ESTIMATED CAPITAL COSTS					\$276,000

^a From FFS Table 9-4 *Technologies and Process Options for Remedy Protection*.

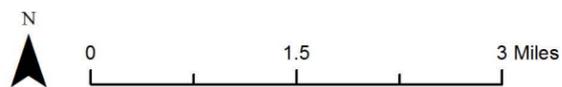
^b For more detailed descriptions of the five Remedy Protection projects, see *TECHNICAL MEMORANDUMs* (TerraGraphics, February 2015(a), (b), (c), and (d)).

^c For detailed presentations of the cost estimates, see project Final Designs (TerraGraphics, April 2015(a) and (b), and TerraGraphics, September 2015).

^d For a detailed presentation of the cost estimate for the Boulder Creek Remedy project, see *TECHNICAL MEMORANDUM* (TerraGraphics, February 2015(d)).



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-  Remy Protection Areas
-  Streams and Tributaries
-  South Fork Coeur d'Alene River
-  Interstate 90

FIGURE 1 Location Map
Silver, Slaughterhouse, Blackcloud, McCarthy & Boulder Creeks
Remy Protection ESD
Bunker Hill Mining and Metallurgical Complex Superfund Site
 Third Five-Year Review
 BUNKER HILL SUPERFUND SITE