
**Interim
Record of Decision (ROD) Amendment,
Upper Basin of the Coeur d'Alene River**

**Bunker Hill Mining
and Metallurgical Complex
Superfund Site**



August 2012

Part 3
Responsiveness Summary

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Part 3—Responsiveness Summary

1.0 Overview and Background on Community Involvement

The U.S. Environmental Protection Agency (EPA) is committed to meaningful community participation throughout the Superfund process in the Coeur d'Alene Basin. Over the years, EPA has engaged the public through all phases of its work. Most importantly, EPA has encouraged the public to be involved in selection of the remedies for Operable Units (OUs) 1, 2, and 3 and, most recently, the Selected Remedy for the Upper Basin.

During the Focused Feasibility Study (FFS) for the Upper Basin, EPA met regularly with the Basin Environmental Improvement Project Commission's (the Basin Commission's) Upper Basin Project Focus Team (PFT), a group focused on technical issues related to cleanup. The PFT members include interested citizens and representatives from the State of Idaho, Shoshone County, the U.S. Department of the Interior Bureau of Land Management (BLM), the U.S. Fish and Wildlife Service (USFWS), the U.S. Forest Service (USFS), the Coeur d'Alene and Spokane Tribes, and the State of Washington. Additional stakeholders participated in some of these meetings, including mining industry representatives. Together, EPA and the Upper Basin PFT developed the remedial alternatives that were evaluated in the FFS Report for the Upper Basin¹ (EPA, 2012).² Variations on these alternatives were carefully considered and screened by the PFT prior to development of the final alternatives. EPA has continued to work closely with the PFT during development of the Selected Remedy for the Upper Basin and associated implementation planning. The PFT was instrumental in helping prioritize actions to include in the Selected Remedy. The PFT continues to work with EPA on implementation planning for the remedy.

In addition to its meetings with the Upper Basin PFT, EPA has provided a wide range of opportunities for community participation in the selection of a remedy for the Upper Basin. Since late 2008, EPA has hosted and/or attended approximately 75 meetings to share information and gather input for development of the FFS Report and the Upper Basin Proposed Plan (EPA, 2010a). EPA has engaged local residents, elected officials, community groups, and many other stakeholders in the decision-making process. This outreach has included working with the Basin Commission, its Technical Leadership Group (TLG), and the Citizens' Coordinating Council (CCC). EPA also submitted drafts of the FFS Report to stakeholders and the Upper Basin PFT for review and comment to assist EPA in preparing the final report.

For the Proposed Plan, in response to high public interest, EPA set an initial public comment period of 45 days instead of the usual 30 days. Based on subsequent requests from the public, the comment period was extended 90 more days, for a total of 135 days for public and stakeholder comment on both the Proposed Plan and the Draft Final FFS Report

¹ The Draft Final FFS Report (CH2M HILL, 2010) was available for public review concurrently with EPA's Proposed Plan for the Upper Basin (EPA, 2010a).

² The references cited in this Responsiveness Summary overview are provided in full in Section 15.0 of the Decision Summary in Part 2 of this Upper Basin ROD Amendment,

(CH2M HILL, 2010). During the comment period, EPA held three informal open houses, hosted a formal public comment meeting and transcribed its proceedings, attended numerous community meetings, and hosted a public tour of some of the sites included in the Proposed Plan. EPA also participated in U.S. Senator Crapo's Town Hall meeting in Kellogg and the Wallace Town Hall meeting sponsored by the mayors of Upper Basin communities.

In addition, EPA created a Record of Decision (ROD) Amendment webpage for the public. It features fact sheets, technical memoranda, meeting handouts and presentations, community involvement materials, and draft documents. The webpage is regularly updated and widely advertised.

EPA's efforts to provide opportunities for public participation more than satisfy the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, the Superfund law) and the National Oil and Hazardous Substances Pollution Contingency Plan (known as the NCP). The input EPA has received from the public has been instrumental in the changes made to the Upper Basin cleanup plan since the Proposed Plan was issued. The ongoing involvement of the community will be an important part of the cleanup as it moves forward.

2.0 Changes Made to the Selected Remedy Based on Public and Stakeholder Comments

Following consideration of comments on and discussions of the Proposed Plan, EPA has significantly reduced the scope of the Selected Remedy and is not including all the remedial actions that were presented in EPA's Preferred Alternative for the Upper Basin in the Proposed Plan. Changes made to the Selected Remedy are described in detail in Section 14.0 of the Decision Summary in Part 2 of this ROD Amendment and are summarized here. No changes were made to the remedy protection actions included in Selected Remedy. As described in Section 12.0 of the Decision Summary, EPA has selected an interim, not a final, remedy for the Upper Basin. The Selected Remedy includes actions at 145 mine and mill sites rather than the 345 sites³ included in the Preferred Alternative. Remedial actions included in the Selected Remedy are focused on geographic areas within the Upper Basin where water quality is most degraded and where the greatest overall benefits to water quality can be achieved. These focus areas primarily include Canyon Creek, Ninemile Creek, and the non-populated areas of the Bunker Hill Box (OU 2). In addition, the Selected Remedy does not include all the Preferred Alternative's groundwater collection and treatment actions along the South Fork of the Coeur d'Alene River (SFCDR) between Wallace and Elizabeth Park. The Selected Remedy does include the remedy protection actions and OU 2 remedial actions described in the Preferred Alternative. Because of the significant reduction in scope, the Selected Remedy is not expected to fully address surface

³ The Proposed Plan (EPA, 2010) stated that the Preferred Alternative for OU 3 (Alternative 3+) included 348 sites. This total erroneously included three sites in Canyon Creek (WAL007, WAL008, and WAL012) that were in Alternative 4+, but not Alternative 3+. Therefore, the correct number of sites in the Preferred Alternative should have been 345.

water contamination at all locations in the Upper Basin, nor is it intended to fully address groundwater contamination.

The Selected Remedy is expected to result in significant improvements to surface water quality in the Upper Basin and may achieve ambient water quality criteria (AWQC) applicable or relevant and appropriate requirements (ARARs) under the Clean Water Act at many locations; however, the remedy may not achieve these AWQC ARARs at all locations. Furthermore, although the Selected Remedy is expected to result in significant improvements to groundwater quality, it is not intended to achieve groundwater maximum contaminant level (MCL) ARARs under the Safe Drinking Water Act throughout the Upper Basin. Similarly, although the Selected Remedy will provide additional safe habitat for special-status species and is intended to achieve ARARs under the Migratory Bird Treaty Act and the Endangered Species Act (ESA) where remedial actions are taken, it will not achieve these ARARs at all locations. The remedial actions included in the Selected Remedy are expected to result in the achievement of cleanup levels for soil and sediments where actions are taken.

Consistent with 40 *Code of Federal Regulations* (CFR) 300.430(a)(ii)(B) and 40 CFR 300.430(f)(1)(ii)(C)(1), this Selected Remedy, an interim action, is neither inconsistent with nor precludes implementation of a final remedy that will attain ARARs. The final remedy will be identified in subsequent decision documents.

Significant changes from EPA's Preferred Alternative identified in the Proposed Plan to the Selected Remedy described in this ROD Amendment include the following:

- **Reduction in scope from 345 mine and mill sites to 145.** The scope of the Selected Remedy has been significantly reduced from the Preferred Alternative. A site-by-site review was conducted to identify the highest-priority sites for remedial action, and those are included in the Selected Remedy. The PFT helped prioritize the actions to include in the Selected Remedy. This site-by-site review is described in detail in the FFS Report (EPA, 2012). Key considerations for this review included: (1) prior remedial actions and the effectiveness of those actions; (2) current active land use; (3) potential human health risks; (4) downstream water quality; (5) site-specific data such as location, contaminant concentrations,⁴ riparian acreage, and erosion potential; and (6) the volume of waste material.
- **Changes to estimated contaminant volumes and typical conceptual designs (TCDs) for Ninemile Creek.** In keeping with EPA's adaptive management approach for the Upper Basin, pre-design investigation work was conducted in the Ninemile Creek drainage in the summer of 2011. The results of this investigation are detailed in the FFS Report (EPA, 2012). The investigation identified areas within the Ninemile Creek drainage that could serve as local waste consolidation areas. Local consolidation helps reduce the volume of contaminated material trucked to a regional repository. Waste consolidation areas will differ from the centrally located repositories discussed in the

⁴ The review of site-specific contaminant concentrations included data collected following the publication of the Proposed Plan in the summer of 2011 at select source sites in the Upper Basin. The results of this sampling effort are documented in the FFS Report (EPA, 2012).

Proposed Plan. Waste consolidation areas will be set up in tributary watersheds (e.g., the Ninemile and Canyon Creek Watersheds) where significant volumes of waste are already present from historical mine and mill site operations, and enough space is available to dispose of the waste for long-term protectiveness. Data collected during the pre-design investigation work also provided updated, more accurate estimates of contaminated waste volumes at specific sites. Site data and associated costs have been updated based on this new information.

- **Changes to the water collection actions between Wallace and Elizabeth Park.** Hydraulic isolation and groundwater collection actions along the SFCDR between Wallace and Elizabeth Park (a reach over 10 miles long) were included in the Preferred Alternative in the Proposed Plan. These remedial actions are not included in the Selected Remedy. Instead, the Selected Remedy will include construction of a groundwater interception drain only in the Osburn area (a reach less than 1 mile long). Sediment removal actions included in the Preferred Alternative are retained in the Selected Remedy for the Osburn area and selected areas along the mainstem of the SFCDR. It is expected that sediment removal actions through the Osburn area will be implemented prior to construction of the groundwater interception drain.
- **Removal of sites with active facilities from the Selected Remedy.** The Selected Remedy does not include remedial actions at active facilities. Active facilities include mining operations as well as other types of commercial and industrial active land use.
- **Removal of sites where previous cleanup actions have been implemented.** There are a number of sites within the Upper Basin where cleanup actions have previously been conducted as a removal action or as part of the 2002 ROD for OU 3 (EPA, 2002), but the effectiveness of those cleanup actions is still being evaluated through routine monitoring and the CERCLA-required Five-Year Review process. Most of these sites were included in the Preferred Alternative but are not included in the Selected Remedy. The potential need for additional cleanup actions at these sites will be evaluated through the Five-Year Review process, consistent with the NCP. If it is determined that more actions are needed, they will be implemented by EPA under the existing authority of the 2002 ROD.
- **Additional mine and mill site characterization.** Following EPA's consideration of stakeholder comments on the Proposed Plan and input from the Basin Commission and the Upper Basin PFT, additional characterization of a number of sites within the Upper Basin was conducted during the summer of 2011. Based on the results of the focused characterization sampling, 42 sites where contaminant concentrations in soil samples were found to be below screening levels were removed from the Selected Remedy.
- **Updates to stream and riparian cleanup actions.** Following its consideration of public and stakeholder comments received on the Proposed Plan, and as part of its effort to reduce the scope of the Preferred Alternative, EPA further evaluated reaches of the SFCDR designated for sediment removal and follow-on stream and riparian stabilization actions. These included seven reaches of the SFCDR between Mullan and Wallace, three reaches of the SFCDR through Wallace, and two reaches of the SFCDR through Kellogg in the Bunker Hill Box. Based on this evaluation, EPA decided to change certain components of these proposed actions. The FFS Report (EPA, 2012) documents the re-

evaluation and the changes made to the stream and riparian stabilization TCDs that had been included in the Draft Final FFS Report (CH2M HILL, 2010) and the Proposed Plan.

3.0 Responsiveness Summary Overview

This section provides responses to general categories of comments received during the public comment period. For each category, there is a comment summary followed by the response from EPA. For more complex categories, a simple summary response is followed by the complete and detailed response. Section 4.0 of this Responsiveness Summary contains specific responses to individual comments.

3.1 Community Involvement and Community Concerns

3.1.1 Community Participation in the Remedy Selection Process

Comment Summary: Comments were received questioning whether EPA has allowed for sufficient community participation. Some of those comments criticized the length of the initial comment period and the fact that only one public meeting was scheduled.

EPA Response: EPA's efforts towards meaningful community participation are described in Section 1.0 above. The length of the initial comment period on the Proposed Plan was set by EPA at 45 days instead of the usual 30 days, largely because EPA recognized that there would be a high level of community interest in the Proposed Plan. Based on requests from the public after the Proposed Plan was issued, the comment period was extended 90 additional days, for a total of 135 days. During the comment period EPA held three informal open houses, hosted a formal public comment meeting that was transcribed, attended community meetings, and hosted a public tour of some of the sites included in the Proposed Plan. EPA also participated in U.S. Senator Crapo's Town Hall meeting in Kellogg and the Wallace Town Hall meeting sponsored by the mayors of Upper Basin communities.

Between the time that the Proposed Plan comment period ended and publication of this ROD Amendment, EPA carefully considered comments received on the Proposed Plan and made the decision to significantly reduce the scope of the Selected Remedy. EPA will continue to work with the Basin Commission, the Upper Basin PFT, and other stakeholders during implementation of the Selected Remedy.

3.1.2 Future Development and Land Use in the Silver Valley

Comment Summary: Comments were received stating that the cleanup plan will have a negative impact on development in the Silver Valley. Additional comments stated that the plan gives EPA too much control over the future of the Silver Valley.

EPA Response: EPA believes that the cleanup will benefit the local economy in a variety of ways. The Selected Remedy will boost economic growth by significantly improving the environment for residents and tourists, creating jobs with the money that will be spent on the Upper Basin cleanup, and providing opportunities for currently contaminated land to be redeveloped. Retail development in Smeltonville, the Galena Ridge golf community, and the Trail of the Coeur d'Alenes are examples of the types of redevelopment that can occur on remediated properties.

Since 1985, millions of dollars have been spent on cleanup, primarily for yard remediation and cleanup in the Upper Basin, including the Bunker Hill Box. Significant spending will continue for the cleanup actions in the Upper Basin. EPA encourages the hiring of local businesses and workforce for the cleanup work.

Cleanup of additional properties in the Silver Valley will provide opportunities for development that do not currently exist. EPA is committed to working with the mining industry and Silver Valley businesses and landowners to conduct the cleanup in ways that are consistent with the current and future land uses desired by the community. Throughout the cleanup, there have been and will continue to be timely opportunities for the public and local government to provide input through the established Basin Commission process.

3.1.3 Working with the Mining Industry

Comment Summary: Comments were received expressing concern that the cleanup would threaten current and future mining jobs. Some of those comments requested that EPA protect current and future mining opportunities.

EPA Summary Response: EPA is confident that cleanup and mining can continue together in the Upper Basin. Where Superfund cleanup is planned in areas that are being currently mined, developed, or expanded, EPA will coordinate its work with the property owners. This approach will limit disruption to active facilities.

EPA Response: EPA is confident that cleanup and mining can coexist. The Upper Basin cleanup will address *historical* contamination from mining activities that began in the 1880s. Historical mine waste disposal practices were much different than they are today. For example, until 1968, significant amounts of mine wastes were discharged directly into creeks and rivers. This widespread contamination from past mining and smelting activities led to the necessity of CERCLA cleanup actions. Today, ongoing mining activities are regulated by state and federal laws other than CERCLA.

In response to public comments and concerns, this Upper Basin ROD Amendment clarifies the decision process for whether CERCLA cleanup actions will be conducted at “Active Facilities” (i.e., mining facilities, among others). This process was developed through cooperation among EPA, the Idaho Department of Environmental Quality (IDEQ), and the community members and stakeholders involved in the Basin Commission’s Upper Basin PFT. For the purposes of this ROD Amendment, an Active Facility is defined as a property where the owner is actively managing the risk of a release, or potential release, of a hazardous substance through regulatory mechanisms outside CERCLA that enforce compliance to protect human health and the environment. Active Facilities will continue to operate under those governing regulations and will be required to address the release of hazardous substances, as necessary, under those governing regulations. The Selected Remedy does not include Active Facilities, and CERCLA cleanup actions will not be conducted at Active Facilities unless data indicate that a release of hazardous substances has occurred or is occurring from a facility that poses risks to human health or the environment, and that this release is not being satisfactorily managed or addressed by the facility under an existing regulatory program.

EPA is confident that cleanup and mining can continue together in the Upper Basin. One of the provisions of the Consent Decree between Hecla and EPA is for both parties to attend an

annual planning meeting to coordinate the cleanup with ongoing exploration or development by Hecla. EPA is willing to coordinate with other mining companies in the Upper Basin in a similar way, and welcomes further discussions with them.

Cleanup is not expected to restrict future mining and exploration in the Silver Valley. EPA is aware that mining has been an important part of the history and economy of the Silver Valley and will continue to be in the future. EPA also understands that mining companies need certainty for planning and investing, and is committed to completing cleanup actions in ways that allow mining operations to continue in compliance with environmental regulations.

3.2 Risk and the Cleanup

3.2.1 Ecological Risks

Comment Summary: Comments were received stating that EPA has not proven the need for protection of the environment, particularly in the areas upstream from the community of Wallace.

EPA Summary Response: Millions of tons of contaminated mine wastes are spread across the Upper Basin. These historical mine wastes contain heavy metals like lead, arsenic, cadmium, and zinc. A proven and documented risk to human health and the environment exists. Many stream areas have metal levels high enough to kill and/or prohibit a healthy fish population. Many fish have high levels of metals in their tissue. Birds die every year from poisoning as the result of swallowing lead. Heavy metals also harm mammals, amphibians, and plants. EPA has a regulatory responsibility to address these risks.

EPA Response: EPA is required under CERCLA, the Superfund law, to address unacceptable risks to human health and the environment at the Bunker Hill Superfund Site. Protecting human health remains EPA's highest priority. While significant cleanup to address human health risks has taken place in the Upper Basin, there is still contamination in soil, sediments, groundwater, and surface water that poses risks to people, wildlife, and the environment. The levels of contamination significantly exceed regulatory and site-specific water quality standards. Contaminants include lead, zinc, cadmium, arsenic, and other metals. Millions of tons of old mill tailings, mine waste rock, and ore concentrates are spread across the Upper Basin. There is substantial documentation of the contamination levels and the risks posed.⁵

For example, the results of the 2001 Ecological Risk Assessment (EcoRA, CH2M HILL and URS Greiner, 2001), as well as more recent monitoring, show that most watersheds in which mining has occurred and a large portion of the Upper Basin downgradient from mining areas are ecologically degraded as a direct or secondary effect of mining-related hazardous substances. This ecological degradation has resulted in demonstrated, observable effects in the Basin. The results of the EcoRA also show that if remediation is not conducted in the

⁵ See the Remedial Investigation and Feasibility Study Reports for the Coeur d'Alene Basin (EPA, 2001b, 2001c); *Superfund and Mining Megasites: Lessons from the Coeur d'Alene Basin* (National Academy of Sciences, 2005); the 2010 Five-Year Review Report for the Bunker Hill Superfund Site (EPA, 2010b); and the Focused Feasibility Study (FFS) Report for the Upper Basin (EPA, 2012).

Basin, effects can be expected to continue for the foreseeable future. High concentrations of metals are pervasive in the soil, sediments, and surface water. These metals pose substantial risks to the animals and plants that inhabit the Basin. Impacts were evaluated for more than 80 different species, representing many trophic levels and hundreds of exposed species. Species evaluated included “special-status species,” such as those listed by USFWS as endangered or threatened under the ESA. The overall conclusion is that heavy metals, primarily lead and zinc, present significant ecological risks to most ecological receptors throughout the Basin, including fish, birds, mammals, amphibians, terrestrial and aquatic plants, soil invertebrates, and microbial soil processes.

Fish and birds were determined to be most vulnerable receptor classes, as noted below.

3.2.2 Fish and Aquatic Organisms

- Based on historical information, approximately 20 miles of the SFCDR and 13 miles of its tributaries are unable to sustain reproducing fish populations. Some areas are essentially devoid of fish and other aquatic life in the area of the mining impacts.
- Impacted species include the native bull trout, which is listed as “threatened” under the ESA.
- Some expected fish species (e.g., sculpin) are absent from areas due to high metals concentrations.
- Exposure of aquatic organisms to metals was confirmed by the presence of elevated concentrations of metals in fish tissue.
- Based upon comparison of metals concentrations to acute AWQC, surface waters are commonly lethal to some aquatic life in several areas.
- Based upon comparison of metals concentrations in surface waters to chronic AWQC, growth and reproduction of surviving aquatic life would be substantially reduced in numerous areas.
- Site-specific toxicity testing and/or biological surveys indicate lethal effects of waters or reduced populations of aquatic life.
- Bull trout and westslope cutthroat trout are evaluated on an individual level due to ESA concerns. The toxicity for some individuals can occur at levels below the AWQC, particularly in areas with low hardness.
- Toxic effects of contaminated sediments are believed to contribute to adverse effects on aquatic life.

3.2.3 Birds

- Risks to health and survival from at least one metal in at least one area were identified for 21 of 24 avian representative species.
- Potential risks to fish-eating birds are noted in the Upper Basin.
- Lead and zinc present the greatest risks to birds in the Coeur d’Alene Basin.

- Lead poisoning has been documented in Basin waterfowl year-round in the floodplain stretching from Smelterville to Coeur d'Alene Lake.
- In the Lower Basin of the Coeur d'Alene River, lead poisoning (primarily due to ingestion of contaminated sediments) is responsible for 96 percent of the total tundra swan mortality, compared to 20 to 30 percent (primarily due to ingestion of lead shot) at the Pacific flyway and national level.
- Risks to health and survival from at least one metal in at least one area were identified for 21 of 24 avian receptor species (CH2M HILL and URS Greiner, 2001a).
- The number of waterfowl carcasses found in 1997 represents the largest documented die-off in the Lower Basin since 1953. The Upper Basin is a significant source of contaminated sediments that are deposited in the Lower Basin. Deaths by lead poisoning from the ingestion of contaminated soil and sediments are expected to continue.
- The USFWS songbird study (Hansen, 2007; Hansen et al., 2011; USFWS, 2008b), and focused EcoRAs (CH2M HILL, 2006d; Sample et al., 2011) confirmed that ground-feeding songbirds in the Coeur d'Alene Basin are accumulating lead in blood and liver tissue from ingesting lead-contaminated soil at levels that show injury to songbirds.
- EPA made a risk management decision to use a site-specific protective value of 530 milligrams per kilogram (mg/kg) lead in soil and sediments as the benchmark cleanup level for the protection of waterfowl that would also be protective of songbirds.

The Upper Basin cleanup is essential to reducing these risks. That said, EPA recognizes that some areas of the Upper Basin have higher levels of contamination than others. This fact is reflected in the prioritization of remedial actions for the interim Selected Remedy, with the majority of the work expected to occur in Ninemile and Canyon Creeks, Osburn, and the Bunker Hill Box.

3.2.4 Human Health Risks

Comment Summary: Comments were received questioning whether there is a substantial risk to human health, and concluding that cleanup actions are not warranted.

EPA Summary Response: There are serious risks to human health from heavy metal contamination in the Basin. The risks are well documented, and EPA has a regulatory responsibility to address these risks. Lead is of most concern, especially for young children and pregnant women. Though some cleanup has been done, there is more work to do to protect human health. Cleaning up contamination in the Upper Basin will reduce the amount of metals that flows downstream into communities. Also, some of the work done under this ROD Amendment will help keep cleaned-up areas clean. For example, it will address tributary flooding, which can spread contamination.

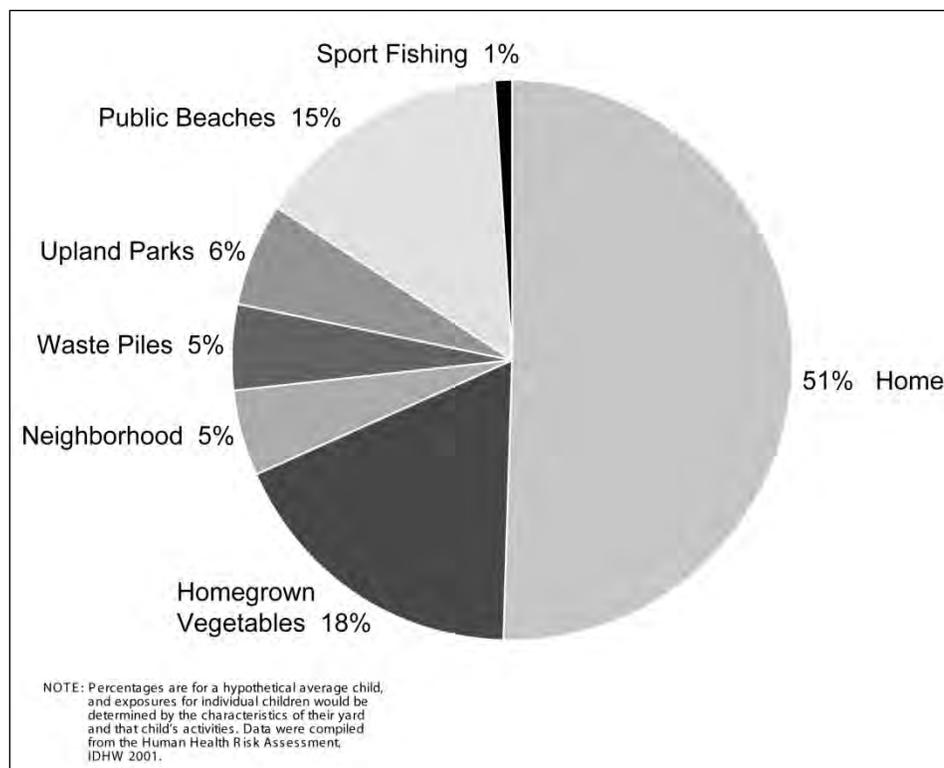
EPA Response: EPA and other agencies have done many studies over the years that document the human health risks posed by contamination in the Coeur d'Alene Basin.⁶ The

⁶ See footnote 5.

primary human health concern in the Upper Basin is excessive lead in the blood of young children and pregnant women. Site-specific analysis of blood lead data paired with environmental lead data demonstrate that complex exposure pathways exist. There is a direct correlation between exposure to lead in soil and dust and blood lead levels. For example, children's blood lead levels can be predicted based on the level of lead in the soil of their yard (von Lindern et al., 2003). It is also known that short-term (such as weekend) exposures to lead contamination along the Coeur d'Alene River have caused elevated blood lead levels.

The effect of greatest concern is lead's potential to cause adverse neurological developmental effects in children. The 2001 Human Health Risk Assessment (HHRA, Idaho Department of Health and Welfare [IDHW], 2001) described contributions that the various exposure pathways and media made to the lead risk by showing the percentages that each pathway or medium would contribute to the average child's exposure. The pie chart below shows the percentage of lead that an average hypothetical child would have received from each of the lead sources in the entire Coeur d'Alene Basin at that time (2001). Since this chart was developed, the contributions to lead exposure from the home have decreased significantly as the result of the implementation of the portions of the existing Selected Remedies focusing on protection of human health for OUs 1, 2, and 3. However, the chart remains useful in indicating that the combination of outside areas (which, for the most part, have not yet been remediated), such as parks, beaches, fishing sites, and waste sites, represented approximately 30 percent of the total lead exposure scenario to this hypothetical child. This exposure potential supports the point that not only ecological receptors, but also human health, remain at risk from the widespread contamination present in the Upper Basin environment.

AVERAGE CHILD'S BASIN-WIDE LEAD EXPOSURE



In response to risks posed by lead, EPA has prioritized cleanup actions to reduce human health exposures in residential areas. Although risks have been greatly reduced through cleanup activities completed to date, more work is needed to address the continued transport of lead from Upper Basin sources, along the SFCDR floodplain and into Coeur d'Alene Lake. EPA is committed and required by CERCLA to address the remaining unacceptable human health risks in the Upper Basin.

In addition, CERCLA Five-Year Reviews have found that some of the existing Selected Remedies focusing on human health for OUs 1, 2, and 3 (EPA, 1991a, 1992, and 2002, respectively) are vulnerable to degradation due to tributary flooding (EPA, 2010b). The remedy protection actions included in the Upper Basin Selected Remedy will protect these existing remedies from SFCDR tributary flooding and maintain the protective barriers needed to reduce risks to human health in residential areas. Basin-wide flooding issues (including SFCDR and Pine Creek flooding) are discussed further in Section 3.3.2.

3.2.5 Human Health Risks Already Addressed in the 2002 ROD for OU 3

Comment Summary: Comments were received stating that of the large amount of money projected for cleanup in the Upper Basin, only \$3 million will be spent on new projects designed to protect human health. Some of those comments also stated that EPA identified human health risks in the 2002 ROD for OU 3 that are already being addressed through work that is nearly complete.

EPA Summary Response: Protecting human health is still EPA's highest priority. The Selected Remedy will spend nearly \$34 million on remedy protection work that is designed to safeguard people's health in residential areas. Other parts of the cleanup will result in cleaner, healthier recreational areas. The "ecological" cleanup work also will benefit public health by reducing the amount of contamination that flows downstream into communities and recreational areas.

EPA Response: EPA has consistently stated and shown that protection of human health in the Coeur d'Alene Basin is its highest priority. Since the ROD for OU 3 was issued in 2002, EPA has carried out the majority of the Selected Human Health Remedy identified in that ROD in the residential areas of the Upper Basin. In addition, to date, millions of dollars have been spent implementing the remedies focused on the protection of human health described in the RODs for OUs 1, 2, and 3. The Selected Remedy for OU 1 focusing on protection of human health, described in the 1991 ROD and performed by the Upstream Mining Group under a 1994 Consent Decree, has been certified complete. Additional human health actions in the Upper Basin are ongoing. Although human health is the highest priority, EPA is (as noted above) also required to address the significant risks to the environment that still exist.

It is not correct that "only \$3 million" will be spent on new projects designed to protect human health." The Upper Basin Selected Remedy includes an estimated \$33.8 million for remedy protection work in the Upper Basin. Remedy protection is intended to protect the existing human health clean soil barriers (e.g., remediated yards and rights of way) within Upper Basin communities from tributary flooding and high-precipitation events. In addition to the remedy protection work, cleanup actions that address mine waste contamination within drainage areas accessible for recreational use will protect human health and improve

surface water quality. Common recreational activities in the Coeur d'Alene Basin include hiking, fishing, hunting, boating, swimming, and all-terrain-vehicle riding. As noted in Section 3.2.2, exposure to lead contamination can cause elevated blood lead levels and resulting adverse neurological effects. EPA has also found that elevated blood lead levels can occur within relatively short exposure periods (such as through recreational exposure to contamination located along the SFCDR, on waste piles, etc.). The Selected Remedy will provide clean surface soil in contaminated areas and reduce particulate lead loading to surface water. In these ways, the Selected Remedy will further reduce the risks people may be exposed to during recreational activities.

3.3 Scope and Role of Cleanup Actions

3.3.1 Scope of Cleanup Actions

Comment Summary: Comments were received stating that EPA claims the cleanup actions will protect drinking water, but the cleanup plan is not about drinking water.

EPA Response: The State of Idaho has identified drinking water as a designated beneficial use for the surface water of the Idaho portion of the Coeur d'Alene Basin. A deep groundwater aquifer and clean surface water tributaries are used as drinking water sources in the Upper Basin. EPA has not focused the Selected Remedy for the Upper Basin on drinking water. Past cleanup plans described in the RODs for OUs 1, 2, and 3 (EPA, 1991a, 1992, and 2002, respectively) have already addressed immediate residential drinking water issues.

The Upper Basin Selected Remedy is expected to result in significant improvements to surface water quality in the SFCDR and its tributaries. In the case of the SFCDR, the ARARs that will protect the environment include site-specific AWQC. These criteria were developed by the State of Idaho to protect aquatic life. The water quality standards to protect the environment are more stringent than drinking water standards (i.e., MCLs) for contaminants of concern in the Basin. There is one exception – mercury – but it has not been found to be prevalent in the Upper Basin. Therefore, EPA believes that achieving ARARs will inherently have a potential drinking water benefit. Furthermore, although the Selected Remedy is expected to result in significant improvement to groundwater quality, it is not intended to achieve groundwater MCL ARARs under the Safe Drinking Water Act at all locations in the Upper Basin.

3.3.2 Basin-Wide Flooding Concerns

Comment Summary: Comments were received stating that EPA should address potential flooding concerns associated with the SFCDR and Pine Creek to protect the existing protective barriers.

EPA Summary Response: EPA's cleanup program does not have the regulatory authority to do comprehensive flood control. But where there is a direct connection to the remedy, EPA can make contributions to local flood control work. EPA will work with local jurisdictions to identify ways to coordinate efforts.

EPA Response: Comprehensive flood control is a complex multi-jurisdictional issue that exceeds the expertise and regulatory authority of EPA's CERCLA cleanup program. EPA is eager to ensure the long-term performance of the protective barriers implemented to protect

human health and understands that local communities are concerned about flood insurance requirements and development restrictions associated with updated Flood Insurance Rate Maps (FIRMs). EPA is therefore committed to working with local, state, and federal entities with an interest in SFCDR and Pine Creek flooding issues to help craft solutions. EPA can and will contribute to efforts to understand SFCDR and Pine Creek flooding issues and may select actions, consistent with EPA's authority, that complement broader flood control measures. CERCLA requires that EPA's contribution to flood control work must have a direct connection to the CERCLA remedy. The inclusion of remedy protection projects in the Upper Basin Selected Remedy is an example of EPA and IDEQ working with local communities to identify flood control projects directly tied to the existing Selected Remedies focusing on human health for OUs 1, 2, and 3.

During site characterization and remedial design of remedy protection, source control, and water quality projects, EPA will continue to coordinate with local communities and flood control authorities, the Basin Commission, the U.S. Army Corp of Engineers (USACE), and the Federal Emergency Management Agency (FEMA). This coordination will ensure that cleanup actions do not exacerbate flooding concerns along the SFCDR and Pine Creek, and will leverage future work by the various entities involved in SFCDR and Pine Creek activities. Where planning and logical work sequencing allow, EPA will work collaboratively with other entities performing flood control projects to coordinate the cleanup work in a manner that provides joint benefits.

In addition, EPA will implement the Upper Basin Selected Remedy in compliance with ARARs and will refer to information "to be considered" (TBC), including official documents that address flooding such as Executive Order 11988, Protection of Floodplains. Among other things, Executive Order 11988 requires federal agencies performing actions within a floodplain to minimize potential harm to or within the floodplain and to avoid long- and short-term adverse impacts caused by floodplain modifications. Thus, as cleanup work is carried out within the floodplains of the SFCDR and Pine Creek, efforts will be made to comply with the mandate of that Executive Order.

There is also an important role for state and local leaders to play. For example, the Idaho Department of Water Resources (IDWR) can make an important contribution through work under its Risk Mapping, Assessment, and Planning (MAP) grant administered by FEMA. Via this program, IDWR is prioritizing drainage areas within the State of Idaho for additional data gathering to support FIRM updates. IDWR's support to prioritize SFCDR data needs is a vital step toward ensuring accurate FIRM mapping. A key to understanding flood risks throughout the complex SFCDR Watershed is performance by USACE of a General Investigation/Feasibility Study (GI/FS), a currently unfunded project. The GI is an established, and a most appropriate, process to gain Basin-wide understanding of the hydrology, hydraulics, flood risks, and measures to mitigate those risks. This understanding is vital to promoting a river system whose flood mitigation structures will not adversely impact other portions of the system. Because EPA is interested in ensuring the long-term performance of all Selected Remedies within the Bunker Hill Superfund Site, EPA will continue to work with those entities whose missions and expertise address large-scale flooding.

3.4 Remedial Action Objectives

3.4.1 Biological Aquatic Benchmarks and Water Quality Criteria

Comment Summary: Comments were received recommending the use of biological benchmarks in addition to or instead of the surface water quality criteria.

EPA Response: In addition to cleanup levels as discussed in Section 12.1.4.1 of the Decision Summary in Part 2 of this ROD Amendment, EPA, in collaboration with the Natural Resource Restoration Team (the Coeur d'Alene Tribe, BLM, USFWS, USFS, and the State of Idaho) has developed ecological response metrics for evaluating remedial progress during the implementation period for the Selected Remedy (Stratus Consulting, 2012). The AWQC remain the ARARs for surface water and the basis for quantitative cleanup levels. Ecological response metrics are refined in part from the fishery tiers included in the 2002 ROD for OU 3, and reflect the current understanding of the river system. Fishery tiers were developed to provide a relationship between dissolved metals concentrations in surface water and the health of fisheries (i.e., the abundance of fish species, age of fish, fish migration, etc.) in the Upper Basin (CH2M HILL and URS Greiner, 2001b).

Identification of measurable ecological response metrics will provide EPA with a means to evaluate, predict, and report on environmental improvements associated with remedial actions planned and implemented in the Upper Basin. The ecological response metrics are intended to serve as estimated measures of change and are not considered ARARs. The intent of such ecological response metrics is limited to providing EPA and the public with the following:

- Tools to estimate potential environmental and ecological improvements that could result from specific remedial actions;
- Target receptors to evaluate environmental recovery; and
- A means for measuring environmental recovery and progress toward cleanup levels during and after the implementation of remedial actions.

For more information on the ecological response metrics, see Section 12.3.6 of the Decision Summary in Part 2 of this ROD Amendment.

3.4.2 Water Quality Criteria

Comment Summary: Comments were received expressing doubt as to whether the cleanup actions could ever achieve the site-specific water quality criteria. Some of those comments recommended that EPA pursue an ARAR waiver.

EPA Summary Response: The Selected Remedy will improve surface water quality in the Upper Basin. However, it may not achieve ARARs at all locations. If EPA determines that aquatic life is being protected by cleanup criteria that are less stringent than the applicable water quality standards, an ARAR waiver may be proposed. However, it is not appropriate to seek an ARAR waiver now, before any substantive cleanup has taken place.

EPA Response: EPA is required by CERCLA to carry out the cleanup to meet ARARs unless these are waived. An ARAR can only be waived if the waiver results in a cleanup that is

protective of human health and the environment. In the case of the Upper Basin cleanup, water quality standards have been identified as ARARs to protect aquatic life.

The ARARs for protection of the environment in the Upper Basin are the site-specific surface water quality standards for cadmium, lead, and zinc developed by the State of Idaho (Idaho Administrative Procedures Act [IDAPA] 58.01.02.285). The site-specific criteria for lead and zinc are higher than the federal and state-wide criteria for protection of aquatic life, although they have been demonstrated to provide a comparable level of protectiveness within the SFCDR Watershed. The site-specific cadmium criterion is lower than the federal and state-wide criteria.

As described in Sections 4.0 and 12.0 of the Decision Summary in Part 2 of this ROD Amendment, EPA has decided to reduce the scope of its Preferred Alternative (identified in the Proposed Plan) in the Upper Basin Selected Remedy. As a result of this reduction in scope, the Selected Remedy is not expected to fully address surface water contamination at all locations in the Upper Basin. The Selected Remedy is an interim, not a final, remedy for the Upper Basin. The Selected Remedy is expected to result in significant improvements to surface water quality in the Upper Basin and may achieve AWQC ARARs under the Clean Water Act in many locations following periods of natural recovery; however, it may not achieve these ARARs at all locations.

The Selected Remedy satisfies CERCLA's protectiveness criteria as applied to an interim remedy. The level of protectiveness provided by an interim remedy is evaluated by the scope of its actions. Accordingly, the Selected Remedy, by its nature, need not be as protective as the final remedy is required to be under the statute. The level of protection that the Selected Remedy will provide is commensurate with the scope of the remedy, and the Selected Remedy will be protective in the context of its scope, even though it does not, by itself, meet the statutory protectiveness standard that a final remedy would meet. Subsequent actions may need to be taken for the overall remedy for the Upper Basin to be considered final. Consistent with 40 CFR 300.430(a)(ii)(B) and 40 CFR 300.430(f)(1)(ii)(C)(1), this Selected Remedy, an interim action, is neither inconsistent with nor precludes implementation of a final remedy that will attain ARARs. The final remedy will be identified in subsequent decision documents.

In EPA's experience at complex sites such as the Bunker Hill Superfund Site, it is reasonable to expect that considerable time will be necessary to achieve cleanup. Significant uncertainty is associated with predicting cleanup times at such sites. For complex sites like these, EPA typically examines the magnitude and extent of contamination, selects and implements remedies, and then collects empirical data over time to assess the effectiveness of the remedies. EPA uses interim benchmarks and ongoing monitoring to assess water quality and aquatic life. If EPA determines that aquatic life is being protected by cleanup criteria that are less stringent than the water quality standards, an ARAR waiver can be pursued. Although it is possible that future data may indicate that ARAR waivers are appropriate in the Upper Basin, it is not appropriate to attempt to invoke them now before any substantive cleanup has taken place and before data are collected to show that the cleanup is protective.

Benefits to aquatic life will begin much sooner than when AWQC are finally met. As cleanup actions move forward, reducing metals concentrations, aquatic conditions will improve and benefits will accrue as concentrations drop further over time. Such benefits

will occur much sooner with more aggressive cleanup actions. Although the results of early cleanup actions will likely not achieve AWQC or fully support aquatic life, the reduced dissolved metals concentrations will bring a substantial improvement to the health of the fisheries and the overall ecosystem. The populations and species diversity of fish and aquatic organisms will continue to improve as cleanup progresses in the Upper Basin.

3.5 Remedy Selection Process

3.5.1 State Legislator Input

Comment Summary: Comments were received requesting that EPA allow sufficient time and opportunity for the Idaho State Legislature to formally review the cleanup plan.

EPA Response: EPA's decision-making process was a careful and collaborative effort consistent with the NCP and included input from state and local governments, Tribes, other federal agencies, the Basin Commission, and the public. Details of EPA's efforts to obtain public and stakeholder input are provided in Section 3.1.1. As required, EPA received public comments on its Proposed Plan. CERCLA requires an initial public comment period of 30 days for proposed plans; however, anticipating high public interest, EPA set the initial public comment period for the Upper Basin Proposed Plan at 45 days. In response to requests for an extension, EPA increased the comment period an additional 90 days, for a total of 135 days. During that time, some members of the Idaho State Legislature reviewed and submitted formal comments on the Proposed Plan. EPA has responded to those comments in Section 4.0 of this Responsiveness Summary.

3.5.2 National Academy of Sciences Recommendations

Comment Summary: Comments were received expressing concern that the cleanup plan ignored recommendations from the National Academies of Sciences (NAS) review completed in 2005.

EPA Summary Response: EPA carefully considered the NAS report and its recommendations. Furthermore, EPA collected additional data and conducted studies to address some of the key NAS recommendations. The results of those efforts are reflected in the Upper Basin Selected Remedy.

EPA Response: In 2002, Congress instructed EPA to ask the National Research Council (NRC) to conduct an independent evaluation of the Bunker Hill Superfund Site. The NRC established the Committee on Superfund Site Assessment and Remediation in the Coeur d'Alene Basin to evaluate the 2002 ROD for OU 3 (EPA, 2002) and supporting documents, and to examine EPA's scientific and technical practices at the Site. NAS issued its resulting report in 2005 (NAS, 2005).

The report's conclusions and recommendations cover the remedial investigation, human health risk assessment, and ecological risk assessment of the Coeur d'Alene Basin, and remediation objectives and approaches. Many of the recommendations relate to EPA's approach to protection of the environment presented in the 2002 ROD for OU 3 and the 2001 Feasibility Study (FS) Report (EPA, 2001c). The NAS review validated much of the 2002 ROD for OU 3, and the recommendations for areas of improvement primarily focused on ecological protection. EPA carefully considered the NAS report and its recommendations, and conducted studies and evaluations to address the major recommendations. The results

of those efforts are reflected in the actions identified in the Upper Basin Selected Remedy. EPA believes the Selected Remedy presented in the ROD Amendment addresses the NAS report's recommendations, while recognizing EPA's statutory obligations under CERCLA.

Since the ROD for OU 3 was issued in 2002 and the NAS report in 2005, EPA has continued to collect environmental data and conduct additional studies throughout the Coeur d'Alene Basin, particularly in the Upper Basin. The additional data and studies have improved EPA's understanding of the Upper Basin and enabled EPA to address key NAS recommendations involving the fate and transport of dissolved metals in the subsurface; the role that groundwater plays in contaminant loading to surface water; approaches to groundwater treatment; the development of predictive tools to assess the effectiveness of remedial actions; evaluation of the SFCDR Watershed as a whole, including the Bunker Hill Box; and improving the use of the adaptive management approach.

3.6 Remedy Effectiveness

3.6.1 Predictive Analysis

Comment Summary: Comments were received questioning the use of the Predictive Analysis (PA) to estimate remedial effectiveness and stating that it has fundamental flaws in its assumptions and methodology.

EPA Summary Response: The PA uses a straightforward accounting process to sum up the contributions of upstream sources to downstream metal loads. The analysis combines existing information about the Upper Basin with scientific understanding of environmental processes. Detailed historical monitoring data on stream flows, contamination levels, and other environmental conditions are limited for the purposes of analyzing and predicting natural conditions. As a result, professional judgment is required to interpret data and to help estimate values, which is standard practice in scientific and regulatory modeling. EPA believes that the PA is an appropriate tool for comparing the relative effectiveness of remedial alternatives for the Upper Basin.

EPA Response: The PA is a tool that can be used to estimate how effective proposed remedial actions will be in relation to projected improvements to surface water quality. The PA was first developed to support the evaluation of alternatives in the 2001 FS Report (EPA, 2001c). It was later used to support evaluations in the ROD for OU 3 (EPA, 2002) and the FFS Report for the Upper Basin (EPA, 2012). The Upper Basin covers a large geographic area, and predicting the potential effectiveness of hundreds of individual remedial actions across the entire Upper Basin presents a significant challenge. The PA provided a means of addressing this challenge. Using the basic principle of mass balance (i.e., if 10 lb. of zinc are present at a site and 9 are removed, 1 lb. remains), the PA provided estimates of remedial effectiveness on an Upper-Basin-wide scale that could be used in comparing alternatives.

The development of the PA (referred to as the Probabilistic Analysis at the time of the 2002 ROD for OU 3) was first documented in a 2001 technical memorandum, *Probabilistic Analysis of Post-Remediation Metal Loading* (URS Greiner, 2001). The PA and associated documentation were reviewed as part of the NAS review (NAS, 2005, Appendix F). That review raised questions about the methods and assumptions used to develop the PA. Following the NAS review, EPA sought an independent review of the PA by a well-known leader in the field of probabilistic modeling, Dr. Gregory B. Baecher, University of Maryland, A.J. Clark School of

Engineering (College Park, Maryland). The purpose of Dr. Baecher's review was to address questions raised by the NAS review.

Dr. Baecher's review validated EPA's use of the PA in the evaluation and comparison of remedial alternatives. This review culminated in a second memorandum, *A Predictive Analysis of Post-Remediation Metals Loading* (EPA, 2007), which provided clarification and additional documentation related to the PA. However, the fundamentals of the analysis have remained unchanged since it was first developed for the 2001 FS. The following is an excerpt from Dr. Baecher's transmittal letter for the 2007 memorandum, which summarizes his findings related to the PA:

"In my opinion, the Predictive Analysis strikes a reasonable balance between the needs of the Remedial Investigation and Feasibility Study (RI/FS) to chart a course forward, and the difficulty of acquiring sufficient data on the basin from which to analyze conditions in a statistically exhaustive way. The approach taken by the Predictive Analysis is the traditional one of using professional judgment – both engineering and scientific – to form assumptions and to make estimates of parameter values, boundary conditions, and initial conditions. In my opinion, this is sound engineering practice."

The PA was used in the FFS to provide approximations of the aggregated effects of specific upstream remedial alternatives on downstream metal loadings at two locations (Elizabeth Park and Pine Creek) for use in evaluating and comparing the alternatives considered. A comparative analysis of remedial alternatives is required under the NCP when EPA is selecting a remedy.

Modifications to the original PA used in 2002 were necessary to support the evaluation of alternatives in the FFS. These modifications were as follows:

- Add Elizabeth Park as a modeled location.
- Update "current" water quality conditions.
- Update source types, volumes, and remedial actions.
- Integrate estimates of load reduction from groundwater models (where appropriate).

The analysis uses a straightforward accounting scheme to sum up the contributions of upstream sources to downstream metal loads. The effect of varying remedial actions at the sources is taken into account by modifying the contributions of each source of metals entering the river. The combined effect of each of the remedial alternatives is forecast by aggregating the contributions over all the sources.

The PA combines existing information about the Upper Basin with scientific understanding of environmental processes, but neither the existing information nor the scientific understanding of environmental processes is perfect. Detailed historical monitoring data on stream flows, levels of contamination, and other environmental conditions are limited for the purposes of analyzing and predicting natural conditions in the Upper Basin. As a result, professional judgment is required to interpret data and to help estimate parameter values, which is standard practice in scientific and regulatory modeling.

Limitations in the empirical monitoring data (including sources, source volumes, and dissolved metals loading), coupled with the assignment of model parameters such as

relative loading potential and treatment effectiveness (based on best professional judgment), result in estimation uncertainties. The PA uses a probabilistic approach to capture such uncertainties and propagate their combined effects through to the forecast. The known uncertainties were quantified by mathematically propagating the uncertainty of the input variables, as measured by their coefficients of variation, through the PA model to the output variables. The results are engineering approximations based on a synthesis and interpretation of available information that provide a sound basis for informed decision-making for comparing alternatives and assisting in the selection of a remedy.

EPA continues to believe that the PA is a useful tool and was appropriate for use in the comparison of the relative effectiveness of the remedial alternatives for the Upper Basin. EPA will implement the Selected Remedy in the Upper Basin using an adaptive management approach, which includes prioritization of cleanup actions. As implementation of the Selected Remedy occurs, EPA will collect considerable monitoring data which, coupled with existing data, will assist in making increasingly improved predictions regarding cleanup effectiveness. Post-ROD Amendment data collected and interpreted over time to monitor the results of remediation will be used to define changes in water quality. Such data can be compared to modeled predictions to refine the predictive process. Furthermore, as part of the adaptive management approach, EPA will evaluate the use of additional ecological response metrics to measure, predict, and report environmental cleanup progress in the Upper Basin. These findings will all be used to further refine the prioritization of cleanup actions.

3.6.2 Role of Potential New Technologies

Comment Summary: Comments were received questioning whether EPA could implement potential new technologies over the course of the cleanup to enhance the effectiveness of remedial actions.

EPA Response: The Selected Remedy will allow for the use of emergent technologies. As the cleanup is put into action, EPA will use the remedial design process combined with an adaptive management approach, periodically reviewing new information as the cleanup moves forward. “New information” may include the effectiveness of implemented remedial actions, the fate and transport of contaminants, and review of new technologies that may be applicable to the Upper Basin. Through ongoing remedial design efforts, adaptive management, and the CERCLA-required Five-Year Review process, EPA anticipates using the information gained to make adjustments to the Implementation Plan and to evaluate and implement new technologies where appropriate. Where changes to the Selected Remedy are significant, EPA will provide opportunities for public participation consistent with the requirements of Section 113(k) of CERCLA and 40 CFR Section 300.435(c). Depending on the significance of the changes in cleanup approach, there may be additional opportunities for public input.

3.7 Water Treatment

3.7.1 Stream Liners and Groundwater Collection Drains Between Wallace and Elizabeth Park

Comment Summary: Comments were received questioning whether stream liners and groundwater collection drains between Wallace and Elizabeth Park would be feasible to implement.

EPA Summary Response: Stream liners and groundwater collection drains are established technologies but, after further technical review and consideration of public and stakeholder comments, EPA has decided to change the groundwater action between Wallace and Elizabeth Park. This smaller action includes a groundwater collection drain (about 4,600 feet long) that will only be located in the Osburn area.

EPA Response: Lining streams with a synthetic geomembrane to reduce surface water flow into contaminated subsurface material, then collecting contaminated groundwater using drains before it flows into a stream, is an established technical approach called “hydraulic isolation.”

In consideration of public and stakeholder comments on the Proposed Plan, EPA decided to review this part of the Preferred Alternative and decided to modify the hydraulic isolation action in this reach of the SFCDR, as documented in this ROD Amendment. The full length of the SFCDR stream liner has been eliminated. In addition, the groundwater collection drain has been shortened significantly to extend only through the Osburn area (about 4,600 feet). Interactions between surface water and groundwater and metals loading to the SFCDR are relatively well understood in this area. This is because more investigations have been conducted for the Osburn area compared to the remaining reaches of the SFCDR between Wallace and Elizabeth Park. This information has enabled actions in that area to be refined. The development of these modified actions is documented in the FFS Report (EPA, 2012).

Sediment removal actions are also included in the Selected Remedy for the Osburn vicinity and other areas along the mainstem of the SFCDR. The initial phase of remedial action in the mainstem of the SFCDR will consist of sediment removal actions followed by construction of the groundwater interception drain near Osburn to collect and convey contaminated groundwater to the CTP for active treatment.

EPA will monitor and evaluate the effectiveness of the modified approach as the remedy is carried out using the adaptive management process. Similarly, the remaining SFCDR reaches between Wallace and Elizabeth Park will be monitored to determine whether any additional action(s) may be needed to meet water quality standards or acceptable aquatic benchmarks. Any additional actions will be documented in future decision documents.

3.7.2 Value of Water Treatment as a Component of the Selected Remedy

Comment Summary: Comments were received questioning whether water treatment is needed to achieve cleanup goals and suggesting that source control actions be conducted instead of water treatment. Commenters stated that the water treatment component of the Selected Remedy is too large, too costly, and not needed.

EPA Summary Response: Water treatment will immediately improve water quality, removing a significant source of metals at relatively low cost. It also will help address the problem of contamination that cannot be removed because it is too deep or located below structures.

EPA Response: Water treatment is a key part of the Selected Remedy because it will (1) address subsurface materials too deep or impractical to be removed, (2) generally provide a high degree of metals load reduction for a relatively low cost, and (3) achieve immediate improvements to water quality.

Where feasible, source control actions will be implemented first and the effectiveness of those actions monitored and evaluated before water treatment actions are conducted in the same area. A good example of this is the groundwater interception drain in the Osburn area. Sediment removal actions will be conducted along the mainstem of the SFCDR prior to water treatment actions.

Much of the infrastructure and numerous communities within the Upper Basin have been built on top of significant amounts of mine waste, which is a major source of groundwater contamination. This underlying mine waste cannot be removed without significantly disrupting the populated communities in the Upper Basin. Many of these inaccessible sources contribute substantial dissolved metals loading to groundwater, which ultimately leads to surface water contamination. Hence, intercepting and treating this otherwise inaccessible contamination is warranted.

The NAS review recommended that groundwater “be addressed directly if loading to the groundwater is determined to stem from subsurface materials too deep or impractical to be removed” (NAS, 2005). In addition, the NAS review urged EPA to continue research into low-cost innovative groundwater treatment systems. Since the NAS review, EPA has conducted studies to evaluate groundwater-surface water interactions and characterize aquifer properties in key areas of the Upper Basin (CH2M HILL, 2007b, 2009a through 2009l); conducted pilot studies for groundwater treatment (CH2M HILL, 2006c; McCloskey, 2005); and evaluated the cost of implementing various groundwater treatment technologies (EPA, 2007). These studies found that for some areas within the Upper Basin, collection of groundwater and treatment at the CTP in Kellogg represent the lowest-cost treatment option.

Contaminated groundwater is one type of water that will be collected for treatment under the Selected Remedy. Contaminated adit discharges⁷ are another. Some of the adit discharges will be treated onsite near the point of collection from the adit, and the treated water will be discharged to the nearest surface water body. Others will be collected and conveyed to the CTP for treatment. The decision to treat a specific contaminated water onsite or at the CTP will be made based on lowest cost. In general, the more remote sites will be treated onsite and the contaminated groundwater at sites nearer to major roadways will be treated at the CTP.

⁷ An adit is a nearly horizontal entrance to a mine that is used for access or drainage. Many adits within the Upper Basin have a seasonal or continuous flow of water coming out of them. In most cases, these adit drainages contain elevated levels of metals.

3.7.3 Impacts on Stream Flows

Comment Summary: Comments were received expressing concern that water collected from the SFCDR and tributaries in the Upper Basin could reduce stream flows and adversely impact fishery conditions.

EPA Summary Response: Under average-flow conditions, the reductions are estimated to only be about 1 percent in Canyon Creek and 5 percent in the SFCDR. Further, this reduction will only occur for a small stretch of river. Problems from reduced stream flow are not expected. EPA will perform additional study and remedial design to ensure that stream flows are not reduced to a point that will have negative effects on water rights holders or aquatic life.

EPA Response: Collection of contaminated groundwater for treatment will reduce surface water flows in Canyon Creek and the SFCDR, but not significantly. EPA has modeled these reductions during low-flow and average-flow conditions. The modeling estimates that the maximum stream flow reductions in Canyon Creek and the SFCDR during extreme low-flow conditions⁸ would be about 10 percent and 16 percent, respectively. To put this in perspective, in a “typical” year, dry season flow rates, as represented by flows in the 10 percentile, have been shown to fluctuate by 21 percent on average over the period of record. Therefore, a fluctuation of 16 percent is within the range of average natural low flow fluctuation from year to year. Under average-flow conditions, the reductions are estimated to only be about 1 percent in Canyon Creek and 5 percent in the SFCDR. Further, this reduction will only occur for a small stretch of river between the collection points in Osburn and Canyon Creek and Kellogg, where the same volume of clean treated water will be returned to the SFCDR. EPA has estimated this expected stream flow reduction using Basin-wide groundwater model historical stream flow monitoring data collected by the U.S. Geological Service (see the FFS Report [EPA, 2012] for documentation of these analyses). Before conducting any water treatment project, EPA will perform additional study and remedial design to ensure that stream flows are not reduced to a point that will have negative effects on water rights holders or aquatic life. During and after remedy implementation, stream flows and collected flow rates will be monitored. Water collected for treatment will include both contaminated groundwater and adit discharges. Surface water will not be collected directly from tributaries and the SFCDR.

Problems from stream flow reduction are not expected but, if any were to occur, collection rates could be modified to minimize or eliminate any problems. In addition, adit discharges currently planned for treatment at the CTP could be treated onsite using semi-passive⁹ technologies. Following treatment at the CTP, the same volume of clean water will return to the SFCDR at Kellogg, albeit downstream from onsite treatment locations. Onsite treatment of the adit discharges involves smaller, semi-passive systems and returns the collected water back to the water body from which it came, resulting in no net reduction in stream flow. The flow rate of adit discharges to be collected is uncertain at this time. Adit discharge flow rates will be determined during design. Early activities will include the sampling of adit

⁸ In this evaluation, extreme low-flow conditions were based on the 7Q10 flow condition, which represents the lowest 7-day average flow that occurs on average only once every 10 years.

⁹ Semi-passive treatment approaches that may be applied include *ex situ* chemical or biological treatment. *In situ* treatment approaches were considered in the FFS and may be evaluated further for application at specific sites.

discharge flows under both low- and high-flow conditions to inform planning for future water treatment actions and evaluation of projected stream flow reductions, including adit discharges.

Some comments received during the public comment period speculated that water treatment will eliminate or greatly reduce water flows. These comments were flawed in that they were based on impossible flow scenarios. For example, maximum groundwater and adit discharge flows, which only take place under high-flow conditions (conditions during peak runoff periods as occur in spring runoff or rain-on-snow events), were compared to the lowest flow conditions, which happen during dry periods like late summer and early fall. This logic was flawed. Peak flows do not occur during the dry season. Therefore, any assessment of stream flow reduction must consider both stream flows and projected groundwater and adit discharge collection under the same flow regime (i.e., comparison of high-flow to high-flow and low-flow to low-flow conditions).

3.7.4 Water Rights

Comment Summary: Comments were received stating that water in creeks and streams belongs to the State of Idaho and that the removal of water for groundwater treatment actions would need to be approved by the state.

EPA Summary Response: The State of Idaho has enacted laws concerning the use of water belonging to the state as described in Title 42 of the 2011 Idaho State Statute (the “Idaho state water law”). The Idaho state water law is an ARAR for the selected remedy. EPA will comply with the Idaho state water law as an ARAR and in accordance with CERCLA.

EPA Response: The State of Idaho has enacted laws concerning the use of water belonging to the state. The “Idaho state water law”, described in Title 42 of the 2011 Idaho State Statute, is an ARAR for the selected remedy. EPA will comply with the Idaho state water law as an ARAR and in accordance with CERCLA. As part of the Selected Remedy, groundwater will be collected from the Woodland Park area of Canyon Creek and along the SFCDR near Osburn and in Kellogg (within the Bunker Hill Box). The groundwater collection in Kellogg will have no net impact on stream flows because the collected water will be treated and discharged at nearly the same location. Groundwater collected from Canyon Creek and Osburn will result in a minor reduction in stream flow in both the lower reaches of Canyon Creek and the SFCDR between Wallace and Kellogg. As discussed in Section 3.7.3, the estimated reduction from these actions under even extreme low-flow conditions is minimal. For this reason, EPA does not anticipate that the groundwater collection and treatment actions will impact existing water rights holders.

In Canyon Creek, the total volume of water that is associated with either water right licenses or statutory claims (surface water and groundwater) in the lower reach, where groundwater extraction would occur, is less than 2 cubic feet per second (cfs). During low-flow conditions, Canyon Creek flows at between 9 and 17 cfs. This means that between 80 and 90 percent of the stream flow remains unallocated (i.e., is not used to meet any water rights). In the case of Canyon Creek, “low-flow conditions” refer to the base flow that occurs in the fall dry season on the high end (17 cfs, as measured in 2006) and the 7Q10 flow on the low end (9 cfs), which represents the lowest 7-day average flow that occurs on average only once every 10 years. The estimated stream flow reduction in the lower reaches of Canyon Creek due to groundwater collection under 7Q10 conditions is 10 percent. Because of this, water

rights holders in Canyon Creek likely will not be impacted by the collection of contaminated groundwater under low-flow conditions.

Similarly, in the SFCDR, 65 percent of the river flow is unallocated to water rights holders under 7Q10 conditions and 80 percent is unallocated under base-flow conditions. This, compared with the estimated reduction in river flow under low-flow conditions of 16 percent discussed above, indicates that water rights holders would not be impacted by the collection of contaminated groundwater and adit discharges under the Selected Remedy.

3.8 Remedy Protection

3.8.1 Protection of Remediated Properties from Stormwater Runoff

Comment Summary: Comments were received suggesting that EPA focus on stormwater runoff prevention to protect properties already cleaned up, rather than focusing on source control and water treatment actions.

EPA Summary Response: The Selected Remedy includes actions to protect remediated properties from SFCDR tributary flooding and stormwater runoff. Tributary flooding and stormwater runoff are concerns because the waters can carry and deposit contaminants as well as damage barriers put in place to protect people and the environment from contamination. The Selected Remedy will help protect areas that have been cleaned up—i.e., keep clean areas clean, which is a common-sense goal. Remedy protection includes actions such as local drainage controls to ensure that clean gravel or soil barriers are not washed away or recontaminated during heavy rain or snow events or by tributary flooding.

EPA Response: The Selected Remedy includes actions to protect remediated properties from SFCDR tributary flooding and stormwater runoff. Tributary flooding and stormwater runoff are concerns because the waters can carry and deposit contaminants as well as damage barriers put in place to protect people and the environment from contamination. The Selected Remedy will help protect areas that have been cleaned up—i.e., keep clean areas clean, which is a common-sense goal. Remedy protection includes actions such as local drainage controls to ensure that clean gravel or soil barriers are not washed away or recontaminated during heavy rain or snow events or by tributary flooding.

To date, EPA has addressed these types of issues on a site-by-site and as-needed basis. In some instances, recontaminated barriers have been replaced by new clean barriers. This approach may have been acceptable in the short term, but it is not proactive in addressing significant and recurring recontamination concerns. EPA recognizes that it is better to be more systematic about these types of recontamination problems. By being proactive, EPA intends to reduce the chance that clean barriers will be recontaminated. Based on hydraulic analyses, field experience over the last 15 years, and input from local public works and elected officials, EPA and IDEQ have identified areas most likely to be recontaminated by tributary flooding or heavy rain or snowfall and the Selected Remedy addresses these concerns. Basin-wide flooding issues (including SFCDR and Pine Creek flooding), however, are not addressed in this ROD Amendment, as discussed in Section 3.3.2.

EPA worked collaboratively with IDEQ to develop and evaluate remedy protection alternatives in the FFS Report (EPA, 2012). The Selected Remedy includes specific mitigation actions (referred to as remedy protection projects) within the primary Upper Basin

communities (Pinehurst, Smeltonville, Kellogg, Wardner, Osburn, Silverton, Wallace, and Mullan) to protect existing Selected Remedies focusing on human health that may be at risk from recontamination. The remedy protection projects include drainage controls such as replacing culverts, improving channel capacity, controlling erosion, and other actions to reduce the risks posed to the existing remedies. In addition to the eight primary communities, the Selected Remedy anticipates additional remedy protection work in the Upper Basin side gulches (defined as drainage areas with residential properties outside the primary communities). Remedy protection projects in the side gulches will be similar to work selected for the primary communities, and will be described in future decision documents as appropriate.

The remedy protection actions are included in the list of priority actions identified in the Selected Remedy.

3.9 Cost and Funding

3.9.1 Cost of Cleanup

Comment Summary: Comments were received stating that the total cleanup cost of \$1.3 billion, as estimated for EPA's Preferred Alternative, is excessive.

EPA Summary Response: EPA agrees that \$1.3 billion is a considerable amount of money, but this estimate represented all the actions that EPA felt were scientifically necessary to meet the human health and environmental protection goals outlined in the Proposed Plan. However, upon consideration of public comments and concerns, EPA decided to significantly reduce the scope of the Selected Remedy so that the total cost is decreased by about half. EPA's implementation planning process will also ensure that money is spent wisely to protect human health and the environment. However, as a result of the reduced scope, the Selected Remedy is now considered an interim rather than a final remedy.

EPA Response: EPA agrees that this is a considerable amount of money and has significantly reduced the scope of the Selected Remedy so that the total cost is decreased from \$1.3 billion to about \$635 million. EPA's implementation planning process will also ensure that money is spent wisely to protect human health and the environment. Under the Superfund law, EPA has a responsibility and the authority to take actions to ensure that the contamination in the Coeur d'Alene Basin is cleaned up to protect human health and the environment, and to communicate this cleanup to the public. The Preferred Alternative, as identified in the Proposed Plan, provided an overall vision of the required cleanup in the Upper Basin. Following consideration of public and stakeholder comments, and after further evaluation, EPA reduced the scope of the Selected Remedy documented in this ROD Amendment. As a result, the Selected Remedy is an interim remedy that identifies the highest-priority remedial actions that are expected to provide the greatest reduction of contamination in the SFCDR and its tributaries and protection of in-place human health barriers in local communities. The Selected Remedy is expected to make substantial progress toward meeting the overall remedial action objectives (RAOs) for the Upper Basin. EPA will ensure that settlement and other monies are spent wisely and will maximize the cleanup completed using these funds. This will be accomplished by rigorous implementation planning and pacing cleanup over time, allowing interest to accrue on the settlement monies.

EPA has listened and responded to comments received on the Proposed Plan to reduce the scope of the Selected Remedy. The total estimated 30-year NPV cost of the Selected Remedy, as presented in the ROD Amendment, is \$635 million. This includes capital costs as well as long-term O&M costs. Furthermore, EPA has developed and documented an implementation approach to identify where the work starts, how it will proceed, how sites may be removed from the Selected Remedy should additional data indicate acceptable exposure risks, and how the community can be involved. The bottom line is that remedial actions will be planned and implemented to ensure that those providing the highest value in terms of effectiveness per dollar spent are conducted first, with consideration of a variety of other factors in consultation with the Basin Commission's Upper Basin PFT and other community members. EPA understands that \$635 million is still a large sum of money, but cleaning up contamination from a hundred years of past mining practices in this large and complex area will require considerable time and resources. The actions included in the Selected Remedy will provide a significant step forward in cleanup of the Upper Basin, and EPA is committed to getting the job done as efficiently and effectively as possible.

3.9.2 State of Idaho Responsibilities

Comment Summary: Comments were received questioning how much funding the State of Idaho would be responsible for providing for the cleanup.

EPA Response: The State of Idaho is not required to provide funds for remedial actions funded by monies EPA recovered from settlements. Settlement funds can be used to reduce both federal and state costs associated with cleanup. EPA has received approximately \$691 million from its settlements with ASARCO Inc. and the Hecla Mining Company, and is committed to careful use of these funds to protect human health and the environment over the long-term. However, the federal government may not pay directly for cleanup unless the state funds 10 percent of the construction costs and 100 percent of the O&M costs.

3.9.3 Taxpayer Responsibilities

Comment Summary: Comments were received expressing concern over the amount of money that taxpayers will be paying for the cleanup.

EPA Summary Response: EPA will pay for much of the proposed cleanup with funds from legal settlements between mining companies and the federal government. The cleanup will proceed as quickly as possible, recognizing the need to balance the speed of cleanup against the desire to increase the funds through interest accumulation. Taxpayer dollars, if any, used to fund the cleanup will augment settlement funds.

EPA Response: EPA will pay for much of the proposed cleanup with funds from legal settlements between mining companies and the federal government. The cleanup will proceed as quickly as possible, recognizing the need to balance the speed of cleanup against the desire to increase the funds through interest accumulation. Taxpayer dollars, if any, used to fund the cleanup will augment settlement funds. At this time, the largest amount of available settlement funds—more than \$573 million—is from the ASARCO bankruptcy proceedings completed in 2009. Of this total, \$494 million is apportioned for EPA response activities and the remainder will be used for mitigation of natural resource damage. Most of the ASARCO settlement funds can be used only for environmental cleanup in OU 3 (mining-related contamination in the Coeur d'Alene Basin outside the Bunker Hill Box).

Approximately \$8 million are to be used for work in OU 2, the non-populated areas in the 21-square-mile Bunker Hill Box. An independent Work Trust has been established to manage the ASARCO settlement funds and conduct the EPA-approved cleanup. The money held by the Work Trust is invested, allowing this fund to continue to grow. Spending and investment under this Work Trust will be carefully managed by EPA to ensure the continued growth of the Work Trust while balancing the need to conduct cleanup in an efficient and a timely manner.

In 2011, a significant settlement was also reached with Hecla Mining Company. Under this settlement, Hecla will pay \$263.4 million plus interest to the United States, the Coeur d'Alene Tribe, and the State of Idaho to resolve claims stemming from releases of wastes from its mining operations. Most (75 percent) of the recovery funds will be used for response actions at the Bunker Hill Superfund Site. The remaining amount will fund natural resource restoration projects.

3.9.4 Cost Estimating Assumptions

Comment Summary: Comments were received questioning the methods used to estimate the cost of cleanup and stating that EPA ignored inflation over time and the rising costs of construction.

EPA Response: The cost estimate was developed according to CERCLA guidance for the Feasibility Study (FS) process (EPA, 2000b). EPA guidance states that the accuracy of the cost estimates presented in an FS should be -30 percent to +50 percent, and that a discount rate of 7 percent should be used to estimate total project costs in today's dollars (EPA, 2000b). According to the guidance, this 7 percent discount rate accounts for inflation and the rising costs of construction over time. In this case, 2009 dollars are the basis for the NPV cost estimate, consistent with cost estimates presented in the FFS Report (EPA, 2012). The cost estimate includes the costs of both the remedial actions and O&M. Cost estimates for work to be performed will be further refined during the remedial design process.

3.10 Duration of Cleanup

3.10.1 Estimated Timeframe for Cleanup

Comment Summary: Comments were received stating that the cleanup duration of 50 to 90 years is too long.

EPA Summary Response: In response to public comments, EPA has reduced the scope of the Selected Remedy. Instead of a cleanup duration of 50 to 90 years, as envisioned in the Preferred Alternative in the Proposed Plan, the Selected Remedy is expected to take about 30 years to complete. The reduced scope of the ROD Amendment does result in the Selected Remedy being an interim remedy, meaning that it is not expected to meet all cleanup levels and all ARARs upon completion.

EPA Response: Due in part to extensive public concern about the duration of cleanup, EPA decided to significantly reduce the scope of the Selected Remedy by prioritizing the remedial actions that were identified in EPA's Preferred Alternative in the Proposed Plan. The Upper Basin Selected Remedy is an interim remedy which identifies the priority remedial actions that are expected to provide the greatest reduction of contamination in the SFCDR and its tributaries and protection of in-place human health barriers in local

communities. EPA's goal is to address human health and environmental risks in the Upper Basin as quickly as possible and with minimum disruption. Implementation of the Selected Remedy is expected to take about 30 years, depending on spending rates.

How long it takes to implement the Selected Remedy will ultimately depend upon the annual funding rate, the ability to work in multiple areas simultaneously, the overall pace of cleanup, and how well the environmental system responds to cleanup actions. As the cleanup progresses, EPA will routinely look for opportunities to speed up the cleanup activities, while identifying locations where no further action is required. Using the adaptive management process, EPA will also evaluate the effectiveness of the cleanup actions as well as the need for additional actions. In addition, a key component of Five-Year Reviews, which EPA is required to complete under the NCP, is to look for ways to expedite cleanup.

3.10.2 Potential Effect of Superfund Designation

Comment Summary: Comments were received expressing concern that because the Upper Basin would continue to be a Superfund site for 50 to 90 years, the "Superfund stigma" would be damaging to the growth of the Silver Valley.

EPA Response: The Bunker Hill Superfund Site was listed on the National Priorities List (NPL) in 1983. Shortly after the listing, EPA began investigations and cleanup in the Bunker Hill Box (OUs 1 and 2), the area most impacted by mining-related contamination. An RI/FS for OU 3 (mining-related contamination in the Coeur d'Alene Basin outside the Box, including the Upper Basin) began in 1998. Since that time, development has continued in the Silver Valley, spurred on at least in part by millions of dollars of EPA response money spent on cleanup projects. Cleanup has provided opportunities for property to be transferred to the State of Idaho for development projects such as the Trail of the Coeur d'Alenes, Silver Mountain Resort, and Galena Ridge Golf Course, which have greatly benefited the Basin. In light of these examples, there is good reason to believe that cleanup of the Silver Valley will continue to enhance, not damage, economic growth.

3.10.3 Comprehensive versus Incremental ROD Amendments

Comment Summary: Comments were received suggesting that EPA should implement smaller, separate ROD Amendments in 10-year increments.

EPA Response: This Upper Basin ROD Amendment selects an interim remedy that includes priority cleanup actions. This Selected Remedy is expected to require about 30 years to implement, which is significantly shorter in duration than the expected implementation of the Preferred Alternative as identified in the Proposed Plan. EPA anticipates that through the adaptive management process and the development of additional decision documents as necessary, significant progress towards achieving environmental goals will be made over time. The processes used will be sufficiently flexible to allow modifications of cleanup approaches, as necessary. If these modifications require significant or fundamental changes to the Selected Remedy, EPA will prepare appropriate new decision document(s) and involve the public in that process.

3.10.4 Hecla's 10-Year Plan

Comment Summary: Comments were received expressing support for the 10-Year Plan that was developed by Hecla Mining Company (Hecla's 10-Year Plan) (Hecla, 2010). Some of these comments went further and recommended that EPA implement this plan.

EPA Summary Response: EPA does not believe that Hecla's 10-Year Plan is comprehensive enough to protect human health and the environment throughout the Upper Basin.

EPA Response: EPA does not believe that Hecla's 10-Year Plan is comprehensive enough to protect human health and the environment throughout the Upper Basin. Most of the sites identified in Hecla's 10-Year Plan are also priority sites that are selected in this ROD Amendment. However, the actions included in Hecla's 10-Year Plan only address a fraction of the contamination that needs to be and is addressed under EPA's Selected Remedy. Hecla's 10-Year Plan also relies heavily on less protective remedial actions, such as "toe pull-back" (moving the base of waste piles away from creeks and the SFCDR), regrading, soil capping, and revegetation. Furthermore, elements of Hecla's 10-Year Plan may not be technically feasible. For example, the plan calls for contaminated adit and seep discharges to be collected and treated at lagoon-type systems which, as proposed, have serious technical flaws and are likely not possible to implement.

In contrast to Hecla's 10-Year Plan, EPA's Selected Remedy identifies effective and proven actions. For example, the remedy includes methods such as excavation of highly contaminated floodplain sediments and tailings, and groundwater collection and treatment, to address contamination that is inaccessible for removal (such as materials located beneath roads and communities). EPA believes these actions will be more effective in reducing metals loading to the SFCDR and its tributaries, and will more comprehensively protect human health and the environment.

3.11 Implementation

3.11.1 Adaptive Management

Comment Summary: Comments were received expressing concern that the use of adaptive management during implementation of the cleanup will allow EPA to change the Selected Remedy without meaningful public participation and/or support. Other comments expressed concern that the term "adaptive management" is too vague.

EPA Summary Response: EPA will use adaptive management to monitor the performance of cleanup actions and will make adjustments to future actions to benefit from the information gained. Adaptive management does not mean that EPA can change the Selected Remedy without meaningful public participation. In fact, if EPA decides in the future that significant or fundamental changes to the remedy are needed, EPA is legally required to document changes to the Selected Remedy in an Explanation of Significant Differences, another ROD Amendment, or another appropriate decision document.

EPA Response: Adaptive management does not mean that EPA can change the Selected Remedy without meaningful public participation. In fact, if EPA determines in the future that significant or fundamental changes to the remedy are necessary, EPA is legally obligated by CERCLA to address these changes through an Explanation of Significant Differences, another ROD Amendment, or another appropriate decision document. Within

the context of the Selected Remedy, adaptive management simply means that EPA will implement specific cleanup actions included in the remedy, monitor the effectiveness of those actions to determine whether cleanup levels are being achieved, and make adjustments to future cleanup actions to benefit from the information gained through the effectiveness monitoring. These adjustments may range from changes in design, changes in priority of certain actions, or potentially more significant or fundamental changes. If these adjustments require significant or fundamental changes to the Selected Remedy, EPA must prepare an appropriate new decision document. In such circumstances, consistent with the requirements of Section 113(k) of CERCLA and 40 CFR Section 300.435(c), EPA will provide opportunities for public participation. Depending on the significance of the changes in cleanup approach, there may be additional opportunities for public input.

Adaptive management is a critical component of the Selected Remedy because it is not possible for physical and chemical conditions to be fully defined and known for this large and complex area. Uncertainty is unavoidable, and the Selected Remedy must be managed and put into action taking this uncertainty into account. An adaptive management framework provides a methodology to carry out the Selected Remedy in a structured, iterative way. Adaptive management considers uncertainty, monitors and evaluates the effectiveness of the remedial actions and cleanup technologies, and then incorporates the “lessons learned” such that uncertainty is reduced for future actions as work progresses towards achievement of the overall cleanup goals. The adaptive management process will provide valuable information to adjust design approaches or prioritize cleanup actions so the greatest amount of effective cleanup is achieved for the lowest cost. EPA previously identified the need to adaptively manage cleanup activities in the Coeur d’Alene Basin in the ROD for OU 3 (EPA, 2002) and through the phased approach used to implement the remedy for non-populated areas of the Bunker Hill Box (OU 2) following bankruptcy of the potentially responsible party. In addition, the NAS agreed with EPA’s decision documented in the 2002 ROD to perform the cleanup through the “establishment of a rigorous adaptive management process” for the planning, implementation, and management of environmental cleanup activities at the Bunker Hill Superfund Site (NAS, 2005). EPA is committed to using an adaptive management framework to manage and carry out the Selected Remedy for the Upper Basin, in accordance with its previous decision documents and the recommendations of the NAS.

The replanting of the OU 2 hillsides that surround the historical Lead Smelter and Zinc Plant is a highly visible and successful example of adaptive management at the Site. Several earlier attempts to revegetate the hillsides failed because the high degree of associated uncertainty was neither understood nor addressed. Uncertainty existed with respect to the causes of prior failures, the levels of contamination, and the planting conditions and species that would have the greatest chance of survival and natural regeneration. To develop a successful planting program, EPA conducted studies of several small-scale test plots on the hillsides. These studies evaluated specific areas of uncertainty such as hillside slopes; contaminant levels; varying fertilizers and seed-tackifiers; and different grass, shrub, and tree species. The test plots were monitored over two growth seasons, and the lessons learned enabled EPA to develop a variety of “recipes” for revegetating the hillsides. The hillside replanting was ultimately a great success, as rocky, bare slopes were transformed into a healthy, green, sustainable ecosystem.

3.11.2 Process to Determine Site-Specific Designs Versus Typical Conceptual Designs Presented in the FFS Report and the Proposed Plan

Comment Summary: Comments were received questioning the conceptual design approach using typical conceptual designs (TCDs). Commenters were concerned that this approach leaves significant decisions to be made after the ROD Amendment is issued.

EPA Summary Response: The use of an iterative process to address uncertainty is common in EPA response actions. In fact, at the ROD stage of any cleanup, only conceptual designs used to evaluate alternatives and compare costs are prepared. Following selection of a remedy, a detailed, rigorous engineering design process is followed to come up with the final designs that implement the remedy. If, through this standard design process and the application of adaptive management techniques, EPA determines that a significant change is necessary, a separate decision process, such as another ROD Amendment or an Explanation of Significant Differences, will be initiated. In any event, the public will have the opportunity to review implementation plans, site-specific remedial design documents, and any future decision documents.

EPA Response: As discussed in Section 3.10.3, sufficient information exists to support the Selected Remedy. However, insufficient information exists to characterize all the specific sources of metals contamination that affect the SFCDR, streams, and floodplains in some areas of the Upper Basin. Before cleanup takes place, many pre-design activities will be conducted at specific sites. Depending on the site, pre-design may include some or all of the following activities:

- Compilation and evaluation of existing site data
- Site investigations, including determination of the nature and extent of contamination and waste characterization
- Surveying and mapping of the site
- Evaluation of waste consolidation and material reuse opportunities
- Assessment of stormwater, surface water, and groundwater flows
- Assessment of site ownership
- Identification of easement and access requirements
- Assessment of historic features and cultural resources, as appropriate
- Review of the ESA for potential site restrictions
- Determination of site access needs (e.g., road improvements)

Following pre-design work, enough information will be available to begin early, site-specific remedial design. The use of this iterative process to address uncertainty is common in EPA response actions. In most cases, EPA anticipates that changes from the TCDs specified in the ROD Amendment to the site-specific remedial designs will be small and largely related to quantities (e.g., the volume of soil requiring excavation) rather than to remedial technologies. However, it is possible that some significant decisions will need to be made after the ROD Amendment is issued. EPA will determine whether these warrant separate

decision processes, such as another ROD Amendment or an Explanation of Significant Differences. In any event, the public will have the opportunity to review implementation plans, site-specific remedial design documents, and any future decision documents.

For example, pre-design investigation work was conducted in the Ninemile Creek drainage in the summer of 2011. The investigation identified areas within the Ninemile Creek drainage that could serve as local waste consolidation areas, thereby reducing the volume of contaminated material that would need to be trucked to a regional repository. Survey data collected during the investigation also provided updated, more accurate estimates of contaminated waste volumes at specific sites. These additional pre-design data allow EPA to optimize the cost effectiveness of actions taken in the Ninemile Creek drainage. This pre-design strategy will be used throughout the Upper Basin.

As discussed in Section 3.11.1, adaptive management is critical to the remedial strategy for the Upper Basin. This was also recognized by the NAS during its review, and was a recurring theme of its conclusions and recommendations (NAS, 2005, Overview of Conclusions and Recommendations, Summary Page 3). The TCD approach taken with the Selected Remedy complements the adaptive management approach—as EPA learns more about remedial effectiveness and the site-specific extent of contamination, detailed remedial designs will be prepared.

3.11.3 Selection of and Approach to Stream and Riparian Cleanup Actions, and Coordination with Other Entities

Comment Summary: Comments were received requesting clarification on how locations and TCDs were assigned to the stream and riparian cleanup actions included in the cleanup plan, how the actions will be modified during design for site-specific conditions, and how EPA will coordinate with local, state, and other federal entities.

EPA Summary Response: The Selected Remedy includes conceptual designs for stream and riparian actions to be completed wherever sediment removal actions are done (i.e., the banks of a stream or river). EPA will complete site-specific conceptual and final designs for stream and riparian actions, which will include consideration of flood management issues and coordination, prior to completing the sediment removal actions. EPA will involve the community and stakeholders in site-specific design through the established Basin Commission processes.

EPA Response: The Selected Remedy includes waste removal actions in and adjacent to contaminated areas of the SFCDR and some of its tributaries. Once the removal portion of a cleanup action has been completed, some contamination may remain adjacent to the stream and riparian area (i.e., the banks of the stream or river), depending on the site and the extent of the contaminated wastes. Following the removal of contamination, the banks will be stabilized to reduce erosion and prevent further contaminated sediment loading to the stream or river, in those cases where not all contamination could feasibly be removed.

The FFS Report (EPA, 2012) identifies general locations within specific reaches of the SFCDR and its tributaries where stream and riparian cleanup actions, as described above, will occur; however, these locations are general areas that are not directly correlated to specific contaminated source sites. The FFS Report also includes 44 TCDs that describe how stream banks can be stabilized depending on site-specific conditions. The general remedial action

locations and the associated stream and riparian cleanup action TCDs and quantities were initially developed during preparation of the 2001 FS Report (EPA, 2001c); were carried forward with an expanded group of TCDs in the FFS Report (EPA, 2012); and were based on estimates of the extent of historical mining-related impairment to river and stream systems as determined from aerial photographs, maps, and experience gained during site visits. Therefore, the conceptual locations and TCDs are currently based on broad assumptions and best professional judgment instead of site-specific information, supporting hydrologic and geotechnical analyses, and other design-related considerations that will be evaluated in the subsequent design phase of a remedial action (see Section 3.11.2). Progressing from the FFS-level conceptual action to a site-specific design is likely to result in modifications to both the specific action locations and the TCD approaches. One benefit of the TCD approach is that, as the design progresses, a TCD can be modified, removed, and/or replaced with another TCD as a result of new data, stakeholder input, or other emergent considerations that would result in EPA taking such action.

Section 3.3.2 describes EPA's jurisdictional authority and commitment to work with local, state, and other federal entities on issues related to SFCDR and Pine Creek flooding. As stated in Section 3.3.2, EPA will coordinate with local communities and flood control authorities, the Basin Commission, USACE, and FEMA during the site characterization and design phases of remedial actions to ensure that cleanup actions do not exacerbate flooding concerns along the SFCDR and Pine Creek. As further stated, where planning and logistical work sequencing allow, EPA will work collaboratively with other entities performing flood control projects to coordinate the implementation of cleanup projects in a manner that provides joint benefits.

The Upper Basin ROD Amendment clarifies the circumstances under which EPA can and will conduct stream and riparian stabilization actions. Per CERCLA, EPA can only address contamination-related issues. In the case of stream and riparian stabilization actions, CERCLA actions can address situations where contamination is actively eroding into a river system by removing the contamination to the extent feasible and then stabilizing the bank to an acceptable design-flood criterion. Mitigating flooding issues in the absence of contamination is not within EPA's CERCLA authority. However, as stated above, EPA is committed to coordinating and collaborating with other entities that have jurisdictional authority to address flooding issues. As an example, if a river reach is not a current source of contamination to the river system and modifications to the reach are planned by others for flood control purposes, if contamination is encountered or generated as part of the flood improvement project, then EPA will assist in locating an appropriate disposal location for the contaminated portion of the wastes generated by the project.

3.11.4 Modifications to Stream and Riparian Cleanup Actions from Those Presented in the Draft Final FFS Report and the Proposed Plan

Comment Summary: Comments were received questioning specific locations along the SFCDR where stream and riparian cleanup actions were identified, and the specific TCDs assigned for some actions.

EPA Summary Response: Following consideration of public and stakeholder comments received on the Proposed Plan, and as part of its effort to reduce the scope of the Preferred Alternative, EPA further evaluated stream and riparian reaches of the SFCDR and

tributaries. As a result of these evaluations, EPA made changes to its plans for stream and riparian cleanup actions.

EPA Response: Following consideration of public and stakeholder comments received on the Proposed Plan, and as part of its effort to reduce the scope of the Preferred Alternative, EPA further evaluated reaches of the SFCDR designated for stream and riparian cleanup actions. The goal of the evaluation was to identify stream and riparian actions that were co-located with remedial actions, particularly sediment removal actions, included in the Selected Remedy. These sediment removal actions are primarily designated for riparian areas (along rivers and creeks). Stream and riparian actions will be conducted following remedial actions to stabilize rivers and creeks in the remediated locations. Therefore, the Selected Remedy refers to these actions as stream and riparian “stabilization” actions in the Selected Remedy. Changes to the stream and riparian actions as identified in the Proposed Plan are summarized below:

- **No stream and riparian actions in the Upper SFCDR Watershed (the SFCDR upstream of Wallace).** EPA determined that stream and riparian stabilization actions are not needed in the Upper SFCDR at this time because the Selected Remedy includes only one sediment removal site (WAL038, located between Wallace and Mullan) and relatively few sediment removal actions in this watershed. In addition, most of the Upper SFCDR currently has abundant rock, riprap, and riparian vegetation, indicating that minimal erosion is likely occurring in this stretch of the river compared with other reaches of the SFCDR. Therefore, no stream and riparian stabilization actions are included for this watershed in the Selected Remedy.
- **Removal of stream and riparian actions in the Ninemile Creek Watershed.** The Selected Remedy does not include any remedial actions in the East Fork of Ninemile Creek; therefore, no stream and riparian stabilization actions will be needed for this reach. Stream and riparian stabilization actions will be conducted at the remaining reaches in the Ninemile Creek Watershed.
- **Stream reaches removed from Big Creek and Moon Creek.** Based on the reduced scope of the remedial actions included in the Selected Remedy, stream segments previously identified for stream and riparian actions along Big Creek and Moon Creek were not included in the Selected Remedy.
- **No stream and riparian actions in SFCDR reaches through Wallace.** The Selected Remedy does not include stream and riparian stabilization actions through Wallace. It is not expected that any sediment removal actions will be conducted through this area due to existing infrastructure (a county bridge, culverts, Interstate 90 support columns, and a concrete channel). Therefore, stream and riparian stabilization actions will not be conducted.
- **No stream and riparian actions in the Pine Creek Watershed.** The Selected Remedy does not include any stream and riparian stabilization actions for Pine Creek. With EPA’s reduction in scope of the remedial actions included in the Selected Remedy, relatively few sediment removal actions are identified in the Pine Creek Watershed.
- **No stream and riparian actions west of Pinehurst in the Mainstem SFCDR Watershed (the SFCDR downstream of Wallace).** The Preferred Alternative proposed stream and

riparian cleanup actions in three reaches to the west of Pinehurst. The Selected Remedy does not include any remedial actions in this area; therefore, stream and riparian stabilization actions west of Pinehurst are not included in the Selected Remedy. Stream and riparian stabilization actions will be conducted at the remaining reaches in the Mainstem SFCDR Watershed east of Kellogg.

Section 14.3 of the Decision Summary in Part 2 of this ROD Amendment provides additional details, including figure references, for the stream and riparian stabilization actions. The FFS Report (EPA, 2012) also documents the detailed changes and associated rationale for reducing the scope of stream and riparian actions included in the Selected Remedy.

3.11.5 Prioritizing Cleanup Actions

Comment Summary: Comments were received suggesting that EPA define or list the high-priority, near-term remedial actions included in the cleanup plan.

EPA Response: The Proposed Plan described how remedial actions included in the cleanup plan would be prioritized and carried out. This ROD Amendment clarifies and provides more details of the implementation approach for the Selected Remedy (see Section 12.3 of the Decision Summary in Part 2 of this ROD Amendment). With help from stakeholders and community members involved in the Basin Commission's Upper Basin PFT, EPA has developed a logical and transparent prioritization process over the past two years.

EPA has used the prioritization process to reduce the scope of the Selected Remedy as compared to the Preferred Alternative in the Proposed Plan. A site-by-site review was conducted to identify the highest-priority sites for remedial action and, thus, those that are included in the Selected Remedy. The Upper Basin PFT provided input to assist EPA in prioritizing actions to include in the Selected Remedy. This site-by-site review is described in detail in the FFS Report (EPA, 2012). Key considerations for this review included: (1) prior remedial actions and effectiveness of those actions; (2) active land uses; (3) potential human health risks; (4) downstream water quality; (5) site-specific data such as location, contaminant concentrations,¹⁰ riparian acreage, and erosion potential; and (6) access road requirements.

3.11.6 Public Input During Implementation

Comment Summary: Comments were received expressing concern that EPA's general plan for implementing cleanup actions will not allow frequent and meaningful opportunities for public input.

EPA Summary Response: The public will have many meaningful opportunities to provide continuing input on the cleanup. We encourage your participation.

EPA Response: As described in Section 3.1.1, EPA has provided considerable opportunities for public input over time. A long-term Selected Remedy does not mean an end to public involvement; the public will have continuing opportunities to provide input on how the cleanup is being implemented. EPA has committed to implement remedial actions in the

¹⁰ The review of site-specific contaminant concentrations included data collected following the publication of the Proposed Plan in the summer of 2011 at selected source sites in the Upper Basin. The results of this focused sampling effort are documented in the FFS Report (EPA, 2012).

Upper Basin through the Basin Commission process. Each year since the establishment of the Basin Commission and issuance of the ROD for OU 3 in 2002, EPA has provided a summary of CERCLA-related activities for the one- and five-year work plans prepared by the Commission that summarize planned Basin-related activities. The one-year work plans establish and maintain the sequencing of activities that will be needed to complete the goals and objectives of the five-year plan. The Basin Commission work plans focus on general areas of work and do not go into project-specific detail. Per Basin Commission protocol, the work plans are reviewed by the Commission's Technical Leadership Group (TLG) and the Citizens' Coordinating Council (CCC), the Executive Director, and any other citizens who may wish to review and comment.

With the issuance of this Upper Basin ROD Amendment, EPA's input into the Basin Commission's one- and five-year work plans will be expanded to include the actions in the Selected Remedy for the Upper Basin.

In addition to the more general Basin Commission Work Plans, EPA will prepare an Implementation Plan in collaboration with the Upper Basin PFT and other stakeholders. This plan will present the results of the prioritization process and will also summarize planned CERCLA activities on a project- and site-specific basis. EPA will work with the Basin Commission to develop the Implementation Plan for specific remedial actions associated with the Selected Remedy, and the public will have opportunities to provide input. In addition, EPA will continue to conduct Five-Year Reviews, as required by CERCLA, and the public will be invited to comment on drafts of Five-Year Review Reports.

3.12 Repositories and Waste Consolidation Areas

3.12.1 Waste Management Strategy, and Facility Siting and Design

Comment Summary: Comments were received expressing concern that the cleanup plan calls for additional repositories and that there are potential hazards associated with new repositories. Some of these comments also stated that new repositories would take away land that would otherwise have potential for development.

EPA Summary Response: More repositories will be required to safely secure contaminated materials removed during the cleanup. Repositories are carefully engineered to contain wastes onsite, preventing contaminants from being released. The use of centralized repositories reduces the footprint required for waste disposal, allowing for development in areas where wastes have been removed.

EPA Response: The Selected Remedy does call for significant excavation and consolidation of contaminated materials in either engineered repositories or "waste consolidation areas." For the purposes of the Selected Remedy, repositories are considered to be large, centrally located areas within the Upper Basin where contaminated soil excavated during cleanup actions is transported to, managed, and secured. EPA's preference will be to locate repositories in areas that are already contaminated, such as on top of historical mine tailings piles. The Big Creek Repository, Page Repository, Osburn Tailings Impoundment, and Hecla-Star Tailings Impoundment are examples of former tailings impoundments that either have been or could be turned into cleanup repositories. Repositories help protect people and the environment by dramatically decreasing the chance that people and wildlife will be exposed to metals-contaminated soil, sediments, and debris. Without repositories,

cleanup cannot proceed and the public will continue to be exposed to high metals levels. The use of centralized repositories also reduces the footprint required for waste disposal, allowing for development in areas where wastes have been removed. Repositories constructed under the Selected Remedy will be engineered to securely contain waste materials, which will prevent contaminants from being released to surface water, groundwater, or air at concentrations above state and/or federal standards.

Waste consolidation areas will differ from the centrally located repositories. Waste consolidation areas will be established within tributary watersheds (e.g., the Ninemile and Canyon Creek Watersheds) where significant volumes of waste are already present from historical mine and mill site operations, and sufficient space is available for performing consolidation. Rather than haul these wastes out of the watershed to a regional repository, EPA's first step will be to look for locations to safely consolidate and cap wastes at the particular mine and mill site being cleaned up or in another area of the watershed where the consolidated wastes can be better protected from surface water runoff and erosion. This approach will significantly reduce the number of haul trucks driving through communities such as Woodland Park, Wallace, and Mullan. The approach has already been used successfully in the Upper Basin and, as a result, the volume of soil hauled to repositories has been minimized. Good examples of the successful use of waste consolidation areas include the Moon Creek Watershed and the Golconda Mine near Wallace. Pre-design investigation work has also led to the identification of locations for waste consolidation areas in the Ninemile Creek drainage. Based on this new information, selected TCDs for sites in the Ninemile drainage have been modified to optimize the use of these local waste consolidation areas and minimize the need for regional repository space.

EPA, IDEQ, and the Basin Commission are working together to identify locations for new repositories in the Upper Basin. There are many opportunities for community involvement in repository siting. To learn more, please contact Don Carpenter, IDEQ, at 208-373-0550 or Ed Moreen, EPA, at 208-664-4588, or visit:

http://basincommission.com/TLG_PFT_Repository.asp.

4.0 Responses to Individual Comments

This section presents EPA's responses to individual comments received on the Proposed Plan. EPA received comments in various forms including letters, emails, and oral testimony at community meetings. The comments and EPA's responses are organized into the following attachments (the attachments are provided in electronic format):

- **Attachment A:** Index of Commenters and Responses
- **Attachment B:** Master Comment List
- **Attachment C:** Responses to Federal Agency Comments
- **Attachment D:** Responses to State Agency Comments
- **Attachment E:** Responses to Native American Tribe Comments
- **Attachment F:** Responses to Local Jurisdiction Comments

- **Attachment G:** Responses to Local Community/Special Interest Organization Comments
- **Attachment H:** Responses to Business Comments
- **Attachment I:** Responses to Individual Comments

Attachment A presents an Index of all comments sorted using two methods. First, all commenters are listed alphabetically by the last name of the person or the organization providing the comments. This list provides the locations (by attachment and page number) of the comments and EPA's responses. Second, all comments are listed alphabetically/numerically by the comment number, along with the locations of the comments and EPA's responses.

Many comments address similar issues. In these cases, the response for a given issue is provided once. Responses to later comments on the same issue refer to the master comment list where this response is provided. These responses are referred to as "master comment responses" and are found in Attachment B. When using Attachment B, the commenter may find that the referenced response addresses more issues than he or she raised. In these cases, it is expected that the commenter will be able to identify those parts of the referenced response that apply. In other cases, a comment may raise multiple issues. In such cases, the commenter may be referred to several master comment responses for a complete response to all issues raised. An overview of the issues raised and EPA's responses is provided in Part 3, Section 3.0, Responsiveness Summary.

In Attachments C through I, the comments and responses are sorted alphabetically by the last name of the commenter. Each comment letter, email, and oral testimony comment was assigned a unique identification number (e.g., 1365213). Each comment was assigned a unique comment number (e.g., LJ36-1). Many commenters submitted more than one comment letter. In these cases, a separate identification number and comment number were assigned for each set of comments. This approach helped EPA ensure that all comments were addressed.

In Attachments C through I, an image of the original comment is shown on the left side of the page and includes EPA's delineation. The right side of the page presents EPA's response to that comment.

A number of commenters' names were illegible, and these commenters are listed as "Unknown." EPA has included their comments in Attachment I and has responded to the comments where possible.

As provided in the CERCLA statute, Section 117(b), EPA is only responsible for providing responses to each of the "significant" comments, criticisms, and new data. Comments not meeting this statutory criterion have nonetheless been recorded in this section, and responses have been provided to the extent possible.