PART 3

RESPONSIVENESS SUMMARY

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1.0 OVERVIEW AND BACKGROUND ON COMMUNITY INVOLVEMENT

On October 29, 2001, EPA released the Coeur d'Alene Basin Proposed Plan for public review. The plan described EPA's Preferred Alternative for cleaning up mine waste contamination in the Basin. The plan described a suite of activities aimed at protecting human health and the environment. The activities in the plan are estimated to take 30 years and cost $359 million. The comment period was extended twice in response to public requests, for a total of 120 days, and officially closed on February 26, 2002. EPA also held four public meetings in the Basin during the comment period to allow people to make oral comments for the record. The meetings were held in Wallace, Idaho on November 13, 2001, Cataldo, Idaho on November 14, 2001, Coeur d'Alene, Idaho on November 15, 2001, and Spokane, Washington on November 19, 2001.

EPA's preparation of the Responsiveness Summary conforms to the intent of EPA guidance, including: OSWER Directive No. 9230.0-06, *Superfund Responsiveness Summaries* and *Community Relations in Superfund: A Handbook*, and the *Superfund Community Involvement Handbook*. The Responsiveness Summary provides information about the views of the public, government agencies, the support agencies, and potentially responsible parties (PRPs) regarding the proposed remedial action and other alternatives. Further, it documents how comments have been considered during the decision-making process and provides answers to all significant comments. Section 1 presents an overview and background on community involvement. Section 2 provides an overview of the general community concerns and themes expressed during the comment period and EPA's responses. Section 3 presents an overview responsiveness summary that addresses the commenters' major issues and concerns, by subject, including those raised by the local communities. Section 4 presents comprehensive responses to each of the individual comments that EPA received on the Proposed Plan.

In total, EPA received more than 3,300 comments on the Proposed Plan from approximately 1,300 commenters. EPA sent copies of all comments received to the states of Idaho and Washington, the Coeur d'Alene and Spokane tribes, and the federal natural resource trustees. EPA reviewed all the comments, in consultation with the regulatory stakeholders, to determine what, if any, changes were appropriate to the Preferred Alternative identified in the Proposed Plan. Based on this evaluation of the comments, both minor changes and significant differences from the Preferred Alternative are reflected in the Selected Remedy of the ROD.

This Responsiveness Summary is a continuation of EPA's extensive efforts to involve stakeholders and community members in the remedy selection process. EPA's community involvement efforts during the remedial investigation/feasibility study (RI/FS) far exceed those required by the National Contingency Plan (NCP). One of the ways EPA worked to ensure early community input was to provide four public review periods at various stages of the Proposed Plan in addition to the required comment period on the Proposed Plan. People in the Basin reviewed and commented on the remedial investigation, the human health risk assessment, the ecological risk assessment, and the feasibility study for the Basin as summarized below.

Document	Public Review	Date of Final Report
Draft Ecological Risk draft Assessment	August 2000 to November 2000	May 2001
Draft Human Health Risk Assessment	July 2000 to October 2000	July 2001
Draft Remedial Investigation	October 2000 to March 2001	October 2001
Draft Feasibility Study	December 2000 to April 2001	October 2001

EPA also prepared written responses to comments on each of these documents. These responses are included in the Administrative Record for the site. Additional information on public involvement in the remedy selection process is presented in Section 3 of Part 2 of this ROD.

Because EPA worked intensively to involve community members and all levels of government affected by the cleanup throughout the RI/FS process and during the development of the Proposed Plan, input from these groups was incorporated into the Preferred Alternative prior to the Proposed Plan being released for public comment. Therefore, the Selected Remedy in this ROD is not substantially different from the Preferred Alternative. Since the release of the Proposed Plan, EPA has been working with the governments and communities to address remaining concerns, but these have been largely related to clarifying the scope and cost of the Selected Remedy, not specific cleanup actions or alternatives.

References used in this Responsiveness Summary are listed in Part 2, Section 15.0 of this ROD. Acronyms and abbreviations are also listed in Part 2 of this ROD.

2.0 GENERAL COMMUNITY CONCERNS AND THEMES

As with the four earlier review periods, a broad range of opinions was represented in the public comments on the Proposed Plan. Many of the more than 3,300 comments on the Proposed Plan were a result of organized efforts by citizen groups, and came in the form of postcards, form letters, a paid newspaper multiple choice survey and e-mail campaigns. A breakdown of the 1,317 individual submissions received follows:

Letter	Email	Newspaper Survey	Postcard	Public Testimony	Total
368	89	221	568	71	1,317

Many of these comments addressed general, overarching concerns about the cleanup and about EPA, though some of the form letters did address specific cleanup alternatives. Most of these general comments were similar to comments EPA received during the four earlier review periods.

Some of the general comments expressed a lack of trust and support for EPA and other government agencies. Other comments generally expressed the belief that cleanup is not needed in the Basin and stated a desire for EPA to stop work and leave the Basin. Other comments generally supported EPA's plan and expressed a desire for an even more aggressive cleanup approach.

EPA worked with community residents, including local elected officials and community leaders, over the last several years to understand and address these overarching concerns during the study and cleanup planning process. However, the things some people are most concerned about, such as the boundaries of the Superfund site and EPA's statutory obligation to protect human health and the environment are outside the scope of EPA Region 10's authority. These issues are matters of statute or regulation and include some that have been the subject of court decisions. Because EPA could not address these issues in the RI/FS or Proposed Plan, some people feel that EPA has not listened to them, and they are not satisfied that the cleanup plan addresses their concerns.

Below is a brief summary of some of these general community concerns and how EPA has tried to address these concerns if possible.

General comment: Concern that the human health risks (particularly in the residential areas of the Upper Basin) have been overestimated and that residential cleanups are not necessary.

Some people expressed concern about the way the State of Idaho and EPA assessed the human health risks in the Basin and believe that the risks have been overestimated. Many of these people believe that because they have not seen children who appear to have lead poisoning, they believe no health emergency exists and therefore cleanup in residential areas is not necessary. However, other people have stated they feel that EPA's cleanup plan doesn't go far enough to protect children and that more should be done.

Response: EPA and the State of Idaho have been working with the communities in the Upper Basin on human health issues for several years. These communities will be the most affected by the cleanups in residential areas. It is understandable that people living in these communities may question the need for cleanup of residential soils containing lead since the effects of lead exposure in children are usually not obvious. People are understandably concerned that their communities may be unfairly stigmatized as unsafe or unhealthy and that people from outside the area will not want to visit or relocate to these communities.

This has been a difficult issue to address. EPA and the State of Idaho have stated that a primary goal for cleanup in the Basin is preventing children from being exposed to lead. This is a fundamentally different approach from treating children and conducting cleanups after children exhibit elevated blood-lead levels or other obvious symptoms of lead exposure. EPA and the State of Idaho followed existing national protocols for conducting risk assessments and establishing soil cleanup standards that are protective of children living in the area now, and those that may live there in the future. The risk assessment clearly indicates that the mining-related waste continues to be a health hazard, especially for young children and pregnant women.

Early on in the RI/FS process, in response to public requests, EPA transferred the lead for conducting the human health risk assessment for the Basin to the State of Idaho. The State followed national guidelines and policies for conducting lead risk assessments and establishing soil cleanup levels. The risk assessment was extensively peer reviewed by national experts. EPA and the State believe the science used in the risk assessment is sound. In April 2001, in response to requests from the communities and in an attempt to address questions and concerns, EPA participated in a "Science Summit" sponsored by the Shoshone Natural Resources Coalition's Science Committee. To support the Science Summit, EPA arranged for local, regional, and national lead remediation experts to attend and present information and respond to questions. The Science Summit helped the agencies understand the communities' questions and concerns.

Recently, the Idaho congressional delegation requested a National Academy of Sciences (NAS) review of the scientific and technical analyses that form the basis of the ROD's Selected Remedy. The NAS agreed to conduct the review if it receives an estimated $840,000 appropriation to do so. If the NAS conducts a review, EPA will evaluate the results of the review and determine if changes to the ROD are needed.

General comment: Concern about government actions on private property and disruption to the communities during cleanup.

Some people expressed concern about government actions on private property and cleanup work.

Response: EPA cannot access or take action on private property without permission from the owner or explicit legal authority to do so. For example, the ROD calls for sampling and cleanup of residential properties in the Upper Basin. Before any work occurs, EPA or the appropriate state or local agency will talk with each property owner and request written permission to sample and/or conduct cleanup work on their property.

In response to concerns about large-scale removal of contaminated material, the ROD calls for more limited removals of "hot spots" of contamination and focuses on treatment technologies that will be less invasive and disruptive to communities. In addition, EPA and other agencies will work closely with individual property owners and local governments to minimize disruption of normal day-to-day activities during cleanup. Whenever possible, work will be scheduled so that it does not interfere with community activities or with an owner's plans for the property. In addition, at residential properties, EPA and the State of Idaho will attempt to protect existing landscaping or will replace trees, shrubs, and plants that may be damaged during cleanup work.

General comment: Concerns about the local economy.

Some people expressed serious concerns about the economic conditions in the Basin and potential negative effects of a Superfund cleanup.

Response: EPA shares the concern for the economy in the Basin. In the long-run, however, EPA and the State of Idaho anticipate that cleanup will improve socioeconomic conditions in the Basin. Basin-wide sampling, analysis, and remediation of soil in residential proprieties will provide property owners the information necessary for lead disclosures required for property transactions. Other aspects of the remedy, such as establishing vegetative cover, remediating schoolyards, rights-of-way and commercial property, and providing drainage improvements to protect the remedy, will be coordinated with paint abatement programs and community redevelopment projects and will have the potential to make the communities more attractive locations for business. The work associated with implementation of the Selected Remedy may provide additional jobs for the local labor force and contractors, including local supply contractors. Additionally, remediation dollars spent in the Silver Valley may create other opportunities for local businesses.

Of $95 million federal contract dollars spent on cleanup in the Bunker Hill Box between 1995 and 2000, $42 million were spent locally. This includes local labor, materials, rentals, taxes and utilities. In addition, EPA has provided $200,000 in grant monies for economic redevelopment in the Silver Valley, and will continue to provide this kind of support when possible. Cleanup work will be coordinated with local land use planning and community infrastructure needs. In addition, the Basin Environmental Improvement Project Commission will work to ensure that as many local people and businesses as possible are involved in the cleanup work within the bounds of federal contracting and procurement rules.

General comment: Concerns about the boundaries of the Superfund site.

Some people expressed concern and confusion about the extent of the boundaries of the Superfund site in the Basin. Some people believe that EPA has illegally expanded the boundaries of the Superfund site. People are also concerned about the possible stigma associated with being part of a Superfund site.

Response: Such issues have been major community concerns in the Basin throughout development of the RI/FS and Proposed Plan. These have been very difficult for EPA to address to some people's satisfaction. The definition of a Superfund site provided by the CERCLA statute includes areas where hazardous substances are found or have come to be located. In conducting its work in the Basin, EPA has complied with this definition.

However, some people in the Basin communities believed that the cleanup work in the Basin would be limited to the area near Kellogg and Smelterville, referred to as the Bunker Hill "Box" (the Box). Given this, it is understandable that people would be concerned when the investigation and cleanup work began in areas outside the Box. Unfortunately, the mine waste contamination in the Basin extends far beyond the boundaries of the Box, both upstream and downstream. The contamination outside the Box continues to pose significant risks to both people and the environment. While the mine waste contamination does exist in areas outside the Bunker Hill Box, the contamination is not present, as some people apparently believe, over the entire 1,500 square-mile watershed. The areas where contamination exists are primarily near historical mining operations; in some of the residential and commercial areas of the Upper Basin; in and near the affected parts of the Coeur d'Alene River system; and other downstream areas where contamination exists. Consequently, areas such as those above the floodplain where contamination does not exist are not included in the site. For example, the residential areas of the cities of Coeur d'Alene, Post Falls, and Harrison are not considered part of the site.

While EPA cannot change the definition of a Superfund site, EPA is trying to address "stigma" concerns in two ways. One way is to better define the areas where cleanup work is needed and where it is not needed. The ROD describes the cleanup actions in each part of the Basin and provides a map showing these areas. In addition, EPA is committed to removing the Superfund designation from clean areas as quickly as possible. Communities will not have to wait until all of the cleanup work in the Basin is complete in order to be removed from the site. Specifically, the goal is to complete cleanup work in the Upper Basin communities first, so that these areas can be removed from the Superfund site as quickly as possible.

The Selected Remedy does not include remedial actions for Coeur d'Alene Lake. State, tribal, federal, and local governments are currently in the process of implementing a Lake Management Plan outside of the Superfund process using separate regulatory authorities.

General comment: State and Local governments should have control of cleanup work.

Some people expressed the desire for the State of Idaho and the new Coeur d'Alene Basin Environmental Improvement Project Commission (the Basin Commission) to have the lead role in implementing the cleanup plan for the Basin. Other commenters felt that because the contamination and cleanup work cross the Washington state line and affect tribal land, the federal government should have the lead role in making sure an effective cleanup is carried out across these jurisdictions.

Response: EPA recognizes that in order to have a successful and sustainable cleanup in the Basin, all the governments affected will need to be directly involved in implementing the cleanup actions outlined in the ROD. Starting early on in the RI/FS process, EPA worked closely with state, tribal and local governments, as well as the other federal agencies with authorities in the Basin. EPA has provided significant funding to many of these governments to allow them to fully participate in the process.

EPA will continue to work in a collaborative way with all levels of government during the next phases of cleanup. State legislation under the Basin Environmental Improvement Act established the process for the formation of the Basin Commission. The Basin Commission includes federal, state, tribal, and local governmental involvement. EPA will participate as a member of the Basin Commission for implementation of the ROD and development of priorities and sequencing of cleanup activities. Although the Commission will have an important role in implementing the cleanup in Idaho, EPA will continue to have overall responsibility to ensure that cleanup meets the requirements of the ROD and of CERCLA. EPA also has a legal obligation to work with the State of Washington to implement the cleanup actions outlined for the Spokane River.

General comment: Concern about contamination migrating downstream and re-contaminating clean areas.

People expressed concern about the continued movement of contamination from the Upper Basin to the Lower Basin and from Idaho into the State of Washington. People were also concerned about the potential for cleanup activities to cause contaminants to move downstream and re-contaminate clean areas.

Response: Much of the work described in the ROD is intended to significantly reduce the amount of contamination moving downstream. When implementing the cleanup, EPA will work with the Commission to evaluate which cleanup work should be done first and how to reduce the possibility of re-contaminating clean areas. The ROD calls for removing up to 12 percent of the total of contaminated riverbed sediments in the Basin. EPA and any other party doing work in the river or lakes must comply with existing environmental laws and minimize downstream movement of contaminants.

General comment: Concern that EPA should select a more aggressive cleanup alternative.

Some people commented that EPA should select a more aggressive cleanup approach which would provide additional protection of human health and the environment.

Response: The Selected Remedy includes prioritized actions to provide significant improvements both for human health and the environment in the Basin. The Selected Remedy will be evaluated for its protectiveness at least every five years as required by CERCLA. If the remedy is not found to be adequately protective, measures will be evaluated and implemented to ensure the remedy is protective, consistent with the ROD.

General comment: Concern about the cost of cleanup and the estimated length of time needed to clean up the Basin.

People were concerned about how long cleanup will take and EPA's proposed "incremental approach." These people were concerned that the incremental approach provides no certainty about when the cleanup will be finished and when the Superfund designation can be removed from the Basin. People were also concerned that the estimated cost for complete cleanup in the Basin, as estimated in the Proposed Plan, was over $1 billion.

Response: It is true that given the amount and extent of mine waste contamination remaining in the Basin, cleanup will be costly and will take many years. The work described in the ROD is estimated to cost $359 million and take approximately 30 years to complete. Cleanup work to protect human health in the communities and residential areas is a top priority for completion. Cleanup of these areas will be conducted concurrently with the ecological remedy. EPA's expectation is that the human health remedy will be completed well before the approximately 30-year timeframe for completing the ecological remedy. EPA is not proposing a cleanup plan that costs in excess of $1 billion. However, EPA has indicated that it is likely that additional work beyond that described in the ROD will be needed.

EPA estimated, based on existing information, that environmental cleanup work under Alternative 3 in the Proposed Plan would cost $1.3 billion. However, no decision has been made regarding specific future work, and any additional work beyond that described in this ROD will have to undergo a public process including another Proposed Plan and a public review and comment period.

2.1 HOW COMMUNITIES AND STAKEHOLDERS HAVE SHAPED THE CLEANUP PLAN

EPA involved all of the various levels of government and the affected communities in the Basin throughout the process. Because of this inclusive and collaborative approach, EPA was able to incorporate the suggestions made in public comments in "real time" as the studies were happening, while documents were being written and as the Preferred Alternative and Selected Remedy were being developed. Below is a list of some of the ways EPA was able to respond to community concerns during the RI/FS, Proposed Plan, and ROD development process.

2.1.1 Pre-Proposed Plan Responses to Community Input

- Expedited sampling of Coeur d'Alene Lake beaches was conducted in 1998 (on request from the mayor of Coeur d'Alene). Result: beaches were declared safe)
- The method for drawing children's blood was changed from venous to finger stick
- Voluntary sampling and cleanups have been conducted since 1998 in the Upper Basin (104 residences and common areas cleaned up, 37 residences provided with clean source of water, and more than 300 residences sampled)
- The list of plants and animals evaluated in the ecological risk assessment was changed based on local landowners input, thus changing the scope of the assessment and making it more site-specific
- EPA provided direct funding to Coeur d'Alene, Post Falls, Harrison, and Kootenai County, as well as Shoshone County so that those localities could hire technical consultants to review EPA's work and provide input prior to the release of the Proposed Plan
- EPA provided direct funding for economic development in the Silver Valley
- EPA gave the State of Idaho the lead role in conducting the human health risk assessment for the Basin
- EPA tailored the screening risk assessment for the Spokane River beaches to the community's specified uses

2.1.2 Some Ways That the Proposed Plan and ROD are Responsive to Community Concerns

- The Proposed Plan actions are closely in line with the recommendations from the State of Idaho's Consensus Building Process

- The cleanup plan will minimize disruption to communities during cleanup by limiting the amount of "digging and hauling" of material in a given year and emphasize treating contamination in place where possible

- EPA is supporting the State of Idaho's YES program for yard cleanups

- EPA has been working with local agricultural landowners on creative wetland cleanup options which will benefit the landowner and assist with the cleanup (Lower Basin)

- No relocation of residents is currently planned for Burke Canyon based on input from local residents

- The cleanup plan includes more flexibility in reaching cleanup standards in residential areas, i.e., "community greening," by using barriers such as vegetation on contaminated yards between 700 and 1,000 parts per million (ppm) lead instead of excavating and replacing soil between 700 and 1,000 ppm lead. This will result in less disruption and fewer yards having soil removed and replaced

- The cleanup plan will include improvements to protect the remedy (e.g., drainage improvements) and cleanup work will be coordinated with local land use planning efforts

- Cleanup in communities will be a top priority so that clean areas can be removed from the Superfund list as quickly as possible

- EPA will participate as a member of the Basin Environmental Improvement Project Commission to implement the ROD

- The Selected Remedy does not include remedial actions in Coeur d'Alene Lake. State, tribal, federal, and local governments are currently in the process of implementing a Lake Management Plan outside of the Superfund process using separate legal authorities

- No wetlands in the Lower Basin will be used as disposal sites

- No disposal of material or dredging in Coeur d'Alene Lake is included in the plan.

- The cleanup plan will be tailored to minimize long-term operations and maintenance costs which will result in less cost to the states

- Local waste repositories have been and will continue to be sited and designed with local community input
- Spokane River cleanup areas are based on input from State of Washington, Spokane Tribe, community, and other interested parties

2.2 COMMUNITY INVOLVEMENT ACTIVITIES CARRIED OUT BY EPA IN RESPONSE TO REQUESTS

Below is a list of community involvement activities carried out by EPA in response to requests:

- Monthly NewsBriefs
- Executive Summaries of documents
- Weekly technical conference calls open to the public
- Four educational workshops on Human Health and Ecological Risk Assessments, Remedial Investigation and Feasibility Study
- Public review periods and comment responses provided on the HHRA, Ecological Risk Assessment, and RI/FS (all review periods were extended upon request)
- Extended Proposed Plan comment period to 120 days on request
- Supported the “Science Summit” by bringing national and regional experts on lead risks and cleanups to the Silver Valley
- Provided support for a “health fair” in the Silver Valley
- Staff support for CAC RI/FS Task Force for two and a half years
- Top regional and national EPA managers have visited the Basin at least 16 times on request

3.0 OVERVIEW RESPONSIVENESS SUMMARY

3.1 COMMUNITY RELATIONS AND COMMUNITY CONCERNS

3.1.1 Community Participation in Remedy Selection Process

Comment Summary:

Some comments questioned whether EPA has done enough to ensure community participation in the technical investigation and remedy selection processes and whether community input was used as opposed to merely being noted.

EPA response:

Community acceptance is one of nine criteria that EPA considers, by regulation, in its remedy selection process. Community acceptance played an early and significant role in selecting the remedy. As described in detail in Section 3.0 of Part 2 of the ROD, EPA has provided a wide range of opportunities for community participation in the investigation and remedy selection processes within the Coeur d'Alene Basin including four additional public review periods. EPA is required by CERCLA to provide opportunities for community participation, and the extensive efforts in the Coeur d'Alene Basin go far beyond the required activities and rival any that have ever been taken in the United States by EPA.

As noted previously, some of the community comments and concerns are outside of EPA's authority. EPA has worked with the communities in the Basin to respond to these concerns, but some people still do not feel EPA has listened or adequately addressed all of their concerns.

Part of the community participation effort in the Basin was the State of Idaho's Basin Consensus Building Process. This effort was initiated in September 2000 and continued until March 2001, with the State of Idaho in the lead role and EPA in a support role. A wide variety of stakeholder entities, both governmental and community, participated. The purpose of the process was to identify "common ground" or points of divergence for EPA to use in developing a cleanup plan. Considerable discussion focused on four prominent issues for cleanup:

- Tailings along the South Fork and its tributaries in the floodplain and on uplands that are major sources of zinc in the water
- Banks and beds of the Coeur d'Alene River that are a major source of lead in the water

- Floodplains along the river from Cataldo to Harrison that are a source of lead exposure to wildlife

- Sources of lead, including soil, indoor dust, and house paint, in communities that may be an exposure source to children

Because this process occurred while EPA was developing remedial alternatives as part of the Feasibility Study, EPA had the benefit of considering and incorporating the outcome of the consensus building process into the development of the Proposed Plan.

3.1.2 Relationship Between Selected Remedy and Basin Environmental Improvement Project Commission

Comment Summary:

Some comments supported the formation of the Basin Environmental Improvement Project Commission or some form of local control over cleanup and recommended EPA turn over control of cleanup to that group.

EPA response:

EPA anticipates working as a member of the new Basin Environmental Improvement Project Commission and looks forward to finding innovative means to cleanup the Basin and create job opportunities, while meeting statutory requirements for cleanup.

3.1.3 Control of Cleanup Work

Comment Summary:

Some comments questioned who would be in control of cleanup, ranging from support for EPA control to turning over control to others, and questioned what EPA's role would be in the cleanup.

EPA response:

EPA recognizes that in order to have a successful and sustainable cleanup in the Basin, all the governments affected will need to be directly involved in implementing the cleanup actions outlined in the ROD. EPA is fully committed to working cooperatively with the States of Idaho and Washington, the Coeur d'Alene and Spokane Tribes, the Federal Natural Resource Trustee Agencies, and the local governments in the Basin to implement the cleanup. In addition, EPA is supportive of the appropriate state, tribal and local entities taking the lead in implementing parts of the ROD in a manner consistent with the statutory obligations EPA has under Superfund.

3.1.4 Role of Ombudsman

Comment Summary:

Several comments expressed the opinion that the Office of the National Superfund Ombudsman should be allowed to complete its work and continue to conduct its duties during the Basin cleanup action.

EPA response:

EPA has cooperated and will continue to cooperate with the Office of the National Superfund Ombudsman in its investigation. In September and October 2001, Region 10 provided written responses to Ombudsman interrogatories related to the Bunker Hill/Coeur d'Alene Basin investigation, and has made sure that the Office of the Ombudsman was aware of the schedule for the Proposed Plan and the ROD. To date, EPA has received no recommendations or reports from the Ombudsman. On December 18, 2001, the Ombudsman office sent a 2-page document entitled "Working Findings for Discussion and Comment" to the "Service List for National Ombudsman Investigation" and the local press. The December 18 memo was not sent to EPA Region 10, nor was a response requested by the Ombudsman. However, EPA has reviewed the memo and has determined that it contains no specific recommendations regarding this Selected Remedy. EPA responded to the working findings in a July 16, 2002 letter to U.S. Senator Mike Crapo. If EPA receives final recommendations from the Office of the Ombudsman, it will evaluate them and take appropriate actions. If EPA determines that substantial changes to the ROD are appropriate based on the Ombudsman recommendations, such changes would be subject to additional public review and comment.

3.1.5 Job Opportunities

Comment Summary:

Many comments questioned what economic impact the Selected Remedy will have on local areas of the Basin and stressed the need for a healthy economy and local hiring in the cleanup.

EPA response:

EPA shares the concern for the economy in the Basin. Of the $95 million in federal contract dollars spent on cleanup in the Bunker Hill Box between 1995 and 2000, $42 million were spent locally. This includes local labor, training materials, rentals, taxes and utilities. To date, EPA has provided $200,000 in grant monies for economic redevelopment in the Silver Valley. EPA will continue to provide this kind of support when possible and will make sure that cleanup work is coordinated with local land-use planning and community infrastructure needs. EPA is required to comply with Federal Acquisitions Requirements, including providing for full and open competition. EPA encourages local businesses to be involved with the cleanup work and believes the cleanup work of the Selected Remedy will provide a significant number of jobs to local residents while benefiting the local economy. EPA is committed to assisting with economic development to the extent possible, and supports local hiring whenever and wherever possible.

3.1.6 Need for Certainty and Closure

Comment Summary:

Many comments stated that "certainty" and/or "closure" related to the cleanup is needed for the economic well-being of the Basin. People were concerned about effects on business development, the ability to complete property transactions, and property values. The comments called for clear identification of the duration of cleanup, of which areas require cleanup and which do not, and of cleanup costs.

EPA response:

The Selected Remedy does include certainty regarding human health protection within community areas and those recreational areas prioritized for cleanup. Cleanup of these areas is a top priority and will be completed well before the 30-years described for the ecological portion of the Selected Remedy. Property owners in the Basin will be able to request soil sampling necessary for lead disclosures required for property transactions, and the results will be made available to them in a timely manner. The length of time required for cleanup in the communities will depend on the availability of funding and the participation of property owners. Although future funding is not a certainty to date, the Bunker Hill/Coeur d'Alene Basin work has been a priority for funding.

As described extensively in the Proposed Plan and the ROD, complete certainty with respect to the environmental cleanup is not possible at this time. Sufficient information exists to support the Selected Remedy. However, insufficient information exists to characterize all the specific sources of metals contamination impacting the streams and floodplains, as well as the anticipated effectiveness of certain remedial actions, in some areas of the Basin. The Selected Remedy includes prioritized cleanup actions that are expected to take approximately 30 years to implement. During the five-year review process and at the end of this approximately 30-year period, EPA will evaluate and decide whether any additional CERCLA remedial actions are necessary to attain ARARs or to provide for the protection of human health and the environment, and whether any ARAR waivers should be applied.

Although complete certainty is not possible at this point for the environmental protection portion of the Selected Remedy, actions taken will be in defined locations and will be designed to achieve specific benchmarks. Areas included in the cleanup are specifically identified in maps included in the ROD. These areas are in and near historical mining operations, the affected parts of the Coeur d'Alene River system, and other downstream areas where contamination has come to be located. Consequently, areas such as those above the floodplain where contamination does not exist, and where most economic development opportunities exist, are not included in the environmental cleanup.

The estimated present worth cost of the Selected Remedy is $359 million. Consistent with EPA RI/FS guidance, the accuracy of this cost estimate is -30 to +50 percent.

3.2 SITE DEFINITION AND FUNDING

3.2.1 Description of the Superfund Site

Comment Summary:

Some comments questioned what the Superfund site is, whether EPA has illegally expanded it, and whether the definition of the site means EPA will be taking actions in all parts of the Basin.

EPA response:

The term "site" is derived from the CERCLA definition of a "facility." Section 101 (9) of CERCLA states that "[T]he term 'facility' means…any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located." The site was listed on the National Priorities List (NPL) in 1983 and has a CERCLIS identification number IDD048340921. The listing of the site reflected widespread contamination caused by mining and mining-related activity. Consistent with EPA policy, the listing did not set forth any site boundaries. In June 2000, the United States 9th Circuit Court of Appeals vacated a site decision by the U.S. District Court limiting the scope of the NPL facility to the 21-square miles known as the Bunker Hill Box. This decision left standing the EPA position that the NPL facility includes all areas of the Coeur d'Alene Basin where mining contamination has come to be located. Hence, consideration of cleanup actions outside the Box does not constitute expansion of the site. Areas where mining contamination has come to be located, some of which are addressed in this ROD, are primarily near historic mining operations; in some of the residential and commercial areas of the Upper Basin; parts of the Coeur d'Alene River system; and other downstream areas where contamination has come to be located. Consequently, areas such as those above the floodplain which are unaffected by contamination from mining are not included as part of the site.

3.2.2 Funding for Cleanup in the Coeur d'Alene Basin

Comment Summary:

Some comments questioned what source(s) of funding will be available for the cleanup.

EPA response:

The CERCLA statute and the NCP regulations provide EPA with the authority to take actions to protect human health and the environment. EPA's ability to carry out this mandate is subject to the availability of funds. EPA will consider all funding sources available, including the Superfund and judgments against responsible parties to carry out necessary cleanup actions. Currently, EPA's Superfund budget is appropriated annually from Congress.

3.3 REMEDY SELECTION PROCESS

3.3.1 Description of an "Interim Measure"

Comment Summary:

Some comments questioned what an "interim action" (referred to in the ROD as an "interim measure") is in the context of CERCLA.

EPA response:

EPA implements CERCLA cleanups (response actions) through removal and remedial actions. The regulation that governs the implementation of CERCLA is the National Contingency Plan (NCP). The Selected Remedy in this ROD for the Coeur d'Alene Basin is a "remedial" action. The "threshold criteria" set forth in the NCP at Sec.300.430(f)(1)(i)(A) for selection of remedies are "overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived)." A remedial action, such as the one selected in this ROD, which does not meet ARARs, but will become part of a total remedial action that will attain ARARs, is defined as an "interim measure" by the NCP (Sec. 300.430(f)(1)(ii)(C)(1)). Because EPA cleanups are termed "response actions" by the NCP, EPA often uses the term "interim action," such as it did in the Proposed Plan and as the NCP does, to refer to an interim measure such as the Selected Remedy.

3.3.2 Length of Time, Size, and Complexity of an Interim Measure

Comment Summary:

Some comments questioned whether it was appropriate for EPA to use an interim measure approach to cleanup, considering the lengthy estimated time for cleanup, the size of the site, and its complexity.

EPA response:

CERCLA does not place restrictions on the use of interim measures based on the time necessary to remediate a site or its size or complexity. Instead, the NCP provides discretion to EPA to determine where interim measures are appropriate. As described in the ROD, an adaptive management strategy or incremental approach using interim measures makes sense for cleanup of the Coeur d'Alene Basin. Although overall cleanup times are estimated to be lengthy, the Selected Remedy will produce ongoing incremental human health and environmental improvements over the estimated 30 years. Cleanup work to protect human health in the communities and residential areas is a top priority. Cleanup of these areas will be conducted concurrently with the ecological remedy. EPA's expectation is that the human health remedy will be completed well before the approximately 30-year timeframe of the ecological remedy. Conversely, reduction of dissolved metals until Ambient Water Quality Criteria (AWQC) are met, will occur over long periods of time. The geographic extent of areas requiring cleanup and the complexity of the sources of contamination support the use of an adaptive management approach to cleanup. By using information from CERCLA-required five-year reviews and other processes, the effectiveness of any future increments of cleanup can be optimized.

3.3.3 Relationship Between Remedy Selection Requirements and EPA Guidance Documents

Comment Summary:

Some comments questioned whether EPA strictly adhered to its guidance document in developing the Proposed Plan and selecting a remedy.

EPA response:

EPA's selection of remedies is governed by the requirements of CERCLA and the NCP regulations that implement CERCLA. EPA complied with these requirements in selecting a remedy in this ROD. EPA's guidance document for preparing remedy selection decision documents is "A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents" which was published in July 1999. The "Notice" on the first page of this document states: "This document provides guidance to EPA and State staff…" The document does not, however, substitute for statutes EPA administers nor their implementing regulations, nor is it a regulation itself. Thus it does not impose legally-binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the specific circumstances." EPA used the guidance, as appropriate, to assist it in preparing the Proposed Plan and the ROD.

3.3.4 The Selected Remedy in Relationship to Ecological Alternative 3

Comment Summary:

Some comments questioned whether EPA is selecting Ecological Alternative 3 as the remedy in this ROD.

EPA response:

The Selected Remedy in this ROD is not Ecological Alternative 3. EPA is using an adaptive management strategy to implement cleanup. The Selected Remedy includes the complete remedy needed to protect people from exposure to contamination that currently occurs in the community and residential areas and identified recreational areas of the Upper Basin and Lower Basin, as well as at Spokane River recreational sites upstream of Upriver Dam. For environmental protection, the Selected Remedy includes approximately 30 years of prioritized actions from Ecological Alternative 3 in areas of the Basin upstream of Coeur d'Alene Lake. It also includes cleanup of Spokane River sites between the Washington/Idaho border and Upriver Dam.

3.3.5 The Selected Remedy in Relationship to a Natural Resource Damages Restoration Plan

Comment Summary:

Some comments questioned the relationship of the Selected Remedy to actions taken by the natural resource trustees and whether development of the Selected Remedy was motivated by a desire to assist the natural resource trustees in their natural resource damage litigation.

EPA response:

EPA initiated the RI/FS for Operable Unit 3 because of the threats to human health and the environment created by releases of hazardous substances, not to assist other agencies in litigation. EPA's selection of remedies is governed by the requirements of CERCLA and the NCP. EPA complied with these requirements in selecting a remedy in this ROD. The Selected Remedy is not a restoration plan in support of a natural resource damages lawsuit. While the CERCLA remedial process has certain similarities to the NRDA process in that both address the environmental effects of mining pollution, the two processes are distinct and do not necessarily have the same environmental objectives.

However, EPA does have, and has met, regulatory obligations regarding coordination with natural resource trustees. For example, NCP Section 300.430(b)(7) states that the lead agency shall: . . . "[I]f natural resources are or may be injured by the release, ensure that state and federal trustees of the affected natural resources have been notified in order that the trustees may initiate appropriate actions, including those identified in Subpart G of this Part. The lead agency shall seek to coordinate necessary assessments, evaluations, investigations, and planning with such state and federal trustees." EPA, the lead agency here, has satisfied this coordination responsibility during the conduct of the RI/FS and the selection of the remedy. As discussed previously, EPA worked with a wide spectrum of entities including local governments, federal agencies, state agencies, and Indian tribes in developing the Selected Remedy.

3.4 BACKGROUND METALS CONCENTRATIONS

3.4.1 Background Metal Concentrations Absent Mining Effects

Comment Summary:

Various comments questioned EPA's estimates of background concentrations for metals (i.e., metal concentrations absent mining effects) and asserted that metals concentrations in the Basin are naturally elevated because of geologic conditions in the Basin.

EPA response:

EPA conducted extensive analyses and evaluations of background conditions as part of the RI/FS. These analyses and evaluations conclusively demonstrated that the dominant source of metals is from mining-related activities, not natural sources.

A comprehensive analysis of background concentrations, representing more than 10,000 samples, can be found in the RI/FS Technical Memorandum (Revision 3): "Estimation of Background Concentrations in Soils, Sediments, and Surface Water in the Coeur d'Alene and Spokane River Basins," USEPA 2001. Because metal concentrations are naturally variable, the analysis quantified the range of background concentrations for each metal and selected the 90th percentile for soils and sediments and the 95th percentile for surface water as the representative background concentrations. The background concentrations identified for the Upper Basin represent the most mineralized conditions and are different from background sediment concentrations for the Lower Basin, Coeur d'Alene Lake, and Spokane River. The background soil/sediment and surface water metal concentrations are far below, indeed are small fractions of the existing concentrations in the mining-impacted media targeted for cleanup by the Selected Remedy. Furthermore, the background soil and sediment lead levels are far below the soil/sediment benchmark (530 milligrams/kilogram) reflected in the Selected Remedy. As described in the ROD, the numerical cleanup criteria for soil and sediment may be revised as additional information becomes available.

3.4.2 Mining-Related Sources of Metals

Comment Summary:

Several comments questioned EPA's conclusion that the overwhelming sources of metals that create environmental and human health risks in the Basin are from historic mining-related practices and, in particular, that tailings-impacted sediments are the primary source of metal loadings to Basin streams.

EPA response:

EPA's analyses and the historic record make clear that mining-related practices in general and tailings-impacted sediment in particular are the dominant sources of metals in the Basin. The historic record has been analyzed in USGS Open-File Report 98-595 "Production and Disposal of Mill Tailings in the Coeur d'Alene Mining Region, Shoshone County, Idaho; Preliminary Estimates." The USGS estimates indicate that 62 million tons of tailings containing 880,000 tons of lead and more than 720,000 tons of zinc were discharged to streams prior to 1968. As documented in the FS, these historic releases of metal-rich tailings have mixed with Basin sediments to create a present condition with hundreds of millions of tons of tailings-impacted, metal-rich sediments in the floodplains (including wetlands and lakes) of the Basin and Coeur d'Alene Lake. The 2001 USGS Open-File Report 01-140 "Lead-Rich Sediments, Coeur d'Alene River Valley Idaho: Area, Volume, Tonnage, and Lead Content," provides detailed estimates for lead. EPA's RI/FS Technical Memorandum (Revision 3) "Estimation of Background Concentrations in Soils, Sediments, and Surface Water in the Coeur d'Alene and Spokane River Basins" makes clear that metal concentrations from natural sources are small fractions of the existing concentrations in mining-impacted soils, sediments, and surface water.

3.5 REMEDIAL INVESTIGATION/FEASIBILITY STUDY

3.5.1 Scientific Adequacy of RI/FS, Including Risk Assessments, Versus Need for Independent Study

Comment Summary:

Some comments questioned the scientific adequacy of the RI/FS, including the risk assessments, and called for an independent study of the Basin to determine what remedy is warranted.

EPA response:

EPA's conduct of the Basin-wide RI/FS is governed by and was consistent with CERCLA and the NCP. The findings are based on accepted scientific and engineering principles. The RI/FS was reviewed by a wide variety of stakeholders, including federal, state, tribal, local, and community entities. As described in detail in Section 3.0 of Part 2 of the ROD, EPA has provided a wide range of opportunities for community participation in the investigation and remedy selection processes within the Coeur d'Alene Basin. The RI/FS had a "full, scientific review" and EPA is confident that it is scientifically defensible.

The Idaho congressional delegation has requested that the National Academy of Sciences (NAS) review the scientific and technical analyses that form the basis of the Selected Remedy. EPA will cooperate fully with any NAS review and will seriously consider new information or recommendations resulting from a review. If EPA determines that substantial changes to the ROD are appropriate based on the NAS recommendations, such changes would be subject to additional public review and comment.

3.5.2 Adequacy of Data Collected During RI/FS to Select and Design Remedy

Comment Summary:

Some comments questioned whether sufficient data were available to select a remedy.

EPA response:

More than 10,000 samples were collected to support the RI/FS. These samples, combined with the 7,000 additional samples collected by IDEQ, USGS, the mining companies, EPA under other regulatory programs (e.g., the National Pollutant Discharge Elimination System), and others, provide a solid basis to support informed risk management decisions for Coeur d'Alene Basin mining waste contamination. EPA has made data available to the public through its website, reports, public repositories, meetings, and specific requests.

Section 300.430 of the NCP sets out the process that EPA follows when conducting a remedial investigation and feasibility study and selecting remedies. Section 300.430(d) provides that "[T]he purpose of the remedial investigation (RI) is to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives." Section 300.430(e) provides that "[T]he primary objective of the feasibility study (FS) is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected."

Once a remedy is selected in a ROD, the process moves into the Remedial Design phase, followed by implementation in the Remedial Action phase. Where necessary, additional data are collected to support design of the remedy. Data collected during the RI/FS are not intended to be sufficient to provide all necessary data to fully design the Selected Remedy. This principle is recognized in the NCP and in EPA guidance, and is common in implementing CERCLA remedies nationwide. Hence, the anticipated need for additional design data to implement the Selected Remedy is not unique to the Coeur d'Alene Basin.

3.6 REMEDY EFFECTIVENESS AND IMPLEMENTATION ISSUES

3.6.1 Remedy Effectiveness Estimates for Surface Water Quality

Comment Summary:

Some comments questioned EPA's estimates of post-remediation metal loadings and concentrations in Basin surface water and raised specific questions regarding the effect of possible metal loading to surface water from precipitated zinc in aquifers or from deep groundwater not associated with identified mining sources.

EPA response:

Quantitative estimates of post-remediation dissolved metal (zinc) loadings and concentrations in Basin surface waters upstream of Coeur d'Alene Lake are the subject of EPA's RI/FS Technical Memorandum "Probabilistic Analysis of Post-Remediation Metal Loading." Recognizing the inherent uncertainty in post-remediation conditions, these estimates were based on a rigorous probabilistic approach that quantified the uncertainty consistent with available information. In particular, the potential loadings from precipitated zinc in deep aquifer material and from deep groundwater not associated with identified mining sources were quantified, to the extent practical, and conservatively assumed to be unreduced by remedial action.

The probabilistic approach was used to predict aggregate effects associated with the Preferred Alternative upstream of the lake, as presented in EPA's RI/FS Technical Memorandum "Interim Fishery Benchmarks for Initial Increment of Remediation in the Coeur d'Alene River Basin." The ROD discusses how these probabilistic results were used to support the Selected Remedy. The probabilistic analysis provides one sound technical basis to support the Selected Remedy that is consistent with the CERCLA statute and the NCP.

To date, the probabilistic analysis has not considered the interactive effects of relevant processes in Coeur d'Alene Lake or effects of flooding events, and so is not applicable to conditions along the Spokane River. Enough information regarding the Spokane River does exist, however, to develop and support the Selected Remedy.

3.6.2 Remedy Performance for Ecological Protection

Comment Summary:

Many comments expressed concern regarding the ecological protectiveness of the Selected Remedy, including questions of long-term performance, recontamination, and the role of potential new technology.

EPA response:

As explained in the ROD, within its scope, the Selected Remedy protects human health and the environment from the exposure pathway or threat it is addressing and the waste material being managed. The effectiveness of the Selected Remedy in improving surface water quality has been estimated to the extent practical given existing information. EPA recognizes that after the selected remedial actions are implemented, conditions in the Upper Basin and Lower Basin may differ substantially from EPA's current forecast of those future conditions, which is solely based on present knowledge. Although no ARAR waivers are being invoked at this time, the additional knowledge that will be gained by the end of this period through long-term monitoring and five-year review processes may provide a basis for ARAR waivers in the future. In addition, this new information and advances in science and technology may allow for additional actions to achieve ARARs and fully protect human health and the environment in a more cost-effective manner.

EPA also recognizes that recontamination is a major factor affecting ecological protectiveness, particularly in the Lower Basin. The Selected Remedy was developed recognizing that a majority of Lower Basin sediments contain lead concentrations posing a risk to ecological receptors. One of the criteria used to select wetland areas for remediation was relatively low potential for recontamination during flood events. Remedies implemented in the Upper Basin and beds and banks in the Lower Basin are expected to reduce lead in sediments that may be deposited in wetland units during future floods. Additionally, ongoing performance evaluation of remedial efforts will provide useful data for refining remedies. EPA will review this information during implementation of the Selected Remedy, including during five-year review cycles, to determine the need for and the priority of remedies, not currently described in the ROD, that may be appropriate in the future.

EPA also recognizes that development of new remedial technologies that are potentially more cost-effective and have fewer short-term impacts than conventional technologies is an important potential benefit of the adaptive management approach. Examples of efforts to develop new technologies include ongoing pilot studies of chemical treatment of soil in the Lower Basin and planned studies of passive treatment of surface water in Canyon Creek.

3.6.3 Estimated Times to Achieve AWQC and the Role of Natural Recovery

Comment Summary:

Some comments questioned EPA's estimated time period to achieve water quality standards, with some believing this supports doing more now and some believing this supports doing much less and relying on natural recovery.

EPA response:

The Selected Remedy for protection of the environment in the Upper Basin and Lower Basin will result in substantial reductions of exposures of humans and ecological receptors to metals in the areas the remedy addresses. Full protection of human health and the environment will not be achieved until the final remedy is implemented. The anticipated benefits of the Selected Remedy are described in Sections 12.1.3, 12.2.3 and 12.4.3 of the ROD.

The time needed to achieve overall cleanup goals, including AWQC and risk-based sediment cleanup goals, will be lengthy and require a period of natural recovery for all alternatives. The probable time period decreases with the aggressiveness and completeness of the alternative. These differences in time to achieve water quality standards are described in Section 10.2 of the ROD.

In EPA's experience at complex sites such as in the Coeur d'Alene Basin, the expectation that considerable time will be necessary to achieve cleanup is not uncommon. For such complex sites, EPA typically examines the magnitude and extent of contamination, selects and implements remedies, and then collects empirical data over time to examine the efficacy of the remedies. Once sufficient data are available, an analysis is conducted to determine if ARAR waivers are appropriate. Although it is possible that such future data may indicate that ARAR waivers are appropriate in the Coeur d'Alene Basin, it is not appropriate to attempt to invoke them now.

Benefits to aquatic life begin much sooner than when AWQC are finally met. As remedies are implemented, resulting in reduced metals concentrations, aquatic conditions begin to improve and benefits accrue as concentrations drop further over time. Such benefits will occur much sooner with the more aggressive alternatives (i.e., Ecological Alternatives 3 and 4). As graphed on Figures 10.2-3 and 10.2-4 of the ROD, water quality conditions at completion of remediation (Time 0 on the graphs), as represented by multiples of AWQC, will be considerably better under Ecological Alternatives 3 and 4 than the other alternatives. Although the resulting conditions will not be fully supportive of aquatic life, the reduced dissolved metals concentrations will allow a substantial improvement to the fisheries and ecosystem, as described in more detail in Section 12 of the ROD and the "Interim Fishery Benchmarks Technical Memorandum" (URS 2001d). The population and species diversity of fish and aquatic organisms will continue to improve as cleanup progresses in the Basin.

Differences between the alternatives in anticipated benefits are not restricted to time to achieve water quality standards. Section 10.2 of the ROD also describes the differences between the alternatives in their anticipated effects on impacted sediments in the Basin, and presents a comparative analysis which supports Ecological Alternative 3 as the best balance of tradeoffs for a long-term cleanup approach in the Upper Basin and Lower Basin.

Overall, the Selected Remedy would be expected to achieve about 50 to 70 percent of the dissolved metals load reduction in the Upper Basin (above Pinehurst) that would be anticipated from full implementation of Ecological Alternative 3 for about 19 percent of the estimated cost of Ecological Alternative 3.

3.6.4 Idaho TMDL for the Coeur d'Alene Basin

Comment Summary:

Some comments questioned the relationship of Idaho total maximum daily loads (TMDLs) to the Selected Remedy.

EPA response:

The TMDL establishes waste load allocations for discrete point sources and load allocations for non-discrete sources. It has long been recognized that non-discrete sources are the primary sources of metals in surface water in the Basin. The CERCLA remedial process was identified as the most effective tool for addressing these non-discrete sources. In September 1996, the United States District Court for the Western District of Washington ordered EPA and the State of Idaho to develop a schedule for completion of TMDLs for all water quality impaired streams identified by the State, including the Coeur d'Alene River Basin. TMDL development was initiated in 1998. In August 2000, a TMDL for dissolved cadmium, lead, and zinc in surface waters of the Basin was jointly released by EPA and the State of Idaho. On September 4, 2001, a state court judge for the State of Idaho invalidated the TMDL on the procedural grounds that the IDEQ had not engaged in formal rulemaking when adopting the Basin TMDL. The impact of this court decision on TMDL implementation is currently unclear, and the final status of the TMDL has not yet been determined.

3.6.5 Relationship of Forest Management Practices to Recontamination and Water Quality

Comment Summary:

A number of comments noted the relationship between forest management practices on national forest land in the North Fork Coeur d'Alene River watershed and the magnitude of flood events, particularly those caused by rain-on-snow events. These comments stated that large flood events result in erosion of large amounts of lead-contaminated sediment from the beds, banks, and floodplains, particularly in the Lower Basin. The large lead loads carried by the river during these events can result in recontamination of floodplain areas and have resulted in temporary exceedances of the lead drinking water standard in Coeur d'Alene Lake.

EPA response:

Remedial actions for effects unrelated to releases of hazardous substances, such as deforestation effects associated with logging practices or development, are not addressed by CERCLA unless such effects contribute to a release of hazardous substances or potentially compromise the effectiveness of an implemented response action.

EPA evaluated the Basin on a watershed level, therefore, the potential effects of sediment movement associated with North Fork discharges (and other sources) were considered in developing the RI/FS and the Selected Remedy. The available database used to develop the Selected Remedy includes loadings in the Coeur d'Alene River, including loadings to Coeur d'Alene Lake, during high flow events (including rain-on-snow events) that reflect large discharges from both the North Fork and the South Fork. To increase the available database, further field data are being collected on extreme flow events (including rain-on-snow events) by USGS as part of ongoing monitoring for the Coeur d'Alene Basin cleanup. Additional data will likely be collected as part of (post-ROD) remedial design. The collective data—including data from the USGS, COE/FEMA, and USFS—will be analyzed and interpreted during remedial design to implement the remedy selected in the ROD.

EPA anticipates that the Lake Management Plan will include measures intended to reduce sediment loading resulting from timber harvesting. EPA will consult with state and federal agencies on timber harvest activities in the North Fork to reduce the likelihood of adverse effects on proposed cleanup activities.

3.6.6 Long-Term Protectiveness and Permanence of the Remedy

Comment Summary:

A number of comments expressed a concern over the long-term protectiveness of the remedy and a preference for more permanent solutions, such as removals. A few comments questioned the long-term reliability of synthetic liners used in waste containment systems.

EPA response:

The long-term effectiveness and permanence of remedial actions is one of the criteria EPA weighs when selecting remedial actions. Using permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable is a statutory requirement for remedies selected under CERCLA. When weighing capping of contaminated materials in place against a potentially more permanent remedy, such as disposal in an engineered repository, EPA considers several factors, including the long-term maintenance requirements of capping, the potential for recontamination, and cost. In some cases, the long-term maintenance requirements of capping can be reduced by consolidating the material above the flood elevation. The decision to cap or remove waste materials will be made during remedial design on a site-by-site basis.

The synthetic liners available today are highly effective at isolating contaminated waste, if installed properly. The remedial design will include development of quality assurance requirements for proper installation of liners and other remedy components.

3.6.7 Scope of Lower Basin Sediment Removal

Comment Summary:

A number of comments called for increased removal of impacted sediments in the Lower Basin. Some of these comments cited the potential for adverse effects to waterfowl and the potential for recontamination of downstream areas from these sediments.

EPA response:

The Selected Remedy is focused on cleaning up the highest priority upstream sources. The remedy includes removal of up to 2.6 million cubic yards of some of the most highly contaminated riverbed sediments. These sediments are located in the area around Dudley, where the gradient of the main stem of the Coeur d'Alene River flattens and fine-grained sediments containing relatively high concentrations of metals are deposited. EPA and stakeholders elected not to include more extensive riverbed removal because of the following considerations:

- Beginning with smaller scale removals to refine cost-effective sediment removal or management techniques

- Confirming that removal can be conducted in a manner that is compliant with ARARs and will not exacerbate lead movement downstream
- Uncertainty regarding repository capacity for disposal of the contaminated sediment removed from the river beds
- Limiting the area of removal work to natural sediment deposition areas, thereby limiting the effects of potential recontamination and the effects on boating activities, while enhancing cost-effectiveness
- Insuring that the entire depth of contaminated sediment is excavated at the selected location(s) to eliminate the potential for adverse impacts as a result of exposing deeper, more contaminated sediments than those present on the surface of the river bed

Implementation of the Selected Remedy will provide additional safe feeding area for waterfowl and other animals through a combination of removals and capping in Lower Basin wetlands and lateral lakes. Cleanup of some areas currently used for agriculture is also anticipated to provide additional safe feeding area. In total, about 4,500 acres of safe waterfowl feeding areas could be provided by the cleanup actions taken under the Selected Remedy. Implementation of the Selected Remedy will help determine what additional actions are warranted.

3.6.8 Scope of Remedies for Water Quality and Fish Habitat

Comment Summary:

A number of comments expressed the concern that EPA could be doing more to restore water quality and fish habitat in the watershed.

EPA response:

The Selected Remedy contains actions to reduce the concentrations of dissolved metals, particularly zinc and cadmium, that adversely affect fish. It is estimated that the amount of dissolved zinc entering the river system will be reduced by 580 pounds per day. This represents 26 percent of the zinc load from Basin sources outside of the Bunker Hill Box. Monitoring of the Selected Remedy will help determine what additional actions are necessary to further reduce zinc loadings. Additional improvements will result from remedial actions implemented within the Bunker Hill Box.

The Selected Remedy will result in improvements to fish habitat. In areas where stream and bank cleanups are conducted, stream and bank stabilization will also be conducted. Where feasible, bioengineering stabilization techniques will be used. Bioengineering techniques use natural materials such as large woody debris, native vegetation, and biodegradable materials to protect riverine and riparian areas from flood damage and erosion. Use of these techniques is anticipated to result in improved fish habitat. Areas where cleanup and stabilization will occur under the Selected Remedy include the East Fork of Ninemile Creek, Pine Creek, the South Fork, 33 miles of banks along the lower Coeur d'Alene River, and the Spokane River, including critical habitat areas.

3.6.9 Siting and Design of Repositories for Material Generated by Cleanup Activities

Comment Summary:

Some comments questioned how many repositories will be required as a result of this ROD.

EPA response:

EPA anticipates that the implementation of the remedy will require the construction of several mine-waste repositories for the disposal of metals-contaminated soils, sediments, source materials, and treatment residuals. The estimated volumes of material that may require excavation and disposal are about 500,000 to 900,000 cubic yards in the Upper Basin and about 3,900,000 cubic yards in the Lower Basin (including up to 2,600,000 cubic yards of river bed sediments, approximately 500,000 cubic yards of river bank and splay material, and approximately 800,000 cubic yards of wetland and lateral lake sediment).

The number and size of repositories to accommodate the estimated volumes will be determined during the Remedial Design Phase. It is anticipated that some of the repositories will be small and some will be larger. Some will be used to service nearby cleanup projects (i.e., local repositories) and some will be able to service area-wide cleanup efforts (i.e., regional repositories). All disposal locations will be evaluated using the same process and criteria identified in Section 12.5 of the ROD. All locations will also be subject to long-term institutional controls and monitoring, if necessary, to ensure the integrity of the remedy.

Comment Summary:

Some comments questioned how repositories would be sited and designed.

EPA response:

EPA anticipates that a four-step process will generally be used to evaluate potential repository locations and specify design requirements. (1) A list of potential repository sites for further evaluation will be prepared in conjunction with local governments, property owners, and other Basin stakeholders; (2) A technical evaluation for each specific site will be performed to assess basic environmental and engineering issues; (3) Concurrent with the technical evaluation, a public outreach effort will be initiated so that affected citizens are given an opportunity to comment on the proposed repository location and design; (4) Finally, a remedial design document for each specific site will be prepared that summarizes design requirements, waste acceptance criteria, and other key information associated with the short-term and long-term management of the repository. Repositories constructed pursuant to this ROD will be designed to reliably contain waste material and prevent the release of contaminants to surface water, groundwater, or air in concentrations that would exceed state and/or federal standards.

3.6.10 Treatment of Surface Water from Canyon Creek

Comment Summary:

Some comments questioned the feasibility or potential effectiveness of passive treatment of surface water from Canyon Creek, citing concerns about the availability of suitable sites with adequate size, the feasibility of treating relatively large flows (up to 60 cubic feet per second), the volume of treatment residuals that would be produced, the loads of metals in water that would bypass the treatment system during high flow periods, and the potential for recontamination of treated water after it is discharged into the South Fork Coeur d'Alene River. Other comments sought assurances that a conventional active treatment system would be constructed if the passive treatment system did not achieve metals removal goals. Finally, one comment questioned whether the levels of metals in the treatment system discharge would meet typical permit limits.

EPA response:

Each of the issues raised will be addressed during remedial design, which will include pilot testing to evaluate the effectiveness of passive water treatment. Passive treatment would only be implemented if the pilot testing demonstrates it will effectively remove metals from Canyon Creek water. Responses to the individual issues raised in the comments are presented in the following paragraphs.

Availability of suitable sites. Siting of the treatment facility or facilities will be accomplished during the remedial design phase and will consider public input. The land area required is anticipated to be about 5 to 10 acres. The facility or facilities would be located in areas of flat ground in the Woodland Park area or near the South Fork in the Wallace area. The facility would not be located immediately adjacent to the mouth of Canyon Creek.

One comment suggested the area needed would be about 4,000 acres, based on the size of a passive wetlands treatment system. Some passive wetlands treatment systems can require long retention periods to accomplish metals removal and hence require a relatively large area to treat a given flow. Passive treatment with reactive media typically does not require long retention periods, and hence a larger flow can be treated within a given footprint. Treatability testing will further evaluate the required retention times for the various passive treatment methods.

Feasibility of treating relatively large flows. The feasibility of treating relatively large flows (60 cfs) will be evaluated during remedial design using pilot studies. As stated in the ROD, "if passive treatment does not prove effective, alternative treatment and control systems to achieve the benchmark of at least a 50-percent reduction of dissolved metals loads would be evaluated. Alternative actions may be used based on an evaluation against CERCLA remedy selection criteria."

Volume of treatment residuals. The passive treatment would use a reactive medium, such as apatite, that does not generate the large amounts of sludge that are associated with conventional hydroxide precipitation-based treatment systems.

Loads of metals in water that would bypass the treatment system during high flow periods. The expected (estimated average) value of the dissolved zinc load in Canyon Creek after remedy implementation is estimated to be 234 pounds per day, a reduction of 322 pounds per day compared to the expected value calculated from surface water data collected from 1991 to 1999. The estimated load reduction is based on a design flow of 60 cfs and has taken into account the untreated peak flows and associated loads.

Potential for recontamination of treated water. It is recognized that additional metals are added to the South Fork as a result of surface water/groundwater interactions (i.e., river water infiltrates into the aquifer, dissolves metals associated with the solid phase of the aquifer, and returns to the river containing metals at higher concentrations). However, the re-dissolution of metals by treated water is not anticipated to negate the load reductions resulting from treatment. Geochemical modeling does not suggest that solid-phase zinc and cadmium control the concentrations of the metals in groundwater. Hence, there is no evidence that treated water in the South Fork that enters the groundwater system (which would be a fraction of the total treated water) would subsequently be discharged to the South Fork at the same concentration as it would had it not been treated.

Alternative treatment and control (including active treatment) systems. The benchmark for Canyon Creek is to reduce dissolved metals loads discharging from the creek into the South Fork by at least 50 percent. If passive treatment does not prove effective, alternative treatment and control systems to achieve the benchmark of at least a 50 percent reduction of dissolved metals loads would be evaluated. Alternative actions may be used based on an evaluation against CERCLA remedy selection criteria**.** At this time, it is noted that active treatment could potentially cost more than the $150 million estimated for source removals in Canyon Creek, and thus active treatment is not anticipated to be cost-effective for treating large surface water flows such as in Canyon Creek.

Levels of metals in the treatment system discharge. The expected (estimated average) value of the dissolved zinc load in Canyon Creek after remedy implementation is discussed above. The majority of the untreated load would not be in the treatment system discharge, but rather is associated with two other factors. First, peak flows of Canyon Creek (e.g., flows greater than a design flow of 60 cubic feet per second) would not be treated, and hence daily loads would be higher than average during peak flow periods. Second, depending on the siting of the treatment facility, a significant load associated with groundwater may not be intercepted or treated by the treatment system. The discharge requirements for the treated effluent are defined by the ARARs as outlined in Section 13 of the ROD for this point-source discharge.

3.6.11 Effects of Nonmining Impacts on the Environment

Comment Summary:

Some comments suggested that non-mining impacts (e.g. urbanization, transportation corridors, introduction of non-native fish species) have adversely affected the Basin environment and have not been taken into account by EPA.

EPA response:

The ROD is focused on the effects of historic mining activities on the environment of the Basin. These mining effects, which are substantial, are documented in the RI/FS (and supporting human health and ecological risk assessment reports) and summarized in the Proposed Plan and ROD. EPA acknowledged in its supporting technical documents that physical habitat conditions are limiting to fish and wildlife populations, and that non-mining related modifications of habitats for these species have had a significant effect. However, it is also apparent that secondary effects from mining-related metals contamination have also contributed to the degradation of physical habitat conditions in the Basin (e.g. metals can damage or eliminate vegetation, which promotes erosion and destroys habitat). Such degradation falls under the purview of CERCLA and was considered in the Selected Remedy.

3.7 SELECTED REMEDY FOR HUMAN HEALTH

3.7.1 Development of the Human Health Selected Remedy and EPA National Guidance

Comment Summary:

Some comments, many from the areas where residential cleanups may be conducted, questioned the basis for the selected human health remedy and EPA's determination that human health cleanup activities should be initiated in the Basin. These comments included questions about the use and effectiveness of the model EPA uses to determine site-appropriate soil cleanup levels for residential areas (the IEUBK model).

EPA response:

The Selected Remedy for human health was developed in a manner consistent with EPA's *1994 Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities* and the 1998 clarification to the 1994 Guidance (USEPA 1994a, 1998a). These documents describe a strategy for managing lead contamination at CERCLA sites that have multiple sources of lead. The guidance also recommends use of the Integrated Exposure Uptake Biokinetic (IEUBK) model and blood lead studies and ways to determine appropriate response actions at residential lead sites.

Using the IEUBK model. The IEUBK model is the best available tool for predicting blood lead levels in children exposed to lead in the environment. EPA's guidance also recommends the "evaluation of blood lead data, where available," but suggests that "blood lead data not be used *alone* to assess risk from lead exposure or to develop soil lead cleanup levels," recognizing that blood lead levels below 10 µg/dL are not "necessarily evidence that a potential for significant lead exposure does not exist or that such potential could not occur in the future." The guidance indicates that cleanup actions should be designed to address both current and potential future risk, and that actions should be taken to limit exposure to soil lead levels such that a typical child or group of similarly exposed children would have an estimated risk of no more than 5 percent of exceeding a 10 µg/dL blood lead level. Under a Memorandum of Agreement, the State of Idaho took the lead in preparing the Basin Human Health Risk Assessment (HHRA) and developed the HHRA in a manner consistent with these EPA guidance documents (USEPA 1999a).

While EPA guidance documents are not binding and do not represent final agency action, national guidance is generally followed unless facts or circumstances related to a particular matter indicate compliance with the guidance is inappropriate. EPA guidance documents provide a recommended decision framework for EPA staff and consistent application of these recommendations helps provide greater certainty to the EPA and its stakeholders, including the regulated community. Based on the totality of circumstances, EPA believed it was appropriate to follow national guidance in developing the Basin HHRA.

EPA and IDEQ used the IEUBK model to assist in evaluating human health risks in the Basin for several reasons. Because EPA focuses on preventing elevated blood lead levels in children, EPA believes it is necessary to use a tool that predicts blood lead levels in children exposed to lead in the environment. The IEUBK model is the best tool currently available for this purpose and it has been peer reviewed by the EPA Science Advisory Board (SAB), an independent panel of scientific experts. The SAB concluded that the model approach is sound. EPA is not currently aware of an alternative tool that can be used for a similar purpose, and during the course of the RI/FS, the HHRA, and the remedy selection process (including the associated public comment periods) no alternative was identified. In addition, exposure conditions in the Box and Basin are similar and a substantial database on lead exposure and its subsequent effects in children is available from many years of cleanup in the Bunker Hill Box. The amount of data related to lead exposure and its subsequent effect in children is unique to the Bunker Hill site. Therefore, the Box database was used to calibrate the IEUBK Model, and the calibrated model (referred to as the Box Model) was used in the Basin HHRA. The Bunker Hill Box database is large enough and sufficiently representative of environmental conditions and characteristics of the exposed population to provide a sound basis for the Box Model.

Basin Selected Remedy Compared to Box Record of Decision. The recommendations in the 1994 and 1998 EPA guidance were used to develop the Selected Remedy in this ROD, as compared to the Selected Remedy in the 1991 residential soils ROD for the Bunker Hill Box (USEPA 1991a). The Selected Remedy in the 1991 ROD included a community blood lead goal of no more than 5 percent of children in each community exhibiting a blood lead level greater than 10 µg/dL and less than 1 percent exhibiting a blood lead of 15 µg/dL or greater. This approach was consistent with EPA national policy at that time (USEPA 1989b). In more recent guidance, EPA recommends that risks be assessed at lead-contaminated residential sites using an exposure unit defined as the individual residence and other areas where routine exposures are occurring. Accordingly, the Selected Remedy focuses the response actions on the individual property level to reduce lead exposure pathways, such as soil and dust, and ensure that a typical child has no more than a 5 percent risk of exceeding a 10 µg/dL blood lead level. This approach, by targeting cleanup actions at the individual property level, ensures cleanup of all contaminated residential properties in a community, thereby protecting current as well as future residents.

This difference in approach does not substantially change the soil cleanup strategy (both remedies include partial soil removal for lead soil concentrations above 1,000 mg/kg); however, it does affect the way that annual blood lead screening results are evaluated. While the 1991 ROD includes a community-level blood lead goal for children, the Selected Remedy in the Basin ROD is based on reducing lead exposure pathways to reduce risks to children at the individual property level.

3.7.2 Use of Blood Lead Observations in the HHRA and Development of the Proposed Plan

Comment Summary:

Several comments refer to the use of blood lead screening results from the Panhandle Health District's Lead Health Intervention Program to assess or characterize lead health hazards in the Basin. Most of the comments refer to the nonrepresentative nature of the blood lead screenings with respect to the overall population of the Basin, and question the appropriateness of using blood lead observations in the site-specific analysis.

EPA response:

The HHRA takes great care to discuss the limitations of the blood lead observations in the Basin for uses in the risk assessment, including representativeness of the results, sampling bias, and the potential effect of intervention on blood lead levels. Blood lead observations from the Basin were used in the HHRA (1) to characterize age-related and geographic patterns of blood lead concentrations among the population sampled, (2) to compare IEUBK Model predictions to observed blood lead concentrations, and (3) in site-specific quantitative analysis to evaluate relationships between environmental lead levels and blood lead levels. These uses do not depend on the blood lead concentrations being statistically representative of the Basin population as a whole.

National EPA guidance, issued in 1994 and 1998, recommends evaluation of blood lead data but does not recommend that these data be used alone when assessing risk from lead exposure or developing soil lead cleanup levels. The guidance recognizes that blood lead levels below 10 µg/dL are not necessarily evidence that a potential for significant lead exposure does not exist or that such potential could not occur in the future. The HHRA, consistent with national guidance, evaluated the blood lead screening results in conjunction with environmental sampling data, and follow-up investigations performed under the Lead Health and Intervention Program (LHIP) by the Panhandle Health District (PHD).

Observed blood lead levels used in the HHRA were obtained from the PHD annual screening program, which is conducted as a public health service to Basin residents. PHD uses the annual screening results to provide advice and assistance to families with children exhibiting elevated blood lead levels. These screening efforts are not intended as a research investigation. Individuals were not randomly selected nor were they compelled to participate in a study. It has been State policy for the last three decades to conduct blood lead screenings to identify individual children with elevated blood levels and to provide follow-up intervention services to identify and reduce lead exposure pathways. The Idaho Department of Health and Welfare has not supported blood lead studies for the purpose of acquiring population-based data for academic or experimental purposes. Instead, the State prefers to offer the voluntary program as a service to families with young children. In the past, research studies met with resistance from local families, which reduced participation in screening and cooperation in follow-up programs. As a result, risk assessment and health assessment analysis is limited to the screening results of the voluntary participants and must operate within the constraints of the overriding health response priorities. Nevertheless, used within these limitations, these data have been useful in characterizing lead exposure pathways and developing the Selected Remedy described in the ROD.

Information from the Bunker Hill Box also was used in the HHRA. Paired environmental and blood lead observations collected from the Bunker Hill Box were analyzed to calibrate the IEUBK Model. The calibrated model, referred to as the Box Model, was subsequently used in the Basin HHRA to assess lead risks and to develop the lead soil action levels described in the ROD. The Bunker Hill Box data spanned 11 years, included more than 4,000 pairs of blood and environmental results, and have represented more than 50 percent of all children residing in the Box during every year, since 1988. The Bunker Hill Box database is large enough and sufficiently representative of environmental conditions and characteristics of the exposed population to provide a sound basis for the Box Model.

Participation rates in the Basin annual blood lead screening have not been as high as those in the Box. This may be due to a number of factors, including the absence of door-to-door solicitations in the Basin. It is estimated that there are between 1,000 and 1,100 children from 9 months to 9 years of age in the Basin area. In 1999, the most successful year for participation, 272 children or approximately 25 percent of eligible children participated with a $40 dollar payment ($20 each from the state and local mining companies). In other years, with payments limited to $20, fewer than 20 percent of eligible children participated.

Different opinions have been expressed regarding potential selection bias in the annual screening results. One argument suggests the incidence of elevated blood lead levels is biased low because families who participated were more likely to be attentive to lead health concerns and were more likely to have benefited from the LHIP's assistance in helping parents reduce exposures in the home. A counter argument suggests the incidence of elevated blood lead levels is biased high because the financial incentives for participation favored economically-disadvantaged families, and poverty is generally associated with higher than average blood lead levels. Others requested that the socio-economic co-factors and environmental exposures describing the sampled population be compared to the overall population. The environmental data were compared in Table 3.7-1 and results indicate that the environmental lead concentrations for participants in the 1996 to 1999 blood lead screenings are similar to those of the general population. There is not, however, a complete socio-economic database for Basin children that would allow for a comparison of risk co-factors. An additional consideration is the geographic representation of participants in the blood lead screening program. In recent years, areas with higher lead health risks have been under-represented in the screenings. Whether biased high or low, selection bias relates to behavior of the participants and not the environmental conditions in which they reside.

The HHRA did not draw a conclusion relative to these different viewpoints, as there are not sufficient data to test the competing hypotheses. These issues are discussed in Sections 6.2.2 and 7.4.1, 8.8, and 8.11.2 of the HHRA. As a result, the screening results must primarily be interpreted as information regarding the children and families who desired screening and it may, or may not, be representative of the majority of children who did not participate in the screening programs. In any case, questions of the representativeness of the blood lead screening observations to blood lead concentrations in the population as a whole are largely irrelevant since the data demonstrates that there is a serious risk to the health of the people who exhibit elevated blood lead levels and a clear need to address excessive lead exposure pathways.

Several individuals also questioned the use of repeat blood lead measures in the batch mode runs for the paired data. That is, blood lead levels from the same child in successive years were included. All available observations were utilized in the model runs presented in the HHRA, as was used in the site-specific quantitative analysis. Similar runs also were accomplished using only the initial observation for each child. Both runs, with and without repeat observations, are summarized in Tables 3.7-2a and 3.7-2b (children ages 9 to 84 months), 3.7-3a and -3b (children ages 9 to 60 months), and 3.7-4a and -4b (children ages 9 to 24 months). The analysis showed similar results regardless of whether the repeat observations were included.

3.7.3 The 2000-2001 Lead Health Intervention Program Blood Lead Screening Results

Comment Summary:

Several comments questioned the absence of a discussion of the 2001 annual blood lead screening results in the Proposed Plan, noting that the data indicate a substantial reduction when compared to the blood lead data from 1996 to 1999, which were used in the HHRA. These individuals also state that these apparent declines in blood lead levels call into question EPA's need to initiate human health cleanup activities in the Basin.

EPA response:

The 2001 annual Basin blood lead screening results were made available to EPA after it had issued the Proposed Plan in October 2001. EPA has included the 2000 and 2001 blood lead results in the ROD, and both EPA and the State of Idaho are encouraged by the improvements. However, as noted in Sections 3.7.1 and 3.7.2, data on blood lead levels do not demonstrate that a potential for significant lead exposure does not exist. Because of the limitations of the blood lead data (see response to 3.7.2 above), EPA considered several environmental factors and did not use blood lead data alone to develop the Selected Remedy for human health.

The apparent improvement in blood lead levels may be due to a number of factors including: intervention services to families with children identified as having elevated blood lead levels; cleanup actions at daycares, school, and homes occupied by young children; and the reduced participation in blood lead screening by families from areas with higher environmental lead exposures areas. There is no reason to believe that the reduction in blood lead is the result of any natural attenuation of the risks presented by lead contamination in the environment. The apparent success of previous efforts argues for continued intervention and cleanup efforts to further reduce the risks of lead in the environment.

The 1996 to 1999 blood lead results indicated that about 15 percent of children 6 months to six years of age tested had blood lead levels of 10 µg/dL or greater and 7 percent were greater than or equal to 15 µg/dL. In 2000 and 2001, 13 percent and 6 percent, respectively, of children had blood levels 10 µg/dL or more and 4 percent and 2 percent, respectively, had levels of 15 µg/dL or more. Annual screening results indicate that blood lead levels differ by age and geographic area, as shown in Tables 12.1-3 through 12.1-8 of the ROD and described in the HHRA.

The difficulties of extending the 2000-2001 results to the overall population remain the same as with previous years (discussed in Section 7.2), with some additional complications. These complications include less specific information regarding environmental exposures for these participants and significantly reduced participation by families from some geographic areas. For example, there has been a notable decline in participation among residents of the more contaminated residential areas east of Osburn, where mean blood lead levels remain higher than in the remainder of the Basin. Prior to 1999, 39 children were tested in the Burke/Ninemile area and 23 percent showed blood levels greater than 10 µg/dL and 15 percent were greater than 15 µg/dL. Since 1999, parents of only 3 children from these areas have availed themselves of testing. Another important factor that may affect blood lead screening results are the intervention activities and cleanup actions that have been undertaken in the Basin since 1996. Through 2001, the LHIP has provided follow-up investigations and consultation to families of 72 Basin children identified with elevated blood lead levels. As the total number of participants in the intervention program increases, more families will benefit from home visits that provide information to reduce exposures to lead. The continuing intervention efforts, through annual blood lead screenings, follow-up health programs, and public and school education efforts, have increased general community knowledge. Awareness of lead health issues also has increased since the release of the HHRA and the RI/FS, and residents may be exercising more care in their activities.

In addition to intervention activities, cleanup actions in Basin communities and residential areas have been conducted since 1997. Yard soils from ninety-one homes, resident to an estimated 150 to 200 children, have been remediated as part of EPA's high-risk removal program. Seven schools and six recreation areas have also been remediated as part of the removal program. As a result, nearly 20 percent of all children in the Basin and, at least the 5 percent at greatest risk of exposure, have received direct remediation and/or intervention. Twenty percent is a significant fraction of the children at risk, considering that only about 25 percent of the Basin residential yards are estimated to require remediation. The precise degree of exposure reductions or decrease in lead intake rates associated with these efforts have not been quantified, but experience in the Bunker Hill Box indicates that marked decreases in the percent of children with elevated blood lead levels followed introduction of the aggressive intervention program, common areas cleanup, and high-risk yard remediation programs. For example, in the first two years of the high-risk yard cleanup in the Box (from 1989 to 1991), the incidence of children with blood lead levels greater than 10 µg/dL was reduced from 52 percent to 20 percent in Kellogg and from 78 percent to 23 percent in Smelterville. However, while early intervention and removal actions contribute to reductions in blood lead levels, remediation of all contaminated properties is needed to ensure that children are protected from excessive exposures both now and in the future.

3.7.4 Lead Based Paint and the Relationship to House Dust and Blood Lead

Comment Summary:

Several comments raised concerns about the effect of interior lead-based paint on children's blood lead levels and stated that lead-based paint, not mine waste, is the primary source of lead in house dust.

EPA response:

The site-specific analysis in the HHRA found correlations between paint condition, paint lead content, soil lead, and dust lead with elevated blood lead levels in children (see HHRA Section 6.4.1). The HHRA analyzed the prevalence of elevated blood lead levels among children who were, or were not, exposed to a paint lead hazard (in the analysis, a hazard is defined as paint in poor condition with an X-Ray Fluorescence (XRF) loading of at least 1.0 mg of lead/cm^2). Of the 524 blood lead observations in children, 58 (11 percent) had blood lead levels greater than or equal to 10 µg/dL and 20 of these observations were associated with an XRF paint measurement. Analysis of these 20 observations revealed that 70 percent (14/20) of the children with elevated blood lead levels were not associated with an interior lead paint hazard and the remaining 30 percent (6/20) of the children were associated with an interior lead paint hazard. Thus, the majority of children with elevated blood lead levels (who resided in homes where paint was measured) were from homes without a lead paint hazard.

It is clear that children who live in the Basin and who have elevated blood lead levels tend to be exposed to significantly higher soil and dust lead concentrations and dust lead loading rates than children with blood lead levels less than 10 µg/dL. Measurements of lead loading rates have been obtained by placing a floor mat in the home's main entrance, retrieving the mat after a prescribed period of time, measuring how much dust and lead has accumulated, and adjusting the lead mass to a per area per day rate (mg of lead per m^2 of mat per day). The HHRA supports the conclusion that both lead paint sources and soils from the yard and community contribute to house dust lead and blood lead levels. However, lead in paint affects fewer children than lead in soil based on available data.

These findings are consistent with the follow-up reports from PHD nurses investigating children with elevated blood lead levels and results from other areas, including the Bunker Hill Box. Exposures were characterized in nearly all of the children identified with elevated blood lead levels during follow-up activities by the PHD. Potential paint exposures were noted for a few children, and housing renovation was recommended in a small number of cases. However, follow-up reports of children identified as having elevated blood lead levels continue to indicate that contaminated soils and dusts are the most significant sources for the majority of children.

Some commenters have criticized the use of repeat observations for the same children in successive years in the database used to assess the paint lead contribution. In developing the paint analysis protocol, EPA, IDEQ, and technical representatives to the mining companies agreed to maximize the number of observations in the analysis. Dr. Robert Bornschein, the consultant to the mining companies, recommended that a minimum of 150 observations be included in the analysis. Several potential combinations of exposure and response variables were considered. The largest available database was found to have 126 observations relating blood lead to select environmental variables. It was agreed to use this database, which included the repeat measurements of individuals to maximize the number of observations. Tables 3.7-5a and 3.7-5b show the analysis conducted with and without the repeat observations included. The analysis showed similar results regardless of whether the repeat observations were included.

3.7.5 Comparison of National Declines in Blood Lead Levels and Site-Specific Conditions

Comment Summary:

Several comments suggest that the declines in children's blood lead levels in the Silver Valley are the same as the national declines in blood lead levels and that, therefore, local declines cannot be attributed to the aggressive cleanup of contaminated residential areas.

EPA response:

The State of Idaho compared blood lead levels collected in the Bunker Hill Box since 1974 with the results of the National Health and Nutrition Evaluation Surveys (NHANES) for the periods 1976 to 1994 (Pirkle et al. 1994; Pirkle et al. 1998; IDHW 2000b, 2001b). Because the NHANES studies were conducted over several years, the midpoint of each study period was used to compare results with the Bunker Hill Box and to compute the time elapsed between consecutive studies. Declines in blood lead levels from the Silver Valley have been substantially greater than declines in national averages. The national reduction in overall blood lead levels (i.e., geometric mean) was approximately 13 µg/dL from 1976 to 1999; the Bunker Hill Box data show a reduction of more than 30 µg/dL during the same period of time, as seen in Table 3.7-6.

3.7.6 Soil Lead Sampling and Particle Size

Comment Summary:

Some comments questioned the sampling method used to measure lead in soil for the HHRA. Specifically, some comments were critical of the use of soil samples sieved to 175 micrometer (80 mesh) and recommended the use of the larger 250 micrometer sieve (60 mesh) particle size, which has been recommended in recent EPA guidance, and other comments suggested a finer sieve used for sediment characterization by the U.S. Geological Survey in ecological/transport evaluations. Other comments suggested that the whole soil fraction should be used without sieving.

EPA response:

The 175 micrometer (μm) soil sampling technique used in the Bunker Hill Box and Basin was adopted in 1974 during the original lead health studies and has been used for all residential soil and dust samples collected in the Basin RI/FS. The procedure was developed to represent the size range of particles most likely to adhere to children's hands and be ingested during normal hand-to-mouth activities. The selection of this standard pre-dates recent recommendations from EPA. However, subsequent research has shown that this size-range represents inadvertent soil ingestion of particles most likely to adhere to skin (Driver et al. 1989; Kissel et al. 1996; Que Hee et al. 1985; U.S. Environmental Protection Agency Technical Review Workgroup for Lead, 2000). While some questions remain as to the precise size fraction to use in risk assessment protocols, the studies support an upper size-range limit between 150 and 250 μm. EPA recommendations currently identify 250 μm as a maximum particle size to standardize sieving techniques, but acknowledge that site-specific differences may exist (USEPA 2000e). In the absence of compelling evidence to support modifying the existing protocol, the State of Idaho has decided to continue using the under 175 μm size fraction to maintain consistency in risk characterization for the Bunker Hill Box and Coeur d'Alene Basin. EPA has concurred with the State's approach.

Evidence from other sites suggests that larger particle size fractions are likely to exhibit lower concentrations of lead and other metals (USEPA 1999e, 2000e). The HHRA analysis derived a site-specific dose-response by relating observed blood lead levels to paired soil and dust lead concentrations. This site-specific relationship was used to determine the proposed soil action levels. Assuming that any concentration effect due to sieving is proportional, use of a larger particle size (resulting in a lower soil or dust concentration) would have been compensated with an increased dose-response coefficient in the Basin analysis. That is, the per unit effect of soil or dust lead concentration on blood lead levels would have been greater. The reduced concentration of lead would have been interpreted as a higher bioavailability of soil and dust or a higher ingestion rate of soil and dust. EPA and the State believe that the same sieving methodology used historically to characterize soil and dust exposure and to develop the action levels should be used to implement the cleanup.

3.7.7 Bioavailability, Speciation, and the HHRA

Comment Summary:

Several comments refer to the chemical species of lead in Basin soils and suggest that the relationship between blood lead and lead in soils and dusts observed in the Bunker Hill Box is not applicable to the Basin. Some also suggest that Bunker Hill Box soil and dust contamination is predominantly lead oxide due to the smelter, that there was limited impact of smelter emissions "outside the Box," and that soil contamination in the Basin is lead sulfide due to mine-related activities releasing lead as native galena ore. Because lead sulfide has low solubility, these comments suggest that this lead cannot be dissolved in the digestive tract and is not absorbed by children. In addition, some commenters stated that EPA and the State of Idaho should have conducted site-specific swine studies and speciation analyses to support the Basin HHRA.

EPA response:

The State of Idaho and EPA have found no compelling reason to conduct swine studies and speciation analyses for the Basin HHRA due to the vast amount of site-specific historical emissions research and analyses relating environmental lead exposures to blood lead levels in the Silver Valley. Extensive review and analysis of information on historic emissions from the smelter and mining operations in the Silver Valley, including the smelter owners' own analyses, suggest that exposures in both the Bunker Hill Box and in the Basin are likely to be a mixture of lead oxides and lead sulfides. Analysis of airborne particulate in the 1970s indicate the ratio of lead oxides and sulfides in Basin and Box soils are of a similar average magnitude (von Lindern 1980; von Lindern 1982). It is unlikely that all smelter-related soil and dust lead is in an oxide form and equally unlikely that the soil and dust particles ingested by children, that originated as mining releases, are purely a sulfide form. This conclusion is consistent with the results of the mineralogical investigations conducted in EPA Region 8 (Casteel et al. 1996a, 1996b, 1996c, 1997a, 1997b, 1998, and 2001).

Results Summary of Swine Soil Bioavailability Studies Conducted at Other Lead Sites

The EPA Region 8 investigations concluded that samples from tailings, sulfide ore wastes, and surface soils had relative bioavailabilities (compared to lead acetate) ranging from 1 percent (un-weathered galena) to 90 percent for soil with iron manganese lead oxides (Casteel et al. 1996a, 1996b, 1996c, 1997a, 1997c, 1998, and 2001). The average relative bioavailability of all soils tested (15 samples from 9 sites) was approximately 60 percent (USEPA 1999e).

The bioavailability results were reported as relative to a lead acetate control standard. Relative bioavailabilities are computed as the ratio of soil bioavailability to lead acetate bioavailability. Standardizing results to lead acetate facilitates comparisons of study results from different sites. A relative bioavailability of 60 percent equates to the default bioavailability values used by the IEUBK for soil and dust; this is equivalent to an absolute bioavailability of 30 percent (USEPA 1999e). For simplicity, bioavailability values discussed in the following paragraph refer to absolute bioavailability (e.g. the ratio of the mass of lead absorbed divided by mass of lead administered).

Derivation of Bioavailability at the Bunker Hill Box for the Basin Human Health Risk Assessment

In the Bunker Hill Box, studies have evaluated concentrations of lead in soils and house dust and subsequent effects on children's blood lead levels for more than 20 years (Landrigan et al. 1976;

Yankel et al. 1977). The vast amount of data on children's blood lead levels in the Bunker Hill Box has provided valuable information about how exposure to lead in the environment is absorbed by children, as measured in their blood. This data includes more than 4,000 blood lead measurements taken every year (since 1988) for more than a decade from the majority of children living in the communities within the Bunker Hill Box. Each blood lead measurement was paired with available soil and house dust lead measurements from the homes of the children who participated in the annual blood lead screening. The availability of such a large number of blood lead measurements, combined with a large number of environmental samples, provides a complete picture of lead exposure and its impact on children. The amount of lead exposure data and its subsequent effect in children is unique to the Bunker Hill site. Typically, when the site-specific impact of lead on children is unknown, default average values for bioavailability are used in the IEUBK Model or bioavailability is estimated by feeding soil to juvenile swine and measuring its absorption into the blood (USEPA 1999e). Juvenile swine are believed to represent lead absorption in children better than other species or adult animals, but there is some uncertainty associated with using animal models for human inference (Mushak 1998; USEPA 1999e).

Extensive review and analysis of historic emissions data provided substantial information about lead speciation in the Silver Valley. Bioavailability is affected by the chemistry and physical state of lead that is being analyzed, and by the person (or animal) exposed. For example, lead sulfide is dissolved slowly by the digestive tract, which makes it difficult to be absorbed by the human body. In contrast, lead oxides are more readily absorbed by the human body and are, therefore, more bioavailable. Additionally, particles with more exposed lead at the surface are more bioavailable than particles with lead inclusions occurring beneath the surface (Brown et al. 1999). Children absorb lead more readily than adults and people who have fasted absorb more lead than people who have recently eaten (Maddaloni et al. 1998). Extensive analysis of dose-response relationships between soils/dust lead content and blood lead levels were conducted in the late 1980s, prior to the initiation of the soils cleanup in the Bunker Hill Box. These studies suggest that both the bioavailability of lead and the contribution to blood lead levels per unit of soil/dust lead concentration (i.e., dose-response) have been remarkably consistent throughout the last 25 years, both before and after the smelter closure (in 1980) and during remedial activities. No compelling evidence exists to indicate that these conclusions are not applicable to the Basin (USEPA 1989a; USEPA 1990a).

The studies of dose-response relationships observed in the Bunker Hill Box assumed a typical daily soil/dust ingestion rate of 100 mg and the estimated lead intake included air, diet, and drinking water. An absorbed dose (i.e., lead uptake rate, μg/day) was calculated that yielded the observed blood lead levels, assuming the biokinetic parameters estimated by Kneip (Kneip et al. 1983). The parameters estimated by Kneip are used in the IEUBK Model. The result was a coefficient relating the estimated lead intake and uptake that represents the lead bioavailability from soil/dust. By solving for bioavailability in this way, any errors in the estimates of soil/dust lead concentration or soil/dust ingestion rates would proportionally change the bioavailability estimate because the mass of absorbed lead is the product of the lead concentration in soil/dust, the ingestion rate of soil/dust, and bioavailability.

Therefore, if the lead concentration or ingestion rate is overestimated, then this calculation would underestimate bioavailability proportionally.

This approach was applied to the exposure and blood lead data collected in the Bunker Hill Box from 1974 to 1989, which yielded estimates of lead bioavailability that ranged from 14 percent to 18 percent. These estimates formed the basis for using a value of 14 percent for bioavailability in developing the 1,000 mg/kg individual yard and 350 mg/kg community geometric mean threshold cleanup criteria for residential soils in the Bunker Hill Box (USEPA 1991a). This analysis was updated with an estimate of the geometric mean bioavailability (18 percent) for the data collected from 1988 to 1998. This value was used in the Five-Year Review of the Bunker Hill Box, and was the basis for the 18 percent value in the Box Model used in the Basin HHRA (IDHW 2000b, 2001a). The bioavailability of soil and dust are discussed at length in the HHRA, HHRA Response to Comments, Appendix Q to the HHRA, the 1999 Five-Year Review for the Populated Areas of the Box, and the Extended Response to Comments for the Five-Year Review (IDHW 2000b, 2001a, 2001b; USEPA 2000f).

Distribution of Lead Minerals Based on Historic Smelter Emissions Data

The meteorological effects on the dispersion of smelter emissions were extensively studied by the smelter owners in their development of the supplemental control system (SCS) for the complex. The difference between upwind and downwind impacts in the Silver Valley was small and the impacted area extended beyond the Bunker Hill Box in both directions. In addition to smelter emissions, other significant sources of airborne lead included transport of ore, concentrates, and tailings and use of large-scale mechanized materials handling equipment. Passive fugitive dust sources included windblown dust from exposed surfaces and inactive storage piles. Geographic and terrain-related phenomena had important effects on the source strength and the dispersion and deposition of particulate lead. Estimates of various source impacts also were developed to assess potential compliance strategies for the smelter prior to the time of closure. These analyses showed that different sources were dominant at different locations. Combining the estimated relative impacts with the oxide/sulfide content of the sources results in an estimate of the relative constituency at various locations. Airborne lead levels were estimated to range from 57 percent to 72 percent oxides and 28 percent to 43 percent sulfides between Cataldo and Wallace (IDHW 2001a; von Lindern 1980; and 1982). The data indicate that the ratio of lead oxides and sulfides in historic airborne particulate matter was comparable among the Bunker Hill Box and Basin communities.

Processes Affecting Speciation of Tailings-Derived Lead Minerals

Other contaminant migration processes were operating to mix, redistribute, and abrade lead particulate in soils and dusts throughout the valley, including releases of mine and mill tailings.

Prior to 1968, large masses of mine-related releases were discharged to local streams or flood plain locations in predominantly lead sulfide form. However, oxidized ores were also likely released because milling and extraction practices were primarily designed to capture galena from sulfide ore. Oxidized lead minerals present in the original ores also were likely discharged to tributaries of the Coeur d'Alene River. These waste materials were redistributed by the river, flood events, construction activities, or mineral recovery operations. During movement and weathering, the lead in mill tailings was subject to physical and chemical transformation through abrasion, pH changes, and exposure to the atmosphere and aerobic hydrologic environments. These conditions promoted decreased particle size and increased surface area, and enhanced oxidation and the transition from lead sulfide to oxidized species. As an example of the large quantity of lead released into the environment, between 48,000 and 90,000 tons of lead were removed from the 300-acre Smelterville Flats area in 1998 and 1999 (IDHW 2001b).

These transformation processes are important for lead sources of greatest concern to children's exposure. The soil and dust particles that adhere to skin are generally small, in the <150 micron range, and more available for ingestion because of frequent hand-to-mouth activity (Driver et al. 1989; Kissel et al. 1996). That is, smaller particles adhere to hands and are more likely to be ingested. Lead in mine tailings can occur as complexes adsorbed on particle surfaces, which are potentially more bioavailable than the underlying lead bearing minerals which may be otherwise poorly soluble (Brown et al. 1999). Common oxidation products of galena (lead sulfide PbS) include cerussite (lead carbonate $PbCO_3$), hydrocerussite ($Pb_3(CO_3)_2(OH)_2$), anglesite (lead sulfate $PbSO_4$), lead-bearing jarosites (iron hydroxy sulfates), and lead-bearing iron oxyhydroxides (Roussel et al. 2000). Weathering, which increases with surface area, favors oxidation products which can become more bioavailable over time compared to galena (Roussel et al. 2000).

In summary, the ratio of lead oxides and sulfides in Basin and Box soils are likely similar. It is unlikely that all smelter-related soil and dust lead is in an oxide form and equally unlikely that the soil and dust particles ingested by children, that originated as mining releases, are purely a sulfide form (Brown et al. 1999; von Lindern 1980; and 1982). This conclusion is consistent with the results of micro-probe analyses studies conducted in EPA Region 8 (Casteel et al. 1996a, 1996b, 1996c, 1996d, 1997a, 1997c, 1998, and 2001). Several tailings and sulfide ore wastes were found to be bioavailable. The results of the investigations suggest that the average (absolute) bioavailability ranged from 1 percent to 45 percent with the average of all wastes and soils tested being consistent with the 30 percent bioavailability default value used by EPA (USEPA 1999e). The 18 percent used in the Basin HHRA is on the low side of bioavailability observed across the range of potential sources and should be regarded as a minimum. The true value could be higher if ingestion rates are less than the IEUBK default or if lead concentrations in the 175 μm size fraction are biased high relative to the 250 μm size fraction.

3.7.8 Subtle Health Effects of Lead Exposure

Comment Summary:

Several comments expressed the opinion that there have been no observed cases of lead poisoning in the Basin since the Bunker Hill Smelter closed in 1981 and consequently that no public health emergency exists in the Basin.

EPA response:

EPA and IDEQ agree that lead exposures in the Basin are not a public health emergency. The health effect of greatest concern at blood lead levels observed in the Basin is lead's potential to cause subtle neurologic developmental effects in children. These effects are based on systematic observations of groups of children and would not be visibly apparent in any individual child.

Lead induced neurological effects and decreases in intelligence quotient (IQ) have been affirmed by multiple consensus reviews undertaken by the EPA, the NAS, the Centers for Disease Control and Prevention (CDC), and the Agency for Toxic Substances Disease Registry (CDC 1991; NAS 1993; DHHS 1999; USEPA 1986). The 1993 NAS committee report states:

> *The toxic effects of lead range from recently revealed subtle, subclinical responses to overt serious intoxication. It is the array of chronic effects of low-dose exposure that is of current public-health concern and that is the subject of this chapter. Overt, clinical poisoning still occurs, however, and is also discussed here. We have several reasons for emphasizing low-dose exposure. As recently noted by (Landrigan, 1989), the subtle effects of lead are bona fide impairments, not just inconsequential physiologic perturbations or slight decreases in reserve capacity.*

Recognition of low-dose health effects of lead and the need for primary prevention is accepted among mainstream medical groups (see the American Academy of Pediatrics Statement at: <http://www.aap.org/policy/re9815.html> or the CDC Lead Prevention Fact Sheet <http://www.cdc.gov/nceh/lead/factsheets/leadfcts.htm>). Recent studies have suggested that clinical treatment (chelation therapy), which effectively lowers blood lead levels in treated children, is unable to prevent subtle neurological health effects (Rogan et al. 2001). Furthermore, subtle health effects may occur at blood lead levels below 10 µg/dL. Correlation and regression analyses of data on blood lead levels and various health outcomes point to a spectrum of undesirable effects that become apparent in populations having a range of blood lead levels extending upward from 10 – 15 µg/dL. These include effects on heme metabolism and erythrocyte pyrimidine nucleotide metabolism, serum vitamin D levels, mental and physical development of infants and children, and blood pressure in adults (Rothenberg et al. 1999; USEPA 1990a, 1990b; Wasserman et al. 1994). Although correlations between blood lead levels and various health outcomes persist when examined across a range of blood lead levels extending below 10 µg/dL, the risks associated with blood lead levels below 10 µg/dL are less certain (Schwartz 1994). More recent literature lends further support to the possibility of adverse consequence of exposures that result from blood lead levels below 10 µg/dL (Lanphear et al. 2000). Although excessive lead exposure has been shown to adversely affect neurological development, lead is not the only determinant of IQ. Research has suggested that a developmentally enriched environment can combat lead-induced deficits (Schneider et al. 2001).

3.7.9 Community Support for the Selected Human Health Remedy

Comment Summary:

Several comments suggested that there is widespread community opposition to the human health remedy.

EPA response:

A wide range of community leaders and local citizens have participated in the various public forums throughout the development of the Basin RI/FS and Proposed Plan and submitted comments during the extended public comment period. While some local citizens, including some elected officials and community leaders, have expressed their opposition to the cleanup plan for residential areas in public forums, others have expressed their support and, in some cases, have requested a more aggressive cleanup plan. EPA and the State of Idaho have found that many Basin homeowners, when presented with specific information about residential cleanup, are receptive to participating in cleanup programs.

For example, since 1997, EPA has been conducting removal actions to address lead exposures to young children and pregnant women in the Basin. The removal program is voluntary and EPA notified community residents about the soil and drinking water sampling that was available through the program. From 1997 to 2001, approximately 275 Basin residents contacted EPA to have their homes sampled for potential cleanup. Those homeowners who met the removal program criteria were sampled, and those homes that exceeded the lead soil action level and drinking water action levels (for homes on private wells) were remediated. From 1997 to 2001, soil at approximately 223 residential properties was tested and cleanup actions were conducted at 91 residential yards, 7 schools and daycares, and 6 recreational areas. Drinking water treatment, municipal hook-up, or bottled water has been provided to approximately 28 residences. These yard removals represent approximately 10 percent of the estimated total number of yards with lead concentrations greater than 1,000 mg/kg in the Basin. In addition, the high-risk yard removals have reduced exposures to a significant percentage of Basin children because this program was focused primarily on homes where children or pregnant women reside.

Similarly, in the fall of 2000, IDEQ commissioned a telephone survey of residents in Kootenai and Shoshone counties that found that 51 percent of those surveyed agreed that lead contamination in residential yards is a serious health problem, 29 percent disagreed, and 20 percent were undecided.

A total of 488 residents were interviewed. More recently, during the Spring of 2002, a door-to-door survey conducted by IDEQ in the towns of Osburn and Wallace found that approximately 66 percent of the residents surveyed (176 out of 266) wanted their yards sampled to provide information regarding potential cleanup.

3.8 ECOLOGICAL ISSUES

3.8.1 Cleanup Criteria

Comment Summary:

Some comments questioned the basis at the 530 mg/kg lead benchmark for cleanup of Lower Basin soils/sediments.

EPA response:

There are no promulgated cleanup criteria or standards that are ARARs for the soil or sediment of the Upper Basin or Lower Basin. Lead is the main risk driver in the soil and sediment and accordingly, EPA has identified lead as the preferred metal to be used as a benchmark. Background lead concentrations in the soil and sediment of the Lower Basin are estimated to be 47.3 mg/kg while the mean concentrations of lead in soil and sediment in the impacted area of the Lower Basin are approximately 3500 to 4000 mg/kg.

To establish a benchmark cleanup criterion for sediment, EPA examined site-specific data and all other available relevant information. For sediment in the wetlands and lateral lakes areas of the Lower Basin, a site-specific lead level of 530 mg/kg has been identified by the United States Fish and Wildlife Service (USFWS) as the lowest observed adverse effects level (LOAEL) for waterfowl (Beyer, et al. 2000). The USFWS has noted that soil and sediment in 95 percent of the floodplain habitat area of the Lower Basin have lead concentrations greater than 530 mg/kg. Using all available lines of evidence, the EcoRA also estimated a range of sediment lead concentrations protective of aquatic birds and mammals. The lead concentrations potentially protective of aquatic birds and mammals include:

- 3.65 mg/kg - no observed adverse effects level (NOAEL) for protection of individuals
- 249 mg/kg - LOAEL for protection of populations
- 718 mg/kg - based on an ED_{20} for populations

Given the absence of promulgated criteria for metals in soil and sediment, EPA made a risk management decision to use the site-specific protective value of 530 mg/kg lead as the benchmark cleanup criterion for the soil and sediment in the Upper Basin and Lower Basin. This value is based upon recent data collected in the Coeur d'Alene Basin. It is also within the range of potentially protective values from the literature and other sites. While 530 mg/kg lead in soil/sediment may not be fully protective of all aquatic birds and mammals, it will address 95 percent of the habitat area. Only 5 percent of the impacted area in the Lower Basin is estimated to have lead concentrations between 530 mg/kg and background. For these reasons, EPA believes that selection of 530 mg/kg lead as the benchmark cleanup criterion for soil and sediment is technically the best alternative available at this time.

It is important to recognize that numerical cleanup criteria for soil and sediment may be revised as additional information becomes available. For example, EPA anticipates conducting studies to evaluate soil and sediment cleanup criteria that are protective of migratory birds in riparian and riverine habitats. As part of this effort, EPA Region 10 and USFWS are currently assessing concentrations in soil and sediment that would be protective of riparian songbirds. Any revisions to criteria would be documented in future decision documents.

3.8.2 Waterfowl Issues

Comment Summary:

Some comments expressed the belief that waterfowl populations in the Basin are increasing and questioned the need to take actions to protect waterfowl.

EPA response:

Waterfowl mortality in the Lower Basin due to ingestion of contaminated soil/sediment remains a concern, despite fluctuations in regional population size, because EPA is responsible under CERCLA for protecting the environment and because waterfowl mortality represents unacceptable “take” under terms of the Migratory Bird Treaty Act (MBTA). The MBTA is an ARAR for the Basin cleanup and requires EPA to consider both individuals and populations of waterfowl and other migratory birds.

There are many causes of mortality in animal populations, and population numbers vary from year to year due to many factors in addition to poisoning of adult animals. The Ecological Risk Assessment (EcoRA) and ROD (Section 7.2 of Part 2) focus on observed and expected effects of mining-related hazardous substances on health or reproduction of waterfowl and other ecological receptors. Waterfowl mortalities associated with the ingestion of contaminated sediments have been reported for decades. Nearly 80 percent of all waterfowl (including many swans) found dead or dying in the Coeur d’Alene River Basin were affected by lead poisoning due to the ingestion of lead-contaminated soil/sediment. While it is difficult to precisely count the number of impacted waterfowl because these birds are often scavenged by predators or hidden by vegetative cover, there were 13 times more tundra swans found sick or dead in the Coeur d’Alene Basin than in an adjacent reference area. Wildlife mortality information is presented in the report by Audet et al. (1999 [cited as 1999a in the EcoRA; the report was considered a “working draft” at the time it was referenced, but it is now available as a final report]), and in the Report of Injury Assessment and Injury Determination: Coeur d’Alene Basin

Natural Resource Damage Assessment, prepared for USFWS, USFS, and the Coeur d'Alene Tribe by Stratus Consulting (2000). Species in which lead poisoning has been documented in the Basin include mallard, wood duck, northern pintail, American wigeon, tundra swan, trumpeter swan, Canada goose, canvasback, redhead, common goldeneye, common merganser, and meadow vole. Chemical of concern (COC) concentrations protective for waterfowl are presented in Section 7.2 of Part 2 of the ROD.

Waterfowl species are at greater risk than many other kinds of wildlife because they obtain much of their food from among the contaminated sediments in the Basin, and they continue to die as a result of their exposure, especially to lead, as summarized in Section 7.2 of Part 2 of the ROD. The modeling done for the EcoRA estimated risks in various portions of the Basin and then provided estimates for soil/sediment concentrations that represented NOAEL-, LOAEL-, and ED20-based preliminary remedial goals (PRGs). These endpoints represent both individual- and population-based protective concentrations of metals. The estimates were based on multiple lines of evidence, including extensive field data (especially for waterfowl) and laboratory studies. Bioavailability of lead from sediment to waterfowl was measured in the laboratory study and was factored into the EcoRA exposure estimates.

Although remediation of contaminated areas in the Lower Basin will cause short-term disruption of the ecosystem, the long-term benefits of reducing waterfowl and other wildlife mortality due to lead poisoning support the decision to remediate the floodplain soil/sediment in some areas. Among the goals of remediation are the reduction of waterfowl exposures to contaminated sediments in the Lower Basin and the minimization of recontamination of those areas after they are remediated. Thus, actions are proposed for both the Lower Basin and upstream source areas.

3.8.3 Fish Issues

Comment Summary:

A number of comments expressed the opinion that fish populations were increasing and questioned the need to do additional cleanup work to protect fish.

EPA response:

While there are indications of slow recovery in some portions of the Coeur d'Alene Basin, other areas are still severely affected and recovery is not expected to occur within many years. Fish populations at various locations in the South Fork Coeur d'Alene River and its tributaries have been observed over a limited period of time. This information is documented in the EcoRA and the Technical Memorandum: Interim Fishery Benchmarks for the Initial Increment of Remediation in the Coeur d'Alene Basin (Final) (USEPA 2001d), and it is summarized in Section 7.2 of Part 2 of the ROD.

During the period for which data are available, fish population abundance and composition fluctuated due to the influence of natural and human-related influences. Nevertheless, fish population data for the South Fork and its tributaries show a clear abundance gradient between contaminated and uncontaminated areas. For example, fish populations on the South Fork are much lower below the confluence with Canyon Creek, where concentrations of hazardous substances are much higher than in the South Fork above the confluence. Similarly, fish populations in Canyon Creek above Burke are much higher than below Burke, where metal concentrations are higher. Exposure of aquatic organisms to metals was confirmed by the presence of elevated concentrations of metals in the tissues of fish and invertebrates in many portions of the Basin. Some species expected to be present (e.g., sculpin) are absent from areas of high metals contamination. In general, areas supporting the healthiest fish populations tended to have the highest abundance even in years when numbers on the whole were depressed. Conversely, areas with depressed fish populations continued to support very low numbers during years of both low and high abundance. Several available sources of invertebrate index data used in the EcoRA indicate that macroinvertebrate diversity is depressed in areas of the Coeur d'Alene Basin affected by mining contamination. For example, as many as 50 species of invertebrates were observed in surveys of the non-contaminated headwaters areas, whereas only 9 or 10 metals-tolerant species were observed in downstream areas. Long-term monitoring of aquatic populations will be required to identify trends in fish and invertebrate abundance in response to remediation, and is proposed in association with the ROD.

3.8.4 Special-Status Species

Comment Summary:

Several comments questioned the identification of certain special-status species.

EPA response:

In accordance with the Endangered Specifies Act (ESA), special-status species have been identified by USFWS. Risks to special status species (including federally listed endangered or threatened species, those identified by the USFWS as species of concern, state-listed sensitive plant species, and culturally significant plant species) were evaluated at the individual level as well as the population level, because these species are to be more stringently protected under the ESA or some other statute/policy guidance. Briefly, the EcoRA indicated no significant risks to several of these species (including the bald eagle, fisher, wolverine, gray wolf, or lynx), but some level of risk was determined to exist for several other wildlife species in at least one portion of the Basin (as summarized in Section 7.2 of Part 2 of the ROD).

3.8.5 Bull Trout

Comment Summary:

Several comments questioned whether bull trout are present in the Basin and suggested that it is, therefore, inappropriate to use bull trout as a species of concern.

EPA response:

Under the ESA, the USFWS has identified bull trout as a listed threatened species and the westslope cutthroat trout as a species of concern in the entire project area (as described in Section 7.2 of Part 2 of the ROD). Although bull trout are rare, they have been identified in parts of the Coeur d'Alene Basin. The affected area falls within the historic range of this species and remains accessible to existing populations. Bull trout populations are known to exist in the St. Joe River and Coeur d'Alene Lake, and bull trout have been observed in the North Fork Coeur d'Alene River. These fish have access to the South Fork Coeur d'Alene River and its tributaries, and could potentially re-colonize these habitats if limiting habitat and water chemistry conditions are addressed. Therefore, it was appropriate to examine risks to bull trout in the Basin from this perspective. Although the AWQC are generally protective for surface-water biota, in areas of low hardness (e.g., 10 mg/L as $CaCO_3$) the AWQC may not be fully protective of individuals of special-status species such as bull trout and cutthroat trout. EPA published an update to the AWQC for cadmium (66 FR 18935; April 12, 2001) at about the same time as final changes were being incorporated into the EcoRA, and it was not feasible to re-analyze risks to aquatic organisms in time to make corresponding changes in the final EcoRA. Revised protective concentrations for cadmium are, however, shown in Section 7.2 of Part 2 and in later sections of the ROD. In relatively soft waters of the Basin, the updated cadmium AWQC is lower than the 1998 cadmium AWQC used in the EcoRA, and use of the 2001 criterion would result in larger estimated cadmium risks to aquatic biota than the risks identified in the EcoRA if the risks were recalculated.

3.9 COEUR D'ALENE LAKE

3.9.1 Relationship Between Selected Remedy and Coeur d'Alene Lake

Comment Summary:

Some comments questioned why Coeur d'Alene Lake is not included in the Selected Remedy or mistakenly assumed it is.

EPA response:

The selected remedy does not include remedial actions for Coeur d'Alene Lake. State, tribal, federal, and local governments are currently in the process of implementing a Lake Management Plan outside of the Superfund process using separate regulatory authorities.

3.9.2 Lake Management Plan

Comment Summary:

A number of comments questioned whether the Lake Management Plan will be an enforceable and effective tool for maintaining and improving water quality in the lake. A number of comments expressed support for implementation of the Lake Management Plan, but questioned whether adequate funding would be available. Some viewed the lake management plan as an unfunded institutional control.

EPA response:

EPA is looking toward implementation of the Lake Management Plan by state, tribal, and local agencies under separate legal authorities outside of the Superfund process to reduce the probability of additional metals movement from the sediments at the lake bottom into the lake water. The Lake Management Plan was developed by the Coeur d'Alene Tribe, the State of Idaho Department of Environmental Quality, and the Clean Lakes Coordinating Council, the commissions of Kootenai, Benewah, and Shoshone Counties, Idaho, the U.S. Geological Survey, the Coeur d'Alene Basin Restoration Project, and the Panhandle Health District to protect the water quality of the lake.

The mechanism for funding of the Lake Management Plan is still under development. EPA will support the efforts of state, tribal, and local agencies to obtain funding for implementation of the plan. Funding will likely come from several sources, including the states, tribe, local agencies, and the federal government. The Lake Management Plan, however, is not an unfunded institutional control under Superfund because no Superfund action is being taken at this point (see response to comment 9.1 in Table 4-1).

3.9.3 Potential for Release of Metals from Coeur d'Alene Lake Bottom Sediments

Comment Summary:

A number of comments questioned whether the chemical processes controlling metals movement in the lake were fully understood and raised questions regarding what process(es) would lead to increased metals mobility in lake bed sediments.

EPA response:

The geochemistry within Coeur d'Alene Lake is complicated. The basin-wide monitoring plan will be used as a tool to evaluate conditions in the lake and elsewhere over time.

Based on available information, the association of heavy metals (e.g., cadmium, lead, and zinc) with metal (e.g., iron) oxides within the hypolimnion and shallow sediments is a very important process controlling metals movement in the lake. If oxygen within the lake becomes depleted, the metal oxides may be reduced (i.e., transformed into non-oxide forms), and the heavy metals associated with the oxides could be released into the water column. Nutrient enrichment would be the process most likely to cause oxygen depletion in the lake.

3.10 BUNKER HILL BOX

3.10.1 Bunker Hill Box as Source of Metal Contamination

Comment Summary:

A number of comments supported removal of dissolved metals to protect fish and identified the Bunker Hill Box as a major source that requires cleanup.

EPA response:

The Selected Remedy contains actions to reduce the concentrations of dissolved metals, particularly zinc and cadmium, that adversely affect fish. It is estimated the load of dissolved zinc entering the river system will be reduced by 580 pounds per day. This represents 26 percent of the zinc load entering Coeur d'Alene Lake from Basin sources outside of the Box. Monitoring of the Selected Remedy will help determine what additional actions are necessary to further reduce zinc loads. The Bunker Hill Box is a major source of dissolved metals; it represents about half the dissolved metals load in the South Fork at its confluence with the North Fork. Extensive remedial actions have been conducted within the Bunker Hill Box beginning in 1995 and are ongoing.

As discussed under 3.11.2 below, the Bunker Hill Box is not part of the Selected Remedy for Operable Unit 3.

3.10.2 Relationship Between the Bunker Hill Box and the Selected Remedy

Comment Summary:

Some comments questioned whether the Bunker Hill Box would be cleaned up as part of this ROD.

EPA response:

Although the Bunker Hill Box is part of the Basin and, as discussed in Section 10.2 of Part 2, is a major source of dissolved metals, the Box is not part of the Selected Remedy because it is already the subject of ongoing remedial actions selected in existing RODs for this area. EPA is approaching cleanup of the non-populated areas in the Bunker Hill Box in two phases. Phase 1 is focused on cleaning up known source areas. Phase 2, which is underway, includes evaluating the efficacy of Phase 1 and determining what additional remedies, including, for example, potential groundwater collection and treatment, are necessary. EPA will integrate actions in the Bunker Hill Box with those described in the Selected Remedy to effectively clean up the Coeur d'Alene Basin.

3.11 UNION PACIFIC RAILROAD

3.11.1 UPRR Cleanup in Relationship to the Selected Remedy

Comment Summary:

Some comments questioned whether the UPRR cleanup was intended to address all potential problems within the railroad right-of-way (ROW), and, if not, what will be done to address these problems.

EPA response:

As discussed in Section 2.3.1 of the Part 2 of the ROD, UPRR cleanup activities are continuing as mandated by the 2000 consent decree between the United States, the Coeur d'Alene Tribe, the State of Idaho and the Union Pacific Railroad (UPRR). This consent decree resulted from the engineering evaluation/cost analysis (EE/CA) conducted under CERCLA removal authority. UPRR has substantial obligations, including long-term obligations that extend in perpetuity. Furthermore, the United States has reserved its rights against UPRR in the event that previously unknown conditions or information arise.

The cleanup uses combinations of removal and disposal/consolidation of hazardous substances, placing protective barriers over hazardous substances, and institutional controls. Oversight of the UPRR cleanup is carried out by representatives of EPA, the Coeur d'Alene Tribe, and the State of Idaho.

The UPRR cleanup was intended to protect human health. In particular, the cleanup was intended to protect users of the recreational trail being constructed along the ROW, as well as protect trail maintenance workers and residents in proximity to the ROW. The UPRR cleanup was not intended to and does not cleanup all portions of the ROW. Additional actions may be warranted in portions of the ROW, particularly in floodplain areas that are susceptible to recontamination. As cleanup is implemented under the UPRR consent decree, the Selected Remedy of this ROD for the Coeur d'Alene Basin and any subsequent actions, results may indicate additional actions may be warranted in the ROW to protect against risks to human health and the environment. Such actions will be taken with the appropriate regulatory authority which, depending on the circumstances, may include the UPRR consent decree, another removal action, a remedial action, or some other action.

3.12 SPOKANE RIVER

3.12.1 Anticipated Water Quality Conditions in the Spokane River

Comment Summary:

Some comments questioned what degree of cleanup will be accomplished in the Spokane River and why more actions are not included for the Spokane River.

EPA response:

The long-term goal is to achieve AWQC in the Spokane River. Improvements to ambient surface-water quality will be closely tied to the pace and scope of the cleanup actions in the Lower Basin and Upper Basin as well as the long-term retention of metals in Coeur d'Alene Lake sediments. Although the remedial actions of the Selected Remedy will result in improved conditions in the Spokane River, the reality is there is some uncertainty in predicting exact cause and effect relationships for water quality improvements in the Spokane River. This argues for the adaptive management approach to cleanup under the Selected Remedy.

3.12.2 Sole-Source Spokane Valley-Rathdrum Aquifer

Comment Summary:

A number of comments were received expressing concern about potential contamination of the sole-source Spokane Valley-Rathdrum Prairie Aquifer (which has been designated as a sole-source aquifer) by metals. The comments noted that this aquifer is recharged by Coeur d'Alene Lake and parts of the upper Spokane River. Many of the comments requested monitoring of the recharge areas and plans to mitigate potential impacts, including those that might occur from sediment-rich floodwaters.

EPA response:

EPA recognizes the tremendous importance of the Spokane Valley-Rathdrum Prairie Aquifer to eastern Washington. EPA is developing a long-term monitoring plan that will include monitoring of Coeur d'Alene Lake and the Spokane River and their potential effects on the aquifer.

The Spokane Valley-Rathdrum Prairie Aquifer is recharged, in part, by infiltration from Coeur d'Alene Lake and the upper Spokane River. According to a study by Wyman (1993), about 30 percent of the recharge to the aquifer is from the lake and the river; although not quantified, the lake contributes most of the recharge via underflow.

While Coeur d'Alene Lake and the Spokane River contain levels of some metals that are potentially harmful to sensitive fish and aquatic organisms, the levels are well below the drinking water standards established under the Safe Drinking Water Act for protection of human health.

Metal	Drinking water standard, µg/L	Range of dissolved metals concentrations, µg/L	
		Spokane River	Coeur d'Alene Lake
Lead	15	0.3 to 1.2	0.2 to 4
Zinc	5,000	30 to 90	40 to 100
Cadmium	5	0.1 to 1	0.22 to 0.34
Arsenic	10	0.4 to 1.1	No data

The Lake Management Plan that will be pursued for Coeur d'Alene Lake is in part predicated on actions that are designed to minimize remobilization of metals from the bottom of the lake into the overlying water. Successful implementation of this plan will reduce the possibility that metals from the bottom of the lake will adversely affect downstream areas.

A surface water/groundwater interaction study in the upper Spokane River indicated that dissolved metals entering the aquifer from the river in this area are not migrating far beyond the river bank or are being quickly diluted by aquifer water (Marti and Garrigues, 2001). Concentrations of metals in the aquifer are substantially lower than the concentrations in the water of the lake and the river.

Floodwaters can transport relatively large amounts of sediment from the Coeur d'Alene River to the Spokane River. This sediment contains elevated levels of metals, such as lead, that bind to sediments, and some of the sediment typically is deposited in slack water areas along the Spokane River. Because the sediment-associated lead is relatively insoluble, it is not expected to pose a threat of contaminating the aquifer at levels of concern. As a part of remedy monitoring, EPA anticipates sampling depositional areas along the Spokane River after floods.

3.12.3 Cleanup Method for Sediments Behind the Upriver Dam

Comment Summary:

Comments were received from local government and utility representatives and the public expressing concern about the possible impacts of excavating sediments that have accumulated behind Upriver Dam. The comments postulated that existing sediments may limit infiltration of river water at this location. Possible adverse effects of sediment excavation, and the resulting potentially increased river water infiltration and short-term sediment mobilization, included:

- Impacts on dam integrity
- Impacts on nearby water supply wells

EPA response:

The ROD selects a combination of access controls, capping and sediment removals for this area; however, it does not specify the exact cleanup methods that will be used. These will be established following further study and engineering evaluation. The Washington Department of Ecology (Ecology) also has concerns about PCBs in the sediments behind Upriver Dam. EPA will coordinate with Ecology in the cleanup of the sediments. The engineering evaluation of sediment cleanup will include consideration of the potential effects of cleanup actions on dam stability and nearby water supply wells.

3.12.4 Remedies for Contaminated Sediments in Shoreline and Depositional Areas

Comment Summary:

A number of comments expressed concern about the remedies for contaminated sediments in shoreline and depositional areas of the Spokane River and indicated a preference for maximum removal of contaminated sediments.

EPA response:

The Selected Remedy identifies a combination of removals and capping of contaminated sediments on Spokane River beaches and accumulated behind Upriver Dam. Each of these areas will be the subject of a remedial design prior to implementation of the remedial action. The details of the remedial action will be determined during remedial design. In making that determination, a number of factors will be considered, including:

- the long-term maintenance requirements of capping
- the potential for recontamination
- cost

3.12.5 Protectiveness of Shoreline Remedies

Comment Summary:

A number of comments stated that the cleanup of the impacted shoreline areas in Washington needs to fully protect the public health and environmental health. Many of these comments further stated that, in case of recontamination, remedial action should be triggered by the same criteria triggering the initial cleanup. Many of the comments also expressed that cleanup of the Spokane River beaches should be a priority.

EPA response:

The Selected Remedy includes cleanup of beach areas upstream of Upriver Dam where lead is present in soil or sediment at a concentration exceeding 700 mg/kg. Based on the Spokane River screening-level risk assessment, this cleanup level, and therefore the remedy, will be protective of public health. The Selected Remedy also will achieve protection of environmental health through cleanup of shoreline areas that have been identified by the Washington State Department of Ecology as critical habitat areas and include sediments that contain metals at concentrations exceeding risk-based levels.

Cleanup of areas for protection of human health have been identified by EPA and stakeholders as a top priority for implementation of the Selected Remedy. Should shoreline areas in Washington become recontaminated, these areas would be addressed to ensure that human health continues to be protected.

3.12.6 PCBs in Sediments

Comment Summary:

A number of comments identified human health and environmental concerns related to the presence of PCBs in Spokane River sediments. Some comments suggested that risks related to PCBs were as great as or greater than those related to metals. Some comments called for EPA to coordinate cleanup for metals with any cleanup conducted for PCBs.

EPA response:

The RI/FS (including supporting risk assessments and technical memoranda) and Proposed Plan addressed mining contamination in the Coeur d'Alene Basin and Spokane River. The PCB contamination in the Spokane River sediments is not mining related and thus not part of the Proposed Plan or ROD.

Ecology is evaluating options for cleanup of PCBs. EPA will work with Ecology as practicable to ensure a coordinated cleanup of the Spokane River sediments that jointly addresses the PCB and mining-related metals contamination.

3.13 MONITORING

3.13.1 Monitoring as Part of the Selected Remedy for Ecological Improvement

Comment Summary:

A number of comments emphasized the importance of monitoring in the Basin and requested clarification of the role of monitoring in the Selected Remedy. The focus of these comments appeared to be on the ecological portions of the remedy.

EPA response:

Monitoring is a key part of the Selected Remedy for ecological improvement in the Basin. EPA, with stakeholder input, is in the process of developing the scope and details of a long-term monitoring program, which will be finalized after the ROD and coordinated with remedial design. As part of this process, EPA intends to balance the wide range of viewpoints on monitoring while meeting the legal requirements of CERCLA. Goals of the Basin-wide monitoring are to ensure that adequate data are collected to evaluate the effectiveness of remedial actions, progress towards the benchmarks and areas for improvement, and gain a better understanding of Basin processes and data variability. Some of this monitoring will be conducted routinely to examine the efficacy of the remedies over time; other portions will be tailored to specific parts of the remedies. The monitoring will provide data for EPA to conduct the CERCLA-required five-year reviews of the progress of remedy implementation.

3.13.2 Monitoring of Fish in Coeur d'Alene Lake and the Spokane River

Comment Summary:

A number of comments called for monitoring of fish in Coeur d'Alene Lake and the Spokane River. Many of these comments emphasized potential risks to persons, particularly low-income and subsistence users, that consume relatively large quantities of fish caught in these water bodies.

EPA response:

EPA agrees that further study is needed to evaluate potential risks to persons that consume large amounts of fish caught in the Spokane River or the Lake. EPA and the Spokane and Coeur d'Alene Tribes are cooperating in planning additional testing and studies to evaluate these exposures. Sampling of fish in Coeur d'Alene Lake was conducted in the spring and summer of 2002, and it is anticipated the results of testing will be available in early 2003.

Table 3.7-1
Summary Statistics for Environmental Variables for Two Data Sets
(all environmental data versus the subset of environmental data paired with blood lead measurements)

Area	Stat	Mat Lead (mg/kg)		Lead Loading (µg/m2/day)		Soil Lead (mg/kg)		Vacuum Lead (mg/kg)		Interior Mean Paint Lead (mg/cm2)		Exterior Mean Paint Lead (mg/cm2)	
		All Homes	All Children	All Homes	All Children	All Homes	All Children	All Homes	All Children	All Homes	All Children	All Homes	All Children
KINGSTON	N	48	14	42	10	99	44	30	25	37	7	40	10
	MIN	63	145	0.06	0.19	22	57	102	102	0.00	0.00	0.00	0.00
	MAX	15500	3505	6.31	3.78	9228	753	1750	1750	0.57	0.06	8.60	1.65
	GEOMEAN	610	660	0.74	0.96	257	207	466	326	0.02	0.02	0.03	0.18
	GSD	2.69	2.96	3.26	3.32	3.34	2.35	2.07	1.81	7.23	5.15	15.65	12.07
LOWER BASIN	N	110	18	109	18	160	38	31	15	104	23	102	22
	MIN	22	55	0.02	0.04	15	15	49	68	0.00	0.00	0.00	0.00
	MAX	4805	4805	29.75	22.52	7350	7350	3140	3140	7.85	0.12	0.93	0.21
	GEOMEAN	318	263	0.48	0.56	110	104	301	221	0.01	0.01	0.04	0.03
	GSD	3.26	3.24	4.41	6.47	4.29	6.04	2.81	3.59	6.28	3.29	5.12	4.99
MULLAN	N	47	10	40	9	105	27	32	14	43	13	43	13
	MIN	278	892	0.43	0.66	40	215	429	557	0.00	0.00	0.00	0.00
	MAX	4460	2800	10.47	4.79	20217	5620	4060	4060	0.72	0.27	2.83	2.83
	GEOMEAN	1242	1301	1.52	1.34	628	930	985	1385	0.03	0.03	0.10	0.04
	GSD	1.78	1.45	2.04	2.13	2.91	2.49	1.70	2.03	6.69	5.58	7.03	11.71
BURKE/ NINE MILE	N	54	33	37	27	88	70	35	33	38	38	39	38
	MIN	173	691	0.30	0.96	32	37	83	83	0.00	0.00	0.00	0.00
	MAX	59498	27601	87.17	45.70	5410	5410	5800	5800	2.14	2.14	4.70	4.70
	GEOMEAN	1781	2044	4.28	6.07	679	628	879	906	0.02	0.04	0.05	0.22
	GSD	2.86	2.60	4.43	3.81	3.25	4.01	2.63	2.72	10.15	11.87	12.92	11.67
OSBURN	N	98	35	73	27	262	95	84	48	81	46	79	45
	MIN	202	517	0.19	0.35	33	76	23	82	0.00	0.00	0.00	0.00
	MAX	42045	6020	66.16	3.91	12883	4251	2192	1340	0.35	0.28	4.28	0.51
	GEOMEAN	882	990	0.88	1.06	419	532	493	328	0.02	0.02	0.06	0.05
	GSD	1.94	1.81	2.49	1.91	2.45	2.34	2.17	2.26	6.38	6.51	8.87	6.45
SIDE GULCHES	N	53	19	47	16	100	45	26	14	52	28	53	28
	MIN	167	281	0.17	0.17	25	31	116	162	0.00	0.00	0.00	0.00
	MAX	8840	2103	21.37	5.73	3356	1200	3929	1646	0.34	0.25	1.67	1.67
	GEOMEAN	842	651	1.13	1.18	368	197	695	493	0.02	0.03	0.04	0.03
	GSD	2.11	1.78	2.55	4.06	2.38	2.65	2.21	1.78	7.83	7.67	7.19	8.08
SILVERTON	N	22	28	19	27	70	69	26	37	23	35	24	35
	MIN	326	374	0.28	0.42	94	94	75	75	0.00	0.00	0.00	0.00
	MAX	3658	1458	9.45	2.69	6098	1690	3390	3390	0.57	0.28	1.83	1.58
	GEOMEAN	863	859	1.10	1.21	352	356	557	660	0.05	0.11	0.08	0.16
	GSD	1.93	1.58	2.42	1.95	2.25	2.24	2.52	2.23	6.56	3.76	8.24	4.75
WALLACE	N	42	12	33	6	110	56	35	19	37	26	37	26
	MIN	604	716	0.35	1.17	54	65	259	681	0.00	0.01	0.01	0.01
	MAX	47624	3440	158.27	4.78	16027	3020	29724	3300	1.23	1.20	9.90	3.40
	GEOMEAN	1774	1404	2.63	2.31	771	866	1004	1059	0.08	0.08	0.22	0.12
	GSD	2.54	1.69	3.14	1.60	2.47	2.10	2.33	1.48	5.26	3.64	7.89	4.20

Table 3.7-2a

IEUBK Batch Mode Overall Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-84 Months: Default and 40:30:30 - with repeat observations

	Mullan			Burke/Nine Mile			Wallace			Silverton		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	15	15	15	46	46	46	39	39	39	55	55	55
Minimum (µg/dl)	2	5	4	1	4	3	1	6	4	2	2	2
Maximum (µg/dl)	12	16	9	21	27	17	19	21	13	23	19	11
Arithmetic Mean (µg/dl)	5.5	10.2	6.4	7.8	10.2	6.6	6.1	10.0	6.5	5.5	7.3	4.7
Geometric Mean (µg/dl)	4.7	9.7	6.1	6.3	9.2	6.1	5.2	9.6	6.3	4.6	6.7	4.5
Geometric Standard Deviation	1.75	2.08	1.73	1.98	1.76	1.78	1.82	1.64	1.70	1.81	1.86	1.79
% ≥ 10 µg/dl	13%	48%	19%	22%	44%	20%	13%	47%	19%	11%	26%	8%
% ≥ 15 µg/dl	0%	22%	5%	15%	22%	7%	5%	20%	5%	5%	10%	2%

IEUBK Batch Mode Overall Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-84 Months: Default and 40:30:30 (continued)

	Osburn			Side Gulches			Kingston			Lower Basin			Total		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	62	62	62	30	30	30	36	36	36	28	28	28	311	311	311
Minimum (µg/dl)	1	3	2	1	2	2	1	2	2	1	2	2	1	2	2
Maximum (µg/dl)	11	14	8	9	14	8	16	9	5	18	28	16	23	28	17
Arithmetic Mean (µg/dl)	4.6	6.2	4.2	4.0	6.1	4.2	5.7	5.0	3.4	6.9	7.0	4.5	5.7	7.6	5.0
Geometric Mean (µg/dl)	4.0	5.7	4.0	3.6	5.7	4.0	4.3	4.7	3.3	4.9	4.5	3.2	4.6	6.6	4.5
Geometric Standard Deviation	1.77	1.86	1.74	1.64	1.79	1.73	2.17	1.83	1.72	2.40	2.68	2.81	1.93	2.02	1.90
% ≥ 10 µg/dl	5%	19%	5%	0%	17%	5%	17%	11%	2%	32%	21%	14%	13%	28%	11%
% ≥ 15 µg/dl	0%	6%	1%	0%	5%	1%	17%	2%	0%	11%	16%	7%	7%	12%	3%

Note: observed levels are for children 9-84 months or 0-7 years old as opposed to community mode showing observed levels for 0-9 year olds.

Table 3.7-2b
IEUBK Batch Mode Overall Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-84 Months: Default and 40:30:30 - without repeat observations

NO REPEATS

	Mullan			Burke/Nine Mile			Wallace			Silverton		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	15	15	15	37	37	37	35	35	35	36	36	36
Minimum (µg/dl)	2	5	4	1	4	3	1	6	4	2	3	2
Maximum (µg/dl)	12	16	9	20	27	17	19	21	13	23	17	10
Arithmetic Mean (µg/dl)	5.5	10.2	6.4	7.4	10.5	6.7	6.1	10.2	6.6	6.1	7.4	4.8
Geometric Mean (µg/dl)	4.7	9.7	6.1	6.1	9.5	6.2	5.1	9.8	6.4	5.1	6.8	4.6
Geometric Standard Deviation	1.75	2.08	1.73	1.90	1.72	1.80	1.85	1.60	1.70	1.81	1.87	1.77
% ≥ 10 µg/dl	13%	48%	19%	19%	46%	21%	14%	48%	20%	14%	27%	8%
% ≥ 15 µg/dl	0%	22%	5%	11%	24%	8%	6%	22%	6%	8%	10%	2%

IEUBK Batch Mode Overall Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-84 Months: Default and 40:30:30 (continued)

	Osburn			Side Gulches			Kingston			Lower Basin			Total		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	52	52	52	23	23	23	32	32	32	26	26	26	256	256	256
Minimum (µg/dl)	1	3	2	1	2	2	1	2	2	1	2	2	1	2	2
Maximum (µg/dl)	11	14	8	9	14	8	16	9	5	18	28	16	23	28	17
Arithmetic Mean (µg/dl)	4.7	6.4	4.3	4.2	6.2	4.3	5.9	4.9	3.4	6.6	6.0	3.9	5.8	7.6	5.0
Geometric Mean (µg/dl)	4.1	5.9	4.1	3.7	5.8	4.1	4.4	4.6	3.3	4.7	3.98	2.9	4.7	6.6	4.5
Geometric Standard Deviation	1.75	1.88	1.75	1.75	1.81	1.73	2.24	1.83	1.71	2.42	2.45	2.62	1.94	2.06	1.91
% ≥ 10 µg/dl	6%	20%	5%	0%	18%	5%	19%	10%	2%	31%	15%	10%	14%	28%	11%
% ≥ 15 µg/dl	0%	7%	1%	0%	5%	1%	13%	2%	0%	12%	12%	6%	6%	12%	3%

Note: observed levels are for children 9-84 months or 0-7 years old as opposed to community mode showing observed levels for 0-9 year olds.

Table 3.7-3a
IEUBK Batch Mode Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-60 Months: Default and 40:30:30 - with repeat observations

	Mullan			Burke/Nine Mile			Wallace			Silverton		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	8	8	8	31	31	31	26	26	26	46	46	46
Minimum (µg/dl)	2	8	5	2	4	4	2	7	5	2	3	2
Maximum (µg/dl)	12	13	8	21	27	17	19	21	13	23	19	11
Arithmetic Mean (µg/dl)	6.8	10.9	6.9	7.9	11.1	7.2	7.0	10.9	7.2	6.0	7.8	5.0
Geometric Mean (µg/dl)	5.8	10.7	6.8	6.3	10.0	6.7	6.0	10.6	7.1	5.0	7.2	4.8
Geometric Standard Deviation	1.87	1.64	1.65	1.98	0.98	1.77	1.79	1.79	1.66	1.78	1.81	1.75
% ≥ 10 µg/dl	25%	56%	22%	23%	48%	24%	19%	54%	25%	13%	29%	10%
% ≥ 15 µg/dl	0%	25%	6%	16%	26%	9%	8%	25%	7%	7%	12%	2%

IEUBK Batch Mode Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-60 Months: Default and 40:30:30 (continued)

	Osburn			Side Gulches			Kingston			Lower Basin			Total		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	43	43	43	23	23	23	27	27	27	18	18	18	222	222	222
Minimum (µg/dl)	1	3	3	1	3	2	1	3	2	1	2	2	1	2	2
Maximum (µg/dl)	11	14	8	9	14	8	16	9	5	18	28	16	23	28	17
Arithmetic Mean (µg/dl)	5.0	6.5	4.4	4.2	6.6	4.5	6.7	5.6	3.8	8.2	9.3	5.7	6.3	8.2	5.4
Geometric Mean (µg/dl)	4.3	6.1	4.3	3.8	6.3	4.4	5.4	5.3	3.7	6.2	5.7	4.1	5.1	7.2	4.9
Geometric Standard Deviation	1.80	1.83	1.71	1.61	1.75	1.69	2.03	1.79	1.68	2.31	3.27	3.11	1.90	1.96	1.86
% ≥ 10 µg/dl	7%	20%	6%	0%	20%	6%	22%	14%	3%	39%	32%	21%	16%	31%	13%
% ≥ 15 µg/dl	0%	7%	1%	0%	6%	1%	15%	3%	0%	17%	25%	11%	8%	14%	4%

Note: observed levels are for children 9-60 months or 0-5 years old.

Table 3.7-3b
IEUBK Batch Mode Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-60 Months: Default and 40:30:30 - without repeat observations

NO REPEATS

	Mullan			Burke/Nine Mile			Wallace			Silverton		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	8	8	8	24	24	24	23	23	23	31	31	31
Minimum (µg/dl)	2	8	5	2	4	4	2	8	6	2	3	2
Maximum (µg/dl)	12	13	8	20	27	17	19	21	13	23	17	10
Arithmetic Mean (µg/dl)	6.8	10.9	6.9	7.1	11.6	7.5	7.0	11.2	7.4	6.5	7.9	5.1
Geometric Mean (µg/dl)	5.8	10.7	6.8	6.0	10.4	6.9	5.9	10.9	7.3	5.4	7.4	4.9
Geometric Standard Deviation	1.87	1.64	1.65	1.81	1.88	1.79	1.83	1.75	1.65	1.80	1.82	1.73
% ≥ 10 µg/dl	25%	56%	22%	17%	51%	26%	22%	56%	26%	16%	31%	10%
% ≥ 15 µg/dl	0%	25%	6%	8%	28%	11%	9%	27%	8%	10%	12%	2%

IEUBK Batch Mode Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-60 Months: Default and 40:30:30 (continued)

	Osburn			Side Gulches			Kingston			Lower Basin			Total		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	38	38	38	19	19	19	25	25	25	16	16	16	184	184	184
Minimum (µg/dl)	1	3	3	1	3	2	1	3	2	1	2	2	1	2	2
Maximum (µg/dl)	11	14	8	9	14	8	16	9	5	18	28	16	23	28	17
Arithmetic Mean (µg/dl)	5.1	6.7	4.5	4.4	6.6	4.6	6.9	5.4	3.7	7.9	7.9	5.0	6.3	8.2	5.4
Geometric Mean (µg/dl)	4.4	6.2	4.4	3.9	6.3	4.4	5.5	5.1	3.6	5.8	4.9	3.6	5.2	7.2	4.9
Geometric Standard Deviation	1.74	1.85	1.72	1.68	1.77	1.70	2.07	1.78	1.68	2.38	2.79	2.88	1.88	2.01	1.88
% ≥ 10 µg/dl	8%	22%	6%	0%	21%	6%	24%	12%	2%	38%	24%	17%	17%	32%	13%
% ≥ 15 µg/dl	0%	7%	1%	0%	6%	1%	16%	3%	0%	19%	19%	9%	8%	14%	4%

Note: observed levels are for children 9-60 months or 0-5 years old.

Table 3.7-4a
IEUBK Batch Mode Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-24 Months: Default and 40:30:30 - with repeat observations

	Mullan			Burke/Nine Mile			Wallace			Silverton		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	4	4	4	10	10	10	8	8	8	16	16	16
Minimum (µg/dl)	5	10	7	2	8	6	3	8	6	3	4	3
Maximum (µg/dl)	11	13	8	20	27	17	16	15	9	23	17	10
Arithmetic Mean (µg/dl)	7.8	12.1	7.8	9.1	15.0	9.6	8.1	11.4	7.7	7.5	8.5	5.5
Geometric Mean (µg/dl)	7.4	12.1	7.8	6.6	13.7	9.0	7.0	11.2	7.6	6.1	7.9	5.3
Geometric Standard Deviation	1.44	1.61	1.61	2.39	2.00	1.70	1.83	1.64	1.64	1.86	1.85	1.74
% ≥ 10 µg/dl	25%	65%	30%	30%	67%	42%	38%	59%	29%	19%	35%	13%
% ≥ 15 µg/dl	0%	33%	8%	30%	44%	20%	13%	28%	8%	19%	15%	3%

IEUBK Batch Mode Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-24 Months: Default and 40:30:30 (continued)

	Osburn			Side Gulches			Kingston			Lower Basin			Total		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	14	14	14	9	9	9	7	7	7	7	7	7	75	75	75
Minimum (µg/dl)	2	3	3	2	5	4	2	3	2	3	2	2	2	2	2
Maximum (µg/dl)	11	12	8	9	14	8	15	9	5	18	25	15	23	27	17
Arithmetic Mean (µg/dl)	6.5	6.2	4.5	5.2	7.4	5.0	7.7	6.5	4.3	8.7	8.9	5.6	7.5	9.2	6.1
Geometric Mean (µg/dl)	6.0	5.7	4.3	4.8	7.0	4.9	6.3	6.1	4.2	7.1	5.5	4.0	6.2	7.9	5.5
Geometric Standard Deviation	1.55	1.87	1.73	1.55	1.72	1.69	2.03	1.82	1.67	2.04	2.88	3.07	1.82	2.08	1.91
% ≥ 10 µg/dl	14%	18%	6%	0%	26%	9%	29%	20%	4%	43%	29%	21%	23%	37%	17%
% ≥ 15 µg/dl	0%	6%	1%	0%	9%	2%	14%	5%	1%	14%	23%	12%	12%	19%	6%

Note: observed levels are for children 9-24 months or 0-2 years old.

Table 3.7-4b
IEUBK Batch Mode Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-24 Months: Default and 40:30:30 - without repeat observations

NO REPEATS

	Mullan			Burke/Nine Mile			Wallace			Silverton		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	4	4	4	9	9	9	8	8	8	15	15	15
Minimum (µg/dl)	5	10	7	2	8	6	3	8	6	3	4	3
Maximum (µg/dl)	11	13	8	20	27	17	16	15	9	23	17	10
Arithmetic Mean (µg/dl)	7.8	12.1	7.8	8.0	14.9	9.6	8.1	11.4	7.7	7.8	8.7	5.6
Geometric Mean (µg/dl)	7.4	12.1	7.8	5.9	13.4	8.9	7.0	11.2	7.6	6.4	8.1	5.4
Geometric Standard Deviation	1.44	1.61	1.61	2.31	2.09	1.70	1.83	1.64	1.64	1.84	1.88	1.75
% ≥ 10 µg/dl	25%	65%	30%	22%	66%	41%	38%	59%	29%	20%	37%	13%
% ≥ 15 µg/dl	0%	33%	8%	22%	42%	20%	13%	28%	8%	20%	16%	3%

IEUBK Batch Mode Observed vs. Predicted Blood Lead by Geographic Area, Ages 9-24 Months: Default and 40:30:30 (continued)

	Osburn			Side Gulches			Kingston			Lower Basin			Total		
	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)	Observed	Predicted (Default)	Predicted (40:30:30)
N	13	13	13	9	9	9	7	7	7	7	7	7	72	72	72
Minimum (µg/dl)	2	3	3	2	5	4	2	3	2	3	2	2	2	2	2
Maximum (µg/dl)	11	12	8	9	14	8	15	9	5	18	25	15	23	27	17
Arithmetic Mean (µg/dl)	6.5	6.3	4.5	5.2	7.4	5.0	7.7	6.5	4.3	8.7	8.9	5.6	7.4	9.2	6.1
Geometric Mean (µg/dl)	5.9	5.8	4.4	4.8	7.0	4.9	6.3	6.1	4.2	7.1	5.5	4.0	6.2	7.9	5.5
Geometric Standard Deviation	1.57	1.88	1.73	1.55	1.72	1.69	2.03	1.82	1.67	2.04	2.88	3.07	1.81	2.08	1.90
% ≥ 10 µg/dl	15%	19%	7%	0%	26%	9%	29%	20%	4%	43%	29%	21%	22%	38%	17%
% ≥ 15 µg/dl	0%	7%	1%	0%	9%	2%	14%	5%	1%	14%	23%	12%	11%	19%	6%

Note: observed levels are for children 9-24 months or 0-2 years old.

Table 3.7-5a
General Linear Model and Regression Coefficients for Blood Lead and Environmental Sources - with repeat observations

Dependent Variable: BLPB
R-Square=0.597 (P<0.0001)
N=126

Variable	Estimate	Pr>F	Standardized Estimate
Intercept	2.8644	0.0032	0.0000
AGE	-0.3351	0.0007	-0.2056
SOILPB	0.0007	0.0012	0.2249
LEADLD	0.1638	0.0006	0.3212
EXTMED	0.5176	0.0005	0.2742
INTCCMIN	1.9230	0.0008	0.2313

Table 3.7-5b
General Linear Model and Regression Coefficients for Blood Lead and Environmental Sources - without repeat observations

Dependent Variable: BLPB
R-Square=0.598 (P<0.0001)
N=97

Variable	Estimate	Pr>F	Standardized Estimate
Intercept	3.0020	0.0072	0.0000
AGE	-0.3261	0.0056	-0.1907
SOILPB	0.0005	0.0435	0.1635
LEADLD	0.1895	0.0006	0.3803
EXTMED	0.4572	0.0083	0.2365
INTCCMIN	2.0071	0.0023	0.2401

Table 3.7-6
Blood Lead Declines in National Surveys, Smelterville, and Kellogg

Time Period	Geometric mean µg/dL	Annualized Decline using mid-points of study periods µg/dL per year
National Blood Lead Levels		
1976-80	15.0	--
1988-91	3.6	1.0 (Annest et al. 1983)
1991-94	2.7	0.3 (Brody et al. 1994)
1999	2.0	0.1 (Pirkle et al. 1998)
1978-99		0.6 (CDC 2000)
Smelterville Blood Lead Levels		
1975	44.8	--
1989-90 midpoint	11	2.3 (IDHW 2000b)
1992-93 midpoint	6.6	1.5 (IDHW 2000b)
1999	3.6	0.5 (IDHW 2000b)
1975-99		1.7 (IDHW 2000b)
Kellogg Blood Lead Levels		
1975	37.4	--
1989-90 midpoint	8.8	2.0 (IDHW 2000b)
1992-93 midpoint	6.1	0.9 (IDHW 2000b)
1999	3.7	0.4 (IDHW 2000b)
1975-99		1.4 (IDHW 2000b)

4.0 RESPONSES TO INDIVIDUAL COMMENTS

In Section 4.0 of the Responsiveness Summary, EPA's responses to individual comments are presented. The comments and responses are organized alphabetically by the last name of the person providing the comment in Table 4-1. Each comment was assigned a unique comment number. Many commenters submitted more than one comment, and an individual comment number was assigned to each of these comments.

Many comments addressed similar issues. In this case, the response for a given issue is provided once, and additional comments addressing the same issue are referenced to the comment number where this response is provided. These referenced responses are organized in numerical order by comment number in Table 4-2. When using Table 4-2, the user should be aware that in some cases the reference responses may address more issues than those raised in the user's comment. In these cases, it is expected that the user will be able to identify those parts of the referenced response applicable to his or her comment. In other cases, a comment may raise multiple issues. In such a case, a user may be referred to multiple reference responses for a complete response to all issues raised. An overview of issues raised and EPA's responses is provided in Section 3.0.

A small number of written comments were illegible and some oral comments were inaudible. EPA has included these comments in this section and has attempted to respond to such 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.

Following Table 4-2 is a list of references used in the responses to comments related to the human health remedy.