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Dear Ms. Eckman,

Thank you for this opportunity to comment on the draft cleanup proposal for the Coeur d'Alene Basin.

I am a Spokane physician and serve as the Sierra Club's conservation chair for Idaho and eastern Washington. Since 1983 I have been involved with environmental issues in the Spokane River watershed. For 14 years I have been concerned about, and involved with efforts to remedy toxic mine wastes polluting the Spokane River watershed.

My comments are submitted on behalf of the Sierra Club's Upper Columbia River Group. The Sierra Club has about 700,000 members, 1,680 of whom live in the Idaho Panhandle and northeastern Washington. The Sierra Club was formed in 1892. Regional offices are located in Boise, Spokane, and Seattle; the national office, in San Francisco. The Sierra Club's mission is to explore, enjoy, and protect the wild places of the earth; practice and promote the responsible use of the earth's ecosystems and resources; educate and enlist humanity to protect and restore the quality of the natural and human environment; and use all lawful means to carry out these objectives.

My comments are organized into the following thirteen areas:

(1) The final plan should include a brief discussion of the 100-year history to stop the pollution;
(2) Lessons are offered from a chronic disease paradigm;
(3) Washington should have an equal role with Idaho;
(4) EPA should retain oversight of the cleanup, and be held accountable;

(5) Deficiencies at the Bunker Hill Superfund Site should not be expanded throughout the Coeur d'Alene Basin;
(6) Delaying the cleanup risks further polluting Washington waters;
(7) Lake Coeur d'Alene should not be delisted as a Superfund Site until it is cleaned up;
(8) Washington's polluted beaches need to be cleaned up;
(9) To reduce Zinc loading, further remediation is needed at Bunker Hill;
(10) The final plan need to restore Forests to reduce toxic floods;
(11) Idaho's "Killing Fields" need to be clean-up;
(12) A science-based monitoring plan needs to be adopted for the Basin; and
(13) National standards for residential soils and house dusts should be adopted to protect the Public Health, and medical expertise developed for the Coeur d'Alene Basin.

(1) The final plan should include a brief discussion of the 100-year history to stop the pollution.

The draft Cleanup Plan summarizes the history of the mining and resultant pollution:

> Mining within the Coeur d'Alene Basin began more than 100 years ago. The basin has been one of the leading silver, lead, and zinc-producing areas in the world, with production of approximately 1.2 billion ounces of silver, 8 million tons of lead, and 3.2 million tons of zinc (Long 1998). The region surrounding the South Fork has produced over 97 percent of the ore mined in the basin (SAIC 1993). The Bureau of Land Management (BLM) has identified nearly 900 mining or milling-related features in the region surrounding the South Fork (BLM 1999). [Overview 1-5]
>
> An estimated 62 million tons of tailings were discharged to streams from the beginning of ore processing in 1884 until discharge to streams was discontinued in 1968. The tailings contained an estimated 880,000 tons of lead and more than 720,000 tons of zinc (Long 1998). [Overview 1-6]
>
> By the 1950s, mine tailings piped from the river covered 2,000 acres of the Cataldo Mission Flats to an average depth of 25 to 30 feet. Sediment dredging, pumping 7,000 gallons of water per minute, and excavating some 500 tons of contaminated river sediments per day continued until 1968. Approximately 72 million tons of this sediment contaminated with mine tailings have been discharged into the Coeur d'Alene River (Krieger 1990, Weston 1989). [Human Health Alternatives 1-8]

The draft cleanup plan does mention some of the past efforts at protecting human health and the environment:

> Based on the 1983 Lead Health Study, a comprehensive program of intervention and risk reduction was established in 1985 for the Bunker Hill area. The program consisted of a combination of efforts including in-home intervention, annual blood lead monitoring, public awareness efforts, and targeted remediation activities (including remediation of residential yards). These efforts have continued for more than 15 years. [Human Health Alternatives 1-7]

EPA's cleanup plan for the Coeur d'Alene Basin is part of a continuum of efforts to stop the pollution.

In 1884 mining companies started dumping the pollution into the waters. In the early 1900s farmers began to sue the mining companies for poisoning their farms and killing their livestock. Starting in 1929 the *Coeur d'Alene Press* published its "Valley of Death" series focusing on the dumping and the threat to Lake Coeur d'Alene. The *Press*' investigative journalism prompted a political outcry that led to the 1930s scientific investigation led by Dr. M.M. Ellis. Dr. Ellis' scientific team concluded that the mining companies should stop the dumping. But still the dumping continued, and was not curtailed until 1968. Thus was the Spokane River system polluted with toxic mine wastes.

The final cleanup plan should contain a history discussing the efforts by farmers, the Coeur d'Alene community, and others to stop the dumping that spans nearly 100 years. There are several excellent references on this matter, including: Nicholas A. Casner, "Toxic River: Politics and Coeur d'Alene Mining Pollution in the 1930's" in *Idaho Yesterdays*, Idaho State Historical Society, Fall, 1991, Vol. 35, No. 3.

(2) Lessons from a Chronic Disease Paradigm

As is clear from the EPA's draft cleanup plan, there is no easy cure for the toxins dumped by mining companies into this river ecosystem. The challenges facing the public and governments can best be understood using a chronic disease paradigm. Chronic diseases are characterized by the lack of any immediate cure, the need for interventions over prolonged periods of time, monitoring, and treatment strategies that are often expensive.

A chronic disease model is instructive and applicable to a pollution problem of this scope. A final cleanup plan should contain scientifically defensible basin-wide cleanup goals, discrete interventions in the various watersheds and over time to achieve these cleanup goals, and systematic monitoring that yields scientifically valid information to assess the effectiveness of the interventions demonstrating progress toward achieving the goals. A cleanup plan is needed that adequately treats "the disease": the heavy metal pollution.

We also need a government agency to implement the plan that is authorized, funded, and accountable for results.

People react to bad news in fairly characteristic ways, and the public reaction to the bad diagnosis for the Coeur d'Alene Basin is no exception. This is perhaps best described by Elisabeth Kubler-Ross's seminal book "On Death and Dying." In response to bad news people experience denial, anger, bargaining, depression, and eventually acceptance. . ["On Death and Dying" Macmillan Publishing Co, 1969]

(3) Washington should have an Equal Role with Idaho.

The pollution knows no state boundaries (indeed, mining companies started dumping in 1884 before there even was a state boundary). The upstream cleanup in Idaho will impact Washington downstream. Washington and Idaho should have an equal voice. Decisions should also fully involve the Coeur d'Alene Tribe and Spokane Tribe whose ancestral homelands and waters are polluted by the mine wastes.

(4) EPA should retain oversight of the Cleanup, and be held Accountable.

EPA should be held accountable for protecting human health and the environment. EPA should retain oversight of this cleanup.

Idaho elected officials have variously expressed an interest in transferring cleanup authority from EPA to Idaho and a newly created Coeur d'Alene Basin Commission. Indeed Gov. Kempthorne recently spoke in Wallace, Idaho, stopping just short of demanding that EPA leave Idaho. A brief review of Idaho's role in the Coeur d'Alene Basin pollution helps explain why EPA is far better suited to remain in control of the Cleanup.

(4.1) Throughout Idaho's existence as a state, mining companies polluted the waters of the Coeur d'Alene Basin. Idaho government was aware of the opposition to the dumping. The dumping continued from 1884 until 1968: 84 years (or the first 78 years of Idaho's existence as a state). Since 1968 mining companies have continued to pollute Idaho waters of the Coeur d'Alene, although at lower levels.

[Although there is no single comprehensive history of Idaho's role in the pollution, several excellent sources exist and include: Nicholas A. Casner, "Toxic River: Politics and Coeur d'Alene Mining Pollution in the 1930's"; Kathie Durbin, "Poisoned Promises: The Silver Valley's Toxic Legacy" *The Oregonian*, April 7, 1992; John Fahey, *Hecla: A Century of Western Mining*, University of Washington Press, 1990; and Fred Rabe and David Flaherty, *The River of Green and Gold*, Idaho Research Foundation, 1974.]

(4.2) Idaho, acting as a Trustee under Superfund law, settled with mining companies for environmental damages in 1986 for $4.5 million (the *interim* draft Cleanup Plan calls for a budget of $359 million) after funding for the Attorney General's lawsuit to recover damages from the mining companies curiously vanished in the Idaho Legislature. [Statement of former Idaho Attorney General Jim Jones Jim Jones regarding the 1985 State of Idaho settlement with several mining companies pursuant to the state's Natural Resource Damages claim under CERCLA at the Bunker Hill NPL, December 30,1997.]

(4.3) Idaho succeeded in appointing an Idaho attorney, Robie Russell, to head EPA's Region 10 during the late 1980s. Russell used his position to actively protect mining companies by blocking EPA's Superfund cleanup, thereby endangering public health while allowing the companies to shift and hide assets to avoid cleanup costs. [Special Review of EPA Handling of the Bunker Hill Superfund Site, Report Number E6FGGO-13-2005-0400006, Office of the Inspector General, January 30, 1990.]

(4.4) Idaho political leaders have pressured the U.S. Forest Service for decades to overcut the Coeur d'Alene National Forest. Idaho continues to advocate logging of this heavily damaged forest, the source of the toxic floods carrying pollution into Washington. [See, for example*, Spokesman-Review* "Our Failing Forests" a three-part series, November 1993; and Idaho State government's proposed TMDL (Draft Sub-basin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River).]

(4.5) Idaho officials have been highly critical of the BHSS cleanup, yet Idaho itself influenced the 1991 and 1992 Records of Decision for this cleanup plan.

(5) Deficiencies at the Bunker Hill Superfund Site (BHSS) should not be expanded to the entire Coeur d'Alene Basin.

The draft Cleanup Plan states:

> The Bunker Hill Superfund Site (BHSS) has already been evaluated through the CERCLA process and is the subject of two existing CERCLA RODs. Additional remedial actions or considerations within the BHSS are not included in the alternatives developed for this FS. . . . Two RODs were developed for the BHSS, one for populated areas and one for non-populated areas (USEPA 1991, 1992). [Overview 1-8]

It is important not to simply expand to the entire Coeur d'Alene Basin the deficiencies of the BHSS cleanup. $150 Million - $200 million have been spent on the cleanup of the Bunker Hill Superfund Site (BHSS), commonly referred to as "the Box". The cleanup plan for the Coeur d'Alene Basin is separate from, but inextricably linked to the BHSS.

"A valid citizen concern is that the quality of the cleanup in the new, larger area should be better than that in the much smaller original area . . . ," noted Joel S. Hirschhorn, Ph.D. and EPA TAG Technical Advisor, in his 1998 review of the BHSS ["Technical Issues Report: Bunker Hill Mining and Metallurgical Complex Superfund Site, Shoshone County, Idaho, (p. 4)].

Several concerns have been raised regarding the BHSS cleanup resulting from the 1991 and 1992 Records of Decisions (RODs). These include:

(5.1) The BHSS Cleanup Plan was based on Containment rather than Permanent Cleanup, leaving future generations at risk.

Containment reduces the short-term costs, but commits future generations to an endless effort to ensure that institutional controls remain in place. Long-term costs and public health risks may be greater, since there will be a need in perpetuity to maintain institutional controls.

Costs for long-term institutional controls are borne not by the federal government, but by state governments. As noted by Dr. Hirschhorn: "One of the subtleties of the Superfund program is that EPA walks away from sites after the initial major actions . . . are completed and the states assume responsibility for the long term operation and maintenance of the sites. Whether state government has the long term interest and funding to effectively maintain cleanup sites is highly uncertain." [Technical Issues Report, p. 7]

The decision not to pursue a permanent cleanup at BHSS leaves future generations at risk, as described by Dr. Hirschhorn:

> "The Bunker Hill inheritance to future generations is not a pristine and safe natural environment, but rather an imperiled geographical area in which a massive amount of hazardous materials remains, like a ticking time bomb, ready to release risks to public health and environment over years and decades as people and government agencies inevitably forget or discount the hidden toxic threats to people and nature. The Superfund cleanup chosen by EPA is not much of a cleanup after all, but more of a massive transfer of hazardous wastes and contaminated soils from multiple locations into a smaller number of containment locations that contain concentrated toxic wastes." [Technical Issues Report, p. 32]

(5.2) Two of the three containment areas have inappropriate caps, allowing for increased permeability and loading of heavy metals to the Coeur d'Alene system.

The BHSS cleanup is predicated on containment, including three major containment areas. As noted by Dr. Hirschhorn, two of these have low quality caps (reducing the cost while resulting in a lower quality cleanup). Concerns were raised by the Department of Interior that this would be inadequate, but EPA did not change its position based on what the PRPs wanted. [Joel S. Hirschhorn, Ph.D., "EPA's Five-Year Review of Superfund Sites: Application to the Bunker Hill Cleanup," January 25, 1999.]

As Dr. Hirschhorn described for the CIA (Central Impoundment Area), the U.S. Department of Interior advocated for a higher standard cap:

> "We believe that this is an important reduction (especially since the CIA seeps are a 680 lb/day loading source) and that 10^{-7} cm/sec should be required by the plan. We disagree with the PRPs' response . . . that the 10^{-7} is not appropriate because it is more protective than Idaho normal tailings pile closure requirements. This is a Superfund site along a water quality limited stream segment where more than normal Best management Practices should be required."

Ultimately EPA selected the less expensive, lower quality cap. ["Analysis of the Three Main Containment Areas At the Bunker Hill Superfund Site, December 15, 1998]

(5.3) The BHSS Cleanup gave priority to reduced costs at the expense of Public Health.

The common thread in the decisions made for the BHSS in the 1991 and 1992 RODs was to reduce the costs to the PRPs:

- Some contaminated areas such as hillsides went untreated;
- Standards selected resulted in a low-quality cleanup inconsistent with cleanups elsewhere;
- Containment was selected over permanent cleanup;
- Interiors house dusts were recognized as a major source of exposure and threat to public health, but were not systematically addressed; and
- Other toxins besides lead were not adequately assessed as part of the cleanup.

Hirschhorn states, "the Bunker Hill cleanup has been a massive compromise between the goal of minimizing near term cleanup costs versus maximizing cleanup quality. The Bunker Hill cleanup is an incomplete, partial action that has not offered the most that the law and technology offer citizens." [Technical Issues Report, pp 11-12]

(5.4) For Soil Lead cleanup, BHSS adopted 1,000 ppm rather than 400-500

There is considerable support for establishing a lower threshold for soil leads. The threshold commonly used by EPA at other sites is 400-500 ppm. As Dr. Hirschhorn noted in his technical review of the BHSS, "The 400 ppm soil screening level for residential soils was given in EPA's Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, 1994, which is one of the most important EPA documents concerning the cleanup of lead contamination at Superfund sites. It previously had set a 500 ppm cleanup level in 1989."

But at the BHSS, EPA used the 1,000 ppm for soil remediation.

(5.5) House dust / Interiors were not systematically addressed as part of the BHSS cleanup plan.

Interiors are a major public health issue in the Coeur d'Alene Basin. "Interestingly, in a key 1985 report on the lead poisoning problem," wrote Dr. Hirschorn, "a strong correlation between child blood lead levels and household dust lead levels was found. Nevertheless, the residential interiors part of the overall Bunker Hill cleanup has not received a major cleanup action to this date . . . ." [Technical Issues Report, p. 6]

Dr. Hirschorn continues:

> EPA had the authority under Superfund to address the direct human exposure to toxic substances resulting from house dust and to actively and aggressively remediate the problem, either by removing people from the hazards or removing the

> hazards from the homes. Instead, there is a rather insignificant and ineffective approach to assisting only those citizens who voluntarily seek assistance from the Panhandle Health District's Insitutional Control Program. Even in only lead contamination was considered this approach is not satisfactory, and it is even more distressing when it is acknowledged that house dust is also contaminated by other site contaminants posing chronic health risks to adults as well as children, including arsenic and cadmium. [Technical Issues Report, pp 47-48.]

Dr. John Rosen, Professor of Pediatrics and Head of Environmental Sciences at Children's Hospital at Montefiore, Albert Einstein College of Medicine, reviewed the BHSS cleanup and concluded, "EPA and the State of Idaho never pursued a course of investigation or remediation to strictly control ingestion and inhalation of contaminated house dust through a systematic and comprehensive institutional control program. . . . . Thus there is no reason to ACCEPT OR TRUST EPA (REGION 10)-IDAHO data that declining lead levels in household dust and children's blood values reflects successful remediataion operations or basic paradigms of human health risk assessment." [Emphasis in original, Critical Compromises, p. 7]

(5.6) Blood Lead Surveys are Unscientific.

As will be discussed below, the blood lead data collected for the BHSS cleanup are of no real usefulness in determining whether or not remediation has been successful. There has yet to be an epidemiological, longitudinal study of blood lead levels in the Coeur d'Alene Basin.

Several reviews of the BHSS cleanup have been completed by Dr. Rosen, Professor of Pediatrics, and Head of the Division of Environmental Sciences, Montefiore Medical Center, Bronx, New York. Dr. Rosen's assessments of the BHSS include: (1) "Critical compromises to Public Health: The Effectiveness of Remediation at Bunker Hill is Open to Serious Questions and Unresolved Issues", undated; and (2) "The Public's Health in Kellogg has been Incompetently Addressed by the Panhandle Department of Health, ATSDR, the Local Medical Community and Terragraphics, Inc." Jan. 14, 1999.

To the extent that standards and procedures used at the BHSS have become models for the Coeur d'Alene Basin cleanup, the BHSS should receive scrutiny so that the public can be assured that deficiencies and errors will not be expanded throughout the entire Coeur d'Alene Basin.

EPA's final cleanup plan should include an expanded discussion of the BHSS cleanup plan, its implementation, and its relationship to the Coeur d'Alene Basin cleanup plan.

(6) Delaying the Cleanup risks further polluting Washington Waters

In the 1996 flood, over a million pounds of lead flowed into Lake Coeur d'Alene in a single day. The Lake is an inefficient trap for the lead, and some of it flowed into the Spokane River, passing from Idaho into Washington State.

The toxic floods have two major sources: (1) about 100 million tons of toxic sediments located over thousands of acres of river bottom, banks, and wetlands between the confluence of the North and South Forks, and Lake Coeur d'Alene; and (2) logging-damaged watersheds susceptible to rain-on-snow events that unleash floods onto these polluted wetlands.

Under the Clean Water Act, EPA is responsible for ensuring that when the Spokane River crosses from Idaho into Washington, the quality of the water meets Washington's water quality standards. For this to occur, the *source* of much of the pollution in the Spokane River will need to be remediated: millions of tons of mine wastes currently located in the wetlands upstream from Lake Coeur d'Alene (in CSM-3). Further, the source of the floods—the damaged forests of the Coeur d'Alene National Forest—will need to be remedied and the ecological integrity of the forests restored.

(7) Lake Coeur d'Alene (CSM-4) should not be delisted as a Superfund Site until it is Cleaned-Up.

The Draft Cleanup Plan states:

> Two alternatives have been developed for the lake (CSM Unit 4). Alternative 1 is "no action," as required by the NCP. Alternative 2 involves implementation of the Lake Management Plan (CLCC 1996). [Overview 5-18]
>
> Management goals were primarily directed toward phosphorus control because lowering zinc concentration required action to address mining-impacted areas in the Coeur d'Alene Basin, which was beyond the scope of the Lake Management Plan. [Overview 5-18]

Lake Coeur d'Alene continues to be a major repository for mine wastes. With each flood, more heavy metals flow into the lake. The lake bottom's pollution puts at risk the Spokane River. The Spokane River partially supplies the Aquifer, sole-source of drinking water for 450,000 people.

In discrete locations such as the Chatcolet Bridge causeway, the extent of the pollution has not been determined. Sampling has yet to reveal the limits of the contamination edges.

Meanwhile, land disturbing activities such as agriculture, logging, and real estate development contribute nutrients to the lake. Reducing zinc loading from the upper Coeur d'Alene Basin may accelerate eutrophication of Lake Coeur d'Alene. Eutrophication and depleting dissolved oxygen in the water column risks resuspending

the massive repositories of heavy metals currently on the lake bottom. Resuspending these toxins *en masse*, would devastate Lake Coeur d'Alene and the Spokane River.

Lake Coeur d'Alene is inadequately dealt with in the draft cleanup plan. There is very little information provided, and only two alternatives developed. Protecting the lake will likely require significant trade-offs: failure to cleanup the metals will result in a transfer of the economic burden to other industries, including timber, agriculture, and real estate. These other economic sectors will likely pay a price for the ongoing mine waste pollution of Lake Coeur d'Alene.

The draft Plan relies on the future implementation of a Lake Management Plan. For the Lake Management Plan to work it must be both effective and enforceable. Today it is neither. Effectiveness must still be tested scientifically. And even if the plan is scientifically effective there must be changes made to local laws and funding must be available for the lake plan's implementation to be effective. Moreover, since the lake plan is part of a CERCLA remedy for the Basin, there is a legal need for EPA remain in an enforcement position for the long term.

In the final Plan, EPA should provide an adequate range of alternatives for Lake Coeur d'Alene, recognizing the lake as an ongoing repository for, and source of, toxic mine wastes moving through the Coeur d'Alene Basin.

(8) Cleanup Polluted Beaches (CSM-5).

Cleaning-up the polluted beaches in Washington needs to fully protect the public health and environmental health. In case of recontamination, remedial action should be triggered by the same criteria triggering the initial cleanup. Removal, rather than capping should be the preferred remedial action where ever possible.

(9) Zinc: Cleanup Bunker Hill.

The Draft Cleanup Plan states:

> It is anticipated that future cleanup actions in the BHSS could be required to meet ambient water quality criteria in the South Fork Coeur d'Alene River and the Coeur d'Alene River. [Overview, 6-3]
>
> Metal loading from the BHSS—Although undergoing remedial actions, the BHSS has historically been a major source of zinc, cadmium, and lead loading to the South Fork Coeur d'Alene River. While it remains to be seen how much the BHSS remedial actions will reduce future metal loading, the remedial alternatives developed for this FS have not included additional actions in the BHSS. [Overview, p. x]
>
> Based on sampling conducted between 1991 and 1999, the upper basin is the source of about 79 percent of the dissolved zinc load and about 24 percent of the estimated average total lead load in the Coeur d'Alene River at Harrison. [Overview, 2-7]

> Based on sampling conducted between 1991 and 1999, the expected (estimated average) value of dissolved zinc loading from the BHSS is about 1,500 pounds per day, or slightly more than one-half of the dissolved zinc load in the South Fork at its confluence with the North Fork (with a range of about 44 percent to 58 percent). Extensive remedial actions have been conducted within the BHSS beginning in 1995 and are ongoing. [Overview, 2-10]

Zinc is especially toxic to aquatic life, is relatively water soluble, and has moved through the entire system of rivers and lakes. The Cleanup Plan needs to correct the zinc-loading in the upper Coeur d'Alene basin, and EPA needs to complete a thorough cleanup of the 21-square-mile Bunker Hill Superfund Site to effectively reduce zinc loading to Spokane River system.

(10) Restore Forests to reduce Toxic Floods.

The Draft Cleanup Plan states:

> Specifically, the FS includes the basin except for the North Fork of the Coeur d'Alene River. [Overview. p.v]

> Little sediment is transported through Coeur d'Alene Lake except during flood events. [Overview, p. 2-17]

> These weather patterns make the Basin one of the highest-precipitation areas of the Upper Columbia River Basin and can lead to flooding, especially when winter rainfall occurs on top of snow conditions. [Human Health Alternatives 1-11]

> High blood lead levels in the lower basin have been associated with homes that were flooded in 1996, and recreational activities outside the home (TerraGraphics and URSG 2001). [Overview 3-4]

> Recontamination—Periodic flooding can recontaminate previously remediated areas where storm, snow melt, or flood waters have caused erosion and subsequent redeposition of contaminated sediments. This is a particular concern for community recontamination in smaller basin communities. Many of these communities do not have surface water control systems (e.g., curbs, gutters, and ditches) that effectively control runoff during snowmelt and storm events. For residents living in or near flood plains, uncontrolled surface water runoff, especially during flood events, has a high likelihood of recontaminating properties where remediation has previously been conducted. [Overview. p. ix]

> Flooding would recontaminate remediated yards by depositing contaminated sediment derived from upstream mining activities. Reviews of flood maps prepared by the U. S. Department of Housing and Urban Development (HUD) and the Federal Emergency Management Agency (FEMA) identified communities with significant flooding problems. Other communities with flooding problems were identified by obtaining anecdotal information from local residents. The estimated percentage of

residences with flooding problems is provided by investigation area and community in Table 4-3. [Human Health Assessment, 4-6]

Reducing flood severity and frequency is integral to protecting human health in communities at risk for flooding, and slowing the movement of mine wastes into Lake Coeur d'Alene and the Spokane River.

The relationship between forest damage and floods is not newly recognized in the Coeur d'Alene Mountains. In the North Fork of the Coeur d'Alene, the relationship of stream flows between heavily logged Big Elk Creek drainage and lightly logged or recovered Halsey Creek drainage is clearly shown in the graph derived from monitoring during 1989 and 1990 that accompanied *A Procedure for Evaluating Risk of Increasing Peak Flows from Rain on Snow Events by Creating Openings in the Forest Canopy,* [Gary Kappesser, USFS Idaho Panhandle National Forests, March, 1991].

Forest ownerships of the Coeur d'Alene are a mix of federal, state and private. A glance at forest maps shows that most of the watershed is in the Coeur d'Alene National Forest (an individually proclaimed National Forest that has since been combined with the St. Joe and Kaniksu National Forests as an administrative unit: Idaho Panhandle National Forests).

The Coeur d'Alene National Forest contains some of the most damaged forest in the National Forest System, with logging road densities *averaging* about 11 road miles per square mile of forest. Forests canopies have been extensively clearcut. As a Forest Service hydrologist told the *Spokesman-Review* in describing the Little North Fork of the Coeur d'Alene River: "There's no question this drainage has been hammered. It's been killed. That's a legacy we're still paying for." [*Spokesman-Review*, Nov. 20, 2001.]

Since passage and implementation of the National Environmental Policy Act in 1969, the U.S. Forest Service claimed that each of its timber sales in the North Fork of the Coeur d'Alene drainage would have no significant cumulative effect on the environment. Yet since that time, most of the streams in that drainage are so burdened with sediment that they are classified as Functioning at Risk (FAR) or Not Properly Functioning (NPF). The situation is so severe that both the North Fork and the Little North Fork Coeur d'Alene River systems are classified under the Clean Water Act as a Water Quality Limited Segment, 303(d).

Logging headwater forests sets in motion a series of changes like falling dominoes: damage starts at the top and perpetuates through the river system. Forest disturbing activities at the top of the Coeur d'Alene Basin increase peak flows and stream energies, thereby mobilizing bedload sediment. Filling river channels with bedload and increasing water flows helps explain some of the profound movement of lead and other toxins into Lake Coeur d'Alene and the Spokane River.

Headwater are sensitive to increases in peak flows. This is acknowledged in the 1993 IPNF *Guidelines for Watershed and Stream Channel Evaluations and Project*

Implementation. This document emphasizes the need to limit headwater logging in all drainages, especially in drainages with streams in condition yellow (FAR) or condition red (NPF). Peak flows will increase in all the affected drainages and thus the risk for damage and downstream movement of mine wastes is also greatly increased.

Much of the watershed is located within well-defined elevations referred to as "rain-on-snow" (ROS) belts. Rain on snow events occurring where forests and slopes have been disrupted by forest canopy removal and logging roads increase the peak flows, increase the risk of further destabilization of the affected stream channels and increase bedload production and transport. The more heavily logged and road-damaged is a drainage, the greater the impact from ROS events.

Aggradation of bedload sediment from headwater logging results in the rivers becoming wider and shallower, and therefore more susceptible to flooding. As Paul Woods of the U.S. Geological Survey noted, "You could have lower flow, but higher stage [of flood] because the river can't handle it." [*Spokesman-Review* 2/15/96.]

The draft Cleanup Plan's omission of the Coeur d'Alene watershed is glaring. Both the North and South Fork Coeur d'Alene Basins need to be restored. A final cleanup plan needs to include enforceable watershed management agreements. Forest canopies should be allowed to grow back, and logging roads removed. Restoration and flood-prevention should be given the highest priority in land management decisions on the Coeur d'Alene forested watersheds.

(11) Cleaning-up Idaho's "Killing Fields" (CSM-3).

The Draft Cleanup Plan states:

> The impacted floodplain sediments, in particular, also act as "secondary" metal sources that impact the other media. Directly or indirectly, the impacted floodplain sediments are the major source of metals in basin waters, the major source of metal exposure risks to ecological receptors and a major source to humans, and a major source of potential future recontamination of downstream areas that are cleaned up. The estimated mass and extent of impacted site media—primarily sediments—exceeds 100 million tons dispersed over thousands of acres. [Overview, p. vi]

Perched upstream from Lake Coeur d'Alene are wetlands that are now a toxic ore body that "exceeds 100 million tons dispersed over thousands of acres." Migrating tundra swans and other wildlife come here to these wetlands, and many birds die here from the mining pollution.

The draft plan does not provide assurance that it will address these problems. Indeed, the costs of cleaning-up CSM-3 are expected to be high. The draft Cleanup Plan's overall budget of $359 million cost contains only $81 million for removing sediment from selected riverbed depositional and floodplain areas. This figure is a small fraction of

what can be expected to be required to remediate this part of the polluted watershed and signals that Plan, as currently written, will not intervene significantly in CSM-3. And as noted above, the draft cleanup plan is entirely silent on remedies for the damaged forests that are the source of floods. The result: the toxic floods of the Coeur d'Alene will continue dumping millions of pounds of lead into Lake Coeur d'Alene and further polluting the Spokane River.

Special care should be given to removal and replacement of contaminated soil in all reaches but in particular to those subject to the greatest amount of erosion during flooding. Cleanup of CSM 3 should be done in a manner that at all times will protect Lake Coeur d'Alene and the Spokane River from recontamination.

(12) Monitor Children & Pollution Cleanup.

The Draft Cleanup Plan states:

> Blood lead levels in children have declined by 58 percent in Kellogg (from 10.8 to 4.5 micrograms per deciliter) since the inception of remedial activities within the BHSS in 1989. [Overview, p. 1-8]
>
> The declining blood lead levels that have occurred in the BHSS provide validation to the human health remedies implemented, namely, health education and intervention programs, vacuum loan programs, and residential and common use soil removal and replacement actions. [Overview, 3-3]

The public must have reliable data collected over the decades to know that this cleanup plan is working. Yet a valid epidemiologic study of lead poisoning has never been done for the BHSS, much less the Coeur d'Alene Basin. As such, data are of limited usefulness to the public and decision-makers.

Reviewers of the BHSS cleanup have raised concerns that blood lead surveys lack statistical validity. This severely limits their usefulness as measures of cleanup success at BHSS, as Dr. Rosen wrote: "It can be concluded that blood lead surveys at Bunker Hill are unscientific and epidemiologically invalid for the purpose of declaring to what extent remediation has been successful." [Critical Compromises, p. 4]

Procedures for obtaining blood specimens to assess for lead concentrations in the Coeur d'Alene Basin has recently changed from venous sampling to finger sticks. While the use of finger stick is understandable (less painful), the results are subject to collection artifact and error. During the fingerstick, skin contamination may artificially raise the blood lead level, or, alternatively, by pressing a finger tightly, to obtain blood, extracellular fluid will dilute the sample thereby artifically lowering the blood lead value. Moreover, even if a finger stick sample is properly obtained by experienced health professionals, if the blood lead value is elevated, a measurement on a venous sample is then mandatory.

Addressing the need for a valid, longitudinal study, Dr. Rosen suggests that "A useful approach … is through the use of a nested exposure assessment design in which a small-representative number of the population is subjected to extensive direct and indirect measurement of exposure, including personal and microenvironmental monitoring, biomarkers, and modeling. This population would thus serve as a surrogate for the larger study population." [Critical Compromises, p. 4]

The final cleanup plan should also discuss how monitoring data on blood lead sampling should be used in the context of judging the effectiveness of the cleanup:

> "OSWER (EPA's Office of Solid Waste and Emergency Response) recommended that blood-lead studies not be used to determine future long-term risk where exposure conditions are expected to change over time; rather, they should be considered a snapshot of ongoing exposure under a specific set of circumstances (including community awareness and education) at a specific time." [Critical Compromises, p. 4]

(13) Prevent Lead Exposure.

(13.1) Housedust / Contaminated Interiors

The Draft Cleanup Plan states:

> [H]ouse dust is the major source of home lead exposure, contributing 56 percent, followed by outdoor soil, which accounts for 31 percent of lead exposure in the home. House dust lead concentrations include all sources of lead, such as interior paint, as well as lead dust from yard and community soils. [Overview 3-5]

A major public health omission in the BHSS cleanup is the need to adequately address interiors. Infants and children are especially at risk. Dr. Rosen, who has a considerable breadth of experience with lead poisoning in children, has noted, "A pooled analysis of 12 epidemiologic studies demonstrated that lead-contaminated house dust, with or without normal hand-to-mouth activity in children 1-6 years of age (and teen-agers and adults), is the major source of lead exposure for children. [Critical Compromises, p. 7]

Part of the risk for infants in the Coeur d'Alene Basin can be explained by certain behaviors unique to the age group. "[D]ust lead levels in the home were directly and indirectly related to blood lead levels via **HAND LEAD** (Lanphear and Roghmann, 1997, Lanphear et al., 1998; Sterling et al., 1999). . . . [M]outhing behaviors of young children are a critical factor towards excessive lead exposure in young children." [Emphasis in original, Dr. Rosen, Critical Compromises, p. 7.]

Because of the importance of contaminated interiors to the Public Health, interiors should be addressed in a systematic manner using the best available science. As Dr. Rosen recommends, this should be done first in the existing BHSS, and then expanded to the communities at risk outside the BHSS.

> Undisputable evidence . . . demonstrated that Kellogg homes and others in the "box" were grossly contaminated with metal toxicants; and to meet all basic public health principles to ensure the health of this community, it is mandatory that all homes within the Superfund Site be cleaned to remove these toxicants . . . . Priority should be given first for Pb home measurements and home cleanups for all homes within the current Superfund site. Once this task has begun in all aspects, described below, a similar program should then be initiated promptly for homes in the entire Coeur d'Alene river Basin. [Critical Compromises, p. 5]

Recognized and accepted standards for contaminated interior dusts should be adopted in the final Cleanup Plan for interior cleanups: floor, 40mcg/ft2; window sills, 250mcg/ft2; and window wells, 400mcg/ft2.

(13.2) Residential Soils: Set at the Standard at 400ppm

The draft Cleanup Plan risks would repeat several of the same mistakes and deficiencies of the BHSS but expand them throughout the Coeur d'Alene Basin. This include reducing the level of cleanup (and short-term costs) while accepting a threshold for residential soils of 1,000 ppm (parts per million).

There is a considerable body of evidence that the protective levels for lead in soil should be seat at 400 ppm, including the "Revised Interim Lead Guidance for CERCLA Sites" (EPA OSWER Directive 9355.4-12, August 1994):

> Establishes a streamlined approach for determining protective levels for lead in soil. Recommends a 400 ppm screening level, describes how to develop site-specific remediation goals, and describes a strategy for management of lead contamination at sites that have multiple lead sources. A previous soil lead OSWER Directive (September 1989) recommended a soil lead cleanup level of 500 to 1,000 mg/kg for protection of human health at residential CERCLA sites (OSWER Directive #9355.4-02). The current recommended residential screening level for lead of 400 mg/kg is calculated with the IEUBK model (Pub #9285.7-15-2, PB93- 963511), using default parameters. EPA recommends that residential PRGs for CERCLA sites can be developed using the IEUBK model on a site-specific basis, where site data support modification of model default parameters. In developing lead PRGs for CERCLA sites, EPA recommends that a soil lead concentration be determined so that a typical child or group of children exposed to lead at this level would have an estimated risk of no more than 5 percent of exceeding a blood lead level of 10 µg/dL, which corresponds to a soil lead level of 400 mg/kg using the default parameters in the IEUBK model. The 1994 interim directive superceded all previous directives on soil lead cleanup for CERCLA and RCRA programs. [Appendix C, ARARs]

(13.3) Develop Medical Expertise for the People of the Coeur d'Alene Basin

In medicine, data are collected for several reasons. Unless people have agreed to become involved in research protocols, people assume that lab data will be used to actually help

them. For people living in the lead-contaminated Coeur d'Alene Basin, if blood levels are found to be elevated, then a medical system needs to be in place capable of intervening appropriately. Lack of medical expertise for heavy-metal pathology is a deficiency of the BHSS cleanup, a problem that risks being expanded throughout the Coeur d'Alene Basin with the expanded cleanup.

As noted by Dr. Rosen, who has sampled blood leads in the Silver Valley, blood lead surveys related to the BHSS cleanup thus far have been limited to

> study such a community . . . without the hope or expectation of providing or implementing medical management or treatment in any or all affected children or adults at this specific superfund site. Previously examined extensive studies, with medical monitoring as their foundation, have failed to relieve the pain and suffering of any single or several affected residents of the Silver Valley, including children and adults. As a clinical researcher and clinician scientist myself, I find this disregard for the health of this community to be immoral and unethical: To uncover treatable disease states and totally fail to implement meaningful treatment-medical interventions can be considered to be medical malpractice. [Critical Compromises, p. 15]

The need to establish medical expertise in treating lead and other heavy metal pathology for the people living in the Coeur d'Alene Basin has been requested of various federal agencies. There is precedence for governmental support for medical care, but that has not extended to the residents of the Silver Valley. As Dr. Rosen notes regarding the Agency for Toxic Substances and Disease Registry (ATSDR),

> ATSDR's medical monitoring in Bunker hill is, in large part, totally irrelevant to the public's health in the Silver Valley. If ATSDR truly intended to assist affected individuals in a medically underserved community, this agency could have done so years ago by providing support to the Community Lead Health Project, whose aims are to provide state-of-the-art medical care. Has ATSDR supported such endeavors at other superfund communities?? the answer is 'yes;' and Dr. Johnson, the Administrator of ATSDR, did so prior to relinquishing his job at this agency. [Critical Compromises, p. 15]

In closing, I want to thank the staff, past and present, at the Environmental Protection Agency for your perseverance and your work on behalf of the Coeur d'Alene Basin. This Superfund cleanup effort that began in the early 1980s with the designation of the BHSS has been a long journey indeed. None of us who were involved with the cleanup effort in the Coeur d'Alenes during the 1980s could have envisioned how far we would come, and come to understand how far we must still go to protect the public health and environment.

Thank you again for this opportunity to comment.

Sincerely,

John Osborn, M.D.

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Governor Gary Locke
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