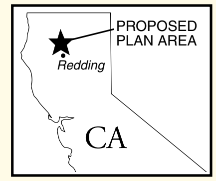
EPA

Iron Mountain Mine Superfund Site

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY • REGION 9 • AUGUST 2004



Opportunity for Public Comment on Proposed Plan to Clean up Contaminated Sediments

This Proposed Plan presents the United States Environmental Protection Agency's (EPA's) recommended plan to address environmental threats posed by contaminated sediment in the Spring Creek Arm of Keswick Reservoir in California.

EPA is requesting written or oral comments on this Proposed Plan and on the information contained in the administrative record file by September 13, 2004. In preparing this Proposed Plan, EPA consulted with the California Department of Toxic Substances Control (DTSC) and the California Regional Water Quality Control Board (RWQCB) (see *EPA's Recommended Alternative* on pg. 3).

The purpose of this Proposed Plan is to assist the public in providing comments by summarizing information about the contaminated sediments in the Spring Creek Arm and explaining the cleanup alternatives that EPA is considering. This Proposed Plan is a companion to the Remedial Investigation and Sediment Feasibility Study reports (RI/FS) and the administrative record file. For more detailed information, we encourage you to review the RI/FS and the rest of the administrative record file at the Shasta County Library (see *Information Repositories on pg. 13*).

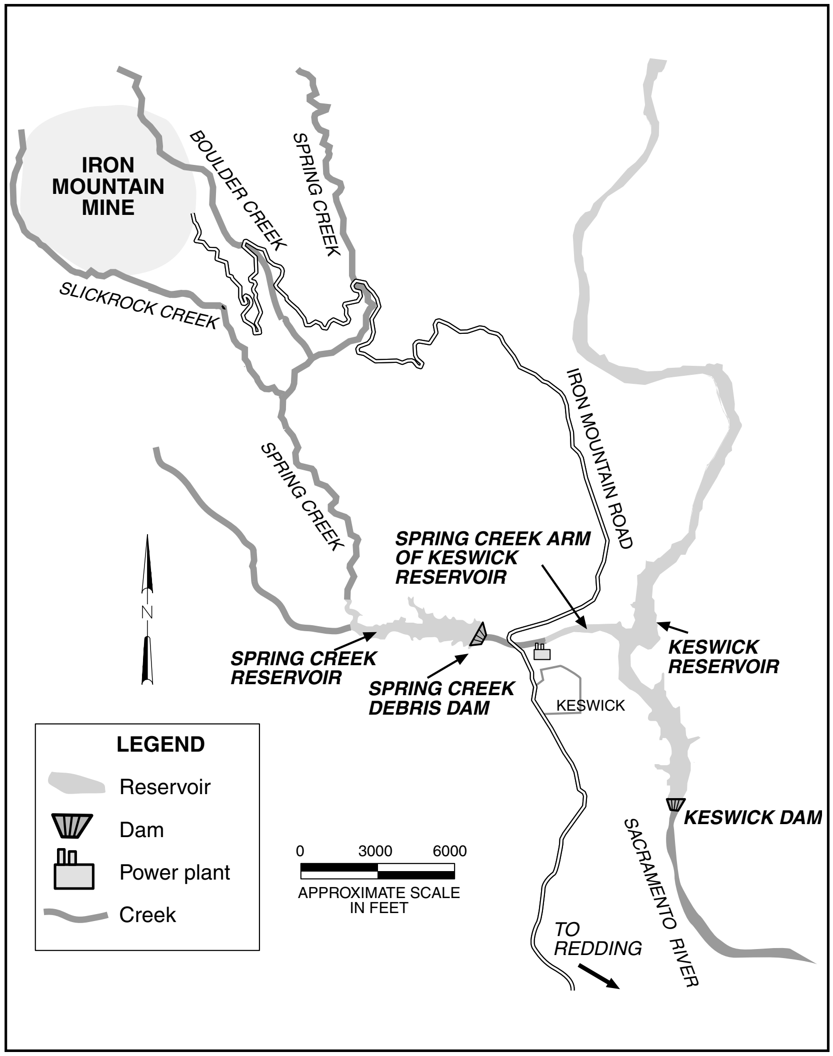


Figure 1: Location of Iron Mountain Mine Superfund Site

• HOW DO I COMMENT? •

Public Meeting

Wednesday, August 25, 2004

7:00 - 9:00 p.m.

Red Lion Hotel, Redding

Public Comment Period on Proposed Plan

August 11 to September 13, 2004

(Please see page 13 for details.)

Site History

The Iron Mountain Mine Superfund Site (Site) is an inactive mine near Redding in Shasta County, California. The 4,400 acre mine operated for about a century (1860-1962), and was mined for iron, silver, gold, copper, zinc and pyrite. Historic mining activity fractured the mountain exposing the mine to rain, surface water and oxygen. For much of this century, the annual rains have transported the acid mine drainage (AMD) containing toxic levels of copper, cadmium and zinc from the mine into the Sacramento River.

Prior to EPA's Superfund actions, Iron Mountain Mine discharged more than a ton per day of toxic metals into the Sacramento River and was the largest discharger of heavy metals to surface water in the nation. The copper, zinc and AMD discharged into creeks and streams adversely impacted water quality–killing fish, ruining important salmon spawning habitat, and limiting water for distribution throughout the State.

Iron Mountain Mine was placed on the list of the nation's most hazardous waste sites, known as the Superfund National Priorities List (NPL), in September 1983. Since that time, EPA has studied the sources of the AMD and carried out several emergency response and long-term cleanup actions to reduce the AMD discharging from the site into the Sacramento River ecosystem (see *History of Cleanup Actions*, pg. 3).

With the recent completion of the Slickrock Creek Retention Reservoir, EPA now controls 95 percent of the historic copper, cadmium and zinc discharges. This level of control provides significant protection to the Sacramento River fishery and ecosystem.

EPA's activities at the Site are being conducted under the authority established in the federal Superfund statute, the Comprehensive Environmental Response, Compensation and Liability Act, as amended, (42 U.S.C Section 9601 et seq.). Table 1 shows the current status of sediment cleanup within the Superfund Process (see below).

The Superfund Process

Site Discovery	NPL Ranking/ Listing	Remedial Investigation (RI)	Feasibility Study (FS)	**Public Comment Period**	Record of Decision (ROD)	Remedial Design	Remedial Action	5-Year Review	NPL De-listing
Evidence of potential contamination is reported.	Site placed on EPA's National Priorities List, making it eligible for cleanup action under Superfund.	EPA investigates the nature and extent of contamination.	EPA identifies and analyzes alternatives for addressing site contamination.	The public comments on alternatives, including EPA's preferred alternative, during formal public comment period. EPA considers these comments & prepares responsiveness summary.	EPA documents the selected remedy in the Record of Decision.	EPA oversees development of detailed specifications for the selected remedy.	EPA oversees construction and operation of the remedy.	EPA reviews the effectiveness of the remedy every five-year period of the cleanup action.	EPA removes the site from the Superfund (NPL) List when cleanup goals are achieved.

Interim Cleanup Actions Occur When Necessary

Enforcement Activities Occur Throughout the Superfund Process

Community Involvement Activities Occur Throughout the Superfund Process

Table 1: The Superfund Process

History of Cleanup Actions

Over the past 20 years, EPA has implemented several major cleanup actions to control the AMD discharges from the Site. Each of these actions was taken following a thorough investigation, a public comment process, and official approval in a Record of Decision (ROD). This section provides an overview of these cleanup actions.

One set of actions focused on preventing the formation of AMD at the Site:

- reducing the amount of clean water that comes in contact with metals in the exposed mine wastes by covering those areas with layers of clay or other impermeable materials (caps),
- reducing the erosion of mine wastes into creeks by constructing surface water controls,
- keeping clean water coming downstream towards the mine from contacting mine wastes through diversions of the clean water away from the contaminated wastes.

A second action focused on increasing the ability to manage the safe release of contaminated water from the Site into the Sacramento River:

- increasing the ability to store surface water contaminated by the Iron Mountain Mine discharges in the Spring Creek Reservoir.

A third set of actions focused on collecting and treating the groundwater and surface water already contaminated with AMD before it reaches the Sacramento River:

- construction of collection and conveyance pipelines and a treatment plant to cleanup the AMD discharges from the underground mine workings,
- construction of a small dam to form a retention reservoir to collect and retain contaminated surface water runoff, and pipelines to convey it to the treatment plant for cleanup.

In the future, and as determined necessary by EPA, there may be additional investigations and cleanup actions at the Site.

Why EPA Proposed this Action

To date, most of EPA's cleanup efforts have been to control the release of acid mine drainage into the Sacramento River watershed. As the result of these ongoing EPA cleanup actions, 95 percent of the historic quantities of copper, cadmium and zinc are now removed from the water before it leaves the Site (see *History of Cleanup Actions,* at left).

However, past discharges of acid mine drainage have contaminated the sediments in the Spring Creek Arm of Keswick Reservoir over the last forty years. These discharges resulted in the formation of three large piles of heavy metal-laden sediments in the Spring Creek Arm that total in excess of 280,000 cubic yards of contaminated material. These sediments are toxic to aquatic life and in the event of a large storm, a significant amount of these sediments could erode, move and redeposit in the important fish spawning habitat of the Sacramento River downstream of Keswick Dam (see *Profile of the Contaminated Sediments* on pg. 4).

EPA's Recommended Alternative

EPA's recommended cleanup alternative would use a hydraulic dredge to fully remove contaminated sediments located in two areas that have high erosion potential and partially remove sediments located in a deep water area of the Spring Creek Arm. The sediments remaining in the deep water would not be subject to erosion except under circumstances that are extremely rare and very unlikely (see *Alternative 4* on pg. 9).

The State agencies agree that the recommended alternative is technically feasible and provides important environmental benefits. However, the State raised concerns about the adequacy of sediment containment safeguards during the sediment removal operations. In response to these concerns, EPA is including the implementation of several specific measures to assure close coordination with State agencies and to assure that the contaminated sediments will be contained during dredging operations:

- EPA would acquire additional data during the design phase to further characterize sediment engineering properties;
- EPA would work closely with the State agencies to develop and implement a well designed monitoring program to provide early detection of any problems;
- EPA would closely coordinate with State agencies during the phased implementation of the dredging operations;
- EPA would involve the State agencies in the evaluation of the performance of sediment containment measures and consult with the State agencies regarding the potential need for additional sediment containment safeguards during the sediment removal program.

Formation of the Contaminated Sediments

The Spring Creek Arm is the portion of Keswick Reservoir directly below the Spring Creek Debris Dam (Debris Dam). The Spring Creek Arm is approximately two-thirds of a mile long and flows eastward. Flows within the Spring Creek Arm originate primarily from the Debris Dam and the Spring Creek Power Plant (Power Plant), with minor inflow from Shasta Dam releases. The location of the Spring Creek Arm makes it a mixing basin for metal-rich acidic waters, sediment released from the Debris Dam, freshwater from Shasta Dam and Whiskeytown Reservoir (via the Power Plant), and Keswick Reservoir. The result is fine-grained sediment mixed with a rust-colored sludge that is high in heavy metals and formed from the acid mine drainage.

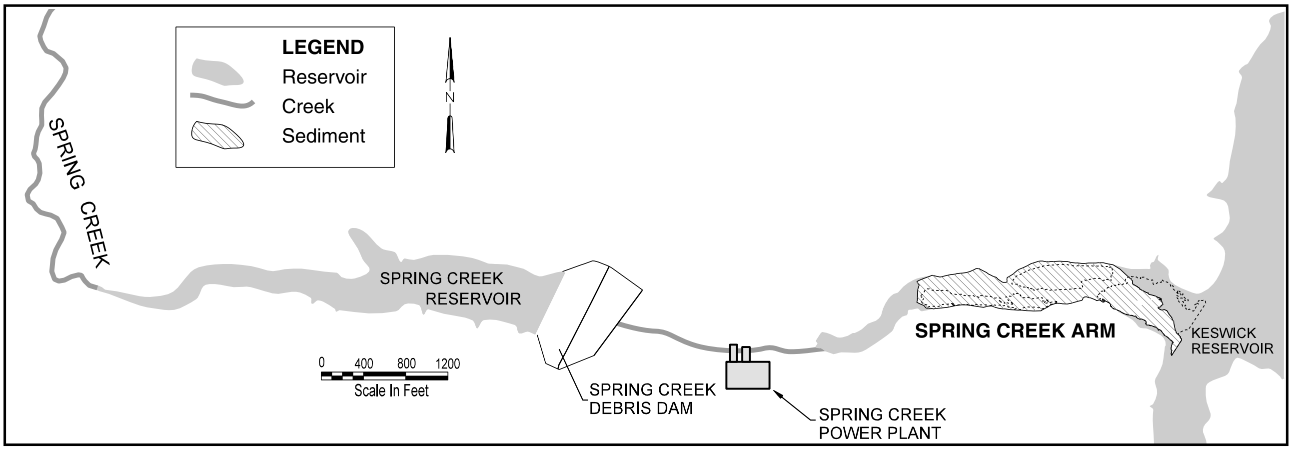


Figure 2: Formation of contaminated sediments

Profile of the Contaminated Sediments

This contaminated sediment has deposited, accumulated, and mixed in three distinct piles within the Spring Creek Arm: Piles A, B, and C. The vast majority of the sediment that comprises Piles A, B, and C has deposited since 1963. Because of the completed and ongoing remedial actions (see *History of Cleanup Actions* on pg. 3), the rate of sediment formation in the Spring Creek Arm has been significantly reduced.

Piles A, B and C consist of typical sediment interlayered with the rust-colored contaminated sludge. Based on studies conducted in 2001, an estimated 280,000 cubic yards (cy) of sediment are located in the Spring Creek Arm. Approximately 90 percent of this volume, or 250,000 cy, is within the three sediment piles.

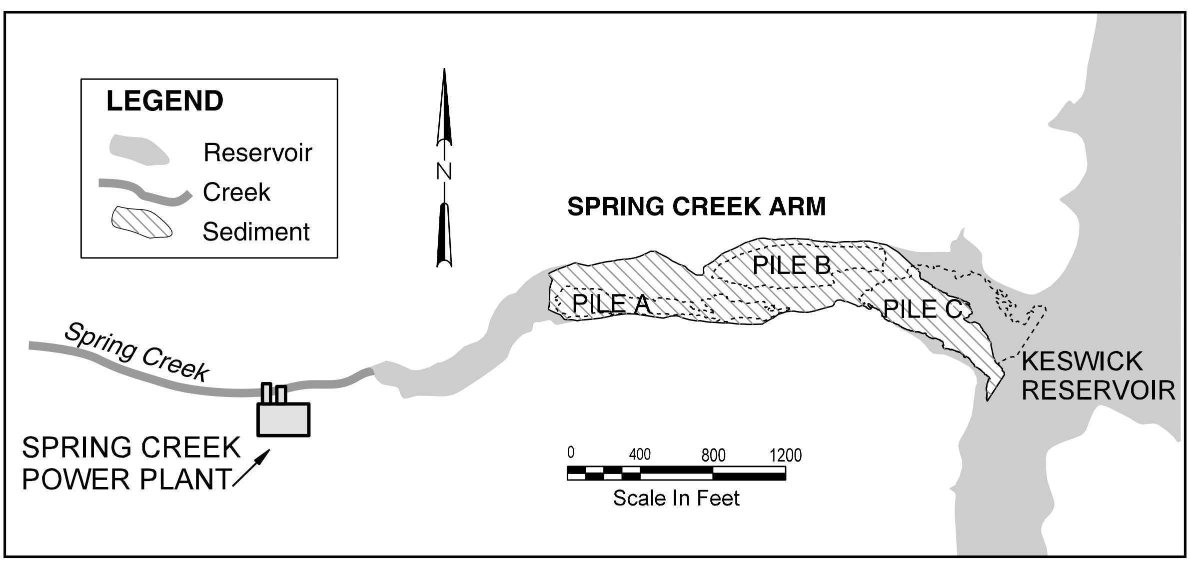


Figure 3: Profile of contaminated sediments

Evaluation of Risk to Human Health and the Environment

Human health and environmental risk evaluations indicate that contaminated sediment in the Spring Creek Arm poses a significant potential risk to the environment. The contaminated sediments do not pose an unacceptable risk to human health.

The environmental risk evaluation concluded that metal contaminants in the sediments are toxic to aquatic life in the Spring Creek Arm. The existing piles have very limited organism populations and habitat and no plant life. Testing has shown that if the sediments move into the water column, the water can be toxic to aquatic life, even if diluted by 400 times. The pollutants in the sediments are particularly toxic to organisms and habitat at the bottom of the creek and fish in early life stages. The evaluation identified ten metals as contaminants of potential ecological concern with copper and arsenic posing the greatest potential risks.

Uncontrolled flows from the Debris Dam during major storm events and high flows from the Power Plant could scour and move sediment, which would then enter Keswick Reservoir and carry this mass of metals into the Sacramento River ecosystem. During such an event, Sacramento River water quality would be expected to be highly toxic to aquatic life. It is also expected that significant quantities of the toxic sediments would deposit into the gravels of the important upper Sacramento River spawning grounds. These sediments would threaten the early life stages of salmon and steelhead present at the time of the deposit. These deposited toxic sediments would be expected to continue to contaminate the spawning grounds until difficult cleanup operations could be performed. Since salmon return in cycles of three to four years, contamination in the spawing grounds over an extended period of time could jeopardize the survival of the entire population of salmon.

EPA believes that these risks are significant enough to warrant consideration of the five cleanup alternatives.

Cleanup Goals

Based on the Human Health and Environmental Risk Evaluations, the goals or remedial action objectives for the sediment cleanup are:

- Prevent the movement and deposit of contaminated sediments into important fishery spawning habitats located in the Sacramento River downstream of Keswick Dam.
- Meet the protective water quality standards to maintain water quality in Keswick Reservoir and the Sacramento River to support all beneficial uses.

Together these two objectives help assure that remedial action meets the overall goal of eliminating the discharge of toxic contaminants that are harmful to the Sacramento River ecosystem.

Discussion of Each Cleanup Alternative

The alternatives for the cleanup of contaminated sediment in the Spring Creek Arm are described and evaluated on pages 7-10. The characteristics of possible disposal cells, which applies to Alternatives 3, 4 and 5, are described on page 10. The alternatives were evaluated against seven of the nine criteria established in the National Contingency Plan (NCP). These nine criteria are defined in Figure 4 on page 6. Two of these seven criteria are considered threshold criteria. This means that any cleanup alternative must meet these criteria to be eligible for selection by EPA. The two criteria are: 1) overall protection of human health and the environment, and 2) compliance with legal requirements that are applicable or relevant and appropriate (ARARs).

Five additional evaluation criteria include long-term effectiveness, short-term effectiveness, technical and administrative implementability, reduction in toxicity or mobility or volume, and cost. Table 2 provides a comparison of alternatives (see pages 11 and 12). EPA's evaluation of the last two NCP criteria, State acceptance and community acceptance, will be based on comments received during the public comment period. This next section discusses each cleanup alternative according to seven of the NCP criteria.

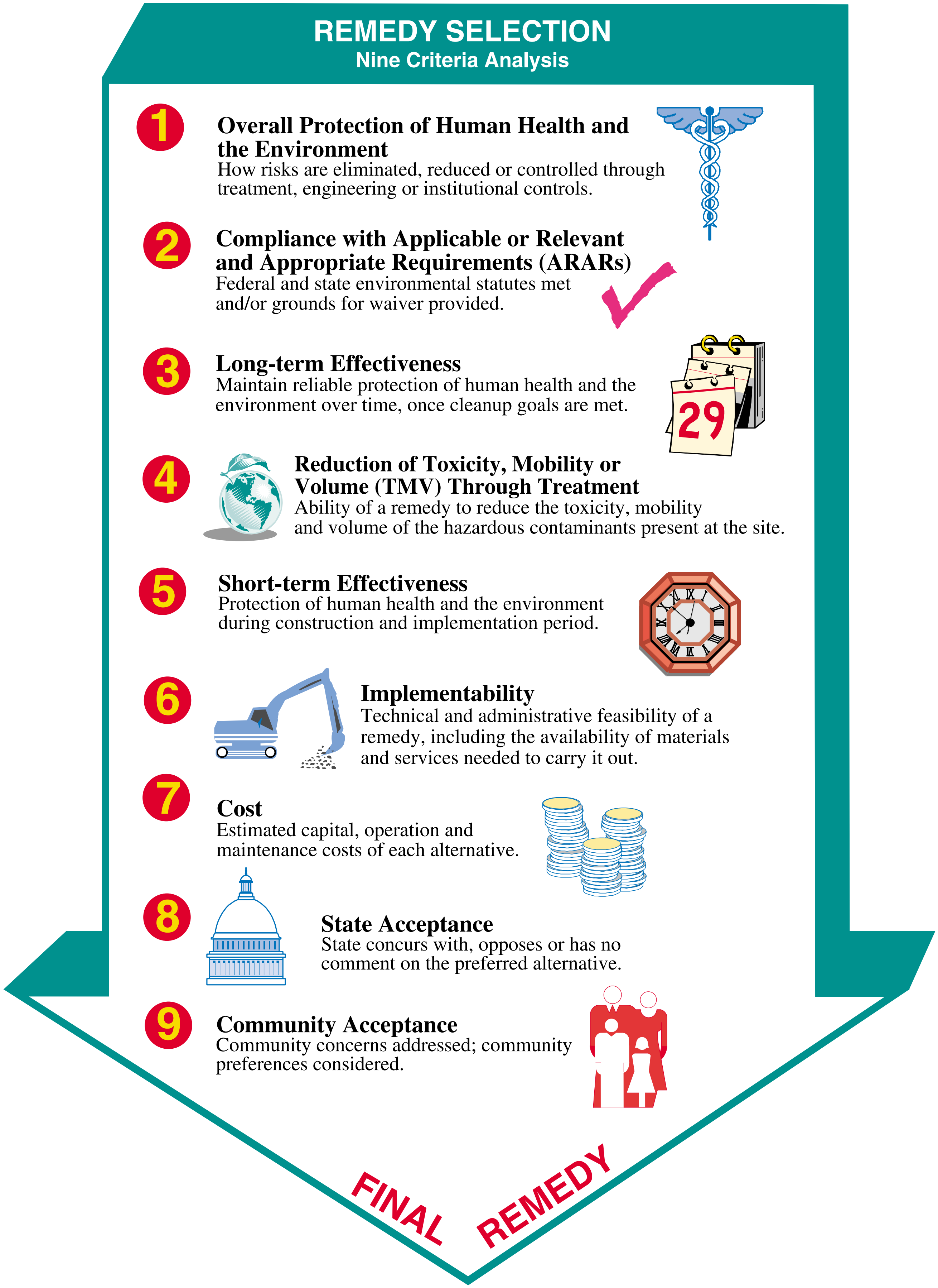


Figure 4: Superfund Remedy Selection Criteria

Cleanup Alternatives

Summary

Alternative 1 Summary: No Further Action

Capital cost: $0
Annual Operation & Maintenance (O&M): $0
50-year Present Value: $0

This alternative is evaluated to determine the risks posed to public health and the environment if no further actions were taken to reduce the potential for movement of contaminated sediment into the Sacramento River. This alternative assumes continued operation of the Debris Dam and Keswick Reservoir and that the Bureau of Reclamation (Reclamation) would continue to control the release rate from the Debris Dam in order to match the discharges from Shasta Dam and the Power Plant so that water quality criteria are met downstream of Keswick Dam. Reclamation would also continue low-flow releases from the Power Plant during Debris Dam releases to flush Spring Creek Reservoir water through the Spring Creek Arm. Lastly, Keswick Reservoir water levels would continue to be restricted because of concerns that sediment with high metals concentrations in the Spring Creek Arm would move.

Discussion

Alternative 1 Discussion

The no-action alternative fails to meet either of the NCP threshold criteria. The first threshold criteria is not met because unacceptable long-term environmental risks would remain for sediment erosion, movement, and deposit in sensitive areas of the Sacramento River. A discharge of contaminated sediment is capable of causing significant adverse impacts to the important fishery resources of the Sacramento River below Keswick Dam, including spawning areas that are critical for survival of two Federal and State listed species, winter-run and spring-run Chinook salmon. Early life stages of fish, such as the eggs and fry, would be particularly susceptible to the toxic contaminants in the sediments. These environmental risks would be expected to continue for an extended period of time, perhaps many years. The no-action alternative does not meet the second threshold criteria because a release of contaminated sediment from the Spring Creek Arm would violate protective State water quality standards established to prevent toxicity in the Sacramento River ecosystem.

Alternative 2 Summary: Capping the Sediment in Place

Alternative 2A
Capital cost: $11,300,000
Annual O & M: $280,000
50-year Present Value: $17,900,00

Alternative 2B
Capital cost: $8,210,000
Annual O & M: $195,000
50-year Present Value: $12,800,000

This alternative provides for placement of a cap of coarse sand, gravel, and riprap over contaminated sediment in the Spring Creek Arm. The cap would be designed to contain the sediment and limit its movement into the Sacramento River.

Alternative 2 includes two subalternatives that relate to the volume of sediment capped. First, capping the full extent of the Spring Creek Arm and 100% of the sediment (Alternative 2A).

Cont'd.

Alternative 2 Discussion

This alternative meets both of the NCP threshold criteria. For subalternatives: 2A (Capping the Full Extent of the Arm) and 2B (Capping Piles A, B, and C), the engineered cap is designed to contain sediment during the greatest anticipated discharges to the Spring Creek Arm under low and high reservoir water elevations. The cap also physically isolates contaminated sediment from the organisms and habitat at the bottom of the creek. This capping complies with water quality goals below Keswick Dam and location-specific ARARs.

Over the long-term, no restrictions would be required on Keswick Reservoir operating elevations or maximum Power Plant release rates. However, the cap would require periodic inspections, long-term maintenance, and land use restrictions to remain effective. In addition, the mobility of the contaminated sediment is reduced but there is no reduction in toxicity or volume.

Under all alternatives that involve in-water work, short-term risks to the environment exist from resuspension and movement of contaminated sediment. Resuspension management would include best management practices, engineering prac-

Alternative 2 Summary *(Cont'd.)*

Second, capping part of the Spring Creek Arm and 90% of the sediment in Piles A, B, and C (Alternative 2B). Both Alternatives 2A and 2B include: controls to prevent dredging or construction activities that could damage the cap, long-term maintenance of the cap, and long-term monitoring of the effectiveness of the remedial action. Placement of capping materials would be limited to times when the Power Plant is not operating and no flow is released from the Debris Dam. This would facilitate construction and limit movement of suspended sediment.

Alternative 2A requires about 3 years to construct while Alternative 2B requires about 2 years.

Alternative 2 Discussion, *(Cont'd.)*

tices, and sediment curtain barriers to mitigate this risk. Technical challenges exist with cap placement because of the fine grain size and high moisture content of the sediment and high metals concentrations of the sediment and pore water. These characteristics of the sediment would likely result in movement of some fine-grained contaminated sediments into downstream areas during capping, which would reduce the overall effectiveness of this approach.

Alternative 2B is designed to minimize the potential for large releases of sediment from the Spring Creek Arm, but uncapped sediment, which comprises about 10 percent of the total volume in the Spring Creek Arm, might be transported into Keswick Reservoir over time. Also, because the uncapped areas are potentially erodable, loss of these sediments could reduce the stability of the cap for the remaining sediment. Therefore, this subalternative is less protective than 2A.

Alternative 3 Summary: Full Dredge with Disposal

Alternative 3A:
Capital cost: $26,000,000
Annual O & M: $123,000
50-year Present Value: $28,900,000

Alternative 3B:
Capital cost: $26,300,000
Annual O & M: $119,000
50-year Present Value: $29,100,000

This alternative provides for removal of contaminated sediment in the Spring Creek Arm to the full extent technically feasible. The target volume of contaminated sediment to be removed is 284,000 cubic yards (cy). Sediment would be removed using a hydraulic dredge. Discharge from the dredge would be pumped to a treatment and disposal area, where solids would be separated from liquid during dewatering. Solids would be disposed in an upland, engineered disposal cell, and water would be discharged to the Spring Creek Reservoir.

Alternative 3 includes two subalternatives that evaluate different locations for the engineered disposal cell: Alternative 3A (behind the Debris Dam and adjacent to Spring Creek Reservoir) and Alternative 3B (adjacent to Iron Mountain Road which is about 1 mile north of Keswick Reservoir). Alternatives 3A and 3B include long-term monitoring of the effectiveness of

Alternative 3 Discussion

This alternative meets both of the NCP threshold criteria and full removal of the sediment provides the greatest long-term protection of human health and the environment. This alternative complies with water quality goals below Keswick Dam and dredging complies with location-specific ARARs.

The full dredge is extremely effective over the long-term and no restrictions would be required on Keswick Reservoir operating elevations or maximum Power Plant release rates for the alternative to remain effective. In addition, the full dredge reduces toxicity, mobility, and the volume of contamination in the Arm.

Short-term risks to the environment exist from resuspension and movement of contaminated sediment during the cleanup. Steps, including use of sediment curtains, would be taken to prevent release of contaminated sediments. In addition, technical challenges exist with dredging sediment in the Spring Creek Arm because of the unique properties of the sediment (e.g., fine grain size, high moisture content, and high metals concentrations). The greatest technical challenge is the depth of sediment and debris in Pile C (the most downstream pile). The thickness of sediment in Pile C is up to 37 feet, and the depth of water in this location is a minimum of 20 feet, for a total required digging depth of up to 60 feet. Removal efficiencies are greatly reduced at these depths and might require modifications to the

Alternative 3 Summary *(Cont'd.)*

the remedial action such as surface water monitoring in Keswick Reservoir and long-term monitoring of the disposal cell. Either disposal location would require some long term maintenance, access restrictions and future use limitations. Dredging would primarily be limited to times when the Power Plant is not operating and no flow is released from the Debris Dam.

Alternatives 3A and 3B require about 3 to 4 years to complete.

Alternative 3 Discussion *(Cont'd.)*

dredge. Debris, such as submerged decaying trees, and obstructions, such as a submerged railroad trestle, have been observed in Pile C. Therefore, complete removal of sediment in Pile C may prove to be technically impossible and long-term management might be required for the remaining sediment that is infeasible to dredge.

Alternative 4 Summary: Partial Dredge with Disposal

EPA's Preferred Alternative

Alternative 4A:
Capital cost: $18,600,000
Annual O & M: $106,000
50-year Present Value: $21,100,000

Alternative 4B:
Capital cost: $18,400,000
Annual O & M: $102,000
50-year Present Value: $20,800,000

This alternative provides for partial removal of the sediment that is most susceptible to erosion in the Spring Creek Arm (i.e., all of Piles A and B and part of Pile C). For purposes of the Sediment FS, it was assumed that contaminated sediment would be removed to an elevation of 560 feet msl, which removes approximately 55% of the sediment (158,000 cy). Dredging to this elevation would fully remove Piles A and B and leave approximately 126,000 cy of sediment in Pile C.

As described under Alternative 3, the considerations and locations for the engineered disposal area are the same for Alternative 4: Alternative 4A (adjacent to Spring Creek Arm Reservoir) and Alternative 4B (adjacent to Iron Mountain Road).

Alternatives 4A and 4B are estimated to require 2 to 3 years to complete.

Alternative 4 Discussion

This alternative meets both of the threshold NCP criteria through the removal of sediment in the Spring Creek Arm that is most susceptible to erosion. This alternative significantly reduces the potential for contaminated sediments to move and deposit into important fishery spawning habitats and reduces the metal loads and suspended solids discharged from the Spring Creek Arm to the Sacramento River. For the second threshold criteria, it meets water quality standards that assure the protection of the Sacramento River below Keswick Dam and location-specific requirements, including the Endangered Species Act, Fish and Wildlife Conservation Act, and the Fish and Wildlife Coordination Act.

This alternative provides for removal of contaminated sediments most susceptible to erosion and substantially reduces the toxicity, mobility and volume of contaminated sediments that are currently present in the Spring Creek Arm. For the sediment which would remain, EPA's modeling analyses indicate that the sediment that would remain in Pile C after partial dredging would not be eroded except during extremely rare and unlikely circumstances related to the operation of Central Valley Project (CVP) facilities during rare storm events. Operational restrictions on CVP facilities would be implemented to address this unlikely risk scenario.

As with Alternatives 2 and 3, short-term risks to the environment exist from resuspension and movement of contaminated sediment during the cleanup. Steps, including the use of sediment curtains and other engineering or management controls, would be taken to prevent the release of contaminated sediments. With respect to the technical challenges of implementation, partial dredging under Alternative 4 would have fewer technical challenges than full removal under Alternative 3 because the depth of dredging would be shallower.

Alternative 5 Summary: Partial Dredge with Disposal and Cap of Pile C

Alternative 5A:
Capital cost: $20,800,000
Annual O & M: $160,000
50-year Present Value: $24,500,000

Alternative 5B:
Capital cost: $20,600,000
Annual O & M: $156,000
50-year Present Value: $24,200,000

Alternative 5 provides for partial removal of the sediment that is most susceptible to erosion in the Spring Creek Arm (i.e., all of Piles A and B and part of Pile C) and placement of a cap to contain the sediment on Pile C that remains after dredging. A cap of coarse sand and gravel would be placed over 126,000 cy of fine-grained sediment remaining in Pile C over which.

As described under Alternative 3 and 4, the considerations and locations for the engineered disposal area are the same for Alternative 5: Alternative 5A (adjacent to Spring Creek Arm Reservoir) and Alternative 5B (adjacent to Iron Mountain Road).

Alternatives 5A and 5B each require about 2 to 3 years to complete.

Alternative 5 Discussion

This alternative meets both the NCP threshold criteria and is very protective of the Sacramento River ecosystem and complies with water quality goals below Keswick Dam and location-specific ARARs.

This alternative is very effective in the long-term and no restrictions would be required on Keswick Reservoir operating elevations or maximum Power Plant release rates for Alternative 5 to be effective. However, the cap over the remaining sediment in Pile C would require periodic inspections, long-term maintenance, and use restrictions to remain effective. In addition, the partial dredge reduces toxicity, mobility, and the volume of contamination in the Arm.

Alternative 5 would have greater technical challenges than Alternative 4. Technical challenges exist with cap placement because of the unique properties of the sediment and the presence of debris and obstructions in and near Pile C. These technical challenges include the potential for movement of fine-grained contaminated sediment from the Spring Creek Arm to the Sacramento River during cap placement, but less than Alternative 2.

Disposal Cell Subalternatives

Alternatives 3, 4, and 5 all include the same two subalternatives about the location of the disposal cell. For all the alternatives, the disposal cell will be constructed and maintained to minimize the long-term risk of contaminant discharge to surface water or groundwater. The Spring Creek Reservoir disposal location (Alternatives 3A, 4A, and 5A) is located within the impacted watershed and behind the Debris Dam, reducing the long-term risks of contaminant movement. In contrast, the disposal cell adjacent to Iron Mountain Road (Alternatives 3B, 4B, and 5B) is located outside of the impacted Spring Creek Arm watershed. The Iron Mountain Road disposal location is closer to areas used by the public, resulting in greater short-term human health risks during dredging operations. For example, this short-term human health risk could be the result of unauthorized public access despite the presence of fencing and signs. Disturbed seasonal wetlands are located at both disposal locations. The construction activities would impact the wetlands and mitigation would be required.

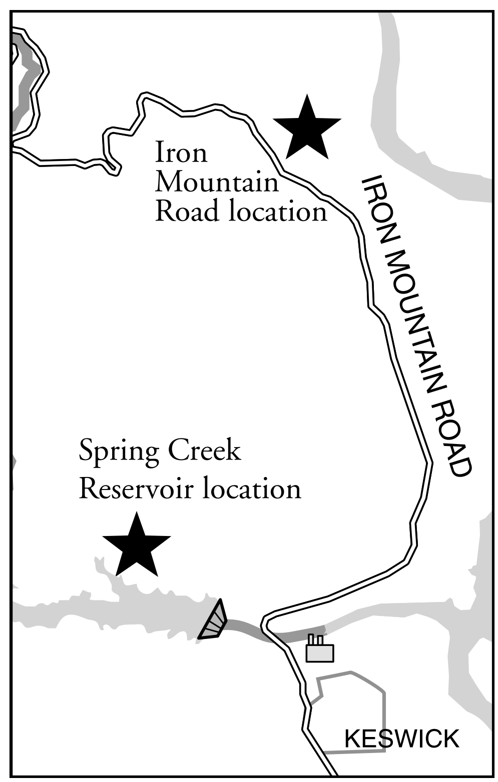
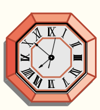


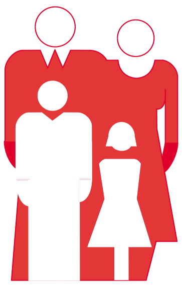
Figure 5: Locations of potential disposal cells

Table 2: Comparison of Alternatives

	Alternative 1 No Further Action	Alternative 2 Capping the Sediment in Place	
Description	No further cleanup actions are undertaken	**2A-Capping Entire Arm** Cap is placed over all the sediment in the Spring Creek Arm	**2B - Capping Piles A, B, & C** Cap is placed over the contaminated sediment in Piles A, B, and C only
 **Overall Protectiveness *(threshold criteria)***	Is not protective and does not meet threshold criteria	Very protective of Sacramento River Ecosystem	Less protective of Sacramento River Ecosystem than 2A
 **Compliance with State and Federal Requirements *(threshold criteria)***	Does not comply with ARARs or meet threshold criteria	Complies with ARARs and meets threshold criteria	
 **Long-term Effectiveness**	Not effective	Effective in the long-term	Less effective than 2A in the long-term
 **Reduction of Toxicity, Mobility, or Volume**	No reduction in toxicity, mobility, or volume	Mobility of contaminated sediment reduced. No reduction in toxicity or volume of contaminated sediment	Some mobility of contaminated sediment reduced. No reduction in toxicity or volume
 **Short-term Effectiveness**	Does not meet remedial action objectives	Minimal risk to human health during implementation. Significant short-term risk to environment from potential movement of the fine-grained sediments during cap placement	
 **Implementability**	Not Applicable	Technical challenges with cap placement	
 **<u>Cost</u>**			
Capital Cost	**$0**	**$11,300,000**	**$8,210,000**
Annual O&M	**$0**	**$280,000**	**$195,000**
50-year Present Value	**$0**	**$17,900,000**	**$12,800,000**

Alternative 3 **Full Dredge with Disposal**	**Alternative 4** **Partial Dredge with Disposal**	**Alternative 5** **Partial Dredge with Disposal & Cap for Pile C**	**Alternative Locations for Disposal Cell**	
Contaminated sediment in Spring Creek Arm removed (dredged) to the extent technically feasible. The dredged solids placed in dewatering/disposal cell	Contaminated sediment in Spring Creek Arm most susceptible to erosion removed (dredged). Dredged solids placed in dewatering/disposal cell	Contaminated sediment in Spring Creek Arm most susceptible to erosion removed (dredged). Dredged solids placed in dewatering/disposal cell. Cap placed over the sediment remaining in Pile C	**Adjacent to Spring Creek Reservoir** Alternatives 3A, 4A, and 5A	**Adjacent to Iron Mountain Road** Alternatives 3B, 4B, and 5B
Most protective overall of Sacramento River Ecosystem	Protective of Sacramento River Ecosystem	Very protective of Sacramento River Ecosystem	Both locations provide same level of protectiveness	
Complies with ARARs and meets threshold criteria	Complies with ARARs and meets threshold criteria	Complies with ARARs and meets threshold criteria	Both locations comply with ARARs	
Extremely effective in the long-term. Limited areas of unremovable sediment must be properly managed	Very effective in the long-term at preventing release of contaminated sediments	Very effective in the long-term at preventing release of contaminated sediments. May support limited benthic community.	Both locations equally effective over long-term. Lower risk to environment over long-term	Both locations equally effective over long-term. Low risk to environment over long-term
Mobility, toxicity and volume almost entirely reduced	Mobility almost entirely reduced. Much of toxicity and volume reduced	Mobility almost entirely reduced. Much of the toxicity and volume reduced	Not Applicable	
Minimal risk to human health during implementation. Limited short-term risk to environment due to localized loss of sediment during dredging	Minimal risk to human health during implementation. Limited short-term risk to environment due to localized loss of sediment during dredging	Minimal risk to human health during implementation. Short-term risk to environment due to localized loss of sediment during dredging. Limited potential loss of sediments during cap placement	Minimal risk to human health during implementation. Short-term risk to environment during construction and limited risk during cleanup	Greater risk to human health during implementation. Low short-term risk to environment during construction and cleanup
Technical challenges with dredging	Most implementable alternative	Some technical challenges with dredging and cap placement	Most implementable location	Less implementable location
Alt. 3A / **Alt. 3B**	**Alt. 4A** / **Alt. 4B**	**Alt. 5A** / **Alt. 5B**		
$26,000,000 / **$26,300,000**	**$18,600,000** / **$18,400,000**	**$20,800,000** / **$20,600,000**		
$123,000 / **$119,000**	**$106,000** / **$102,000**	**$160,000** / **$156,000**		
$28,900,000 / **$29,100,000**	**$21,100,000** / **$20,800,000**	**$24,500,000** / **$24,200,000**		

The Role of Public Comment



EPA will not make any final decision until it has considered all comments submitted during the public comment period. Any final cleanup alternative selected by EPA could differ from EPA's Preferred Alternative based on public comment. A final EPA cleanup decision would be made in a "Record of Decision" (ROD) following EPA's review and consideration of public comment.

Where do I get more information?

Please contact:

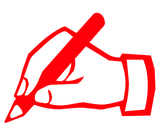
Hector Aguirre (SFD-3)
Community Involvement Coordinator
(415) 972-3238

Rick Sugarek (SFD-7-2)
Remedial Project Manager
(415) 972-3151

EPA
75 Hawthorne Street
San Francisco, CA 94105

or leave a message on our toll-free line:
1 (800) 231-3075

How do I comment?



Public comments can be submitted in writing or orally. All written comments must be mailed on or before **September 13, 2004** and oral comments will be accepted at the Public Meeting on **Wednesday, August 25**.

Please address comments to:

Rick Sugarek (SFD-7-2)
Remedial Project Manager
U.S. EPA
75 Hawthorne Street
San Francisco, CA 94105

Information Repositories

Iron Mountain Mine Administrative Record:

Shasta County Library
1855 Shasta St.
Redding, CA 96001
(530) 225-5754

EPA Records Center
95 Hawthorne St., Suite 403S
San Francisco, CA 94105
(415) 536-2000

Cal State - Chico
Meriam Library
400 W. First St.
Chico, CA 95929
(530) 898-5833

IRON MOUNTAIN MINE SUPERFUND SITE

Public Meeting

Wednesday, August 25, 2004

7:00 - 9:00 pm

Red Lion Hotel, Redding

Public Comment Period on Proposed Plan

August 11 - September 13, 2004

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