ACTION MEMORANDUM

SELECTIVE SOURCE RESPONSE ACTION
NEW WORLD MINING DISTRICT
RESPONSE AND RESTORATION PROJECT

Gallatin National Forest - Gardiner Ranger District
Park County, Montana

February 14, 2001

ACTION MEMORANDUM

Date: February 14, 2001

Subject: Request for Removal Action
New World Mining District Response and Restoration Project
Gallatin National Forests

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To: Regional Forester

Through: John R. Logan, District Ranger, Gardiner Ranger District
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I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed non-time-critical removal action described herein for the Selective Source Response Action at the New World Mining District (District), located in Park County, Montana. As the cleanup of mining wastes present in the District will be conducted over several years, this Action Memorandum only presents the decision for cleanup proposed for selective sources. An overall project work plan prepared for the project (Maxim, 1999a) and an annual work plan prepared for the project (Maxim, 2000a) describe in detail the process for prioritizing sites and the overall schedule for cleanup of historic mining wastes present in the District. A Draft Engineering Evaluation/Cost Analysis (EE/CA) was prepared to develop various alternatives that address impacts associated with hazardous substances present in the District (Maxim, 2000b). The Final Selective Source Response Action EE/CA provides the details and basis for the proposed response action and is attached to this memorandum as a supporting document (Maxim, 2001). The discussion provided in this memorandum will substantiate the need for a selective source removal response, identify the proposed action, and explain the rational for the removal.

The Selective Source Response Action will be executed by following the non-time-critical removal action process as defined by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA; 42 USC 9604) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR Part 300). Response actions -- as explained in the U.S. Environmental Protection Agency's (EPA) *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* -- are implemented to respond to "the cleanup or removal of released hazardous substances from the environment … as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment…" (EPA, 1993).

II: SITE CONDITIONS AND BACKGROUND

A. Site Description

The primary environmental issues within the District are associated with impacts from historic and recent gold, silver, copper, and lead mining activities which occurred in the area since prospecting was initiated in about 1869. Mining disturbances are primarily situated on lands managed or controlled by the USDA Forest Service. Human health and environmental issues are related to elevated levels of heavy metal contaminants present in mine waste piles, open pits, acidic water discharging from mine openings, and sediments.

For the Selective Source Response Action, environmental data collected by numerous parties over the years show that mine waste dumps located on District Property are contributing sediments and contaminants of concern to the surrounding land and nearby streams. Mine waste has been subject to erosion and leaching of contaminants since these materials were dumped when the mining operations were active. District Property is defined as including all property or interests in property that Crown Butte Mining, Inc. (CBMI) relinquished to the United States under the terms and conditions of a Settlement Agreement and Consent Decree entered by the United States District Court for the District of Montana in 1998 (Consent Decree).

1. Removal Site Evaluation

In 1996, the EPA began a site investigation of mining impacts in the District, which was performed by URS Operating Systems (UOS). The EPA investigation involved installing monitoring wells, surface water sampling, groundwater monitoring, and completing a groundwater tracer study. The results of these studies were published in a technical report (UOS, 1998) which included the following: a review of all previous surface water and groundwater data collected by the Montana Department of Natural Resources and Conservation, USDA Forest Service, CBMI, EPA, and UOS; an evaluation of the data collected during the 1996, 1997, and 1998 field seasons; and an overall evaluation of the complete data set with respect to restoration and reclamation of the historic abandoned mining operations. Site investigation data adequately document impacts to human health and the environment that are associated with historic mining. The Consent Decree negotiated with the former owner of the mining interests in the District, CBMI, provides the terms and funding for cleanup efforts.

2. Physical Location

The New World Mining District falls within the boundaries of the Gallatin and the Custer National Forests and abuts Yellowstone National Park's northeast corner. The Absaroka-Beartooth Wilderness Area bounds the District to the north and east. To the south of the District is the Montana-Wyoming state line. The District lies entirely within Park County, Montana.

The communities of Cooke City and Silver Gate, Montana are the only population centers near the District. The neighboring communities of Mammoth, Wyoming and Gardiner, Montana are located about 80 kilometers (50 miles) to the west. Red Lodge, Montana is about 105 kilometers

(65 miles) to the northeast, via the Beartooth Highway, and Cody, Wyoming is located 100 kilometers (60 miles) to the southeast. Only two routes of travel are open on a year-round basis to the District: the Sunlight Basin road, which allows access to within a few miles of the District in the wintertime, and the highway between Mammoth and Cooke City. The Beartooth Highway is closed during the winter.

3. Site Characteristics

The District is located at an elevation that ranges from 2,400 meters (7,900 feet) to over 3,200 meters (10,400 feet) above sea level. The site is snow-covered for much of the year. The District covers an area of about 100 square kilometers (40 square miles). Historic mining disturbances affect about 20 hectares (50 acres) of District Property according to recent measurements made by the USDA Forest Service Interagency Spatial Analysis Center.

The topography of the District is mountainous, with the dominant topographic features created by glaciation. The stream valleys are U-shaped and broad while the ridges are steep, rock-covered, and narrow. Much of the District is located at or near tree line, especially in the Fisher Mountain area, where the major mining disturbances are located.

The District is situated at the headwaters of three river systems, which all eventually flow into the Yellowstone River. The three tributary rivers are the Clark's Fork of the Yellowstone, the Stillwater, and the Lamar. The Lamar River flows through Yellowstone Park. The major tributary streams in the District include Daisy, Miller, Fisher, Goose, Sheep, Lady of the Lake, Republic, Woody, and Soda Butte creeks.

4. Release or Threatened Release into the Environment of a Hazardous Substance

a. Hazardous Substances

The hazardous substances as defined in section 101(14) of CERCLA found at the site include aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, and zinc. Concentrations of hazardous substances in solid wastes and surface water are documented in the Selective Source Response Action EE/CA (Maxim, 2001).

b. Sampling and Analytical Data

The sampling methods used to collect the chemical data are described in the Selective Source Response Action EE/CA prepared by Maxim Technologies under contract to the USDA Forest Service (Maxim, 2001). Laboratory analytical results from waste dump samples indicate that mine waste contains elevated levels of arsenic, cadmium, copper, lead, and zinc as compared to background concentrations. Long-term monitoring of surface water in headwater streams that originate in the mining district show that water quality standards for aquatic life are particularly exceeded for copper and zinc as well as other parameters including pH, suspended solids, and iron.

c. Mechanism for Past, Present, or Future Release

The waste dumps present in the District are largely unvegetated and unconfined. Runoff, which erodes material into Fisher Creek, Daisy Creek, and Soda Butte Creek, potentially leaches metals from the wastes into groundwater. Portions of the selected waste dumps are in direct contact with surface water at certain times of the year; some of the dumps are located in the path of avalanches.

d. Events or Features that could Spread or Accelerate Releases

Large runoff events, particularly during the spring when twelve to twenty feet of snowpack melts off the sites, presents potential conditions for increasing erosion of the dumps into surface water drainages. Water quality in Fisher Creek and Soda Butte Creek is impacted by metals associated with the mine waste dumps and mineralized host rock. Several water quality parameters exceed Montana's water quality standards (Montana Circular WQB-7) as well as both the acute and chronic aquatic life standards in portions of Daisy Creek, Fisher Creek, and the Clark's Fork of the Yellowstone River.

e. Properties that Influence the Rate of Releases

The overall site conceptual model for the District is complex, and site investigations are ongoing to provide insight into the primary sources of mining related contaminants, the likely mechanisms that are involved in releasing contaminants into the environment, and the exposure pathways that present risks to humans and the environment. The conceptual model presented in the Overall Project Work Plan (Maxim, 1999a) illustrates that the major sources of contaminants are acidic, metal-laden mine waste dumps located at mine openings and massive sulfide ore deposits underground that are exposed to the atmosphere by either mine workings or natural fracturing and faulting. Other secondary sources of contaminants include stream sediments that have been transported downstream from other sources. The primary mechanisms of movement of metal-laden mine wastes include the following:

- Erosion into surface water courses
- Dissolution of contaminants in runoff
- Infiltration of dissolved metals into soil and groundwater
- Movement of impacted water through open underground mine workings and improperly abandoned exploratory borings
- Groundwater discharge into surface water
- Contaminated surface water flow to groundwater.

Mine waste sources in the District are many and widely scattered throughout the 64 square kilometer (40 square mile) area that the District encompasses. There are in excess of over 150 mine dumps on District Property totaling about 330,000 cubic meters (430,000 cubic yards) of solid waste, and more than 20 mine discharges, numerous acid seeps, and several kilometers of contaminated instream sediments.

Except for some of the larger waste dumps, individual contributions of specific mine waste sources via the pathways identified above will be difficult to quantify because of the wide distribution of sources. Quantification of metal loading has been done to a certain degree by previous investigators for Daisy Creek and Fisher Creek (Amacher, 1998; Kimball, et al, in progress; Nimick, 1999, in progress), although there remains a large discrepancy in the remainder terms (the balance of the metal loads that cannot be assigned to defined point or non-point sources).

These studies, however, do give some indication of how metal loads are distributed for some of the source types. The study completed by Amacher (1998) provides some guidance on how the effects of response and restoration activities may be partitioned among the various sources and pathways. For instance, dissolved copper load was apportioned to the Glengarry adit (20%), leachate from the Glengarry dump (14%), tributary input from the Como Basin (21%), and tributary input from Fisher Mountain (14%). About 30% of the dissolved copper load could not be ascribed to any particular source.

Using this information as a rough approximation of the effect of response and restoration actions, it is evident that adit discharges contribute a considerable amount of metals to Fisher Creek and response actions directed at reducing or treating flows from the more substantial adit discharges should directly result in water quality improvements. This is also true of leachate generated from waste dumps that directly impact surface water. The effect of response or restoration actions on other sources, such as stream sediments, cannot be quantified at this time. Metals sorbed, precipitated, or coprecipitated in or on stream sediment have complicated reactions with surface water and are transient because fine-grained sediment generally move downstream and may be continually replenished from upstream sources.

5. National Priority List (NPL) Status

CERCLA, sometimes referred to as the "Superfund" statute, was enacted in 1980 to address sites where releases of hazardous substances pose a threat to public health and the environment. Under CERCLA, the nation's most contaminated sites are placed on the National Priorities List or NPL. No mine sites in the District are listed or have been nominated for listing on the NPL.

6. Maps, Pictures, and other Graphic Representations

A location map and map of site features are displayed in the attached Final EE/CA (Maxim, 2001; Figures 1, 3, 4a, and 4b).

B. Other Actions to Date

1. Previous Actions

On August 12, 1996, the United States signed a Settlement Agreement (Agreement) with CBMI to purchase CBMI's holdings in the District. The resulting transfer of property to the U.S. government effectively ended CBMI's proposed mine development plans and provided $22.5 million to cleanup historic mining impacts to specific properties in the District. In June 1998, the

Consent Decree, which was signed by all interested parties and CBMI, and approved by the United States District Court, finalized the terms of the Agreement and made available the funds that will be used for mine cleanup.

Mitigation of historic mining wastes has been an on-going interest of numerous parties since the 1970s. One of the first to investigate revegetation in the District was the USDA Forest Service Intermountain Research Station (Brown, 1994; 1995). This research has focused on reclamation of high elevation mine disturbances. Larger scale reclamation efforts have been conducted by numerous parties involved in reclamation of the McLaren Tailings near Cooke City. In 1969, the Bear Creek Mining Company covered the McLaren Tailings with soil and rerouted Soda Butte Creek. In 1989, the EPA constructed a dam at the lower end of the tailings to stabilize the banks of Soda Butte Creek (UOS, 1998). Other areas of the tailings have been recontoured and revegetated since that time.

Some reclamation work was completed by CBMI on District Property as part of exploration and proposed mine development work. In 1993, CBMI began surface restoration work to reclaim the historic McLaren open pit mine disturbance and areas disturbed by exploration activity in the Como Basin. Reclamation activities at the McLaren pit included recontouring, construction of runon control ditches, treating acid soils with a lime amendment, and fertilizing and seeding with native grasses. Similar reclamation work was completed in the Como Basin area although additional work was done in this area to construct runon controls to prevent water from entering a raise connected to the Glengarry adit. From 1993 to 1996, CBMI also reclaimed a number of exploration roads and drill pads.

2. Current Actions

The primary purpose in completing response and restoration activities in the District is to mitigate certain threats to the environment that are consistent with overall project work plan objectives for the site (Maxim, 1999a). In March 1999, the USDA Forest Service initiated the planning process for overall project cleanup. Planning documents were in place in June 1999, and work was begun on the project with the monitoring of surface water and groundwater quality at selected monitoring points. In July, the USDA Forest Service began investigating potential repository locations for disposal of mining wastes in the District. Other activities conducted in 1999 included the following:

- Establishing a database management system for the project.
- Cataloging existing information available for the site.
- Completing a technical evaluation of existing information and data.
- Improving portions of the Daisy Pass and Lulu Pass roads to accommodate construction traffic.
- Improving a previously constructed surface water diversion around the Como Shaft.
- Developing a suitable map base of District Property to support engineering design.
- Evaluating areas of erosion contributing excessive sediment to area drainages.
- Completing a repository siting evaluation report and collecting hydrogeologic data on two prospective repository sites.
- Completion by the U.S. Geological Survey of a surface water tracer study on Daisy Creek to

determine surface water inputs.

- Preparing the Draft 1999 Engineering Evaluation/Cost Analysis (EE/CA).
- Obtaining data to fill identified data gaps for proposed 2000 Response Actions at the site.
- Identifying unrecorded mine waste dumps, adits, and boreholes, and developing a database of site characteristics.
- Ranking mine waste sources according to a modified Hazard Ranking System to aid in the prioritization of sites slated for clean up.
- Identifying unrecorded cultural features.
- Determining the feasibility of reopening the Glengarry Adit.
- Evaluating water quality treatment alternatives for acid mine discharges.
- Preparing the Selective Source Response Action EE/CA.
- Satisfying the requirements of the petition for temporary standards submitted by CBMI.

Following the preparation of the draft EE/CA, a decision was made by the USDA Forest Service to delay the 1999 Response Action. This decision was made to allow additional time to complete the study of potential mine waste repository sites and to further consider source area prioritization.

Planning and Response Actions for 2000 include the following:

- Maintain community relations by implementing activities described in the Community Relations Plan.
- Maintain the project database and the project Web site.
- Continue long-term monitoring of surface water and revegetated areas as described in the respective long-term planning documents.
- Evaluate mass loading of metals from specific source areas to assist in the overall evaluation of potential response actions.
- Complete the hydrologic and geologic evaluation of the McLaren Pit area.
- Complete the repository siting evaluation.
- Continue to evaluate water quality treatment alternatives for acid mine discharges.
- Reopen the Glengarry Adit to assess the feasibility of potential response actions directed at reducing the input of acid mine drainage emanating from the adit.
- Evaluate and implement additional erosion control measures in the Como Basin area or other areas contributing excessive sediment to area drainages. Install and maintain sediment and stormwater management controls where needed.
- Monitor groundwater at selected locations in July 2000.
- Complete a surface water tracer study on Miller Creek.
- Complete the identification of unrecorded mine waste dumps, adits, and boreholes within the District.
- Complete the identification of the extent and character of underground mine workings on District Property.
- Complete road improvements initiated in 1999 and install a bridge across Fisher Creek at the current location of the low water crossing.
- Construct the Selective Source Response Action.
- Identify potential response actions for implementation in 2001.
- Prepare the 2001 Work Plan.

- Prepare the 2001 EE/CA.

The USDA Forest Service completed a draft version of an EE/CA for the Selective Source Response Action on March 24, 2000. A public notice appeared in the Bozeman Chronicle, Livingston Enterprise, Cody Enterprise, and Powell Tribune announcing that the draft EE/CA was available, setting the time for the comment period, and listing the location of the Information Repositories. A 30-day comment period was established which ended on April 28, 2000. Comments were incorporated into the final version of the EE/CA, which is being issued with this Action Memorandum. A copy of the draft version of the EE/CA was placed in the Information Repositories in Cooke City (Chamber of Commerce), Gardiner (Gardiner Ranger District Office), and Bozeman (Gallatin National Forest Supervisor's Office). A response to comments received is presented in Section V.A.1(k) of this Action Memorandum.

C. State and Local Authorities' Role

1. State and Local Actions to Date

The USDA Forest Service has been cooperating throughout the project with the states of Montana and Wyoming, the Environmental Protection Agency, the Department of Interior, and the local county commissioners. A preliminary list of Applicable, or Relevant and Appropriate Requirements (ARARs) has been developed for the project with significant input provided by the State of Montana. All the cooperating agencies have reviewed the various project documents and have provided comments to the USDA Forest Service.

2. Potential for Continued State/Local Response

Neither the State nor local authorities have the resources or authority to conduct a Response Action at this time. State and local constituents will continue to be involved in site activities and will be kept apprised of all activities of this Response Action.

III. THREATS TO PUBLIC HEALTH OR WELFARE AND THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES.

The EE/CA indicates there is a threat to public health or welfare, or to the environment as set forth in the National Contingency Plan (NCP) at 40 CFR 300.415(b)(2). Briefly, this threat is the risk of continued and future metals contamination of surrounding lands, surface water, and groundwater in the Fisher Creek, Daisy Creek, and Soda Butte Creek watersheds.

Due to the concentrations of metals in mine waste sources (Maxim, 2001), conditions at these sources meet the criteria for initiating a Response Action under 40 CFR 300.415(b)(2) of the NCP. The following factors from 40 CFR 300.415(b)(2) of the NCP form the basis for USDA Forest Service's determination of the threat present and the appropriate action to be taken:

(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

(ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems;

(iii) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate;

(iv) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

(v) The unavailability of other appropriate federal or state response mechanisms to respond to the release.

A. Threats to Public Health or Welfare

Heavy metals associated with these waste rock sources can affect human health through inhalation or ingestion. The total hazard quotient for arsenic and zinc present in dumps included in the Selective Source Response Action exceed 1.0, indicating that these two contaminants pose a human health risk. The total hazard quotient for zinc is 3.0, which is attributed to the risk posed by ingestion of fish taken from the stream by recreationists. Because there are no fish in Fisher Creek at the present time, this risk of exposure to zinc in surface water is currently not a pathway at this site. Therefore, based on these data, arsenic is the only contaminant that presents a human health risk associated with the waste dumps considered for this Response Action. Site specific testing on leachability of arsenic from the waste dumps included in the Selective Source Response Action shows that arsenic is not leachable and is therefore a human health concern in only the solid form.

B. Threats to the Environment

Two groups of ecological receptors have been identified as potentially being affected by contamination associated with historic mining present in the District. The first group includes aquatic life and wetlands associated with Fisher Creek and Soda Butte Creek located downgradient of the source areas. The second group of receptors is native terrestrial plants at the site whose ability to grow in soil or mine waste is limited by relatively high concentrations of certain metals.

The pathways by which ecological receptors could become exposed to contaminants at the site are through direct contact with soils, ingestion of contaminated soils, direct contact with water and sediments, ingestion of water and sediments, and ingestion of contaminated food. Fisher Creek as a cold water fishery has been impacted by the elevated heavy metals concentrations (principally copper and iron). A comparison of metals levels measured in mine waste samples collected from selected dumps to literature guidelines and state aquatic water quality standards indicate that aluminum, copper, iron, and lead pose a risk to organisms in the aquatic environment. In addition, arsenic, copper, lead, and zinc appear at phytotoxic levels in waste dumps.

A threat to the environment also exists through the migration of, and airborne exposure to, contaminated dust. On dry windy days, dust may migrate to the surface waters, wetlands, and other recreational areas as they become airborne.

IV. ENDANGERED DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

The proposed action for the Selective Source Response Action is removal of selected mine wastes to an on-site repository (Modified Alternative 2C in the Final EE/CA). The repository will be designed to isolate the wastes using an engineered cap and bottom liner. Source areas selected for removal were based on the conceptual model described in Section II.A.4 of this document, and the overall objective of reducing or eliminating uncontrolled releases of metals from waste sources that are in direct contact with surface water or groundwater. The removal action will address the immediate threat to the environment posed by the selected mine waste piles. More detail on the selection process, removal action objectives, and alternative analysis can be found in the final EE/CA.

The waste dumps slated for removal under this action are the Spalding dumps, Tredennic dumps, and Rommel and Soda Butte tailings. These mine waste dumps are situated at the headwaters of Fisher Creek (Tredennic, Spalding, and Small Como dumps) and at the headwaters of Soda Butte Creek (Rommel and Soda Butte Tailings dumps). The dumps are generally located a few kilometers north of Cooke City on public land within the Gallatin National Forest.

Volumes and areas of the selected waste dumps included in the Response Action are shown in Table 1. Approximately 24,600 cubic meters (32,300 cubic yards) of waste rock are contained in the dumps, which cover about 1.6 hectares (4.0 acres) of disturbance. Composite samples were collected from each of the waste dumps under consideration for this Response Action. Analytical results are shown in Table 2.

Removal of mine wastes to the on-site repository will involve the following: construction of temporary roads to access the waste material sites; excavation, loading, and hauling wastes; backfilling the removal areas with suitable coversoil; and recontouring and revegetating the sites. Newly constructed access roads to the sites will be reclaimed following completion of the work. Adit discharges that are associated with the Tredennic and Spalding dumps will be diverted to a constructed percolation basin and allowed to infiltrate into the ground. A more detailed description of some of the construction activities is provided below.

TABLE 1
Mine Dumps Included in the Selective Source Response Action
New World Mining District – Response and Restoration Project

Waste Dump Name And Designation	AIMSS Rank*	Area hectares (acres)	Volume cubic meters (cubic yards)
Rommel Tailings (SBSI-96-2)	19	0.58 (1.43)	19,000 (25,000)
Lower Spalding Dump (FCSI-96-8)	23	0.13 (0.32)	2,000 (2,630)
Lower Tredennic Dump One (FCSI-96-5)	26	0.16 (0.40)	2,610 (3,430)
Upper and Middle Spalding Dump (FCSI-96-7)	33	0.11 (0.28)	560 (740)
Upper Tredennic – Five Dumps (FCSI-96-15)	36	0.11 (0.28)	375 (495)
Soda Butte Tailings Dump (SBSI-96-1)	39	0.06 (0.14)	330(440)
Middle Tredennic - Dumps One to Three (FCSI-96-6)	45	0.11 (0.28)	620 (845)
Small Como Dump (FCSI-96-9)	96	0.10 (0.25)	310 (410)
TOTALS:		**1.36 (3.38)**	**25,800 (33,990)**
****ADJUSTED TOTALS:**		**1.56 (3.89)**	**26,600 (35,000)**

Note: * - AIMSS - Abandoned and Inactive Mine Scoring System
** - Adjusted totals allow 15% overage on area affected to allow construction staging and access, and 20% overage on volumes to allow over-excavation of mine wastes (except for Rommel Tailings where no volume correction is applied).

TABLE 2
Waste Rock Sample Analytical Results - pH and Total Metals
New World Mining District – Response and Restoration Project
Selective Source Response Action

Waste Dump Name	pH	Total Metals (milligrams per kilogram)					
		As	Cd	Cr	Cu	Pb	Zn
Rommel Tailings	7.3	7	5	6	1580	110	366
	7.4	7	8	6	1360	280	631
	--	11.2	3.4	37.7	1450	155	369
Lower Spalding Dump	2.1	240	34	6	17600	110	49
Lower Tredennic Dump One	3.2	58	18	14	167	188	84
Upper and Middle Spalding Dump	2.2	310	75	6	2120	130	28
Upper Tredennic Dump Two	3.4	120	<1	5	518	492	88
Soda Butte Tailings Dump	7.3	14	8	6	2950	280	491
Middle Tredennic Dump One	2.4	60	<1	5	170	383	42
Small Como Dump	7.1	6	<1	5	120	20	42
Average	**--**	**83**	**15**	**10**	**2,804**	**215**	**219**
Average background concentration*	**--**	**2**	**5**	**13**	**63**	**51**	**31**

Notes: -- Not analyzed or applicable
< Less than the indicated value
J Data flag for estimated value
* Based on mean concentrations from five natural samples collected by Furniss (see Appendix A)

- *Road Improvements* - Considerable road improvements were made in 1999 on the Daisy Pass and Lulu Pass roads. Remaining improvements will be made to improve access to selected dump sites. Road improvement work includes regrading existing roads, improving drainage, increasing the width of the road to the Tredennic, Rommel tailings, and Soda Butte tailings sites, and constructing new access roads to the Upper and Lower Tredennic sites and the Lower Spalding Dump. For new road construction, a disturbed road width of 6 meters (20 feet) would be stripped of topsoil and stockpiled along the road. Dozer grading would be used to establish a 3.7 meter (12 feet) wide travel width. No turnouts would be required. The road to the Upper Tredennic dumps will involve the most disturbance. The new haul road will depart from the existing road near the Middle Tredennic Dump One and will follow the east side of Polar Star Creek for a distance of about 365 meters (1,200 feet). Total new disturbance associated with this road is expected to be 0.25 hectares (0.67 acres). New access roads needed to the Lower Spalding and Lower Tredennic will require much less disturbance that the Upper Tredennic road, with estimated length of 30 meters and 100 meters, respectively. All new access roads will be fully reclaimed after the removal is completed.

- *Bridges* - Two permanent, pre-cast concrete bridges were installed on the Lulu Pass Road during July and August 2000. At the current location of the low water crossing on Fisher Creek, a 12 to 15 m bng (40 to 50 feet) bridge was constructed. The construction of a permanent bridge on this county-owned road was preferred to a temporary bridge by Park County, which is responsible for maintaining the road. A second bridge was constructed over Polar Star Creek, located about 450 m below the Glengarry Mine. This second bridge is about 6 m long.

- *Connect Road Construction* - Construction of a new road between the Daisy Pass and Lulu Pass roads will be used to haul wastes from the dumps in Daisy and Miller creeks to the repository and to haul materials and supplies that may be needed to complete a Response Action at the McLaren Pit. This new road, designated the upper connect road, will extend from MP 1.41 of the Daisy Pass Road (near the Alice E turnoff) for 1.2 km easterly, where it would tie into the County Connect Road and Lulu Pass Road at MP 1.10. The proposed road would be constructed to a 4 m width with ditches and culverts as needed, and turnouts would be constructed at intervals that allow clear sight distances. The location traverses a bench outside the viewshed of US 212, with no side slopes exceeding 30%. The route is completely within the 1988 burn area, minimizing clearing costs. This road is being built to eliminate substantial reconstruction of an existing connect road that is in poor condition. At the completion of the project, a travel plan for the District will be used to determine final disposition of both the new and the old connect roads.

- *Adit Closures* - Closure of open and collapsed adits will be done at the mine sites included in the Selective Source Response Action by backfilling the adits with rock and regrading the surface to blend with the surrounding topography. To facilitate regrading, the seasonal drainage emanating from adit discharges present at the Upper, Middle, and Lower Tredennic dumps and at the Lower Spalding dump will be routed from the current point of discharge (the adit) to a percolation basin constructed in front of the existing adit. A drainage channel will be constructed to route any seasonal overflows from the percolation basin and around the area reclaimed or treated. The historic point of discharge where the existing adit flows leave the waste site will be constructed in the same or near-by location as exists under current conditions. This construction element will prevent the untreated discharge from percolating through the mine wastes that remain at the site, or from percolating into clean backfill materials that will be brought in to replace removed wastes. The existing character and condition of the adit discharges will be essentially unchanged except for improvements that may be gained in water quality by eliminating any discharge from percolating through mine waste prior to entering a receiving stream.

- *On-Site Repository Construction* - An on-site repository will be constructed at a site along the Lulu Pass road approximately two miles north of Highway 212. The repository footprint needed to contain the wastes removed under the Selective Source Response Action will cover about 1.5 hectare (3.7 acres). The repository could be expanded, if necessary, to accommodate up to 88,000 cubic meters (115,000 cubic yards) of waste. The footprint of a full buildout of this nature would cover about 3 hectares (7.5 acres).

The engineered repository design includes an engineered composite cap system (vegetation, cover soil, geotextile layer, drainage layer, geotextile, geomembrane, and geocomposite) overlying the waste material. The capping system will greatly reduce any percolation of precipitation into the waste. A similar composite liner, leachate collection system, and drainage layer beneath the wastes will add another layer of protection to prevent measurable quantities of leachate from entering groundwater beneath the wastes. Surface water runon will be diverted around the repository. The repository site, referred to as SB-4B, offers positive characteristics that should work in concert with the engineered repository to mitigate any impacts caused by this facility.

a. Address Identified Human Health and Environmental Threats

Removal to an on-site repository will provide protection of human health and the environment because all the mine waste dumps would be moved to an engineered repository. All three repository design alternatives evaluated in the EE/CA (Maxim, 2001) are expected to fully protect human health because all three alternatives will have a substantial cap with good vegetation on moderate slopes.

Effectiveness of on-site disposal is comparable to off-site disposal. Off-site disposal does offer an additional level of protection to the New World Mining District environment, but the associated short-term impacts (about 1,650 trucks hauling waste on a variety of highways through Montana, Wyoming, and Utah), the high cost associated with trucking the wastes a long distance, and RCRA disposal fees offset this advantage. In addition, this transfers the material to another "environment" at the selected RCRA disposal site. On-site disposal minimizes public safety issues associated with waste transport and the threat of spillage resulting from an accident because all haulage would be done on USDA Forest Service and county roads.

Although some risk remains for recontamination of the environment under on-site disposal, this risk is managed through engineering controls employed at the on-site repository. Evaluation and field investigations of potential repository sites in the District led to the selection of a site that has suitable characteristics for mine waste disposal. These characteristics include an appropriate geologic setting, presence of an adequate thickness of low permeable glacial till beneath the repository, suitable hydrogeologic conditions, adequate size, suitable materials for repository construction, and limited visibility from adjacent land.

b. Justification for Proposed Alternative

The USDA Forest Service has selected removal of the selected mine waste dumps and disposal in an on-site repository because it provides the best combination of effectiveness, implementability, and cost of the four alternatives evaluated for the Selective Source Response Action. Removal of the selected waste dumps is an appropriate response because the selected waste dumps directly impact tributary flow to Fisher Creek and Soda Butte Creek. Mine waste will be hauled to an on-site repository situated in the Soda Butte Creek drainage.

Three different repository design alternatives were considered in the draft EE/CA (Maxim, 2000b) and a preferred alternative was identified by the USDA Forest Service as Modified

Alternative 2B, a composite cap without a bottom liner. Based on comments received from the public and cooperating agencies, this preferred alternative was changed by the USDA Forest Service to Modified Alternative 2C, a composite cap with bottom liner and leachate collection system. A discussion of this change is presented in the attached final EE/CA.

Disposal in an on-site repository is highly effective at reducing contamination of the environment because the wastes would be contained at a favorable site in an engineered repository. A repository siting evaluation was conducted in 1999 in the District, with 28 sites evaluated against 28 siting criteria. Repository siting was initiated in the spring of 1999 by reviewing the results of a regional screening and fatal flaw analysis conducted by CBMI. The mining company evaluated 28 potential tailings impoundment sites within a 10-mile radius of their proposed mine as part of the permitting and environmental impact analysis processes. Because site selection of a repository site needed for response and restoration activities used similar siting criteria as those developed by the mining company for tailings impoundment siting, the project team had a ready source of information to quickly focus on the best suited sites within the District.

Sites considered by CBMI included several sites in each of the three principal watersheds in the District (Soda Butte Creek, Daisy Creek, Fisher Creek, and Miller Creek), and sites in disturbed areas at the top of Lulu and Daisy passes. Following a detailed site selection process, the number of sites was reduced to 13 and a qualitative evaluation of each of the sites was performed. Three sites were selected from the 13 sites after a second level of site ranking was completed. CBMI collected additional environmental data from each of these three sites that was then used in the USDA Forest Service repository siting evaluation.

The results of the repository siting study were published in a report in June 1999 (Maxim, 1999b). The siting evaluation resulted in the selection of a single site, designated SB-4B, that possessed the most favorable characteristics for a mine waste repository. This site was further investigated in 1999 and 2000 by gathering additional geophysical data, excavating test pits, analyzing subsurface materials, drilling and sampling numerous borings, installing monitoring wells, analyzing groundwater quality, completing hydrogeologic tests, conducting a dye tracer study, and monitoring groundwater levels in the wells.

The results of the detailed repository site investigation were published in a report in December 1999 (Maxim, 1999c). Two interim draft technical memoranda presenting the results of the water level and dye monitoring were issued in February and June 2000 (Maxim, 2000c). Water level and dye monitoring support the general tenants on hydrogeologic characteristics that were summarized in the December Phase II report.

Results of the Phase II repository site evaluation indicate that the SB-4B site is suitable for mine waste disposal in an engineered repository. This site has suitable geologic and hydrogeologic conditions that are conducive to siting a repository and will be used for disposal of District Property wastes. The total capacity of the site for placement of mine waste is about 88,000 cubic meters (115,000 cubic yards). Placement of 88,000 cubic meters would disturb about 3.0 hectares (7.5 acres).

Within the area studied, geology is characterized by glacial till overlying granite gneiss bedrock. Two small areas with bedrock outcrops are present within the site. Except for these two small areas, till thickness ranges from 2.5 to 10 meters (8 to 33 feet) with the till consisting of a heterogeneous mixture of coarse fragments, sand, silt, and clay. The percentage of fine-grained silt and clay in till ranges from 25 to 29%. The heterogeneous nature and amount of fine-grained material in the till result in relatively low horizontal and vertical hydraulic conductivity. Horizontal hydraulic conductivity of glacial till ranges from 10^{-3} to 10^{-6} centimeters per second (cm/sec), with an average of about $1x10^{-4}$ cm/sec. Vertical hydraulic conductivity of glacial till ranges from 10^{-6} to 10^{-8} cm/sec, with an average of approximately $1x10^{-7}$ cm/sec.

Horizontal hydraulic conductivity of bedrock ranges from 10^{-3} to 10^{-7} cm/sec as determined by slug and pump testing. The average hydraulic conductivity is low, about $3x10^{-5}$ cm/sec. The low hydraulic conductivity of bedrock tested at this site would likely result in sub-optimal performance as an aquifer for domestic well use.

Groundwater flow in bedrock is generally upward into till. This characteristic is documented using dual bedrock and till completions at each of ten nests of monitoring wells. At the upper end of the site, three of the four till wells were dry through the fall and winter. Water entered the till during the spring runoff period, which began in late April 2000, and caused water levels to rise in all the wells monitored. Water levels subsequently fell to pre-snowmelt levels by the end of July.

Groundwater flow direction, in general, is toward the south-southeast, down the topographic slope. A component of flow direction in bedrock follows bedrock structures that are oriented northeast by southwest. Groundwater is expected to discharge to the surface into drainages that surround the SB-4B site; this was documented through dye monitoring with the measurement of dye in mid-June 2000 in a drainage immediately below the site.

Of the three on-site repository alternative designs evaluated, Modified Alternative 2C uses an engineered cover system to reduce infiltration through the cap and into the waste and a bottom liner with a leachate collection system to capture leachate. This alternative reduces the amount of potential leachate percolating through the base of the repository to very small quantities. In concert with site conditions at the repository -- particularly the natural buffering capacity available in the till beneath the repository, the upward hydraulic gradient present in the bedrock water bearing unit, and the discharge of groundwater from beneath the repository into nearby surface water drainages -- Modified Alternative 2C will not degrade water quality in Soda Butte Creek to a measurable degree.

c. Technical Feasibility and Probable Effectiveness

The proposed alternative will effectively reduce containment mobility at the site by removing the wastes and placing them in a secure disposal facility. Removal to an on-site repository is both technically and administratively feasible. Key project components such as equipment, materials, and construction expertise, although distant from the site, are available and would allow the timely implementation and successful execution of the alternative.

Removing the wastes from current locations should be a permanent solution requiring little maintenance and providing long-term effectiveness at the waste dump sites. Consequently, surface water erosion and groundwater contamination problems present at the dump sites are expected to be corrected. Infiltration of precipitation through the wastes and migration of contaminants to groundwater will be substantially reduced.

At the repository site, engineering controls constructed in the cover and leachate collection systems and natural site conditions will be effective at reducing migration of contaminants from the site to non-detectable quantities in surface water drainages surrounding the site and in groundwater immediately downgradient of the site.

d. Further Information

No further information is needed to select the proposed action.

e. Verify Extent of Contamination

Final contours and visual observations will be used to determine when to stop excavating the wastes and underlying contaminated soil. Samples from the bottom of excavated areas will be collected and analyzed to verify that contaminant levels in native material below the waste are at acceptable concentrations.

f. Sensitive Environments

Road improvements needed to implement this alternative may have some short-term impacts on the watershed. Increased sedimentation may result from road improvements although these impacts can be mitigated by limiting the construction period to the drier months of the year and by implementing best management practices for stormwater runoff. Most road improvements needed to access the waste dumps selected for removal will be reclaimed at the completion of the construction season.

g. Uncertainties

Uncertainties associated with implementing this alternative are limited to the uncertainty of knowing the exact volume of waste and contaminated soils that will be removed.

h. Institutional Controls

Following construction, a temporary fence will be built around the repository to protect against wildlife and vehicle damage.

i. Off-Site Disposal

Since the material is being disposed on-site, off-site disposal is not required.

j. Post-Removal Site Controls

Post-removal site control would be required at the removal sites and at the repository. Post-removal site control at the removal sites will involve annual monitoring to identify any problems with revegetation or erosion. Monitoring at the repository will involve surface water and groundwater monitoring consisting of periodic sampling at stations both upgradient and downgradient of the repository. Monitoring and maintenance of the cover system will involve visually checking the condition of the cap several times during the snow-free season to insure that the vegetative cover is performing adequately and that no erosion or stability problems are occurring. Monitoring and maintenance of the leachate collection system will involve periodically measuring the quantity of leachate collected, analyzing samples of the leachate to determine leachate disposal alternatives, and disposing of the collected leachate.

k. Changes Resulting from Public Comments

Written comments were received on the Draft 2000 EE/CA from the EPA, Montana DEQ, Department of Interior National Park Service, Environmental Materials Inc., Greater Yellowstone Coalition, Ralph Glidden, and Park County Environmental Council. Several comments were made concerning the schedule of the proposed Response Action. These comments indicated that the schedule appeared to be advancing too rapidly and advocated delaying any actions related to removal of waste rock to an on-site repository until issues related to site-wide cleanup could be addressed. Several comments were made on the water rights compact analysis that was included in the Draft EE/CA. One comment was made on the cost and source of lime amendment material that was evaluated for use in two of the alternatives included in the draft EE/CA.

Several comments were made on the need to prepare an Overall EE/CA or reclamation plan outlining the schedule for cleanup and schedule for expenditure of cleanup funds.

Several comments were made on the location and design of a central repository. These comments indicated a preference for a repository to be constructed in an existing disturbed area such as the McLaren Pit or the Como Basin. For repository construction, those who commented preferred a repository design that included a bottom liner and leachate collection system. In terms of repository design, several comments were made on the ability of the design to comply with State of Montana solid waste and non-degradation requirements. Several comments were also made on the need for the central repository site to have the capacity to store the McLaren Tailings as well as the other wastes in the District.

One comment was made on the selection of dumps to be reclaimed in the Response Action. This comment indicated that lower ranked sites included in the Response Action should only be responded to after the higher ranking sites were completed. One comment was also received on the goals and objectives of the Response Action and specific impacts to human health and the environment from each of the selected dumps. A question was also raised on whether adit discharges associated with each of the dumps would be addressed in the proposed Response Action.

On the issue of site-wide cleanup and schedule, the USDA Forest Service maintains that the Overall Project Work Plan, in concert with the Support Document and Implementation Plan, forms the basis for the site-wide cleanup approach and the schedule that has been adopted to fulfill the objectives of the Consent Decree.

On the issue of the water rights compact, detailed comments received from the National Park Service on the analysis presented in the draft EE/CA were incorporated into the final EE/CA. In their detailed comments, the National Park Service indicated that, with the suggested modifications, a justification for non-consumptive use could be pursued.

On the issue of the cost of lime amendment, the cost used in the EE/CA was within 20% of the cost reported by the individual submitting the comment. In accordance with EPA guidance on preparing cost estimates for feasibility studies, a cost range of +50% to -30% is considered adequate.

On the issue of repository siting, the USDA Forest Service followed a step-by-step siting process that identified the preferred site only after a detailed evaluation was completed using all available information relative to siting criteria developed in Table 1 of the *Repository Site Evaluation Report* (Maxim, 1999b). Much of this information was developed by CBMI during a search for a potential tailings impoundment site in the District. During the initial repository siting evaluation, use of disturbed areas such as the McLaren Pit and Como Basin was considered and rejected because these sites scored relatively poorly as compared to the other sites considered. Four of the most promising sites appraised were selected for further evaluation by a team of technical specialists from the cooperating agencies and the USDA Forest Service. Two of these sites were rejected after a field visit to the sites. The remaining two sites were studied intensively, leading to the selection of the SB-4B site as the best site for a central repository in the District.

In light of all the information gathered and considered through the repository siting process, the USDA Forest Service strongly supports the SB-4B site as the best site in the District to dispose of mine wastes in a controlled manner. The USDA Forest Service has documented the selection process, selection criteria, and data used to characterize the SB-4B site, and has released these documents for review and comment. Input was solicited from agency cooperators, environmental groups, and the public on the suitability of the SB-4B site, and an endorsement on its suitability as a repository site was received from both the technical evaluation team and most of the participants in the selection process.

On the issue of the design alternative for the repository, the USDA Forest Service responded to comments received by modifying the preferred alternative proposed in the draft EE/CA to include a leachate collection system. With this change, the USDA Forest Service also proposed moving the location of the repository to a swale within the SB-4B site. This site tentatively would have provided the necessary capacity to contain all mine wastes within the District. However, there were several disadvantages to locating the repository in the swale, including the disturbance of about 0.4 hectares of Category II wetland and about 90 meters of perennial stream channel that would be affected by the initial build-out of the repository.

A technical meeting was held in Mammoth, Wyoming on June 29, 2000 to discuss these changes with the technical team, agency coordinators, and representatives of several environmental groups. The proposed changes in the preferred repository design and the change in repository location to the swale were supported by the participants in the meeting.

After numerous discussions with MDEQ representatives between July and December 2000, it became clear that filling a portion of the Category II wetland in the swale was unacceptable to the State of Montana. MDEQ also indicated that the State of Montana would take responsibility for final disposition of the McLaren Tailings, thus eliminating the need to provide sufficient capacity to contain all mine wastes within the District. Moreover, MDEQ made clear that it would not allow disposal of the McLaren Tailings in the swale. In view of these positions, the USDA Forest Service decided to return to the hillside location and eliminate from further consideration the building of a central repository with the capacity to dispose of all District wastes.

On the issue of adit discharges, clarification was added in the final EE/CA and in this document on the disposition of these discharges.

2. Short-Term Impacts

The major short-term impact to the surrounding community, residents, and wildlife involves increased vehicle traffic and temporary closures of access to some forest roads. An increase in traffic will occur during mobilization and demobilization of construction equipment. Short-term road closures in the project area may also be necessary, limiting access to the forest. Increased traffic may impact wildlife by either changing their daily migration patterns or exposing them to a higher potential for injury or death due to collisions with vehicles.

3. Contribution to Remedial Performance

The Selective Source Response Action is the first of several response actions that will be done on an annual basis. While the Selective Source Response Action will not alone mitigate all the mining impacts in the District, the combined total sum of all response actions is expected to meet project goals, objectives, and ARARs.

4. Description of Alternative Technologies

General response actions potentially capable of achieving response action objectives and goals at the selected waste dumps were screened in the EE/CA (Maxim, 2001). These included no action, institutional controls, engineering controls, excavation and treatment, and in-situ treatment.

a. Institutional Controls

Institutional controls include land use and access restriction. Institutional controls by themselves will not prevent migration of the contaminants off-site through groundwater, surface water, or

air. Therefore, institutional controls as a separate alternative were not considered. However, institutional controls as components of other alternatives were considered.

b. Engineering Controls

Engineering controls limit the release or threat of release of hazardous substances generally by limiting mobility through isolation, and/or by limiting physical processes necessary for mobility. These measures included removal, containment, chemical fixation, and surface controls. All of these measures were incorporated into the alternatives considered for this site.

c. Waste Disposal

Waste disposal options are used as a source control measure by placing contaminated media in an engineered repository. The preferred repository design is an improved cover system that reduces potential percolation through the mine waste to a very low volume. The design also includes a liner and leachate collection system.

d. Miscellaneous Alternatives

Technology types and process options were screened to eliminate those technologies that are obviously unfeasible, while retaining potentially effective options. General response actions and process options were applied to the mitigation of contaminants in the specified waste dumps. No evaluation was conducted for technologies that directly address surface water, groundwater, or streambed sediments because water treatment technologies and mitigation of sediments are beyond the scope of this phase of the response action. The removal of solid wastes does presume that some reduction in contaminant concentrations will occur in surface water, groundwater, and streambed sediments as a result of removing or controlling the primary sources of contamination present at the selected mine waste source areas.

Various response actions and technology types were evaluated but rejected due to a variety of reasons including uncertainties in effectiveness and high cost. These response actions included: physical/chemical treatments to separate contaminants from the waste, thermal treatments to either vaporize or immobilize contaminants, and covering the wastes.

5. Engineering Evaluation/ Cost Analysis (EE/CA)

An EE/CA that details site characteristics and identifies and develops alternatives was prepared. The USDA Forest Service Interdisciplinary team and specialists from the cooperating agencies analyzed the effects of the alternatives identified in the EE/CA, and considered public comments. The Forest Service then selected a preferred alternative. A copy of the EE/CA is attached (Maxim, 2001).

6. Applicable or Relevant and Appropriate Requirements (ARARs)

Section 300.415(i) of the National Contingency Plan (NCP) and guidance issued by the Environmental Protection Agency (EPA) require that removal actions attain ARARs under

federal or state environmental laws or facility siting laws, to the extent practicable considering the urgency of the situation and the scope of the removal (EPA, 1993). In addition to ARARs, the lead Agency may identify other federal or state advisories, criteria, or guidance to be considered for a particular release. Removal actions should, to the extent practicable considering the exigencies of the situation, attain ARARs.

ARARs are either applicable or relevant and appropriate. Applicable requirements are those standards, requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant found at a site. Relevant and appropriate requirements are those standards, requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that are not applicable to a particular situation but apply to similar problems or situations, and therefore may be well suited requirements for a response action to address.

ARARs are divided into contaminant specific, location specific, and action specific requirements. Contaminant specific ARARs are listed according to specific media and govern the release to the environment of specific chemical compounds or materials possessing certain chemical or physical characteristics. Contaminant specific ARARs generally set health or risk based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values. These values establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment.

Location specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs generally relate to the geographic location or physical characteristics or setting of the site, rather than to the nature of the site contaminants.

Action specific ARARs are usually technology or activity based requirements or limitations on actions taken with respect to hazardous substances.

Only the substantive portions of the requirements are ARARs. Administrative requirements are not ARARs and do not apply to actions conducted entirely on-site. Provisions of statutes or regulations that contain general goals expressing legislative intent but are non-binding are not ARARs.

Section 121 of CERCLA, 42 U.S.C. ə 9621, only those state standards that are more stringent than any federal standard to be an ARAR provided that these standards are identified by the state in a timely manner. To be an ARAR, a state standard must be "promulgated", which means that the standards are of general applicability and are legally enforceable. The State of Montana ARARs set forth below have been identified in cooperation with, and assistance from, the State of Montana Department of Environmental Quality.

a. Federal Contaminant Specific Requirements

Groundwater Standards - Safe Drinking Water Act (Relevant and Appropriate)

The National Primary Drinking Water Standards (40 CFR Part 141), are not applicable to the Selective Source Response Action because the aquifer underlying the area is not a current public water system, as defined in the Safe Drinking Water Act, 42 U.S.C. ə 300f(4). These standards are relevant and appropriate standards, however, because groundwater in the area is a potential source of drinking water. In addition, because groundwater discharges to District tributaries that may be a source of drinking water, these standards are relevant and appropriate. Maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) are standards promulgated pursuant to both federal and state law. No State MCL is more stringent than the corresponding federal MCL.

Because groundwater has not been investigated in the vicinity of any of the dumps included in the Selective Source Response Action, it is not known whether groundwater quality is impacted. Removal of source areas, however, should not degrade groundwater quality and may improve it in specific, local areas where the removals occur.

Groundwater standards will be maintained at the repository site using engineering controls in concert with natural site characteristics. The composite cover system will minimize potential leachate released to the underlying groundwater system. The leachate collection system will collect the majority of any leachate generated in the waste. HELP modeling predicts that a very small quantity of leachate will percolate through the base of the bottom liner. This quantity of leachate is estimated to be about 0.07 gallons per year per acre of area covered with waste. In addition, buffering capacity available in the till underlying the waste should effectively limit the migration of contaminants to groundwater. Extensive work done at the Silver Bow Creek/Butte Area National Priorities List (NPL) Site and the Clark Fork River Operable Unit of the Milltown Reservoir Sediments NPL Site shows that excess buffering capacity effectively controls the solubility of copper and zinc (Reclamation Research and Schafer and Associates, 1993; Schafer and Associates, 1997; Maxim, 1998). In one study done with mine waste containing copper and zinc concentrations up to 10 times greater than present in District mine wastes (Maxim, 1998), excess alkalinity in the form of calcium oxide and calcium carbonate reduced soluble copper concentrations by 100 times and zinc concentrations by 1,000 times. Excess alkalinity present in 2.5 meters (8 feet) of glacial till at the SB-4B repository site (the minimum thickness of till between the base of waste and groundwater) averages about 5,800 metric tons per hectare in the minus 10 mesh fraction.

Surface Water - Ambient Standards and Point Source Discharges.

While CERCLA and the NCP provide that federal water pollution criteria are the usual surface water standards to be used as relevant and appropriate standards for removal action cleanups, the State of Montana has promulgated surface water quality standards pursuant to the State of Montana Water Quality Act that are as or more stringent than the federal standards. The State of Montana has designated uses for District tributaries as B-1 and has promulgated specific standards accordingly. Discussions of these standards are included in the State of Montana ARARs discussion.

Air Standards - Clean Air Act (Applicable)

Limitations on air emissions resulting from cleanup activities or emissions resulting from wind erosion of exposed hazardous substances are described in the federal action specific requirements.

b. Federal Location Specific Requirements

The National Historic Preservation Act (Applicable)

This statute and implementing regulations (16 U.S.C. ə 470, 40 CFR ə 6.310(b), 36 CFR Part 800) require federal agencies or federal projects to take into account the effect of any federally assisted undertaking or licensing on any district, site building, structure, or object that is included in, or eligible for, the National Register of Historic Places.

Compliance with this ARAR is being met through identifying cultural and historic sites and consultation with the State Historic Preservation Office (SHPO). Cultural and historic data collected during the mining company permit application were mapped and reviewed in detail by USDA Forest Service archaeologists. The location of potential historic resources is known and will be further inventoried as sites are identified for cleanup. The USDA Forest Service has drafted a Memorandum of Agreement (Agreement) with SHPO that outlines the steps involved with historic resource delineation and protection.

Impacts to historic features associated with the Selective Source Response Action include removing timbers and metal debris; backfilling collapsed adits; and, removing mine dumps. Historic structures and debris located adjacent to the dumps will be protected. Historic structures and debris that can be easily salvaged will be moved off the dumps and protected to represent elements of the former mining features. Where proposed cleanup actions impact historic or cultural resources, mitigation measures will be taken in accordance with the Agreement. These mitigative measures will be considered for the District as a whole as response actions are initiated. If unknown or undocumented historic properties are discovered during the response action, construction will be halted in the immediate area of the discovery and a USDA Forest Service archeologist will be notified.

Archaeological and Historic Preservation Act (Applicable)

This statute and implementing regulations (16 U.S.C. ə 469, 40 CFR ə 6.301(c)) establish requirements for evaluation and preservation of historical and archaeological data, including Indian cultural and historical resources, which may be destroyed through alteration of terrain as a result of federal construction projects or a federally licensed activity or program. If eligible scientific, prehistorical, or archaeological data are discovered during site activities, these resources will be preserved in accordance with these requirements. The procedure for addressing such discoveries is described under the previous National Historic Preservation Act discussion.

Historic Sites, Buildings, and Antiquities Act (Applicable)

This requirement states that "in conducting an environmental review of a proposed EPA action, the responsible official shall consider the existence and location of natural landmarks using

information provided by the National Park Service pursuant to 36 CFR ∋ 62.6(d) to avoid undesirable impacts upon such landmarks. Those activities described for the National Historic Preservation Act provide procedures to comply with this ARAR.

Fish and Wildlife Coordination Act (Applicable)

These standards (16 U.S.C. ∋∋ 661 et seq. and 40 CFR ∋ 6.302(g)) require that federally funded or authorized projects ensure that any modification of any stream or other water body affected by a funded or authorized action provide for adequate protection of fish and wildlife resources. Compliance with this ARAR is being met through consultation with the U.S. Fish and Wildlife Service (USFWS) and the State of Montana Department of Fish, Wildlife, and Parks (FWP).

Floodplain Management Order (Applicable)

This requirement (40 CFR Part 6, Appendix A, Executive Order No. 11,988) mandates that federally funded or authorized actions within the 100 year flood plain avoid, to the maximum extent possible, adverse impacts associated with development of a floodplain. Compliance with this requirement is detailed in EPA's August 6, 1985 "Policy on Floodplains and Wetlands Assessments for CERCLA Actions." No designated 100-year floodplain will be affected by the Selective Source Response Action.

Protection of Wetlands Order (Applicable)

This requirement (40 CFR Part 6, Appendix A, Executive Order No. 11,990) mandates that federal agencies avoid, to the extent possible, adverse impacts associated with the destruction or loss of wetlands. The order also provides that activities avoid construction in wetlands if a practicable alternative exists. Section 404(b)(1), 33 U.S.C. ∋ 1344(b)(1) prohibits discharge of dredged or fill material into waters of the United States.

At the removal sites, construction will only occur in disturbed areas or along areas needed to access the waste dumps. Wetlands present in the drainage below the SB-4B repository site will not be disturbed by this Response Action.

The Endangered Species Act (Applicable)

This statute and implementing regulations (16 U.S.C. ∋∋ 1531 - 1543, 50 CFR Part 402, and 40 CFR ∋ 6.302(h)) require that any federal activity or federally authorized activity may not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify a critical habitat.

Threatened and endangered species are present in or near the District. During development of CBMI's permit application, consultation with the USFWS identified the grizzly bear, bald eagle, peregrine falcon, and gray wolf as threatened and endangered species that may be present in the project area. No critical habitat was designated or proposed in the project area. Threatened and endangered species are not expected to be impacted for several reasons. First, new disturbances are limited to upgrading existing roads and constructing new roads to the mine waste dumps and

the new connect road. Second, the response action will be completed in a relatively short period of time, reclaiming any new disturbances, and maintenance of permanent facilities (the repository) will not require a level of activity that is greater than that existing under current conditions.

Migratory Bird Treaty Act (Applicable)

This requirement (16 U.S.C. §§ 703 et seq.) establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the USFWS during design and construction to ensure that cleanup does not unnecessarily impact migratory birds. The USFWS is being consulted to comply with this requirement and measures would be taken to mitigate removal activities if adverse affects are identified.

Bald Eagle Protection Act (Applicable)

This requirement (16 U.S.C. §§ 668 et seq.) establishes a federal responsibility for protection of bald and golden eagles, and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that any cleanup of the site does not unnecessarily adversely affect the bald and golden eagle. The USFWS is being consulted to comply with this requirement and measures would be taken to mitigate removal activities if adverse affects are identified.

c. Federal Action Specific Requirements

Solid Waste (Applicable) and RCRA (Relevant and Appropriate) Requirements

District Property wastes are not RCRA hazardous waste, in accordance with 40 CFR § 261.4(b)(7) (the Bevill exemption), although certain RCRA hazardous waste requirements have been determined to be relevant and appropriate in the handling of these wastes. For any management (i.e., treatment, storage, or disposal) or removal or retention of that contamination, the following requirements are ARARs.

- Requirements described at 40 CFR §§ 257.3-1(a), 257.3-3, and 257.3-4, governing waste handling, storage, and disposal, including retention of the waste

- RCRA regulations found at 40 CFR §§ 264.228(a)(2)(iii)(B), (C), and (D) and .251(c), (d), (f), (g), and (h) (regarding run-on and run-off controls), are relevant and appropriate requirements for the repository site to be used for waste management and disposal.

The modified Alternative 2C design evaluated in the EE/CA includes elements typical of designs for Class II and RCRA waste disposal facilities. In particular, a composite cover system will utilize (from top to bottom) a vegetated cover consisting of 1.2 meters of soil, a 0.6 meter thick drainage layer to capture infiltrating precipitation, and a double synthetic cover liner system consisting of a combination of a geomembrane and a geocomposite clay liner. Mine waste will be compacted as it is placed to prevent settling and damage to the soil cover system and run-on will be diverted around the repository site. Leachate will be prevented from entering the environment by constructing a leachate collection system. This system includes (from bottom to

top) a drainage layer beneath the bottom liner, a double synthetic liner system consisting of a combination of a geomembrane and a geocomposite clay liner, a drainage layer with leachate collection piping, and a sump.

No point discharge of contaminants will be released from the repository. Engineering analysis of the performance of the cover and bottom liner systems predict that a very small quantity of leachate has the potential to migrate beneath the bottom liner. Leachate migration through the bottom of the liner may occur primarily because of small imperfections that are commonly present in synthetic liner systems. Predicted leachate chemistry and groundwater hydraulic properties were used to evaluate the impacts on the groundwater and surface water system beneath and adjacent to the repository to directly address the relevant and appropriate RCRA standards. These analyses are presented in the final EE/CA and indicate that no detectable increase in the concentrations of metals in groundwater will be measured beneath or downgradient of the repository. These analyses also indicate that no detectable increase in the concentration of metals in surface water will be measured downgradient of the repository. Both analyses support the fact that construction of a repository at the SB-4B site will comply with the RCRA standards for surface water and groundwater.

In addition to the engineering aspects of the repository cover system, the natural site characteristics allow for placement of waste on top of glacial till material. The glacial till material contains excess buffering capacity in the form of calcium carbonate that will be available to neutralize potential leachate migrating through the base of the repository, allowing precipitation and coprecipitation of copper and zinc compounds in the till zone. Sufficient separation to groundwater will be provided with the synthetic bottom liner and the underdrain system.

Surface Mining Control and Reclamation (Relevant and Appropriate),

Regulations promulgated under the Surface Mining Control and Reclamation Act (30 CFR, Part 816 and 784) cover reclamation requirements for coal and certain non-coal mining operations. Reclamation of the removed dump sites, the repository, and other disturbed areas will generally conform to these requirements. Revegetation requirements will follow prescriptions developed by the USDA Forest Service Rocky Mountain Research Station. These prescriptions are based on 23 years of site specific research involving reclamation of mine wastes at high altitudes and restoration of native plant communities. Revegetation prescriptions have been designed to regenerate under the natural conditions prevailing at the site. Site specific research indicates that revegetation will be permanent, diverse, predominantly native, and of the same seasonality and utility found in similar predisturbance areas. Cover, planting, and stocking specifications are based on local and regional conditions.

Erosion control will be accomplished using best management practices to prevent deterioration of water quality or quantity and prevent erosion resulting from roads. Following removal, revegetated areas will be capable of supporting designated land uses, will blend with the surrounding topography, and meet slope restrictions.

Air Standards - Clean Air Act (Applicable)

These standards, promulgated in accordance with Section 109 of the Clean Air Act, are applicable to releases into the air from removal action activities. Ambient air standards for lead are promulgated at ARM 16.8.815 as part of a federally approved State Implementation Plan (SIP), in accordance with the Clean Air Act of Montana, §§ 75-2-101 et seq., MCA. Corresponding federal regulations are 40 CFR § 50.12. The lead standard provides that no person shall cause or contribute to concentrations of lead in the ambient air that exceed 1.5 micrograms per cubic meter ($\mu g/m^3$) of air, measured over a 90-day average.

Regulations promulgated at ARM 16.8.821 as part of the SIP (§§ 75-2-101 et seq., MCA) apply to particulate matter that is 10 microns in diameter or smaller (PM-10). Corresponding federal regulations are 40 CFR § 50.6. According to this standard, no person shall cause or contribute to concentrations of PM-10 in the ambient air which exceed 150 $\mu g/m^3$ of air for a 24 hour average with no more than one expected exceedance per calendar year or 50 $\mu g/m^3$ of air on an annual average.

For the Selective Source Response Action, sampling data indicated that lead concentrations are not at levels that are high enough to be of concern to human health. Furthermore, based on field investigation, dump materials are primarily of a grain size that is not susceptible to wind transport. Therefore, based on these waste characteristics, removal operations that involve excavation, loading, hauling, and placing wastes are not expected to exceed these two air quality standards. However, to ensure blowing dust is controlled, best management practices will be incorporated into the removal action as site conditions require mitigative actions.

Ambient air standards under Section 109 of the Clean Air Act are also promulgated for carbon monoxide, hydrogen sulfide, nitrogen dioxide, sulfur dioxide, and ozone. If emissions of these compounds were to occur at the site in connection with any cleanup action, these standards would also be applicable (40 CFR Part 50). Carbon monoxide, hydrogen sulfide, nitrogen dioxide, sulfur dioxide, or ozone are not expected to be generated during the removal action beyond those levels normally associated with internal combustion engines. Therefore, no measures will be needed to accommodate these standards.

Point Source Controls - Clean Water Act (Applicable)

If point sources of water contamination are retained or created during the Selective Source Response Action, applicable Clean Water Act standards would apply. The regulations are discussed in the contaminant specific ARAR section, above, and in the State of Montana identification of ARARs. These regulations include storm water runoff regulations (40 CFR Parts 121, 122, and 125) and include requirements for best management practices and monitoring (40 CFR §§ 122.44(i) and 440.148) for point source discharges. Best management practices for stormwater runoff are included in the construction requirements for the Selective Source Response Action.

Transportation of Hazardous or Contaminated Waste (Relevant and Appropriate)

40 CFR Part 263 establishes regulations for the transportation of hazardous waste. These regulations would govern any on-site transportation of material. No off-site transportation of wastes will occur in the Selective Source Response Action. Transportation of waste materials will be done in such a manner to eliminate the spread of waste along haul roads and to immediately cleanup any spills that may occur during haul operations.

Occupational Safety and Health Act (Applicable)

Occupational Safety and Health Administration requirements would be met by requiring appropriate safety training for all on-site workers during construction phase. Site activities would be conducted under the guidance of a Health and Safety Plan for the site per OSHA 29 CFR ∋ 1910.120. Site personnel will have completed 40-hour hazardous waste operations and emergency response training and would be current with the 8-hour annual refresher training as required by OSHA 29 CFR ∋ 1910.120.

d. Montana Contaminant Specific Requirements

Surface Water Quality Standards (Applicable)

Under the State of Montana Water Quality Act, §§ 75-5-101 et seq., MCA, the state has promulgated regulations to protect, maintain, and improve the quality of surface waters in the state. The requirements listed below are applicable water quality standards to the Selective Source Response Action.

On June 4, 2000, the Montana Board of Environmental Review adopted a rule for temporary water quality standards on portions of Fisher Creek, Daisy Creek, and the Stillwater River. Temporary standards will be in effect for 15 years, at which time the water quality issues in the District will be reevaluated by the USDA Forest Service and the Montana Department of Environmental Quality.

For the Selective Source Response Action, the targeted waste dumps that will be removed are all located in the Fisher Creek watershed. The applicable temporary water quality standards for Fisher Creek apply at surface water station CFY-2 (in micrograms per liter):

Aluminum	470
Copper	110
Iron	750
Lead	2
Manganese	82
Zinc	44
pH	greater than 5.7 s.u.

Additional restrictions on any discharge to surface waters are included in ARM 16.20.633 (Applicable), which prohibits discharges containing substances that will:

(a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;

(b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;

(c) produce odors, colors or other conditions which create a nuisance, or render undesirable tastes to fish flesh or make fish inedible;

(d) create concentrations or combinations of materials that are toxic or harmful to human, animal, plant, or aquatic life;

(e) create conditions that produce undesirable aquatic life.

ARM 16.20.925 (Applicable) adopts and incorporates the provisions of 40 C.F.R. Part 125 for criteria and standards for the imposition of technology-based treatment requirements in MPDES permits. Although the permit requirement would not apply to on-site discharges, the substantive requirements of Part 125 may be applicable, i.e., for toxic and nonconventional pollutants treatment must apply the best available technology economically achievable (BAT); for conventional pollutants, application of the best conventional pollutant control technology (BCT) is required. Where effluent limitations are not specified for the particular industry or industrial category at issue, BCT/BAT technology-based treatment requirements are determined on a case by case basis using best professional judgment (BPJ). See CERCLA Compliance with Other Laws Manual, Vol. I, August 1988, p. 3-4 and 3-7.

The pollutants generated at this site are classified as toxic and therefore treatment should apply the best technology economically achievable (BAT).

Applicable for both surface water and ground water, § 75-5-605, MCA, provides that it is unlawful to cause pollution as defined in 75-5-103 of any state waters or to place or cause to be placed any wastes where they will cause pollution of any state waters.

Wastes removed for the Selective Source Response Action will be placed in a repository where these wastes will not be eroded by surface water processes or impact groundwater.

Groundwater Pollution Control System (Applicable)

ARM 16.20.1002 (Applicable) classifies groundwater into Classes I through IV based on the present and future most beneficial uses of the groundwater, and states that groundwater is to be classified according to actual quality or actual use, whichever places the groundwater in a higher class. Class I is the highest quality class; class IV the lowest. Based upon its specific conductance, the great majority of the groundwater in the District should be considered Class I groundwater. ARM 16.20.1002 provides that Class I groundwater has a specific conductance of less than 1,000 micromhos per centimeter at 25° and Class II groundwater is between 1,000 to 2,500 micromhos.

ARM 16.20.1003 (Applicable) establishes the groundwater quality standards applicable with respect to each groundwater classification. Concentrations of dissolved substances in Class I or II groundwater (or Class III groundwater which is used as a drinking water source) may not exceed the human health standards listed in department Circular WQB-7. For the primary contaminants of concern, these levels are listed below. Levels that are more stringent than the MCL or MCLG identified in the federal portion of the ARARs are set out in boldface type.

Chemical	WQB-7 Human Health Standard
Arsenic	18 g/l
Cadmium	5 g/l
Copper	1000 g/l
Lead	15 g/l
Mercury	0.14 g/l

Concentrations of other dissolved or suspended substances must not exceed levels that render the waters harmful, detrimental, or injurious to public health. Maximum allowable concentration of these substances also must not exceed acute or chronic problem levels that would adversely affect existing or designated beneficial uses of groundwater of that classification. ARM 16.20.1003 specifies certain references that may be used as a guide in determining problem levels unless local conditions make these values inappropriate.

Because groundwater has not been investigated in the vicinity of any of the dumps included in the Selective Source Response Action, it is not known whether groundwater quality is impacted. Removal of source areas, however, should not degrade groundwater quality and may improve it in specific, local areas where the removals occur.

Groundwater standards will be maintained at the repository site using engineering controls in concert with natural site characteristics. The composite cover system will minimize potential leachate released to the underlying groundwater system. The leachate collection system will collect the majority of any leachate generated in the waste. HELP modeling predicts that a very small quantity of leachate will percolate through the base of the bottom liner. This quantity of leachate is estimated to be about 0.07 gallons per year per acre of area covered with waste. In addition, buffering capacity available in the till underlying the waste should effectively limit the migration of contaminants to groundwater. Extensive work done at the Silver Bow Creek/Butte Area National Priorities List (NPL) Site and the Clark Fork River Operable Unit of the Milltown Reservoir Sediments NPL Site shows that excess buffering capacity effectively controls the solubility of copper and zinc (Reclamation Research and Schafer and Associates, 1993; Schafer and Associates, 1997; Maxim, 1998). In one study done with mine waste containing copper and zinc concentrations up to 10 times greater than present in District mine wastes (Maxim, 1998), excess alkalinity in the form of calcium oxide and calcium carbonate reduced soluble copper concentrations by 100 times and zinc concentrations by 1,000 times. Excess alkalinity present in 2.5 meters (8 feet) of glacial till at the SB-4B repository site (the minimum thickness of till between the base of waste and groundwater) averages about 5,800 metric tons per hectare in the minus 10 mesh fraction.

Air Quality

In addition to the standards identified in the federal action specific ARARs above, the State of Montana has identified certain air quality standards in the action specific section of the State action specific ARARs below.

e. Montana Location Specific Requirements

Floodplain and Floodway Management Act and Regulations (Applicable)

The Floodplain and Floodway Management Act and regulations specify types of uses and structures that are allowed or prohibited in the designated 100-year floodway and floodplain. No designated 100-year floodplain will be affected by the Selective Source Response Action.

Solid Waste Management Regulations (Applicable)

Regulations promulgated under the Solid Waste Management Act, §§ 75-10-201 et seq., MCA, specify requirements that apply to the location of any solid waste management facility. Under ARM 17.50.505 (formerly 16.14.505)(Applicable), a facility for the treatment, storage or disposal of solid wastes:

(a) must be located where a sufficient acreage of suitable land is available for solid waste management;

(b) may not be located in a 100-year floodplain;

(c) may be located only in areas that will prevent the pollution of ground and surface waters and public and private water supply systems;

(d) must be located to allow for reclamation and reuse of the land;

(e) drainage structures must be installed where necessary to prevent surface runoff from entering waste management areas; and

(f) where underlying geological formations contain rock fractures or fissures which may lead to pollution of the ground water or areas in which springs exist that are hydraulically connected to a proposed disposal facility, only Class III disposal facilities may be approved.

g) no new disposal units or lateral expansions may be located in wetlands.

The Selective Source Response Action complies with the applicable siting requirements for solid waste facilities through the combination of site characteristics and the use of engineered containment materials. The EE/CA demonstrates the adequate capacity of the site for District Property wastes, exclusive of the McLaren Pit waste rock, and no 100-year floodplain is impacted by the full buildout of the repository. While groundwater beneath the repository eventually discharges to the perennial drainage located in the swale below the hillside at the SB-4B site, pollution of ground and surface waters will be prevented by incorporating a bottom liner system in the repository design. The potential for leachate migration has been examined and

leachate migration will be controlled using a bottom liner and leachate collection system. Leachate that seeps through the liner will be of such small quantity that it will not be detected in groundwater beneath the repository or in surface water downgradient of the repository. Nondegredation analysis, along with an evaluation of metals loading from leachate to surface water, support these statements. These analyses are presented in the final EE/CA. No existing wetlands will be impacted by the construction of a repository at the SB-4B site.

Natural Streambed and Land Preservation Standards (Applicable)

Sections 87-5-502 and 504, MCA, (Applicable -- substantive provisions only) provide that a state agency or subdivision shall not construct, modify, operate, maintain or fail to maintain any construction project or hydraulic project which may or will obstruct, damage, diminish, destroy, change, modify, or vary the natural existing shape and form of any stream or its banks or tributaries in a manner that will adversely affect any fish or game habitat. The requirement that any such project must eliminate or diminish any adverse effect on fish or game habitat is applicable to the state in approving removal actions to be conducted. The Natural Streambed and Land Preservation Act of 1975, §§ 75-7-101 et seq., MCA, (Applicable -- substantive provisions only) includes similar requirements and is applicable to private parties as well as government agencies.

ARM 36.2.404 (Applicable) establishes minimum standards which would be applicable if a removal action alters or affects a streambed, including any channel change, new diversion, riprap or other streambank protection project, jetty, new dam or reservoir or other commercial, industrial or residential development. No such project may be approved unless reasonable efforts will be made consistent with the purpose of the project to minimize the amount of stream channel alteration, insure that the project will be as permanent a solution as possible and will create a reasonably permanent and stable situation, insure that the project will pass anticipated water flows without creating harmful erosion upstream or downstream, minimize turbidity, effects on fish and aquatic habitat, and adverse effects on the natural beauty of the area and insure that streambed gravels will not be used in the project unless there is no reasonable alternative. Soils erosion and sedimentation must be kept to a minimum. Such projects must also protect the use of water for any useful or beneficial purpose. See §75-7-102, MCA.

The natural streambed and land preservation act will be complied with at those waste removal sites where wastes are in contact with surface water. These include removals at the upper, middle, and lower Tredennic sites, and at the Rommel tailings site. Removals will be done in a surgical manner at each of the Tredennic sites to minimize any disturbance to the bed or banks of the associated stream. Affected areas will be reconstructed with earth and natural materials and sufficiently protected with erosion control techniques so that the bed and banks are protected from flood erosion. At the Rommel tailings, the stream buried by tailings will be reconstructed with earth and native materials following removal. The reconstructed stream will be designed to provide hydraulic stability. All disturbed areas will be managed during construction to minimize erosion.

At the repository site, no stream channel will be affected by construction activities. Soil erosion and sedimentation will be kept to a minimum by using best management practices.

f. Montana Action Specific Requirements

In the following action-specific ARARs, the nature of the action triggering applicability of the requirement is stated in parentheses as part of the heading for each requirement.

Groundwater Act (Applicable) (Construction and maintenance of groundwater wells)

Section 85-2-505, MCA, (Applicable) precludes the wasting of groundwater. Any well producing waters that contaminate other waters must be plugged or capped, and wells must be constructed and maintained to prevent waste, contamination, or pollution of groundwater.

Monitoring wells have been constructed at the repository site to monitor groundwater levels and water quality following repository construction. Monitoring wells will be constructed in accordance with state monitoring well regulations to assure that pollution will not be spread between aquifers. Because monitoring wells are not producing wells, no groundwater will be wasted.

Air Quality Regulations (Applicable) (Excavation/earth-moving; transportation)

Dust suppression and control of certain substances likely to be released into the air as a result of earth moving, transportation and similar actions may be necessary to meet air quality requirements. Certain ambient air standards for specific contaminants and particulates are set forth in the federal action specific section above. Additional air quality regulations under the state Clean Air Act, §§ 75-2-101 et seq., MCA, are discussed below.

ARM 16.8.1302 (Applicable) lists certain wastes that may not be disposed of by open burning, including oil or petroleum products, RCRA hazardous wastes, chemicals, and treated lumber and timbers. Any waste which is moved from the premises where it was generated and any trade waste (material resulting from construction or operation of any business, trade, industry or demolition project) may be open burned only in accordance with the substantive requirements of 16.8.1307 or 1308.

Burning of combustible wastes will be conducted at the repository site. No combustible wastes meet the definitions listed above.

ARM 16.8.1401(1) and (2) (Applicable) provides that no person shall cause or authorize the production, handling, transportation or storage of any material; or cause or authorize the use of any street, road, or parking lot; or operate a construction site or demolition project, unless reasonable precautions to control emissions of airborne particulate matter are taken. Emissions of airborne particulate matter must be controlled so that they do not "exhibit an opacity of twenty percent (20%) or greater averaged over six consecutive minutes." ARM 16.8.1401(1) and (2) (Applicable) and ARM 16.8.1404 (Applicable).

In addition, state law provides an ambient air quality standard for settled particulate matter. Particulate matter concentrations in the ambient air shall not exceed the following 30-day average: 10 grams per square meter. ARM § 16.8.818 (Applicable).

ARM 16.8.1401(4) (Applicable) requires that any new source of airborne particulate matter that has the potential to emit less than 100 tons per year of particulates shall apply best available control technology (BACT); any new source of airborne particulate matter that has the potential to emit more than 100 tons per year of particulates shall apply lowest achievable emission rate (LAER). The BACT and LAER standards are defined in ARM 16.8.1430. Precautions will be taken during construction to limit dust emissions from removal activities.

ARM 26.4.761 (Relevant and Appropriate) specifies a range of measures for controlling fugitive dust emissions during mining and reclamation activities. Some of these measures could be considered relevant and appropriate to control fugitive dust emissions in connection with excavation, earth moving, and transportation activities conducted as part of the removal. Such measures include watering or frequently compacting and scraping roads, promptly removing rock, soil or other dust-forming debris from roads, restricting vehicle speeds, revegetating, mulching, or otherwise stabilizing the surface of areas adjoining roads, restricting unauthorized vehicle travel, minimizing the area of disturbed land, and promptly revegetating regraded lands.

Fugitive dust will be generated with earth moving activities and transportation of materials on unpaved roads. Dust may also be generated in the stockpiling and handling of lime amendment. Road dust will be suppressed by the contractor through watering. Lime amendment can not be watered so lime amendment handling will need to cease if dust generation is a problem during windy periods.

Solid Waste Regulations

State Solid Waste Management Regulations may be applicable to the removal and disposal of mine wastes involved in the Selective Source Response Action. Action specific solid waste regulations are discussed below.

ARM 17.50.505(2) (formerly 16.14.505(2))(Applicable) specifies standards for solid waste management facilities, including the requirements that:

a) if there is the potential for leachate migration, it must be demonstrated that leachate will only migrate to underlying formations which have no hydraulic continuity with any state waters.

b) adequate separation of such wastes from underlying or adjacent water must be provided, considering terrain, type of underlying soil formations, and facility design.

ARM 17.50.523 (formerly 16.14.523)(Relevant and Appropriate) requires that such waste must be transported in such a manner as to prevent its discharge, dumping, spilling, or leaking from the transport vehicle.

The Selective Source Response Action complies with the applicable requirements for solid waste facilities through the combination of site characteristics and the use of engineered containment materials. While groundwater beneath the repository eventually discharges to the perennial drainage located in the swale below the hillside at the SB-4B site, hydraulic continuity with state waters will be eliminated by incorporating a bottom liner system in the repository design. The bottom liner is also the mechanism that provides adequate separation of the wastes from underlying or adjacent water, as no direct contact between the wastes and groundwater will occur. The potential for leachate migration has been examined and leachate migration will be controlled using a bottom liner and leachate collection system. Leachate that seeps through the liner will be of such small quantity that it will not be detected in groundwater beneath the repository or in surface water downgradient of the repository. Nondegredation analysis, along with an evaluation of metals loading from leachate to surface water, support these statements. These analyses are presented in the final EE/CA.

Reclamation Requirements

The Strip and Underground Mine Reclamation Act, §§ 82-4-201 et seq., MCA, technically applies to coal and uranium mining, but that statute and the regulations promulgated under that statute and discussed in this section set out the standards that mine reclamation should attain. To the extent they are more stringent than the federal regulatory scheme contained in the Surface Mining Control and Reclamation Act (see 30 CFR Parts 789, 816), the State requirements identified here have been determined to be relevant and appropriate requirements for this action.

Section 82-4-231 (Relevant and Appropriate) requires the reclamation and revegetation of the land as rapidly, completely, and effectively as the most modern technology and the most advanced state of the art will allow. In developing a method of operation and plans of backfilling, water control, grading, topsoiling and reclamation, all measures shall be taken to eliminate damages to landowners and members of the public, their real and personal property, public roads, streams, and all other public property from soil erosion, subsidence, landslides, water pollution, and hazards dangerous to life and property.

Sections 82-4-231(10)(j) and (i) and ARM 26.4.751 (Relevant and Appropriate) provide that reclamation of mine waste materials shall, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts of the operation on fish, wildlife, and related environmental values and achieve enhancement of such resources where practicable, and shall avoid acid or other toxic mine drainage by such measures as preventing or removing water from contact with toxic-producing deposits.

ARM 26.4.641 (Relevant and Appropriate) also provides that drainage from acid-forming or toxic-forming spoil into ground and surface water must be avoided by preventing water from coming into contact with such spoil. ARM 26.4.505 (Relevant and Appropriate) similarly provides that acid, acid-forming, toxic, toxic-forming or other deleterious materials must not be buried or stored in proximity to a drainage course so as to cause or pose a threat of water pollution.

Revegetation will be an integral part of the Selective Source Response Action design and construction package. Utilizing nearly 25 years of site specific revegetation trials, the USDA Forest Service has developed revegetation prescriptions that substantially comply with all requirements of the Strip and Underground Mine Reclamation Act. Revegetation is an essential part of the removal action because vegetation protects the removal sites from erosion. All disturbed areas will be revegetated in accordance with the revegetation prescriptions such that revegetation is rapid and effective. At the repository site, topsoil will be stripped, stockpiled, and used as a soil substrate in the removal areas. Vegetation has been selected that will provide rapid reestablishment as well as long-term establishment of sustainable species.

Reclamation Activities - Hydrology Regulations (Relevant and Appropriate) (Excavation, earth moving, altering drainage patterns)

The hydrology regulations provide guidelines for addressing the hydrologic impacts of mine reclamation activities and earth moving projects and are relevant and appropriate for addressing these impacts associated with the Selective Source Response Action.

ARM 26.4.631 (Relevant and Appropriate) provides that long-term adverse changes in the hydrologic balance from mining and reclamation activities, such as changes in water quality and quantity, and location of surface water drainage channels shall be minimized. Water pollution must be minimized and, where necessary, treatment methods utilized. Diversions of drainages to avoid contamination must be used in preference to the use of water treatment facilities. Other pollution minimization devices must be used if appropriate, including stabilizing disturbed areas through land shaping, diverting runoff, planting quickly germinating and growing stands of temporary vegetation, regulating channel velocity of water, lining drainage channels with rock or vegetation, mulching, and control of acid-forming, and toxic-forming waste materials.

During construction of the Selective Source Response Action, storm water controls will be in place during construction and vegetation will be established rapidly after construction to minimize erosion. Temporary diversion channels will be lined with rock to prevent erosion. Acid forming wastes will be removed and permanently disposed in the engineered repository. Pollution at the repository site will be minimized through the use of capping and bottom liner systems that will minimize the contact of waste with water.

ARM 26.4.633 (Relevant and Appropriate) provides water quality performance standards that may be invoked in the event that runoff from the treated areas threatens the water quality or sediments in the stream, including the requirement that all surface drainage from a disturbed area must be treated by the best technology currently available (BTCA).

A storm water control plan will provide measures to ensure that sediment does not affect water quality. Typical measures include, straw bales, erosion mat, silt fence, and sediment detention ponds.

ARM 26.4.634 (Relevant and Appropriate) provides that, in reclamation of drainages, drainage design must emphasize channel and floodplain dimensions that approximate the premining configuration and that will blend with the undisturbed drainage above and below the area to be

reclaimed. The average stream gradient must be maintained with a concave longitudinal profile, and the channel and floodplain must be designed and constructed to:

1. establish or restore the drainage channel to its natural habit or characteristic pattern with a geomorphically acceptable gradient. The habits or characteristics of individual streams include their particular reactions to general laws related to stream work, whether or not the stream has attained the conditions of equilibrium, and the stream channel morphology and stability;

2. remain in dynamic equilibrium with the system;

3. improve unstable premining conditions;

4. provide for floods; and

5. establish a premining diversity of aquatic habitats and riparian vegetation.

These requirements may apply to stream reconstruction components of the Selective Source Response Action. The Rommel Tailings site is the main area where substantial stream reconstruction will be done. The reconstructed stream channel at this site will be designed in accordance with principles of stream channel geomorphology. Streambanks will be rebuilt in a manner that provides stability. The design of channel grades attempts to conform to premining conditions and blend with the undisturbed stream below the tailings area. The reclaimed channel will be revegetated with native species that are adapted to wet soil conditions.

ARM 26.4.635 through 26.4.637 (Relevant and Appropriate) set forth requirements for temporary and permanent diversions. Temporary diversion channels will be designed in consideration of the drainage basin contributing flow to the channels. Erosion will be avoided by using rock lining.

ARM 26.4.638 (Relevant and Appropriate) specifies sediment control measures to be implemented during operations. An erosion control plan will be required that sets forth methods to control sediment during construction.

ARM 26.4.640 (Relevant and Appropriate) provides that discharge from sedimentation ponds, permanent and temporary impoundments, and diversions shall be controlled by energy dissipaters, riprap channels, and other devices, where necessary, to reduce erosion, prevent deepening or enlargement of stream channels, and to minimize disturbance of the hydrologic balance. Sediment basins will be designed with overflow pipes that discharge to existing drainages. Drainages will be rock lined at the discharge points.

Reclamation and Revegetation Requirements (Relevant and Appropriate) (Excavation)

ARM 26.4.501 and 501A (Relevant and Appropriate) set forth general backfilling and final grading requirements. Excavated areas will be backfilled to blend with the surrounding undisturbed topography. Backfill will be suitable for establishment of vegetative cover.

ARM 26.4.514 (Relevant and Appropriate) sets out contouring requirements. Waste removal areas and the final repository surface will be sloped to drain to match the surrounding topography.

ARM 26.4.519 (Relevant and Appropriate) provides that an operator may be required to monitor settling of regraded areas. Long-term monitoring of revegetated areas has been established as a project objective; planning documents provide guidance for long-term monitoring.

ARM 26.4.702 (Relevant and Appropriate) requires that during the redistributing and stockpiling of soil (for reclamation):

1. regraded areas must be prepared to eliminate any possible slippage potential, to relieve compaction, and to promote root penetration and permeability of the underlying layer; this preparation must be done on the contour whenever possible and to a minimum depth of 12 inches;

2. redistribution must be done in a manner that achieves approximate uniform thickness consistent with soil resource availability and appropriate for the postmining vegetation, land uses, contours, and surface water drainage systems; and

3. redistributed soil must be reconditioned by subsoiling or other appropriate methods.

These criteria will be addressed through the design of the Selective Source Response Action. Regraded materials will have slopes that match the surrounding topography and will generally be constructed to be no steeper than 3H:1V. Thickness of topsoil or growth medium will be specified in the contract documents. Regraded soil surfaces will be chiseled using standard farming techniques to promote plant establishment.

ARM 26.4.703 (Relevant and Appropriate). When using materials other than, or along with, soil for final surfacing in reclamation, the operator must demonstrate that the material (1) is at least as capable as the soil of supporting the approved vegetation and subsequent land use, and (2) the medium must be the best available in the area to support vegetation. Such substitutes must be used in a manner consistent with the requirements for redistribution of soil in ARM 26.4.701 and 702.

To comply with this requirement, coversoil will be obtained from the repository site. Agronomic tests were conducted on these materials to ensure the soils are a viable plant medium.

ARM 26.4.711 (Relevant and Appropriate) requires that a diverse, effective, and permanent vegetative cover of the same seasonal variety and utility as the vegetation native to the area of land to be affected shall be established except on road surfaces and below the low-water line of permanent impoundments. The vegetative cover must also be capable of meeting the criteria set forth in 82-4-233, MCA. Vegetative cover is considered of the same seasonal variety if it

consists of a mixture of species of equal or superior utility when compared with the natural vegetation during each season of the year. (See also ARM 26.4.716 below regarding substitution of introduced species for native species.)

ARM 26.4.713 (Relevant and Appropriate) provides that seeding and planting of disturbed areas must be conducted during the first appropriate period for favorable planting after final seedbed preparation but may not be more than 90 days after soil has been replaced.

ARM 26.4.714 (Relevant and Appropriate) requires use of a mulch or cover crop or both until an adequate permanent cover can be established. Use of mulching and temporary cover may be suspended under certain conditions. Mulch and temporary covers are prescribed by the design for stockpiles that remain in place for more than one year and areas that can not be revegetated for long periods such as over winter.

ARM 26.4.716 (Relevant and Appropriate) establishes the required method of revegetation, and provides that introduced species may be substituted for native species as part of an approved plan.

ARM 26.4.717 (Relevant and Appropriate) relates to the planting of trees and other woody species if necessary, as provided in 82-4-233, MCA, to establish a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the affected area and capable of self-regeneration and plant succession at least equal in extent of cover to the natural vegetation of the area, except that introduced species may be used in the revegetation process were desirable and necessary to achieve the approved intended land use plan. Native trees that meet these requirements have been selected in the design.

ARM 26.4.718 (Relevant and Appropriate) requires the use of soil amendments and other means such as irrigation, management, fencing, or other measures, if necessary to establish a diverse and permanent vegetative cover.

ARM 26.4.728 (Relevant and Appropriate) sets forth requirements for the composition of vegetation on reclaimed areas.

All revegetation requirements included in the above ARMs will be complied with using site specific revegetation research results. Nearly 25 years of research was conducted by the USDA Forest Service at the site, primarily through the guidance of Dr. Ray Brown, an eminent scientist stationed at the Rocky Mountain Research Station in Logan, Utah. Through his work, the USDA Forest Service has developed revegetation prescriptions that substantially comply with revegetation requirements. All disturbed areas will be revegetated in accordance with the revegetation prescriptions such that revegetation is effective, permanent, self-sustaining, and native. Soil amendments and revegetation treatments such as lime, fertilizer, mulch, erosion control blankets, and organic amendments are all included in the revegetation prescriptions.

7. Project Schedule

An engineering design and construction package was released to prospective bidders on September 27, 2000. Bids are expected to be awarded no later than April 2001. Construction of the Selective Source Response Action should be completed by November 2001.

8. References

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B. Estimated Costs

The estimated cost to remove the wastes to an on-site repository, including road improvements, and reclamation, is about $520,000. The estimated cost to construct the repository is about $1,375,000 for modified Alternative Design 2C. The total cost of the Selective Source Response Action, including design, construction oversight, and post-removal site control is $2.5 million.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED

OR NOT TAKEN.

If no action is taken to stabilize the wastes and to isolate the wastes from water, surface and groundwater at the site will continue to be degraded and present a risk to human and ecological receptors.

VII. OUTSTANDING POLICY ISSUES

None

VIII. ENFORCEMENT

Although the USDA Forest Service specifically denies any liability in this situation, it will be the "lead agency" for all response actions occurring on National Forest System Lands, as defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR part 300, and all response actions will be undertaken in a manner not inconsistent with the NCP. A Consent Decree and Settlement Agreement between the United States, several signature parties, and CBMI is the legal mechanism that outlines responsibilities of the parties to the agreement, the process, and the funds that will used for cleanup.

IX. ENDANGERED DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in the Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

X. RECOMMENDATION

This decision document represents the selected response action for the removal and disposal of selected sources associated with the New World Mining District Response and Restoration Project. The project is situated in the Gardiner Ranger District of the Gallatin National Forest. This document was developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the site. Conditions at the site meet the NCP section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed removal action.

_____ _____

Sherm Sollid Date
On-Scene Coordinator (OSC)

I concur with the recommendation to implement the proposed alternatives as described in this Action Memorandum and attached Engineering Evaluation/Cost Analysis for the Selective Source Response Action, New World Mining District Response and Restoration Project.

_____ _____

John Logan Date
District Ranger
Gardiner Ranger District

I concur with the recommendation to implement the proposed alternatives as described in this Action Memorandum and attached Engineering Evaluation/Cost Analysis for the Selective Source Response Action, New World Mining District Response and Restoration Project.

_____ _____

David P. Garber Date
Forest Supervisor
Gallatin National Forest

I approve of the proposed removal action as outlined in the Action Memorandum and attached Engineering Evaluation/Cost Analysis for the Selective Source Response Action, New World Mining District Response and Restoration Project.

_____ _____

Dale N. Bosworth Date
Regional Forester