EPA Proposes Plan for Ruby Gulch Waste Rock Repository and Cap

The U.S. Environmental Protection Agency (EPA) and the South Dakota Department of Environment and Natural Resources (DENR) continue to work on the long-term cleanup for the Gilt Edge Mine Site. After detailed studies of the Ruby Waste Rock pile at the mine, EPA and DENR are presenting this Proposed Plan which identifies the Preferred Alternative for a remedial action for the Ruby Waste Rock Pile. This Plan provides the rationale for this preference and also includes summaries of other remedial action alternatives evaluated for use at OU3.

To manage cleanup in a systematic way EPA has divided the site into three operable units (OU). OU 1 addresses the overall sources of contamination at the site and will deal with final site-wide remediation. Operable Unit 2 addresses the ongoing need to manage and treat the Acid Rock Drainage (ARD) waters on the site. OU 3 focuses on reducing risks from the Ruby Waste Rock Pile.

This document is issued by the U.S. Environmental Protection Agency (EPA), the lead agency for site activities, and the South Dakota Department of Environment and Natural Resources (DENR), the support agency. EPA, in consultation with DENR, will select a final remedy for OU3 after reviewing and considering all information submitted during the 30-day public comment period. EPA, in consultation with DENR, may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments. Thus, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). The NCP is the federal regulation that guides the Superfund program.


OPPORTUNITIES FOR PUBLIC INVOLVEMENT

Public Comment Period:
30 days: April 27, 2001 to May 28, 2001

Public Meeting:
May 2, 2001
7:00 p.m.
Holiday Inn Express
22 Lee Street
Deadwood, SD

Send Written Comments to:
Ken Wangerud (8EPR-SR)
EPA Remedial Project Manager
U.S. Environmental Protection Agency
999 18th Street, Suite 500
Denver, Colorado 80202-2466
e-mail: Wangerud.Ken@epa.gov

Information Repositories:
The Proposed Plan and other documents in the Administrative Record are available at the following locations:

- EPA Superfund Records
- Hearst Public Library
- Center
- 315 Main Street
- 999 18th Street
- Lead, SD 57754
- (Visitors: 3rd Floor, South
- (605) 584-2013
- Tower)
- attn: LeeAnn Paananen
- Denver, CO 80202
- (303) 312-6473

*Words in bold italics are in the glossary at the end of the document.*
Detailed background information used to prepare the Proposed Plan is contained in the Final Focused Feasibility Study for Ruby Dump and Gulch Operable Unit 3 (March 2001). This document provides the detailed analysis of cleanup alternatives considered for OU3 to reduce contamination of surface water in Ruby Gulch. It can be viewed at www.epa.gov/region08/sf/giltedge.

This information and other documents in the Administrative Record are available at the locations listed above. The Administrative Record contains all the information that EPA will use, in consultation with DENR, to make its final remedy decision.

SITE BACKGROUND

The Gilt Edge Mine Superfund Site is located about 5 miles southeast of the towns of Lead and Deadwood at the headwaters of cold water fisheries and municipal water supplies of the northern Black Hills in Lawrence County, South Dakota.

The Gilt Edge Mine is an abandoned 258-acre open pit, former cyanide heap leach gold mine, developed in highly sulfidic rock.

Mining operations for gold, copper, and tungsten had been conducted in this small mining district since 1876. About a century ago, a series of small mines dumped metal-laden mill tailings into Strawberry and Bear Butte Creeks.

Beginning in 1986 under a state mining permit, Brohm Mining Company (BMC) developed three open pits, a large cyanide heap leach pad, and a 12 million cubic yard valley-fill waste-rock dump (Ruby Dump), as well as other operations. BMC also did cleanup activities to address some historical tailings off site.

During 1998-1999, BMC encountered serious financial difficulty and informed the state that it could not continue site controls. The operator became insolvent, leaving 150 million gallons of acidic, heavy-metal laden water in three open pits, as well as millions of cubic yards of acid-generating waste rock that need cleanup and long-term treatment. DENR maintained necessary water treatment operations at the site using the State's Regulated Substance Response Fund.

In February 2000, the Governor of South Dakota requested that EPA Region 8 propose the site for the Superfund National Priorities List (NPL) and provide emergency response, as well as long-term remedial cleanup.

DENR maintained the BMC-built water treatment plant operations through July 2000, removing toxic metals using standard pH adjustment methods. Since August 2000, the EPA Region 8 Emergency Response Program has continued water-treatment operations.

The Gilt Edge Mine site was placed on the NPL in December 2000 based on releases of cadmium, cobalt, copper, manganese, lead, and zinc documented in Strawberry Creek, a tributary to Bear Butte Creek. Bear Butte Creek near the Gilt Edge Mine is classified by the State of South Dakota as a cold water permanent fish life propagation water and limited-contact recreation water. Bear Butte Creek downstream of the site recharges a major aquifer supplying water to the Sturgis area.

SITE CHARACTERISTICS

Precipitation at the Gilt Edge mine site averages 29 inches per year. Sources of sulfide and metal contamination have been documented, resulting in substantial acid rock drainage (ARD). Known sources associated with Strawberry Creek include the Heap Leach Pad, Anchor Hill, Sunday and Dakota Maid Pits, and relic tailings formerly in Strawberry Creek. ARD from Ruby Dump, if not contained, is a major source of contamination for the Ruby Gulch drainage and Bear Butte Creek.

Waste rock from the mining activities and spent ores from the leach pads were transported to the Ruby Dump, a tiered storage area for waste rock in the Ruby Gulch drainage. The Ruby Dump was part of the Gilt Edge mining process and is currently recognized as significant source of ARD at the site.

The Ruby Dump (Figure 1) was constructed by end-dumping rock in layers up to 50 feet thick. Rock materials ranging from sand size to boulders are present in the dump. Compaction was achieved by routing haul equipment over the dump. By using the end dumping method to place these materials, large
Color Map(s)

The following maps contain color that does not appear in the scanned images. To view the actual images please contact the Superfund Record Center at (303) 312-6473.
Photograph taken from Ruby Pond looking west.
Heap leach pad is visible in the background.

FIGURE 1
RUBY WASTE ROCK DUMP AND VICINITY
GILT EDGE MINE SITE
LAWRENCE COUNTY, SOUTH DAKOTA

LEGEND

- Creek or Stream
- Topographic Contour - 25-foot interval
- Mine Site Extent

SCALE

500 1000 Feet

CDM Federal Programs Corporation
boulders accumulated at the base of the lifts, and a French drain effect was created in the lower portions of the dump. The dump is very porous and permeable. The dump contains an estimated 15.8 million tons of waste rock and 4.2 million tons of spent ore occupying a volume of approximately 12 million cubic yards. The upper most ungraded portion of the dump contains slopes at various angles of repose.

Drainage ditches had been placed on the sides of the dump, and the main dump slope was placed and partially graded at a 3 to 1 slope with several benches that stair-step down the gulch. The drainage ditches are in poor condition. Current dump slopes range from angle of repose to 3 to 1 slope and need to be regraded for long-term stability.

A containment pond (Ruby Pond) was built within the Ruby Gulch drainage below the waste rock dump. This lined pond has a capacity of approximately 1.2 million gallons. The ARD that drains from the Ruby Waste Rock Dump is collected in Ruby Pond and then pumped to the Sunday Pit for storage prior to treatment. The ARD is treated at an on site water treatment plant and released into the Strawberry Creek drainage.

Precipitation that infiltrates into the Ruby Dump results in the generation of ARD. Monthly average ARD flow at Ruby Dump for September, 1999 to August, 2000 ranged from 15 to 172 gallon per minute (gpm) averaging 58 gpm. This represents a significant source of ARD generation at the site and is the subject of the proposed remedy.

A containment pond for the Ruby Dump is used to capture the ARD from the dump. There is an existing subsurface collection trench (cut-off trench) below the Ruby Dump that channels ARD to the Ruby Pond. ARD is then pumped to an existing water treatment plant at the Gilt Edge Mine site. Although ARD collection and treatment will still be associated with OU3, it will not be addressed further in this Proposed Plan.

2. The implementation of institutional and engineered controls for OU3. Institutional controls for OU3 may include land use controls (governmental and proprietary) that would legally limit or prohibit types of future land use at OU3 and community awareness (informational and educational programs) that provide the public with knowledge concerning the remedial action. Engineered controls include access restrictions (fencing and posted warnings) that reduce potential for human access to the area and warn of potential hazards in the area. Although these controls will be required for OU3, they will be addressed and implemented as part of the Site-Wide Gilt Edge Mine Site OU (OU1) and will not be addressed further in this Proposed Plan.

**SUMMARY OF SITE RISKS**

Following is a summary of known human health and ecological risks. Risk assessments for the site are currently being conducted.

**Human Health**

A baseline human health and ecological risk assessment is being prepared for the Gilt Edge Mine site. EPA conducted a screening to assess risks from soil and rock inorganics (metals) for residents. All inorganics except lead and arsenic were below levels of concern for residents. Potential residential or recreational use of the Ruby Dump before and/or after remediation is not expected. Even so, EPA looked at the data to determine risk for recreational exposure. There does not appear to be a concern for adverse health effects to recreational users. No soil and rock contaminants of potential concern (COPC's) have been identified based on human health exposure.

**SCOPE AND ROLE OF THE ACTION**

Operable Unit 3, the Ruby Waste Rock Dump and Gulch (one of three operable units for the site), is the focus of action proposed in this plan.

If necessary, additional aspects of the overall remedy for the Ruby Dump will be implemented as part of the other OUs at the Gilt Edge Mine site and will be addressed in subsequent Proposed Plans. These are:

1. **The use of the existing ARD collection and treatment systems associated with Ruby Dump.**
Ecological

EPA has completed a Screening Ecological Risk Assessment for the Gilt Edge study area. Preliminary results from this screening identify COPCs for aquatic and wildlife receptors exposed to surface water as aluminum, arsenic, cadmium, chromium, copper, nitrate, lead, nickel, selenium, silver, and zinc. COPCs for aquatic and wildlife receptors exposed to sediment are aluminum, arsenic, cadmium, copper, lead, mercury, manganese, nickel, silver, and zinc. These COPCs may change after the baseline risk assessment using the most recent data has been completed.

**REMEDIAL ACTION OBJECTIVES**

*Remedial action objectives* (RAOs) are mediaspecific (e.g., mine waste, ARD, etc.) and meet the goal of protecting human health and the environment.

The RAOs for OU3 are to:

- Control erosion of mine waste into local water courses
- Control formation and volume of ARD
- Control leaching and migration of contaminants from mine waste into surface water
- Control leaching and migration of contaminants from mine waste that may enter groundwater

Construction of the proposed cap and drainage system will intercept and divert the precipitation-inflows, reducing water treatment volumes by approximately 30 million gallons per year. Containment and capping of the waste rock will also isolate contaminants preventing future human contact and direct exposures from contaminants at the Ruby Dump.

**SUMMARY OF ALTERNATIVES**

The *remedial action alternatives* for OU3 are presented below.

**Common Elements**

Each alternative (except the "no action" alternative) requires covering a portion of the Ruby Dump with a cap constructed of either man-made or natural materials. All alternatives include a periodic cost of $15,600 for a required 5-year site review, since waste remains on site. Costs herein are estimates developed in accordance with a *A Guide to Developing and Documenting Cost Estimates During the Feasability Study* (EPA 2000a) and are generally within -30% to +50% of final remedial design and construction costs.

**Alternative 1 - No Action**

Regulations governing the Superfund program require that the "no action" alternative be evaluated to establish a baseline for comparison to other alternatives. Under Alternative 1, all remedial activities at the Ruby Dump, except for ARD collection and treatment, would be discontinued. There would be no change in the waste rock and generation of ARD because no treatment, containment, or removal of mine waste is included in this alternative. Alternative 1 includes annual surface water monitoring.

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<th>Estimated Capital Cost</th>
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<td>Estimated Annual Operations and Maintenance (O&amp;M) Cost</td>
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<td>Estimated Periodic Cost</td>
<td>$15,600</td>
</tr>
<tr>
<td>Estimated Present Value Cost</td>
<td>$147,800</td>
</tr>
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**Alternative 2a - Regrading of Waste Rock Utilizing Forest Service Property, A Composite Cap Using Geomembrane Material Along With Heap Leach Pad Material (HLP), and Surface Water Controls (FS/Plastic/HLP).**

Steep slopes at the Ruby Dump would be graded to a 3.5 horizontal to 1 vertical slope. Waste rock moved to achieve grade on the Ruby Dump would be placed in depressions and areas north of Ruby Dump extending onto U.S. Department of Agriculture (USDA) Forest Service property. This will result in the efficient achievement of grade and better control of surface water flow. Spent oxide ore from the heap leach pad would be placed over the Ruby Dump as a bedding layer. A multilayer cap would be constructed on the bedding layer. The cap would generally consist of a geomembrane (plastic) liner, drainage net layer, geotextile (filter) fabric, and a protective layer of HLP rock amended with limestone. To promote vegetation...
the final growth media layer would be achieved by amending clean soils, obtained from on-site sources, with organic material and limestone. This alternative assumes that the lime-amended HLP material used in the cap would no longer present risk of ARD generation or other secondary releases of contaminants. However considerable uncertainty exists regarding the validity of this assumption.

Surface water controls would consist of a benched drainage system and diversion ditches. (Benches are stair-step tiers down the slope.) The benched drainage system would be constructed on the cap surface for erosion control and to channel runoff to diversion ditches. Diversion ditches would be constructed on the edges of the cap to channel runoff from the benched drainage system around the existing Ruby Pond. Surface water and source controls would be realized through the construction of the multilayer cap and surface water controls.

Annual O&M associated with Alternative 2a would include annual inspections, maintenance of the cap and surface water controls, and surface water monitoring.

Estimated Capital Cost $20,460,700
Estimated Annual O&M Cost $ 31,100
Estimated Periodic Cost $ 15,600
Estimated Present Value Cost $20,880,300

ALTERNATIVE 2b - Regrading of Waste Rock Utilizing Forest Service Property, A Composite Cap Using Geomembrane Material Along with Highway 385 Project Materials, and Surface Water Controls (FS/Plastic/385) - Preferred Alternative

Alternative 2b is similar to Alternative 2a except offsite materials for construction of the protective layer and surface water controls would be obtained from a highway construction project planned in the immediate vicinity of the Gilt Edge Mine site (Highway 385 project). The rock at the highway project has been tested and is not ARD-generating but would require crushing and screening to meet suitable construction specifications. Growth media would be obtained from onsite sources as described in Alternative 2a. This alternative assumes that offsite highway project materials would meet physical and chemical specifications after crushing and screening and would not require amendments.

Estimated Capital Cost $22,790,000
Estimated Annual O&M Cost $ 31,100
Estimated Periodic Cost $ 15,600
Estimated Present Value Cost $23,209,600


Alternative 2c is similar to Alternative 2a except offsite materials from commercial (Com) sources (e.g., quarry operations) would be used for construction of the cap. Protective layer material would be hauled from preselected offsite commercial borrow pits. Growth media would be obtained from onsite sources as described in Alternative 2a. This alternative assumes that offsite commercial materials would meet specifications and not require amendments.

Estimated Capital Cost $28,315,600
Estimated Annual O&M Cost $ 31,100
Estimated Periodic Cost $ 15,600
Estimated Present Value Cost $28,735,200


The depressions and areas north of Ruby Dump on National Forest property would not be used as part of the Ruby Dump cap under Alternative 3a. In order to achieve required 3.5 to 1 grades, waste rock that presently extends to the National Forest property boundary would instead have to be removed and used as fill in onsite mine pits. Alternative 3a requires removal and hauling of material thus increasing capital cost. The cap construction would be similar to Alternative 2a except that slope directions would vary slightly since the depressions are not used. The surface water controls would also have to be constructed on a different alignment if National Forest property is unuseable. This alternative assumes that the lime-amended HLP material used in the cap would no longer present risk fo ARD generation or other secondary releases of...
contaminants. However considerable uncertainty exists regarding the validity of this assumption.

Surface water controls would consist of a benched drainage system and diversion ditches. (Benches are stair-step tiers down the slope.) The benched drainage system would be constructed on the cap surface for erosion control and to channel runoff to diversion ditches. Diversion ditches would be constructed on the edges of the cap to channel runoff from the benched drainage system around the existing Ruby Pond. Surface water and source controls would be realized through the construction of the multilayer cap and surface water controls.

Annual O&M associated with Alternative 3a would include annual inspections, maintenance of the cap and surface water controls, and surface water monitoring.

Estimated Capital Cost $23,296,300
Estimated Annual O&M Cost $ 31,100
Estimated Periodic Cost $ 15,600
Estimated Present Value Cost $23,715,900


Alternative 3b is similar to Alternative 3a except offsite materials from commercial sources (e.g., quarry operations) would be used for construction of the cap. Protective layer material would be hauled from preselected offsite commercial borrow pits. Growth media would be obtained from onsite sources as described in Alternative 3a. This alternative assumes that offsite materials would meet specifications and not require amendments.

Estimated Capital Cost $27,813,200
Estimated Annual O&M Cost $ 31,100
Estimated Periodic Cost $ 15,600
Estimated Present Value Cost $28,232,800

Alternative 3c - Excavation and Disposal of Waste Rock Into the Mine Pits, Grading, Composite Cap Using a Geomembrane Material Along with Offsite Commercial Materials, and Surface Water Controls (MP/Plastic/Com)

Alternative 3c is similar to Alternative 3a except offsite materials from commercial sources (e.g., quarry operations) would be used for construction of the cap. Protective layer material would be hauled from preselected offsite commercial borrow pits. Growth media would be obtained from onsite sources as described in Alternative 3a. This alternative assumes that offsite materials would meet specifications and not require amendments.

Estimated Capital Cost $29,705,700
Estimated Annual O&M Cost $ 31,100
Estimated Periodic Cost $ 15,600
Estimated Present Value Cost $30,125,300

Alternative 4a - Regrading of Waste Rock Utilizing Forest Service Property, A Composite Soil Cap Using HLP Materials, and Surface Water Controls (FS/Comp/HLP)

Alternative 4a is similar to Alternative 2a except a 2-foot low-permeability layer consisting of compacted HLP material amended with 10 percent bentonite clay by weight would be used as the low-permeability layer (Comp) instead of a geomembrane (plastic) liner. The protective layer consisting of limestone-amended HLP material for this alternative would be 4 feet thick, 2 feet thicker than that used for Alternative 2a. This alternative assumes that the lime-amended HLP material used in the cap would no longer present risk of ARD generation or other secondary releases of contaminants. However, considerable uncertainty exists regarding the validity of this assumption. The bentonite clay would be obtained from offsite commercial sources.

Estimated Capital Cost $22,387,300
Estimated Annual O&M Cost $ 31,100
Estimated Periodic Cost $ 15,600
Estimated Present Value Cost $22,806,900

Alternative 4b is similar to Alternative 4a except offsite materials would be used for construction of the low-permeability layer, protective layer, and surface water controls would be obtained from a highway construction project in the immediate vicinity of the Gilt Edge Mine site (Highway 385 project). The rock at the highway project has been tested and is not ARD-generating but would require crushing and screening to meet suitable construction material specifications. Since there would not be enough offsite highway rock, additional cap construction materials would be required from commercial sources. Growth media would be obtained from onsite sources as described in Alternative 4a. This alternative assumes that offsite highway project and commercial materials would meet specifications after crushing and screening and would not require amendments.

Estimated Capital Cost $44,421,700
Estimated Annual O&M Cost $31,100
Estimated Periodic Cost $15,600
Estimated Present Value Cost $44,841,300


Alternative 4c is similar to Alternative 4a except offsite materials from commercial sources (e.g., quarry operations) would be used for construction of the cap. Low-permeability layer material and protective layer material would be hauled from preselected offsite commercial borrow pits. Growth media would be obtained from onsite sources as described in Alternative 4a. This alternative assumes that offsite materials would meet specifications and would not require amendments.

Estimated Capital Cost $47,603,100
Estimated Annual O&M Cost $31,100
Estimated Periodic Cost $15,600
Estimated Present Value Cost $48,022,700


Alternative 5a is similar to Alternative 3a except a 2-foot low permeability layer consisting of compacted HLP material amended with 10 percent bentonite clay by weight would be used as the low-permeability layer instead of a geomembrane (plastic) liner. The protective layer consisting of limestone-amended HLP material for this alternative would be 4 feet thick, 2 feet thicker than that used for Alternative 3a. This alternative assumes that lime-amended HLP material used for cap construction above the low permeability layer would no longer present risk of ARD generation or other secondary releases of contaminants. However, considerable uncertainty exists regarding the validity of the assumption. The bentonite clay would be obtained from offsite commercial sources.

Estimated Capital Cost $24,869,000
Estimated Annual O&M Cost $31,100
Estimated Periodic Cost $15,600
Estimated Present Value Cost $25,288,600


Alternative 5b is similar to Alternative 5a except offsite materials for construction of the low-permeability layer, the protective layer, and surface water controls would be obtained from a highway construction project in the immediate vicinity of the Gilt Edge Mine site (Highway 385 project). The rock at the highway project has been tested and is not ARD-generating but would require crushing and screening to meet suitable construction material specifications. Since there would not be enough offsite highway rock, additional cap construction materials would be required from commercial sources. Growth media would be obtained from onsite sources as described in Alternative 5a. This alternative assumes that offsite highway project and commercial materials would meet specifications after crushing and screening and would not require amendments.
Estimated Capital Cost $42,369,000
Estimated Annual O&M Cost $31,100
Estimated Periodic Cost $15,600
Estimated Present Value Cost $42,788,600


Alternative 5c is similar to Alternative 5a except offsite materials from commercial sources (e.g., quarry operations) would be used for construction of the cap. Low-permeability layer material and protective layer material would be hauled from preselected offsite commercial borrow pits. Growth media would be obtained from onsite sources as described in Alternative 5a. This alternative assumes that offsite materials would meet specifications and not require amendments.

Estimated Capital Cost $45,488,600
Estimated Annual O&M Cost $31,100
Estimated Periodic Cost $15,600
Estimated Present Value Cost $45,868,200

**EVALUATION OF ALTERNATIVES**

These alternatives were evaluated in detail using the nine criteria identified in the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), the regulation governing cleanups under the Superfund program. The criteria are summarized below.

The first two cleanup evaluation criteria, overall protection of human health and the environment and compliance with *applicable or relevant and appropriate requirements* (ARARs), are threshold criteria that must be met by the selected remedial action. The remaining criteria are used to help select the preferred alternative. The evaluation is summarized in Table 2.

**NCP Evaluation Criteria**

**Threshold Criteria**

Alternatives must meet the first two criteria called Threshold Criteria, to be retained for further consideration.

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled.

2. **Compliance with ARARs** addresses whether or not a remedy will meet all federal and state environmental laws and/or provide grounds for a waiver.

**Primary Balancing Criteria**

Alternatives which meet the threshold criteria are next evaluated against the following five criteria known as the Primary Balancing Criteria:

3. **Long-term effectiveness and permanence** refers to the ability of a remedy to provide reliable protection of human health and the environment over time.

4. **Reduction of toxicity, mobility, or volume through treatment** refers to the preference for a remedy that reduces health hazards, the movement of contaminants, or the quantity of contaminants at the site through treatment.

5. **Short-term effectiveness** addresses the period of time needed to complete the remedy and any adverse effects to human health and the environment that may be caused during the construction and implementation of the remedy.

6. **Implementability** refers to the technical and administrative feasibility of the remedy, including the availability of materials and services needed to carry out the remedy and coordination of federal, state, and local governments to work together to clean up the site.

7. **Cost** evaluates the estimated capital and operation and maintenance costs of each alternative in comparison to other, equally protective measures.

**Modifying Criteria**

The last two criteria are Modifying Criteria and are used to evaluate the technical and administrative concerns the State and the public may have regarding each alternative. Consideration of these two criteria may cause EPA to modify its choice of cleanup strategy. Accordingly, these criteria are evaluated after public comments are received on the Proposed Plan.

8. **State acceptance** indicates whether the state agrees with, opposes, or has no comment on the preferred alternative.

9. **Community acceptance** includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose. (This assessment will not be completed until public comments on the Proposed Plan are received.)
Table 2: Summary of Detailed Analysis of Alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Overall Protection of Human Health and the Environment</th>
<th>Compliance with ARARs</th>
<th>Long-Term Effectiveness and Permanence</th>
<th>Reduction of Toxicity, Mobility or Volume Through Treatment</th>
<th>Short-Term Effectiveness</th>
<th>Implementability</th>
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SUMMARY OF THE PREFERRED ALTERNATIVE

The alternative preferred and recommended by EPA and DENR for this remedial action is Alternative 2b:
* Regrading of waste rock utilizing Forest Service property,
* A composite cap using geomembrane materials, along with Highway 385 project materials and,
* Surface water controls.

EPA recommends this alternative because it will most reliably reduce risk by controlling the formation of ARD and the leaching and migration of contaminants from mine waste into surface water and groundwater.

Based on the information available at this time, EPA and DENR believe that the Preferred Alternative would be protective of human health and the environment, would comply with ARARs, would have long-term effectiveness and permanence, and would be relatively cost-effective.

This alternative does not meet the requirement to provide treatment as a principal element. Treatment of metals contamination in soil or rock is very costly and more difficult to implement relative to other technologies that simply remove and contain wastes. Removal and containment technologies provide the same level of protection for human health and the environment as do treatment technologies at a much lower cost and level of effort.

Based on the information currently available, EPA believes the Preferred Alternative meets the threshold criteria and provides the best balance of all alternatives with respect to criteria listed on page 8. EPA expects the Preferred Alternative to satisfy the following statutory requirements of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121(b):
* Be protective of human health and the environment
* Comply with ARARs (or justify a waiver)
• Be cost-effective
• Provide short and long-term effectiveness and permanence
• Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum practical extent
• Satisfy the preference for treatment as a principal element or explain why the preference for treatment will not be met.

The Preferred Alternative recommended here can change in response to public comment or new information.

COMMUNITY PARTICIPATION

EPA and DENR will provide information regarding the remedial action for Ruby Dump and Gulch OU3 at the Gilt Edge Mine Superfund Site to the public through public meetings, the Administrative Record file for the site, and announcements published in the Black Hills Pioneer newspaper. EPA and the state encourage the public to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted at the site.

Verbal or written comments on this Proposed Plan may be submitted during the public meeting, or written comments may be sent to the EPA Regional Project Manager, Ken Wangerud, postmarked or e-mailed no later than May 27, 2001.

Once the public comments are received, EPA, in consultation with the state, will make its final decision. EPA will then publish the Record of Decision (ROD), a document that provides the rationale for its decision and responds to the state and community comments.

The dates for the public comment period; the date, location, and time of the public meeting; and the locations of the Administrative Record files are provided on the front page of this Proposed Plan.

For further information on the Gilt Edge Mine Superfund Site, please contact:

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ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ARAR</td>
<td>applicable or relevant and appropriate requirement</td>
</tr>
<tr>
<td>ARD</td>
<td>acid rock drainage</td>
</tr>
<tr>
<td>BMC</td>
<td>Brohm Mining Company</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
</tr>
<tr>
<td>COPC</td>
<td>contaminant of potential concern</td>
</tr>
<tr>
<td>DENR</td>
<td>South Dakota Department of Environment and Natural Resources</td>
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<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>HLP</td>
<td>heap leach pad</td>
</tr>
<tr>
<td>NCP</td>
<td>National Oil and Hazardous Substance Pollution Contingency Plan</td>
</tr>
<tr>
<td>NPL</td>
<td>National Priorities List</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>operations and maintenance</td>
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<tr>
<td>OU</td>
<td>operable unit</td>
</tr>
<tr>
<td>PRG</td>
<td>preliminary remediation goal</td>
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<tr>
<td>RAO</td>
<td>remedial action objective</td>
</tr>
<tr>
<td>ROD</td>
<td>record of decision</td>
</tr>
<tr>
<td>USDA</td>
<td>U.S. Department of Agriculture</td>
</tr>
<tr>
<td>mg/kg</td>
<td>milligrams per kilogram</td>
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Acid rock drainage: A natural process that occurs as a result of sulfide oxidation in rock exposed to air and water. Acid rock drainage is typically characterized by low pH (acidic) and increased concentrations of dissolved heavy metals.

Administrative record: The body of documents EPA uses to form the basis for selection of a response.

Applicable or relevant and appropriate requirements: Federal and state requirements for cleanup, control, and environmental protection that a selected remedy for a site will meet.

Baseline human health and ecological risk assessment: A CERCLA study that determines and evaluates risk that site contamination poses to human health and the environment in the absence of remedial action.

Capital costs: Expenditures required to construct a remedial action. They are exclusive of costs required to operate and maintain the remedial action.

Focused feasibility study (FFS): The FFS identifies and evaluates the most appropriate technical approaches to address contamination problems at a Superfund site.

Institutional controls: Legal restrictions applied to source areas to control or prevent present and future use and may consist of land use controls (zoning and restrictions) or community awareness programs.

National Oil and Hazardous Substance Pollution Contingency Plan: The EPA’s regulations governing all cleanups under the Superfund program.

National Priorities List (NPL): EPA’s list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response.

Operable unit: A distinct portion of a Superfund site or a distinct action at a Superfund site. An operable unit may be established based on a particular type of contamination, contaminated media (e.g., soil, water), source of contamination, and/or some physical boundary or restraint.

Operations and maintenance cost: Post-construction costs necessary to ensure continued effectiveness of a remedial action.

Preferred alternative: Of all the alternatives considered, the preferred alternative is the alternative that is proposed by EPA to remediate the site.

Periodic cost: Capital or operations and maintenance (O&M) costs that occur only once every few years or only once during the entire project time frame. Because of their periodic nature, these costs are usually considered separate in the estimating process from initial capital or O&M costs.

Preliminary remediation goals: These are the cleanup goals or action levels that will be attained by implementation of the selected remedy.

Present value cost: The present value of a future investment or payment that is calculated using a predetermined discount or interest rate. Present value cost is the amount of money, that, if invested in the current year, would be sufficient to cover all the costs over time associated with a remedial action.

Proposed plan: A document requesting public input on a proposed remedial alternative.

Record of decision: A document that is a consolidated source of information about the site, the remedy selection process, and the selected remedy for a cleanup under CERCLA.

Remedial action: Action taken to clean up contamination at a site to acceptable standards.

Remedial action alternative: An option for reducing site risk by cleaning up or otherwise limiting exposure to contamination.

Remedial action objectives: Medium-specific (e.g. groundwater, soil) goals for protecting human health and the environment.