



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8

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1282273 - R8 SDMS

ADMINISTRATIVE RECORD

REF: 8EPR-ER

ACTION MEMORANDUM AMENDMENT

SUBJECT: Request for a Ceiling Increase and a Change in Scope for a CERCLA Removal Action for the Carpenter-Snow Creek NPL Site OU3-Carpenter Creek and Silver Dyke Tailings Impoundments in Cascade County, Montana (with attachments)

FROM: Steven Way, On-Scene Coordinator
Emergency Response

Roger Hoogerheide, Remedial Project Manager
Region 8, Montana Office

THRU: Joe Vranka, Superfund Branch Chief
Region 8, Montana Office

Laura Williams, Unit Leader
Emergency Response

TO: David A. Ostrander, Director
Emergency Response and Preparedness

Site ID # 089X OU3

I. PURPOSE

The purpose of this Action Memorandum Amendment (Amendment) is to request and document approval of a ceiling increase, exemption from the 12-month statutory limit, and to modify the scope of work for the time-critical removal action (TCRA) described in the June 11, 2013, Action Memorandum for the Carpenter Creek and Silver Dyke tailings impoundments (Removal Site) within Operable Unit 3 (OU3) of the Carpenter-Snow Creek National Priorities List Site (NPL Site) near Neihart in Cascade County, Montana (Attachment 2). The actions discussed herein are consistent with anticipated and/or potential future remedial actions at the Site. This Amendment also explains the reasons for the increased estimated costs of this removal action.

The original Action Memorandum was signed in June 11, 2013, and is contained in the administrative record for this action. Since the original Action Memorandum was approved, it has been determined that the U.S. Environmental Protection Agency (EPA) is able to implement further response actions consistent with a long-term remedy, by placing certain portions of the

Silver Dyke tailings in a permanent, onsite storage cell (repository). The work is substantially the same as was provided for in the original Action Memorandum but now includes preparing a repository and placing the tailings in the repository.

The administrative record for this Action Memorandum and Amendment contains documentation of ongoing releases of hazardous substances from the Carpenter Creek and Silver Dyke tailings impoundments into Carpenter Creek and downstream into Belt Creek. These releases continue to cause exceedances of water quality standards for aquatic life and drinking water. The releases also impair use of the water as classified by the State of Montana. The releases deposit sediment within Carpenter, Belt and Sih-mem creeks and streamside tailings within the floodplains of Carpenter and Belt creeks and are detrimental to aquatic and aquatic dependent ecological communities. This removal action seeks to stabilize certain portions of the Silver Dyke tailings, reduce erosion, and divert clean water flows away from the tailings until a permanent remedial action is taken. Conditions at the Removal Site may present an imminent and substantial endangerment to human health and the environment and meet the criteria for initiating a TCRA under 40 C.F.R. § 300.415(b)(2) of the National Contingency Plan (NCP).

This time-critical removal action involves no nationally significant or precedent setting issues. This removal action will not establish any precedent for how future response actions will be taken and will not commit the EPA to a course of action that could have a significant impact on future responses or resources.

The Amendment includes a brief summary of the information that was presented in a recent Proposed Plan for a Mine Waste Repository Location (Proposed Plan) (Attachment3) for the Carpenter Snow Creek Mining District Site (Site), as well as the Remedial Investigation / Feasibility Study (RI/FS) for the same action. The Proposed Plan presents the recommendation that two on-site repositories be created to store the mine waste from the Site. Mine waste from the Silver Dyke tailings impoundment area will be removed under this response action and placed in the first MacKay Gulch Repository.

II. SITE CONDITIONS AND BACKGROUND

The Carpenter Creek and Silver Dyke tailings impoundments - Operable Unit 3 (OU3) Action Memorandum was for a TCRA and was signed by EPA on June 11, 2013. The original project ceiling was \$840,000 to install engineered channel lining material on the Carpenter Creek tailings to prevent erosion and to consolidate and stage the Silver Dyke tailings pending the decision for locating a repository.

Site Name:	Carpenter Creek and Silver Dyke Tailings Impoundments- Carpenter-Snow Creek NPL Site
Superfund Site ID (SSID):	089X
Operable Unit:	Operable Unit 3
NRC Case Number:	
CERCLIS Number:	MT0001096353
Site Location:	Cascade County, Montana
Lat/Long:	46.965509/-110.702772

Potentially Responsible Party (PRP):	Under Investigation
NPL Status:	Final 9/13/2001
Removal Start Date:	9/3/2013
Category of Removal:	Time-Critical Removal Action

A. Site Description

See the original Action Memorandum for the complete NPL Site description.

In brief, the Silver Dyke Mining Complex involved mining a low grade ore containing zinc and lead and a high proportion of copper. The low grade and complexity of the ore, which contained both oxidized and sulfide minerals, complicated treatment and disposal and resulted in a large quantity of tailings and refuse left at the Site. A tailings impoundment, now known as the Silver Dyke tailings, co-located in the drainage just east of the Silver Dyke Mill, was damaged by an earthquake in 1925 resulting in a flood of tailings into the valley below. A substantial volume of tailings remained at the tailings impoundment. In 1926, Silver Dyke Mining Company developed two new impoundments (upper and lower) on Carpenter Creek for collection of mine tailings. These tailings are now known as the upper and lower Carpenter Creek tailings or collectively as the Carpenter Creek tailings.

The work completed to date as part of the original removal action includes installing the engineered, synthetic drainage channel lining for erosion control on the Carpenter Creek tailings impoundments among other actions. This work was completed in 2013.

1. Removal Site Evaluation

The portion of OU3 that will undergo a time-critical removal action includes portions of the Silver Dyke and Carpenter Creek tailings impoundment features located upstream of the confluence of Snow Creek in the drainage of Carpenter Creek and its tributaries (Figure 1). The Silver Dyke tailings impoundment is located in an unnamed tributary to Carpenter Creek while the Carpenter Creek tailings are located in the main Carpenter Creek drainage.

The estimated volume of tailings for the Silver Dyke tailings impoundment is 33,000 cubic yards (cy) and disturbs approximately 4 acres. The estimated volume of waste in the Carpenter Creek tailings impoundments is about 250,000 cy with another estimated 200,000 cy of tailings in the floodplain between the Silver Dyke tailings impoundment and the Carpenter Creek tailings impoundments.

See the original Action Memorandum, Site Evaluation section, for the complete discussion of the Silver Dyke and Carpenter Creek tailings impoundments.

As part of the Remedial Investigation (RI) for the Mine Waste Disposal Alternative Selection action, the 2011 investigation of Mackay Gulch included a

topographical survey of the proposed repository area, installation of two piezometers for groundwater monitoring, and installation and sampling of six test pits. No groundwater was encountered in any of the piezometers installed to depths of 20 feet. Soil samples collected from the boreholes and test pits were analyzed for geotechnical, agronomic, and leaching characteristics. More information was gathered regarding land ownership, geology and site access. Three potential repository alternatives were developed to simulate different methods to design and build a repository. The capacity of the repository ranged from 70,000 to 675,000 cy (Tetra Tech 2012a).

2. Physical Location

The NPL Site is located in west-central Montana in the Little Belt Mountains in T14N, R8E Sections 15, 16, and 21. The Removal Site is located within OU3 of the NPL Site and approximately 2 ½ miles northeast of the Town of Neihart in the Carpenter Creek watershed. NPL Site elevation is about 6,000 feet amsl.

3. Site Characteristics

The Carpenter Creek tailings impoundment has minimal vegetative cover and is composed of clay to fine sand tailings. This tailings impoundment lies within the Carpenter Creek floodplain and is repeatedly releasing tailings into the creek during storm events and spring run-off. Overland flow and run-off from side gulches drains over the tailings impoundment and also erodes the tailings and/or associated hazardous substances into the stream.

The Mackay Gulch repository location (Mackay Gulch) is located in the Carpenter Creek drainage on a recently logged ridge top (Figure 1). Mackay Gulch is between the Carpenter Creek tailings and the Silver Dyke mill. The initial investigation referenced above indicated the area could be built into a repository of approximately 4.6 acres. Mackay Gulch is relatively level with a steeper drainage on the west side of the logged area. There are no known sources of surface water at this location (Mine Waste Disposal Alternative Selection RI; Tetra Tech, July 2014).

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

Sampling and analysis of groundwater, surface water, sediment and the tailings impoundments indicate the presence of high concentrations of heavy metals including lead, zinc, cadmium and copper. In addition, these same hazardous substances are found in surface waters and sediment for many miles downstream of the Site. The heavy metals are “hazardous substances” as defined by Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (CERCLA), 42 U.S.C. § 9601(14). The release of these hazardous substances into the environment may pose an imminent and

substantial threat to public health and the environment.

5. NPL Status

The Carpenter-Snow Creek Site was listed on the NPL on September 13, 2001.

6. Maps, Pictures, Other Graphic Representations

Figure 1 shows the location of the MacKay Gulch repository, the Silver Dyke tailings area and the associated haul route.

B. Other Actions to Date.

1. Previous Actions

There has been no previous CERCLA removal action performed in OU3 of the NPL Site. (See the original Action Memorandum for the complete discussion.)

2. Current Actions

Currently, EPA Region 8 has mobilized its ERRS contractor to the Removal Site to perform the removal action proposed in the original Action Memorandum. Following mobilizing on August 11, 2014, the Site access road between the Silver Dyke tailings and the proposed repository has been prepared for haul truck traffic. Temporary erosion control measures have been installed at the Silver Dyke tailings impoundments to allow construction operations. A flow diversion pipe is being installed to carry water during the tailings removal work. Additional Removal Site preparations are underway.

The following response actions as proposed in the Action Memorandum have been completed: Stabilization activities at various locations within the Carpenter Creek and Silver Dyke tailings impoundments include: 1) Construction of lined surface run-on and run-off ditches on the lower and upper Carpenter Creek tailings to reduce storm flows and snowmelt from eroding tailings, 2) Installation of diversion channels to route clean water around all three tailings impoundments; 3) Installation of erosion check dams at all three tailings features in areas where deep rills have formed in past erosion events, 4) Installation and maintenance of a continuous certified weed-free straw bale erosion berm (or a similar erosion control measure) along the Carpenter Creek tailings

C. Federal, State and Local Authorities' Roles

1. Federal, State and Local Actions to Date

The Removal Site is a mixed ownership site with private property ownership and federally managed land under control of the U.S. Department of Agriculture

(USDA) Forest Service. The EPA and the USDA Forest Service are coordinating the implementation of this action and other response actions at the NPL Site. The USDA Forest Service has and is performing specific portions of the TCRA.

The State of Montana Department of Environmental Quality (DEQ), U.S. Fish and Wildlife Services (USFWS), Montana Fish Wildlife and Parks (FWP) and USDA Forest Service have directly assisted with NPL Site investigations. The EPA is the lead agency for the NPL Site. DEQ, under an agreement with the EPA, performs contract development and oversight for remedial investigation activities for the OU2 and OU3 portions of the Site. DEQ, USFWS, EPA and the USDA Forest Service have participated in the assessment and planning associated with the removal proposed in the original Action Memorandum and this Amendment.

2. Potential for Continued State/Local Response

DEQ is the support agency for the Site. DEQ is anticipating involvement in future activities at the Site during subsequent removal and remedial actions. DEQ is expected to remain involved in the removal planning and oversight of this removal action and supports this removal action. The Cascade County Commission and City-County Health Department have regularly been briefed about activities at this Site, and several members have participated in field trips to the Site to observe impacted areas. Cascade County may participate in the development of institutional controls in support of any final remedy at the Site.

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

The levels of surface contamination and the unconfined nature of the ongoing releases from the tailings impoundments support the decision to perform a TCRA. Conditions existing at the Site meet the criteria for initiating a removal action under 40 CFR 300.415 (b) (2) of the NCP.

The EPA has considered all the factors described in 40 CFR 300.415(b)(2) of the NCP and determined that the following factors apply at the Site.

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

Human exposure occurs due to the uncontrolled nature of the tailings impoundments, and the potential for continued exposure exists. There is a potential for direct access where the tailings impoundments are located. More specifically, due to the Carpenter Creek and Silver Dyke tailings impoundments, sediment and downstream tailings are deposited within the floodplain, and/or consumption of water from Carpenter Creek may result in exposure. The tailings impoundments contain high levels of hazardous substances at the surface, and result in offsite migration of hazardous substances to surface water, channel bottom, floodplains and wetlands.

Aquatic life surveys conducted in Carpenter Creek below the confluence with Sih-mem Creek,

indicate populations of benthic invertebrates are severely impaired and fish populations are absent. Investigations conducted by Montana FWP and the EPA in 2010 and 2011 (FWP, 2011, 2012, and TechLaw, 2011, 2012) clearly indicate that metals contamination associated with ongoing contaminant releases severely inhibit aquatic life in Carpenter Creek and suggest that they are contributing to the impairment of aquatic life in Belt Creek below the confluence.

Surface water toxicity results from in-stream and laboratory testing indicate the Carpenter Creek water below Sih-mem Creek is acutely toxic to trout species. Additionally, in 2011, in-stream tests in Belt Creek below Carpenter Creek resulted in 60% mortality as compared to 16% at an upstream reference area (FWP 2012). Sediment toxicity tests conducted with *H. azteca* indicate that sediments from the main stem of Carpenter Creek below Sih-mem Creek and Belt Creek immediately downstream of Carpenter Creek are acutely toxic to benthic organisms (TechLaw, 2012).

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

All Montana waters are classified for multiple beneficial uses. Carpenter Creek is classified as a B-1 stream, which specifies that all of the following uses must be supported: drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply. While Carpenter Creek currently cannot be used for any of its designated uses, the quality of the water must be improved and maintained at a level that can support that use to the extent possible based on a stream's natural potential. Carpenter Creek is listed as impaired for cadmium, copper, iron, lead, mercury, silver and zinc on the State of Montana's 303(d) list, named after Section 303(d) of the Clean Water Act. As such, total maximum daily loads have been developed for these metals (DEQ, 2011).

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

Hazardous substances including lead, copper and zinc are present at the surface of the tailings impoundments and in soil at concentrations that may pose a threat to human health and aquatic life. The tailings readily migrate from the impoundments as described above. Investigation results show evidence of large volumes of tailings eroding from the Removal Site during run-off events.

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

Annual snowmelt run-off conditions and thunderstorms contribute significantly to the continuing release of the hazardous substances from the un-vegetated and unstable tailings impoundments and into adjacent surface water, which results in the release of total suspended solids containing heavy metal concentrations. Erosion of the tailings impoundments has led to heavy sediments and streamside tailings contamination downstream. In addition, acute exposures to aquatic species can occur during releases that occur, such as during thunderstorms and spring run-off,

leading to reductions in the number and diversity of the aquatic and aquatic dependent community, and these events contribute to deposition of tailings near downstream residences.

(vii) *The availability of other appropriate federal or state response mechanisms to respond to the release;*

The USDA Forest Service has implemented portions of this removal action. The USDA Forest Service, EPA and DEQ will participate in the oversight of the work on the removal action. This portion of the removal action is on private property where EPA is the lead agency, and no other appropriate federal or state response mechanism is available to respond to the releases described above.

A. Threats to the Public Health or Welfare

The actual and potential threats to public health or welfare is the risk associated with human contact with contaminated surface water and unconfined tailings by year-long downstream residents, nearby summer residents and dispersed public recreationists engaging in activities such as rock hounding or gold panning, fishing and/or riding an ATV or motorcycle. Exposure could be through water, soil contact, or dust inhalation. ATV and dirt bike riding are considered to be the most exposure-intense recreational uses because of the dust generated by the vehicles and the potential for people to inhale that dust off of the tailings impoundments. Although the frequency of exposure is generally expected to be low because these areas are located on property that is not designated for this use, administrative controls such as fencing and signage are proposed as part of this removal action to eliminate this exposure pathway.

B. Threats to the Environment

Lead, zinc, cadmium and copper from the tailings impoundments are the primary actual or potential threats to aquatic life and terrestrial biota (as well as human health). The pathways by which aquatic and aquatic dependent ecological receptors could become exposed to contaminants at and downstream from the Removal Site are direct contact with the tailings in their present location or at depositional areas downstream following erosion and direct contact with dissolved metals that have leached into water from the tailings impoundments. Terrestrial receptors may be exposed to tailings through incidental soil or sediment ingestion and consumption of contaminated food items.

The threats to the environment, especially to the aquatic and aquatic dependent life of Carpenter Creek and the Belt Creek drainage, have been described previously in this Amendment and the Action Memorandum. The following are descriptions of the threats to the environment posed by the specific contaminants found in the tailings impoundments at the Removal Site.

Zinc

Zinc is found in Carpenter Creek between the Silver Dyke tailings impoundment and the

lower Carpenter Creek tailings impoundments at levels up to 30 times the surface water quality standard. Zinc produces acute toxicity in freshwater organisms over a range of concentrations below those found on the Site. Acute toxicity is similar for freshwater fish and invertebrates. In many types of aquatic plants and animals, growth, survival and reproduction can all be adversely affected by elevated zinc levels.

Cadmium

Cadmium levels in Carpenter Creek between the Silver Dyke tailings impoundment and the lower Carpenter Creek tailings impoundment are approximately ten times above acute surface water quality standards (based on water hardness). Laboratory experiments suggest that cadmium may have adverse effects on reproduction in fish at levels present in lightly to moderately polluted waters. Cadmium is highly toxic to wildlife; it is cancer-causing and teratogenic and potentially mutation-causing, with severe sublethal and lethal effects at low environmental concentrations. It bio-accumulates at all trophic levels, in the livers and kidneys of fish. Crustaceans appear to be more sensitive to cadmium than fish and mollusks. Cadmium can be toxic to plants at lower soil concentrations than other heavy metals and is more readily taken up than other metals.

Copper

Copper concentrations in Carpenter Creek between the Silver Dyke tailings impoundment and the lower Carpenter Creek tailings impoundment are found at levels approximately ten times above acute (based on water hardness) surface water quality standards. Copper produces acute toxicity in freshwater animals and data is available for species in 41 genera. Data for eight species indicate that acute toxicity also decreases with increases in alkalinity and total organic carbon. Chronic values are available for 15 freshwater species, and for Brook Trout it may be as low as 3.873 ug/l, depending on hardness. During the low flow sampling event, copper concentrations are usually above 100 ug/L between the impoundments (TechLaw, 2010, 2011, 2012, 2013). Fish and invertebrate species seem to be about equally sensitive to the chronic toxicity of copper. Copper is highly toxic in aquatic environments and has effects in fish, invertebrates and amphibians. Caged fish bioassays below the lower Carpenter Creek tailings impoundment conducted by FWP in 2011 using Westslope Cutthroat Trout fingerlings saw 100% mortality in less than 24 hours (FWP, 2012). Copper will bio-concentrate in many different organs in fish (potential low, however) and mollusks. Copper sulfates and other copper compounds are algacides, with sensitive algae potentially affected by free copper at low ppb concentrations. Toxicity tests have been conducted on copper with a wide range of freshwater plants, and their sensitivities are similar to those of animals. Copper concentrations (and possibly arsenic, cadmium and other metals) in the aquatic environment (surface water, diet) also impose low-level chronic stress on aquatic macro invertebrates, trout and other fish. The most likely manifestation of this stress is decreased growth.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Carpenter Creek and Silver Dyke tailings impoundments, if not addressed by implementing the response actions described in this Action Memorandum Amendment, may present an imminent and substantial threat to public health, welfare or the environment.

V. EXEMPTION FROM STATUTORY LIMITS

A statutory exemption is requested based on the consistency exemption for an NPL site. This removal will be consistent with potential remedial actions currently anticipated for the Site. The proposed removal meets the criteria for consistency, *i.e.*, does not foreclose the remedial action and is otherwise appropriate. For example, the actions described in this Amendment and the original Action Memorandum are clearly necessary to avoid a foreseeable threat and to prevent or minimize the currently uncontrolled migration of contaminants. Construction to reduce erosion and limit run-on and run-off through the tailings impoundments until a permanent remedial action is taken will not interfere with likely long-term remedial alternatives to address surface water and soil contamination. The amount of construction discussed herein is estimated to take one construction season to complete. However, due to the short construction season in the high elevation and the difficulty of the working conditions, a longer time frame may be needed.

VI. PROPOSED ACTION AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

As described in the Action Memorandum, the response actions included stabilizing tailings at the Silver Dyke tailings and upper and lower Carpenter Creek tailings impoundments. The primary reason for this Amendment is to present the modification to the response action that will now include placing certain portions of the Silver Dyke tailings in an on-site repository located at the MacKay Gulch Repository, which will provide more secure stabilization for the tailings. The Superfund Remedial program proposes to establish two on-site waste disposal areas - Mackay Gulch and the Silver Dyke Glory Hole - as described in the Proposed Plan; and will soon complete a Record of Decision for this action (no adverse comment on the repository locations and descriptions has been received and none is expected). This Amendment to the removal action proposes to place the Silver Dyke tailings in the MacKay Gulch waste disposal area.

The proposed removal action includes: 1) consolidating tailings on location at the Silver Dyke tailings impoundment from the dispersed piles on the surrounding slopes; 2) preparing an on-site permanent storage cell (repository) for the Silver Dyke tailings at the MacKay Gulch repository site; and 3) hauling and placing the tailings in the repository and installing a temporary soil cover. Additional work will include appropriate site restoration / re-vegetation measures and repair of the

road-drainage crossing area of the Silver Dyke tailings to prevent head-cutting, and sedimentation of the tailings and reconstruction of appropriate drainage features and armoring to provide for travel on the Pioneer Lane road as deemed necessary after additional assessment and design analysis.

Administrative controls such as fencing and signage on the Silver Dyke tailings area and repository site will be implemented to eliminate trespass with recreational vehicles and to educate the public on the potential dangers. Other similar actions as may be appropriate to mitigate the on-going releases of hazardous substances at the Carpenter Creek and Silver Dyke tailings may also be implemented.

2. Contribution to Remedial Performance

The TCRA is consistent with the overall objectives for the NPL Site to prevent or mitigate the risks to human health and the environment due to direct contact with tailings containing lead, zinc, cadmium and copper, and from releases of these hazardous substances to the surface water. Specifically, this action is consistent with the Proposed Plan for Mine Waste Disposal Alternative Selection for the Site.

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

An EE/CA is not required for a TCRA.

4. Applicable or Relevant and Appropriate Requirements (ARARs)

This removal action will attain to the extent practicable, considering the exigencies of the situation, ARARs of the federal environmental or more stringent state environmental laws. The proposed action is limited in scope to activities such as reducing erosion and limiting run-on and run-off through the tailings impoundments. The ARARs identified for this removal action include, but are not limited to the following:

FEDERAL ARARS

- a. Clean Water Act (33 U.S.C. §§ 1341 and 1344, 40 CFR Part 230) is relevant and appropriate, as described in the ARARs identified in the RI/FS for the Mine Waste Disposal Alternative Selection.
- b. National Historic Preservation Act and Regulations (16 U.S.C. § 470, 16 U.S.C. § 461, 36 C.F.R. 60, 36 CFR 63, 36 C.F.R. 800 are applicable.
- c. Floodplain Management Regulation Executive Order No. 11988 (40 C.F.R. Part 6.302(b)) is applicable as described in the RI/FS for the Mine Waste Disposal Alternative Selection.

- d. Other repository location and design ARARs identified in the RI/FS for the Mine Waste Disposal Alternative Selection, as described in the ARARs identification portion of the RI/FS.

STATE ARARS

- a. Stormwater Runoff Control Requirements (ARM 17.24.633 and ARM 17.30.1341) are applicable as described in the RI/FS for the Mine Waste Disposal Alternative Selection.
- b. Montana Ambient Air Quality Regulation (ARM 17.24.761) is applicable for the transportation of tailings to the repository and other active site work.
- c. Montana Floodplain and Floodway Management Act and Regulations (MCA 76-5-404, ARM 36.15.601) are applicable as described in the RI/FS for the Mine Waste Disposal Alternative Selection.
- d. Montana Mine Reclamation Regulations (ARM 17.24.505, .631, .635 – .638, .640, .703, .714 and .721) are relevant and appropriate as described in the RI/FS for the Mine Waste Disposal Alternative Selection.
- e. Solid Waste Management Regulations promulgated under the Solid Waste Management Act, §§ 75-10-201 et seq. (ARM 17.50.1009, ARM 17.50.1004 and 17.50.1005) are applicable as described in the RI/FS for the Mine Waste Disposal Alternative Selection.
- f. Noxious Weeds (MCA 7-22-2101(8)(a) and ARM 4.5.201) are applicable for the temporary soil cover to be implemented as part of this action.

5. Project Schedule

The planned start is August 2013 (for the actions described in the original Action Memorandum) and planned completion for all actions is in October 2014.

B. Estimated Costs*

The ceiling increase is requested due to costs of developing the on-site repository for approximately 33,000 cubic yards of tailings, haul road improvements and transporting the tailings to the repository. These costs were not included in the 2013 Action Memorandum. The table below summarizes the increased cost and revised estimate.

Funding for the portion of the removal action that was completed by the USDA Forest Service in 2013 included \$400,000, which was funded by the ASARCO Environmental Trust. In addition in 2014, EPA received \$351,000 from the ASARCO Environmental Trust for the Silver Dyke tailings.

Extramural Regional Allowance Costs:

	Original Estimate**	Change	Revised Estimate
Contractor Costs	\$675,000	\$ 633,000	\$ 1,308,000
Other Extramural Costs	\$ 25,000	\$ 0	\$ 25,000
20% Contingency**	\$140,000	\$ 0	\$ 140,000
Total Removal Project Ceiling	\$840,000	\$ 633,000	\$ 1,473,000

*EPA direct and indirect costs, although cost recoverable, do not count toward the removal ceiling for this removal action. Liable parties may be held financially responsible for costs incurred by the EPA as set forth in Section 107 of CERCLA.

**Corrected estimate; no further contingency needs are anticipated.

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Heavy metal contaminants will continue to migrate off-Removal Site from the Carpenter Creek and Silver Dyke tailings impoundments during the frequent, high intensity thunderstorms that occur in this area in the summer, as documented in July 2012, and during annual spring run-off. The erosion of the tailings impoundments will continue to add to the degraded water quality of Carpenter Creek and its downstream tributary Belt Creek, which has year-long residents living adjacent to the stream. The tailings impoundments, as they exist now, will continue to substantially impact and degrade the creek ecosystems. Additional contaminants will be carried downstream into Belt Creek thereby impacting additional ecosystems and potentially residential property, should action be delayed or not taken. Uncontrolled human access may present actual or potential threats to human health as described above.

VIII. OUTSTANDING POLICY ISSUES

None

IX. ENFORCEMENT

A separate Enforcement Addendum to the Action Memorandum provides a confidential summary of current and potential future enforcement actions, and further investigation and planning for enforcement at the Site, in conjunction with the final remedial actions selected for the Site, is ongoing.

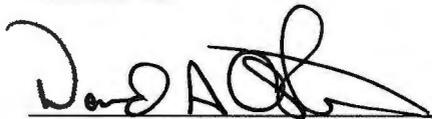
X. RECOMMENDATION

This decision document, along with the Action Memorandum, represents the selected TCRA for the Removal Site located within OU3 of the Site. This Amendment is developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the Removal Site.

Site conditions continue to meet the NCP Section 300.415(b)(2) criteria for a removal and the CERCLA Section 104(c) consistency exemption from the 12-month limitation, and we recommend your approval of the proposed increase of \$633,000 from the original project ceiling of \$840,000. The removal project ceiling, if approved, will be \$1,473,000, of which \$722,000 will be funded from the Fiscal Year 2014 Regional removal allowance.

Pursuant to the Consent Decree entered by the United States District Court for the District of Arizona, captioned *United States of America v ASARCO, Inc and Southern Peru Holdings, Corporation*, No CV 02-2079, the EPA submitted a request for funding from the ASARCO Environmental Trust (Trust) established pursuant to the Consent Decree for the performance of the response action. Of the total project ceiling, \$751,000 has been provided from the Trust.

APPROVE



David A. Ostrander, Director
Emergency Response and Preparedness Program

9/2/2014
Date

DISAPPROVE

David A. Ostrander, Director
Emergency Response and Preparedness Program

Date

Attachments:

- 1) Figure 1: Site Map and Access Route (Sheet 2 - Tetra Tech, 2014)
- 2) Action Memorandum: for the Carpenter-Snow Creek NPL Site OU3-Carpenter Creek and Silver Dyke Tailings Impoundments (June 2013)
- 3) Proposed Plan: Mine Waste Disposal Alternative Selection Carpenter-Snow Creek Mining District Site, Cascade County

Figure 1

Carpenter Creek Watershed

Attachment 2

Action Memorandum

Carpenter-Snow Creek NPL Site OU3

Carpenter Creek and Silver Dyke Tailings Impoundments

June 2013



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REF: 8EPR-SR

JUN 11 2013

ACTION MEMORANDUM

SUBJECT: Request for approval of a Time-Critical Removal Action and exemption from the 12 month statutory limits pursuant to the "Consistency Exemption" found at 40 CFR 300.415(b)(5)(ii) for the Carpenter-Snow Creek NPL Site (U3-Carpenter Creek and Silver Dyke Tailings Impoundments).

FROM: Roger Hoogerheide, Remedial Project Manager *RH 5/6/13*
EPA Region 8, Montana Office

Steven Way, On-Scene Coordinator
EPA Emergency Response Unit *Steven Way 6/11/13*

Bethany A. Ihle, On-Scene Coordinator *Bethany Ihle 5/4/13*
USDA Forest Service, Lewis and Clark National Forest

THRU: Joe Vranka, Superfund Branch Chief *Joe Vranka*
EPA Region 8, Montana Office

Laura Williams, Unit Leader *Laura Williams 5/22/13*
EPA Region 8, Emergency Response Unit

Bill Avey, Supervisor *Bill Avey 5/13/13*
USDA Forest Service, Lewis and Clark National Forest

Bob Wintergerst, Environmental Engineer *Bob Wintergerst 5/26/2013*
USDA Forest Service, Region One

Bob Kirkpatrick, Director of Engineering, CERCLA Coordinator *BK 5/20/2013*
USDA Forest Service, Region One

TO: David A. Ostrander, Program Director
EPA Region 8, Emergency Response and Preparedness

Faye L. Krueger, Regional Forester,
USDA Forest Service, Region One

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed removal and request exemption from the 12-month statutory limits for a removal action described herein for the Carpenter Creek and Silver Dyke tailings impoundments (Removal Site) within Operable Unit 3 (OU3) of the Carpenter-Snow Creek National Priorities List Site (NPL Site) near Neihart in Cascade County, Montana. The actions discussed herein are consistent with anticipated and/or potential future remedial actions at the Site. Due to the urgent nature of the action, it is expected that most actions will be completed in the 2013 construction season but may extend into 2014 due to the short construction season, high elevation and difficult work conditions.

The administrative record for this Action Memorandum contains documentation of ongoing releases of hazardous substances from the Carpenter Creek and Silver Dyke tailings impoundments into Carpenter Creek and downstream into Belt Creek. These releases continue to cause exceedances of water quality standards for aquatic life and drinking water. They also impair use of the water as classified by the state of Montana. These releases deposit sediment within Carpenter, Belt and Sih-mem creeks and streamside tailings within the floodplains of Carpenter and Belt creeks and are detrimental to aquatic and aquatic dependant ecological communities. This removal action seeks to stabilize the tailings, reduce erosion and divert clean water flows away from the tailings until a permanent remedial action is taken. Conditions at the Site present an imminent and substantial endangerment to human health and the environment and meet the criteria for initiating a time-critical removal action under 40 C.F.R. Section 300.415(b)(2) of the National Contingency Plan (NCP).

This time-critical removal action involves no nationally significant or precedent setting issues. This removal action will not establish any precedent for how future response actions will be taken and will not commit the U.S. Environmental Protection Agency (EPA) and the United States Department of Agriculture Forest Service (USDA Forest Service) to a course of action that could have a significant impact on future responses or resources.

II. SITE CONDITIONS AND BACKGROUND

Site Name:	Carpenter Creek and Silver Dyke Tailings Impoundments within OU3 of the Carpenter-Snow Creek NPL Site
Superfund Site ID (SSID):	089X
Operable Unit:	Operable Unit 3
NRC Case Number:	
CERCLIS Number:	MT0001096353
Site Location:	Cascade County, Montana
Lat/Long:	46.965509/-110.702772
Potentially Responsible Party (PRP):	
NPL Status:	Final 9/13/2001

Removal Start Date:
Category of Removal:

Time-Critical Removal Action

A. Site Description

The NPL Site is within the Neihart Mining District, approximately 50 miles southeast of Great Falls, Montana. The nearest community is Neihart which is within the NPL Site boundary and has about 80 year-long residents. The NPL Site, also known as the Montana Mining District, was a relatively steady producer of silver, lead and zinc from its discovery in 1881 to the 1940s.

The NPL Site has been delineated into three OUs. OU1 includes the Neihart Community Soils Area, which encompasses the urban area of the town that contains contaminated soils associated with residential and public-use property. OU1 also includes the mine waste adjacent to residential property, waste accessible to the general public, and the Belt Creek tailings that were addressed as part of an EPA removal action in 2004.

The EPA has established preliminary study area boundaries for the purpose of planning and developing the initial scope of the remedial investigation/feasibility study for remaining OUs of the NPL Site. OU2 contains the abandoned mine sites, mill sites and associated wastes within the Snow Creek watershed. The ore has low base metal content and higher gold content than other areas of the Site. OU2 also contains the abandoned mine sites and mill sites, within Lucy Creek, Mackay Creek, Haystack Creek and Burg Creek, in the upper Carpenter Creek basin and associated wastes at the base of the Neihart slope that lies adjacent to the town of Neihart. OU 3 contains portions of the upper Carpenter Creek basin as well as lower Carpenter Creek to the confluence with Belt Creek and any wastes in the Belt Creek floodplain extending to Monarch. As the NPL Site is characterized further, these OU boundaries are subject to change. The proposed removal action is within OU3 of the NPL Site.

The Silver Dyke Mining Complex also in OU3, is located in the Sih-mem Creek (formerly identified as Pioneer or Squaw Creek) drainage in the upper Carpenter Creek basin. The Silver Dyke Mining Complex includes the Silver Dyke adit, Glory Hole, mill, and tailings piles. The mine operated from 1921 until 1929 and was largely worked through surface stripping and underground extraction methods. The mine was opened by nearly 6,000 feet of drifts and raises that are still evident today in the Glory Hole, an open pit. Two adits provided underground access. The lower adit is the primary portal and is located at an elevation of 6,870 feet above sea level (amsl) and was approximately 1,000 feet in length (Young, 1927). The lower adit was approximately six feet wide and seven feet tall. A 36-inch gage track was installed in the adit and intersected four or more parallel drifts. Ore mined from the Glory Hole was delivered through chutes to the adit below and was then trammed to the mill (Young, 1927). During the summer months, ore from Glory Hole was removed as quickly as possible to prevent compaction or sticking due to the clayey content. During the winter months, when surface mining was impractical due to snow, mining was conducted underground.

The ore in the Silver Dyke Mining Complex is characterized by a wide body of low grade ore containing zinc and lead and a high proportion of copper. The low grade and complexity of the ore complicated treatment and disposal, since the ore contained both oxidized and sulfide minerals and resulted in a large quantity of tailings and refuse. A tailings impoundment, now known as the Silver Dyke tailings, co-located in the drainage just east of the Silver Dyke Mill, was damaged by an earthquake in 1925 resulting in a flood of tailings into the valley below. In 1926, Silver Dyke Mining Company developed two new impoundments (upper and lower) for collection of mine tailings. These tailings, now known as the upper and lower Carpenter Creek tailings, or collectively as the Carpenter Creek tailings, were placed into the impoundments by slurry from the upstream Silver Dyke Mill.

1. Removal Site Evaluation

The portion of OU3 that will undergo a time-critical removal action includes portions of the Silver Dyke and Carpenter Creek tailings impoundment features located upstream of the confluence of Snow Creek in the drainage of Carpenter Creek and its tributaries (Figure 1). The Silver Dyke tailings impoundment is located in an unnamed tributary to Carpenter Creek while the Carpenter Creek tailings are located in the main Carpenter Creek drainage.

The estimated volume of tailings for the Silver Dyke tailings impoundment is 33,000 cubic yards (cy) and disturbs approximately 4 acres. The estimated volume of waste in the Carpenter Creek tailings impoundments is about 250,000 cy with another estimated 200,000 cy of tailings in the floodplain between the Silver Dyke tailings impoundment and the Carpenter Creek tailings impoundments.

The Silver Dyke tailings impoundment surface samples contain copper results between 1,810 mg/kg and 4,130 mg/kg and lead results between 6,280 mg/kg and 8,120 mg/kg (TechLaw, 2012). Semi-annual surface water samples have also been taken from the unnamed tributary since 2009 where it crosses the road. Total metal results for lead range between 48.9 micrograms/liter (ug/L) and 189 ug/L while copper concentrations range between 11.9 and 82.7 ug/L (TechLaw, 2010, 2011, 2012).

On July 16, 2012, the EPA recorded a release from the Carpenter Creek tailings due to a thunderstorm. Photographs were taken throughout the drainage, and water samples were taken in Carpenter Creek at station CSC-104A, located above the confluence with Snow Creek and at CSC-103, near the confluence with Belt Creek. Sample results are presented in Table 1. A note to the file was prepared and submitted to the administrative record and contains the field notes and photographs taken (EPA, 2012).

The upper Carpenter Creek tailings impoundment surface samples contain copper concentrations ranging from 2,060 milligram/kilogram (mg/kg) to 4,260 mg/kg

with an average of 2,762 mg/kg. The lead concentrations ranged from 4,580 mg/kg to 10,400 mg/kg with an average of 7,154 mg/kg. The zinc concentrations ranged from 1,870 mg/kg to 3,690 mg/kg with an average of 2,604 mg/kg (Maxim, 2002).

The lower Carpenter Creek tailings impoundment surface samples show copper concentrations ranging from 114 mg/kg to 2,950 mg/kg with an average of 1,295 mg/kg. The lead concentrations ranged from 304 mg/kg to 8,763 mg/kg with an average of 4,135 mg/kg. The zinc concentrations ranged from 184 mg/kg to 2,242 mg/kg with an average of 891 mg/kg (Tetra Tech, 2012).

Samples collected in residential areas along Belt Creek and in Monarch, which is fourteen miles downstream, show elevated levels of these same heavy metals in soil and sediment. Routine run-off and high flows during spring snow melt continue to cause migration of the tailings, from the Carpenter Creek and Silver Dyke tailings impoundment, into the environment.

Table 1 below shows the concentrations of hazardous substances found in surface water collected in Carpenter Creek below the lower Carpenter Creek tailings impoundment after a thunderstorm on July 16, 2012.

Table 1
Water Quality Results from July 16, 2012, Storm Event

CSC103	Total Metals	Dissolved Metals
	ug/L	ug/L
Arsenic	3.9	< 2.0
Cadmium	53.5	3.95
Copper	6290	13.1
Lead	10800	2.63
Zinc	7080	231
CSC104A	Total Metals	Dissolved Metals
	ug/L	ug/L
Arsenic	4.83	< 2.0
Cadmium	36.2	18.4
Copper	5440	47
Lead	6450	22.7
Zinc	4950	2160

2. Physical Location

The NPL Site is located in west-central Montana in the Little Belt Mountains in T14N, R8E Sections 15, 16, and 21. The Removal Site is located within OU3 of the NPL site and approximately 2 ½ miles northeast of the town of Neihart in the

Carpenter Creek watershed. NPL Site elevation is about 6,000 feet amsl.

3. Site Characteristics

The Carpenter Creek tailings impoundment has minimal vegetative cover and is composed of clay to fine sand tailings. This tailings impoundment lies within the Carpenter Creek floodplain and is repeatedly releasing tailings into the creek during storm events and spring run-off. Overland flow and run-off from side gulches drains over the tailings impoundment and erodes the tailings into the stream.

Carpenter Creek surface water analytical results from samples taken since 2009 show that concentrations of heavy metals increase 2 to 5 times immediately below the Silver Dyke tailings impoundment from those samples collected immediately above this impoundment. The heavy metals increase to 10 to 20 times below the confluence with Sih-mem Creek. Additionally, both water and sediment metals concentrations in Belt Creek increase appreciably below the confluence with Carpenter Creek (TechLaw, 2010, 2011, 2012, 2013).

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

Sampling and analysis of groundwater, surface water, sediment and the tailings impoundments indicate the presence of high concentrations of heavy metals including lead, zinc, cadmium and copper. In addition, these same hazardous substances are found in surface waters and sediment for many miles downstream of the Site. The heavy metals are "hazardous substances" as defined by Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended (CERCLA), 42 U.S. C. Section 9601(14). The release of these hazardous substances into the environment poses an imminent and substantial threat to public health and the environment.

5. NPL Status

The Carpenter-Snow Creek Site was listed on the NPL on September 13, 2001.

6. Maps, Pictures, Other Graphic Representations

Figure 1 is an Aerogrid photograph of the Carpenter Creek watershed and its tributaries and highlights the upper and lower tailings piles.

B. Other Actions to Date.

1. Previous Actions

There has been no previous CERCLA removal action performed in OU3 of the

NPL Site. A 2004 time-critical removal action on OU1, the Neihart Residential Soil Site, involved the removal of lead and arsenic contaminated soil site residences and also several non-residential properties. Average depth for removal was 18 inches. Properties were then capped with either 6 inches of top soil or 4 inches of asphalt.

Initial investigations in OU3 were performed in 1993 by the state of Montana Abandoned Mine Reclamation Bureau. Samples were taken and initial waste volume and adit flow rates were estimated (Pioneer 1993). The USDA Forest Service performed an investigation of the upper Carpenter Creek tailings impoundment in 2002 and 2005 (Maxim 2002, 2005). The EPA has sampled surface water and sediment throughout the Carpenter Creek drainage since 2009 (TechLaw 2010, 2011, 2012, 2013) and Tetra Tech, under a State contract, conducted investigations of the lower Carpenter Creek tailings in 2011 and 2012 (Tetra Tech, 2012, 2013). In addition, the EPA recorded a release from the Carpenter Creek tailings due to a thunderstorm on July 16, 2012. (EPA, 2012).

2. Current Actions

Currently, investigations by the EPA Region 8 Superfund Remedial Program are ongoing and are expected to be presented in a Remedial Investigation Report in 2013. In addition to the remedial investigation activities that are ongoing at the Site, the USDA Forest Service has placed certified weed seed free straw bales along Carpenter Creek at the base of the Carpenter Creek tailings for temporary erosion control and has identified interim erosion control measures to be installed at the Carpenter Creek and Silver Dyke tailings impoundments.

C. Federal, State and Local Authorities' Roles

1. Federal, State and Local Actions to Date

The Removal Site is a mixed ownership site with private property ownership and federally managed land under control of the USDA Forest Service. The EPA and USDA Forest Service are coordinating the implementation of this action and other response actions at the NPL Site. The USDA Forest Service is performing specific portions of the time-critical removal action.

The state of Montana Department of Environmental Quality (DEQ), United States Fish and Wildlife Services (USFWS), Montana Fish Wildlife and Parks (FWP) and USDA Forest Service have directly assisted with NPL Site investigations. DEQ, under an agreement with the EPA, performs contract development and oversight for remedial investigation activities for the OU2 and OU3 portions of the Site. DEQ, USFWS, EPA and the USDA Forest Service have participated in the assessment and planning associated with the removal proposed in this Action Memorandum.

2. Potential for Continued State/Local Response

DEQ is anticipating involvement in future activities at the Site during subsequent removal and remedial actions. DEQ is expected to remain involved in the removal planning and oversight of this removal action and supports this removal action. The Cascade County Commission and City-County Health Department have regularly been briefed about activities at this Site and several members have participated in field trips to the Site to see impacted areas.

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

The levels of surface contamination and the unconfined nature of the ongoing releases from the tailings impoundments support the decision to perform a time-critical removal action. Conditions existing at the Site meet the criteria for initiating a removal action under 40 CFR 300.415 (b) (2) of the National Contingency Plan (NCP).

The EPA has considered all the factors described in 40 CFR 300.415(b)(2) of the NCP and determined that the following factors apply at the Site.

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

Human exposure occurs due to the uncontrolled nature of the tailings impoundments, and the potential for continued exposure exists. There is a potential for direct access where the tailings impoundments are located. Specifically, due to the Carpenter Creek and Silver Dyke tailings impoundments, sediment and downstream tailings are deposited within the floodplain, and/or consumption of water from Carpenter Creek may result in exposure. The tailings impoundments contain high levels of hazardous substances at the surface, and result in offsite migration of hazardous substances to surface water, channel bottom, floodplains and wetlands.

Aquatic life surveys conducted in Carpenter Creek below the confluence with Sih-mem Creek, indicate populations of benthic invertebrates are severely impaired and fish populations are absent. Investigations conducted by Montana Fish Wildlife and Parks and the EPA in 2010 and 2011 (FWP, 2011, 2012, and TechLaw, 2011, 2012) clearly indicate that metals contamination associated with ongoing contaminant releases severely inhibit aquatic life in Carpenter Creek and suggest that they are contributing to the impairment of aquatic life in Belt Creek below the confluence.

Surface water toxicity results from in-stream and laboratory testing indicate the Carpenter Creek water below Sih-mem Creek is acutely toxic to trout species. Additionally, in 2011, in-stream tests in Belt Creek below Carpenter Creek resulted in 60% mortality as compared to 16% at an upstream reference area (FWP 2012). Sediment toxicity tests conducted with *H. azteca* indicate that sediments from the main stem of Carpenter Creek below Sih-mem Creek and Belt Creek immediately downstream of Carpenter Creek are acutely toxic to benthic organisms (TechLaw, 2012).

- (ii) *Actual or potential contamination of drinking water supplies or sensitive*

ecosystems;

All Montana waters are classified for multiple beneficial uses. Carpenter Creek is classified as a B-1 stream, which specifies that all of the following uses must be supported: drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply. While Carpenter Creek is currently not used for any of its designated uses, the quality of the water must be maintained at a level that can support that use to the extent possible based on a stream's natural potential. Carpenter Creek is listed as impaired for cadmium, copper, iron, lead, mercury, silver and zinc on the State of Montana's 303(d) list, named after Section 303(d) of the Clean Water Act. As such, total maximum daily loads have been developed for these metals (DEQ, 2011).

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

Hazardous substances including lead, copper and zinc are present at the surface of the tailings impoundments and in soil at concentrations that may pose a threat to human health and aquatic life. The tailings migrate from the impoundments. Investigation results show evidence of large volumes of tailings eroding from the Site during run-off events.

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

Annual snowmelt run-off conditions and thunderstorms contribute significantly to the continuing release of the hazardous substances from the un-vegetated and unstable tailings impoundments and into adjacent surface water, which results in the release of total suspended solids containing heavy metal concentrations. Erosion of the tailings impoundments has led to heavy sediments and streamside tailings contamination downstream. In addition, acute exposures to aquatic species can occur during releases that occur, such as during thunderstorms and spring run-off, leading to reductions in the number and diversity of the aquatic and aquatic dependent community, and these events contribute to deposition of tailings near downstream residences.

- (vii) *The availability of other appropriate federal or state response mechanisms to respond to the release;*

The USDA Forest Service will implement portions of this removal action. The USDA Forest Service, EPA and DEQ will participate in the oversight of the work on the removal action.

A. Threats to the Public Health or Welfare

The threats to public health or welfare is the risk associated with human contact with contaminated surface water and unconfined tailings by year-long downstream residents, nearby summer residents and dispersed public recreationists doing activities such as rock hounding or gold panning, fishing and/or riding an ATV or motorcycle. Exposure could

be through water, soil contact, or dust inhalation. ATV and dirt bike riding are considered to be the most exposure-intense recreational uses because of the dust generated by the vehicles and the potential for people to inhale that dust off of the tailings impoundments. While the frequency of exposure is generally expected to be low because these areas are located on property that is not designated for this use, administrative controls such as fencing and signage are proposed as part of this removal action to eliminate this exposure pathway.

B. Threats to the Environment

Lead, zinc, cadmium and copper from the tailings impoundments are the primary threats to aquatic life and terrestrial biota (as well as human health). The pathways by which aquatic and aquatic dependent ecological receptors could become exposed to contaminants at the Site are direct contact with the tailings in their present location or at depositional areas downstream following erosion and direct contact with dissolved metals that have leached into water from the tailings impoundments. Terrestrial receptors may be exposed to tailings through incidental soil or sediment ingestion and consumption of contaminated food items.

The threats to the environment, especially to the aquatic and aquatic dependent life of Carpenter Creek and the Belt Creek drainage, have been described previously in this Action Memorandum. The following are descriptions of the threats to the environment posed by the specific contaminants found in the tailings impoundments at the Site.

Zinc

Zinc is found in Carpenter Creek between the Silver Dyke tailings impoundment and the lower Carpenter Creek tailings impoundments at levels up to 30 times the surface water quality standard. Zinc produces acute toxicity in freshwater organisms over a range of concentrations below those found on the Site. Acute toxicity is similar for freshwater fish and invertebrates. In many types of aquatic plants and animals, growth, survival and reproduction can all be adversely affected by elevated zinc levels.

Cadmium

Cadmium levels in Carpenter Creek between the Silver Dyke tailings impoundment and the lower Carpenter Creek tailings impoundment are approximately 10 times above acute surface water quality standards (based on water hardness). Laboratory experiments suggest that cadmium may have adverse effects on reproduction in fish at levels present in lightly to moderately polluted waters. Cadmium is highly toxic to wildlife; it is cancer-causing and teratogenic and potentially mutation-causing, with severe sublethal and lethal effects at low environmental concentrations. It bio-accumulates at all trophic levels, in the livers and kidneys of fish. Crustaceans appear to be more sensitive to cadmium than fish and mollusks. Cadmium can be toxic to plants at lower soil concentrations than other heavy metals and is more readily taken up than other metals.

Copper

Copper concentrations in Carpenter Creek between the Silver Dyke tailings impoundment and the lower Carpenter Creek tailings impoundment are found at levels approximately ten times above acute (based on water hardness) surface water quality standards. Copper produces acute toxicity in freshwater animals and data is available for species in 41 Genera. Data for eight species indicate that acute toxicity also decreases with increases in alkalinity and total organic carbon. Chronic values are available for 15 freshwater species and for Brook Trout it may be as low as 3.873 ug/l, depending on hardness. During the low flow sampling event, copper concentrations are usually above 100 ug/L between the impoundments (TechLaw, 2010, 2011, 2012, 2013). Fish and invertebrate species seem to be about equally sensitive to the chronic toxicity of copper. Copper is highly toxic in aquatic environments and has effects in fish, invertebrates and amphibians. Caged fish bioassays below the lower Carpenter Creek tailings impoundment conducted by FWP in 2011 using Westslope Cutthroat Trout fingerlings saw 100% mortality in less than 24 hours (FWP, 2012). Copper will bio-concentrate in many different organs in fish (potential low, however) and mollusks. Copper sulfates and other copper compounds are algaecides, with sensitive algae potentially affected by free copper at low ppb concentrations. Toxicity tests have been conducted on copper with a wide range of freshwater plants, and their sensitivities are similar to those of animals. Copper concentrations (and possibly arsenic, cadmium and other metals) in the aquatic environment (surface water, diet) also impose low-level chronic stress on aquatic macro invertebrates, trout and other fish. The most likely manifestation of this stress is decreased growth.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Carpenter Creek and Silver Dyke tailings impoundments, if not addressed by implementing the response actions described in this Action Memorandum, present an imminent and substantial threat to public health, welfare or the environment.

V. EXEMPTION FROM STATUTORY LIMITS

A statutory exemption is requested based on the Consistency Exemption for an NPL site. This removal will be consistent with potential remedial actions currently anticipated for the Site. The proposed removal meets the criteria for consistency, i.e. does not foreclose the remedial action and appropriateness, for example it is necessary to avoid a foreseeable threat and to prevent the migration of contaminants. Construction to reduce erosion and limit run-on and run-off through the tailings impoundments until a permanent remedial action is taken will not interfere with likely long-term remedial alternatives to address surface water and soil contamination. The amount of construction discussed herein is estimated to take one construction season to complete. However, due to the short construction season in the high elevation and the difficulty of the working conditions, an exemption is requested.

VI. PROPOSED ACTION AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

The removal action specified in this Action Memorandum includes response actions at the Silver Dyke tailings and upper and lower Carpenter Creek tailings impoundments to stabilize these tailings until a permanent remedial action is taken. The USDA Forest Service has developed engineering design drawings and specifications for these erosion control measures to be constructed during the 2013 construction season.

Stabilization activities at various locations within the Carpenter Creek and Silver Dyke tailings impoundments include: 1) Construction of lined surface run-on and run-off ditches on the lower and upper Carpenter Creek tailings to reduce storm flows and snowmelt from eroding tailings, 2) Installation of diversion channels to route clean water around all three tailings impoundments; 3) Installation of erosion check dams at all three tailings features in areas where deep rills have formed in past erosion events, 4) Installation and maintenance of a continuous certified weed-free straw bale erosion berm (or a similar erosion control measure) along the Carpenter Creek tailings 5) Consolidation of tailings on location at the Silver Dyke tailings impoundment and repair of the road-drainage crossing area of the Silver Dyke tailings to prevent head-cutting, and sedimentation of the tailings and reconstruction of appropriate drainage features and armoring to provide for travel on the Pioneer Lane road as deemed necessary after additional assessment and design analysis; 6) Administrative controls such as fencing and signage on the Silver Dyke and Carpenter Creek tailings impoundments to eliminate trespass with recreational vehicles and to educate the public on the potential dangers; and 7) Such other similar actions as may be appropriate to mitigate the on-going releases of hazardous substances at the Carpenter Creek and Silver Dyke tailings.

Proposed actions 1 through 4 and 6 will be implemented by the USDA-FS.

2. Contribution to Remedial Performance

The time-critical removal action is consistent with the overall objectives for the Site to mitigate the risks to human health and the environment due to direct contact with tailings containing lead, zinc, cadmium and copper, and from releases of these hazardous substances to the surface water. No remedial action has been selected for the Site.

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

An EE/CA is not required for a time-critical removal action.

4. Applicable or Relevant and Appropriate Requirements (ARARs)

This removal action will attain to the extent practicable, considering the exigencies of the situation, applicable or relevant and appropriate requirements of federal environmental or more stringent state environmental laws. The proposed action is limited in scope to activities as reducing erosion and limiting run-on and run-off through the tailings impoundments. The ARARs identified for this removal action include, but are not limited to the following:

FEDERAL ARARS

- a. Clean Water Act (33 USC §§ 1341 and 1344, 40 CFR Part 230) is relevant and appropriate.
- b. National Historic Preservation Act and Regulations (16 USC § 470, 16 USC § 461, 36 CFR 60, 36 CFR 63, 36 CFR 800 are applicable.
- c. Floodplain Management Regulation Executive Order No. 11988 (40 CFR Part 6.302(b)) is applicable.

STATE ARARS

- a. Stormwater Runoff Control Requirements (ARM 17.24.633 and ARM 17.30.1341) are applicable.
- b. Montana Ambient Air Quality Regulation (ARM 17.24.761) is applicable.
- c. Montana Floodplain and Floodway Management Act and Regulations (MCA 76-5-404, ARM 36.15.601) are applicable.
- d. Montana Mine Reclamation Regulations (ARM 17.24.505, .631, .635 – .638, .640, .703, .714 and .721) are relevant and appropriate.
- e. Noxious Weeds (MCA 7-22-2101(8)(a) and ARM 4.5.201) are applicable.

5. Project Schedule

The planned start is August 2013 and planned completion in September 2014.

B. Estimated Costs*

It is estimated that the portion of the removal action that will be implemented by the Forest Service will cost \$400,000, which is funded by the ASARCO Environmental Trust. Additional measures in the proposed action may be implemented by the USDA Forest Service or the EPA pending available removal program funding.

Clean-up Contractor costs	\$675,000
Other Extramural Costs (Engineering or other Federal Agencies)	\$25,000

Contingency Costs (20 percent of subtotal)	\$100,000
Total Removal Project Ceiling	\$775,000

*EPA direct and indirect costs, although cost recoverable, do not count toward the removal ceiling for this removal action. Liable parties may be held financially responsible for costs incurred by the EPA as set forth in Section 107 of CERCLA. "

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Heavy metal contaminants will continue to migrate off-Site from the Carpenter Creek and Silver Dyke tailings impoundments during the frequent, high intensity thunderstorms that occur in this area in the summer as documented in July 2012, and during annual spring run-off. The erosion of the tailings impoundments will continue to add to the degraded water quality of Carpenter Creek and its downstream tributary Belt Creek, which has year-long residents living adjacent to the stream. The tailings impoundments, as they exist now, would continue to substantially impact and degrade the creek ecosystems. Additional contaminants will be carried downstream into Belt Creek thereby impacting additional ecosystems and potentially residential property, should action be delayed or not taken.

VIII. OUTSTANDING POLICY ISSUES

None

IX. ENFORCEMENT

A separate Enforcement Addendum provides a confidential summary of current and potential future enforcement actions.

X. RECOMMENDATION

This decision document represents the selected time-critical removal action for the Removal Site located within OU3 of the Site. This Action Memorandum is developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the Removal Site.

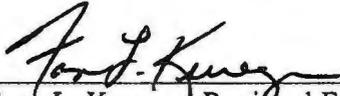
Conditions at the Removal Site meet the NCP Section 300.415(b)(2) criteria for a removal action and the CERCLA section 104(c) consistency exemption from the 12-month requirement and we recommend your approval of this proposed time-critical removal action. Pursuant to the Consent Decree entered by the United States District Court for the District of Arizona, captioned *United States of America v ASARCO, Inc and Southern Peru Holdings, Corporation*, No CV 02-2079, the EPA and the USDA Forest Service submitted a joint request for funding from the ASARCO Environmental Trust established pursuant to the Consent Decree for the performance of the response action. The request was approved and settlement funds have been provided to the USDA Forest Service. The total project ceiling, if approved, will be \$775,000; of this amount \$375,000 may be funded from the EPA Regional removal allowance, and \$400,000 will be funded by the USDA Forest Service.

APPROVE



David A. Ostrander, Director
EPA Region 8, Emergency Response and Preparedness Program

6/11/13
Date



Faye L. Krueger, Regional Forester
USDA Forest Service, Region One

5-20-2013
Date

DISAPPROVE

David A. Ostrander, Director
EPA Region 8, Emergency Response and Preparedness Program

Date

Faye L. Krueger, Regional Forester
USDA Forest Service, Region One

Date

Figure 1

Carpenter Creek Watershed

Attachment 3

Proposed Plan

Mine Waste Disposal Alternative Selection
Carpenter-Snow Creek Mining District Site
Cascade County



Proposed Plan Mine Waste Disposal Alternative Selection

Carpenter-Snow Creek
Mining District Site
Cascade County



U.S. EPA Region 8 - Montana Office

July 2014

Introduction

This Proposed Plan identifies the Preferred Alternative for selecting a secure mine waste disposal location for placing removed mining waste at the Carpenter-Snow Creek Mining District (CSCMD) National Priorities List (NPL) site in Cascade County, Montana, 55 miles south of Great Falls, near the town of Neihart, Montana, and provides the rationale for this preference. In addition, the Proposed Plan includes summaries of other options for secure mine waste disposal locations evaluated for use at this site. The U.S. Environmental Protection Agency (EPA) Region 8 is the lead agency for site activities, in consultation with the Montana Department of Environmental Quality (DEQ), the support agency, and U.S. Forest Service (USFS), a land management agency.



Photo 1: View of the Carpenter Creek drainage from the Silver Dyke Mill.



Photo 2: Sampling acid mine drainage from Dacotah Mine

EPA, in consultation with DEQ and the USFS, will select a final remedy for this action after reviewing and considering all information submitted by the public during the 30-day public comment period. EPA, in consultation with DEQ and USFS, may modify the Preferred Alternative or select another response action presented in this Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all alternatives presented in this Proposed Plan.

Mine waste from the CSCMD site may be disposed of outside of the site boundaries at an existing, State licensed solid waste landfill, or within the site boundaries in a constructed repository. This Proposed Plan presents the rationale for selecting the location for the secure disposal of mine waste from the CSCMD site – on-site repositories at the MacKay Gulch location and the Silver Dyke Glory Hole location. The goal of this action is to select a disposal area that most effectively limits human and ecological exposure to heavy metals and arsenic found in the mine waste, tailings, contaminated soils and sediment (hereby referred to as mine waste). The preferred alternative selected will provide for a permanent disposal repository for the mine waste.

This Proposed Plan was prepared in accordance with the Comprehensive Environmental Response, Compensation and Liability Act as amended (CERCLA or Superfund), the regulations governing Superfund response actions known as the National Contingency Plan (NCP), and EPA's applicable guidance.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of CERCLA and Section 300.430(f)(2) of the NCP. This Proposed Plan summarizes and highlights key information from the Remedial Investigation (RI)/Feasibility Study (FS) Report supporting this action and other documents contained in the Administrative Record for this action. EPA, DEQ and the USFS encourage the public to review the RI/FS Report and Administrative Record file for more information regarding the CSCMD site and this remedial action. Information about the Administrative Record can be found on page 12 of this document.



Photo 3: 3-Dimensional model showing lead contamination in the Carpenter-Snow Creek drainages.

Site Background and History

The Carpenter Snow Creek Mining District was a major silver producer in Montana and the primary producer in Cascade County, producing about \$16 million in silver between 1882 and 1929. The first claim in the district was made in July 1881. Production from the district began to increase in 1891 after the construction of the Great Falls smelter and the Belt Mountain branch of the Great Northern Railroad. Production of mines at the CSCMD site fluctuated for the next 30 years due to variable silver prices.

Beginning in 1921, one million tons of ore were blocked out at the Silver Dyke Mining Complex and a 500-ton flotation mill was constructed. The Silver Dyke operated at capacity until 1929, when the blocked-out ore was depleted and new deposits could not be found. The operations at the Silver Dyke Mining Complex resulted in several tailings deposits which are some of the primary contributors to contamination in the Carpenter Creek drainage.

Since 1930 there has been little production from the CSCMD site. The production that has occurred includes re-mining of waste rock piles and small scale contract mining. Additionally, exploration of new mineral deposits has occurred since 1930. Only small amounts of ore were produced from exploration activities.

The EPA added the CSCMD Superfund Site to the Superfund National Priorities List in September 2001. The CSCMD site has been divided into three subunits called "operable units" or OUs. The EPA has developed or will develop cleanup plans for each OU. This Proposed Plan selects a waste disposal remedy that may be used for the disposal of mine waste from all OUs at the CSCMD site.

The CSCMD site is currently divided in three OUs (Figure 1). OU1 contains the town of Neihart and waste material located in residential yards and streets in the town. OU2 encompasses the mining sites in Snow Creek drainage basin and the western slopes of Neihart Baldy including drainages on the slopes east of Neihart, and mining disturbed areas west of Neihart. OU3 includes mine and creek side waste associated with the Silver Dyke mine and located along Carpenter Creek and Belt Creek downstream to Monarch. The disposal alternative selected in this action will apply to all OUs and prior or ongoing removal actions.

The EPA completed emergency removal actions at multiple locations in the town of Neihart (OU1) in 2004. The USFS conducted a removal action in 2013 at OU3. The USFS removal action included interim response actions at the Silver Dyke tailings and upper and lower Carpenter Creek tailings impoundments to stabilize these tailings until a permanent remedial action is taken. Further work under this removal action is expected. Investigation activities of OU2 and OU3 were started by the USFS in 2001, shortly after the CSCMD site was listed on the Superfund National Priorities List, and is ongoing.

Superfund Process

At every site designated as a Superfund site, the EPA follows a process that begins with discovery, proceeds through investigation, and if warranted, ends with cleanup (Figure 2). The EPA is currently conducting a site wide remedial investigation at the CSCMD site. This *Proposed Plan* focuses on information pertaining to the selection of a disposal alternative for waste located throughout the CSCMD site. Results, conclusions, and other relevant information available regarding the waste disposal alternatives investigated at the CSCMD site can be found in the following key documents:

Site-Wide Secure Waste Disposal Area Remedial Investigation Report. This report summarizes the characterization of the potential repository locations and human health and ecological risk assessments and is available for review as part of the administrative record that supports this Proposed Plan. Eleven potential repository sites were identified in the initial repository investigation report in 2004. One additional site was identified in 2012. Figure 3 shows the locations of all

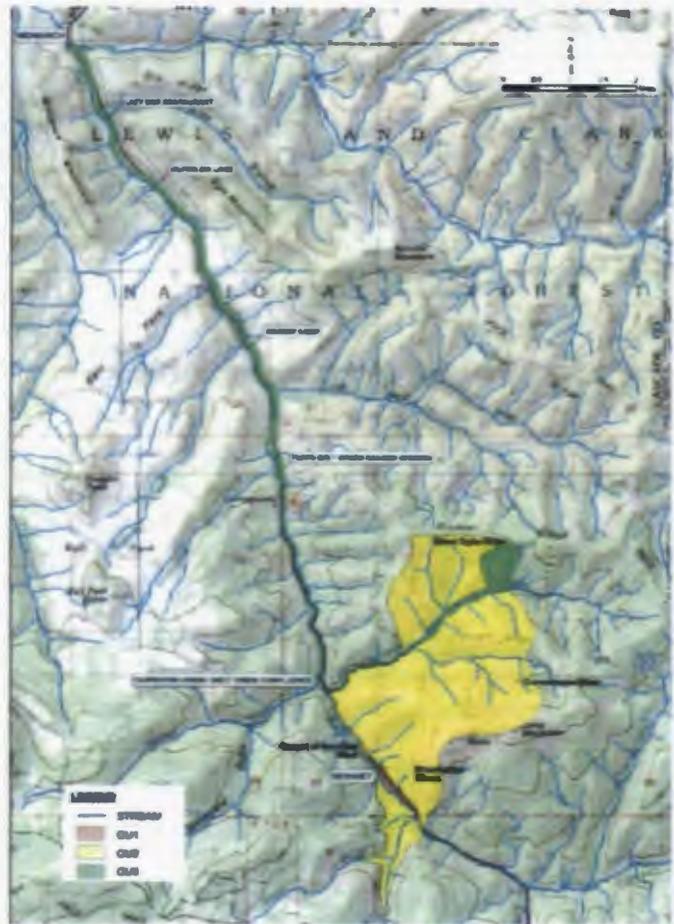
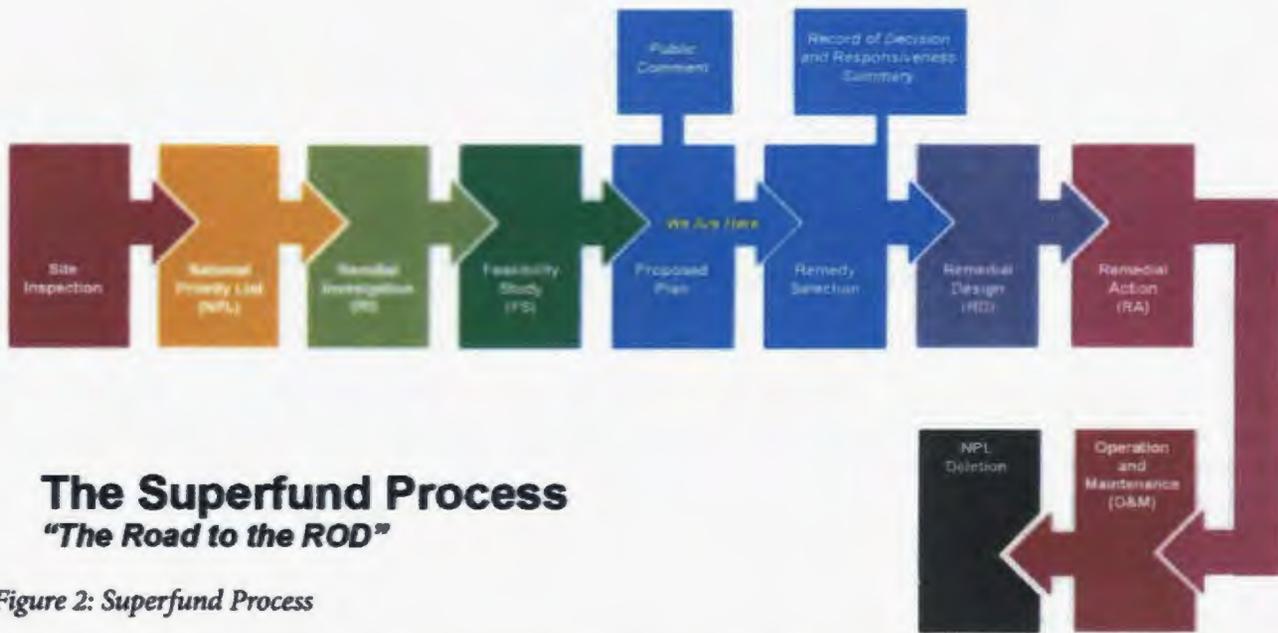


Figure 1: Carpenter-Snow Creek Operable Units



The Superfund Process "The Road to the ROD"

Figure 2: Superfund Process

potential repository sites. Of the twelve sites identified, five (Mackay Gulch, Silver Dyke Glory Hole, Lower Snow Creek, Evening Star, and Neihart Slope) were investigated further to determine their suitability as repository locations.

Site-Wide Secure Waste Disposal Area Feasibility Study Report. This report identifies five different remedial alternatives and evaluates their expected protectiveness, effectiveness, implementability, and cost and is available for review as part of the administrative record that supports this Proposed Plan.

This *Proposed Plan* presents the public with the waste disposal alternatives evaluated in the feasibility study, presenting a preferred alternative, and seeking written and oral comments from the public. The comments will be the basis for the EPA's community acceptance evaluation criteria and will influence the selected remedy presented in the ROD to be issued in 2014. The EPA, in consultation with DEQ and USFS, will provide written responses to public comments in the section of the ROD known as "Responsiveness Summary."

Site Characteristics

The contamination at the CSCMD site is from mine and milling waste from more than 24 mines in the Carpenter Creek drainage, 22 mines in the Snow Creek drainage, and 32 mines on the Neihart slope. The largest mine along Carpenter Creek is the Silver Dyke mine. Remnants of the mine and associated milling include the Silver Dyke glory hole, mill area waste rock and tailings, Silver Dyke tailings, and the upper and lower tailings piles. The other mines in the Carpenter Creek drainage are small by comparison. The largest mines in the Snow Creek drainage are the Benton, Rebellion, and Big 7. On the Neihart slope, the biggest mines are the Queen of the Hills, Dacotah, Moulton, Hartley, and Broadwater. The volume of mine waste (waste rock and tailings deposits) characterized at the CSCMD site thus far is in excess of 1.2 million cubic yards. Much of the mine waste is located in the floodplain of Carpenter Creek and may need to be removed during remedial action. The contaminants of concern (COCs) in the majority of the mine waste include arsenic, cadmium, copper, lead, and zinc.

Site Risks

Human Health and Environmental Risks – Site Wide

This Proposed Plan presents the proposed locations for mine waste disposal at the CSCMD site. The site risks are being more fully assessed in the ongoing, site-wide remedial investigation which is not yet complete. A risk assessment was completed for OU1. The OU1 risk assessment and preliminary risk evaluation indicates unacceptable risks to human



Figure 3: Carpenter-Snow Creek Repository Sites

health and the environment from metals and arsenic contamination in several areas of the CSCMD site.

For OU1, action levels for contaminants in soils (yards and roads) were established (400 ppm for lead and 100 ppm for arsenic) to address unacceptable threats to human health. Mining waste in areas of residential or recreational use comes from various mining sources, and contaminants from those areas can be inhaled or come into dermal contact with human receptors. Contaminants can also be taken in by human receptors through the mouth or through garden products.

Mine waste at the CSCMD site can be mobilized by precipitation and snow melt events and oxidations and erosion. This releases metals and arsenic into ground and surface water. Wind erosion mobilizes small particles from tailings and waste rock into the air and to the surrounding area, where mine waste was used to build roads or trails, vehicle traffic crushes the mine waste into fine powders. All of these exposure pathways lead to contaminants entering surface water and presents risks to wildlife and fish at the CSCMD site.

Ground water contamination presents human health risks through intake by potential drinking water users (ground water at the CSCMD is classified as a potential drinking water source by the State of Montana).

All of these pathways and potential exposures may present a risk to human health and the environment. Because of this, the removal and secure disposal of mine waste into a repository, such as is required under the OU1 ROD, is needed to address unacceptable site risks.

A properly constructed mine waste repository with clean fill over an impermeable liner (altogether referred to as the "cap" or "repository cap") will prevent exposure of the public to mine waste. Controls may be erected around the repository to provide for protection of the repository and to reduce the potential for exposure of the public. Operations and Maintenance (O and M) will continue to maintain the integrity of the repository cap. An off-site, State-licensed solid waste landfill is assumed to be operated and maintained correctly and in accordance with its permit, and would eliminate exposure routes that effect human health and the environment from exposures to mine waste placed in the landfill.

The engineering controls that may be put in place to prevent recreational access to the repository are not expected to prevent access by some ecological receptors. However, because mine wastes will be capped with clean fill and an impermeable cap, no exposure to contaminated materials is expected. The repository cap will prevent wind erosion as well as preventing infiltration of surface water through the contaminated material. This will ensure that surface waters surrounding the repository area are not contaminated by the mine waste. Similarly, an existing, State-licensed solid waste landfill is assumed to be managed and run in accordance with the permit and all applicable statutes and regulations, and will mitigate access by ecological receptors to mine wastes placed in the landfill.

Preliminary Remedial Action Objectives

Preliminary Remedial Action Objectives (PRAOs) are media specific non-numeric objectives for preventing unacceptable exposure to contaminants in order to protect human health and the environment. The PRAOs for mine waste disposal at the CSCMD site are as follows:

- Prevent exposure of humans and the environment to removed mine waste placed in a secure disposal location;
- Prevent the migration of mine waste contamination out of a secure disposal location through erosion and leaching; and
- Site secure disposal locations appropriately in practical places where access and proximity issues can be addressed readily.

Summary of Alternatives

During the feasibility study, five primary remedial alternatives were evaluated and are briefly described here. A more detailed description of the alternatives can be found in the feasibility study. The alternatives were developed to consider the range of categories defined by the NCP (40 CFR 300.430(e)) including, as appropriate:

1. No action.
2. No further action with continued monitoring.
3. Off-site disposal of mine waste at an existing State-licensed solid waste landfill, approximately 68 miles from the CSCMD site (High Plains Landfill northeast of Great Falls, Montana).
4. On-site disposal of mine waste at the Mackay Gulch Repository.
5. On-site disposal of mine waste at the Silver Dyke Glory Hole Repository.

Alternative 1: No Action

The no action alternative will involve no further remedial action or monitoring at the CSCMD site. There is no cost associated with this alternative.

Alternative 2: No Further Action with Continued Monitoring (Estimated Cost \$268,000)

The no further action with continued monitoring alternative will involve no further remedial action or land use controls at any of the currently contaminated locations at the CSCMD site. The only action associated with this option is annual monitoring of the CSCMD site to document conditions and to determine if there is further deterioration of the impacted areas.

Alternative 3: Off-site Disposal at an Existing State-Licensed Solid Waste Landfill (Estimated Cost \$90,304,000)

The off-site disposal at an existing State-licensed solid waste landfill alternative would utilize High Plains Landfill as a mine waste disposal location. This alternative would eliminate exposure routes which effect human health and the environment from exposures to mine waste placed in the repository. For cost purposes it is assumed that all 1.2 million cubic yards of mine waste and contaminated soils and roadways identified at the CSCMD site would be placed in the repository. This results in a high cost component.

Alternative 4: On-site Disposal at Mackay Gulch (Estimated Cost \$20,025,000)

Under this alternative, mine waste from the CSCMD site would be placed in a repository at the Mackay Gulch location. The location would be designed to accept waste in multiple stages from multiple remedial actions. Use of this location would provide ample cover and top soil (clean material for a borrow source) for a repository cap. Current site capacity estimates are approximately 675,000 cubic yards, which could be increased or decreased during design.

Alternative 5: On-site Disposal at the Silver Dyke Glory Hole (Estimated Cost \$17,065,000)

Under this alternative, mine waste from CSCMD site would be placed in the Silver Dyke Glory Hole. The Silver Dyke Glory Hole is a large, unvegetated excavation of the former Silver Dyke Mine. There is adit drainage with high concentrations of heavy metals (particularly zinc) and sulfides coming from the adit underneath the Silver Dyke Glory Hole. Filling the Silver Dyke Glory Hole to create positive drainage may reduce the amount of adit drainage. The estimated waste volume to completely backfill the Silver Dyke Glory Hole is 569,000 cubic yards. There is no cover soil or topsoil at this location, so these would have to be imported from an off-site borrow source such as Mackay Gulch. The Silver Dyke Glory Hole would need to be filled rapidly (likely 3 years or less) to reduce the potential for ponding of water or leaching of metals from mine waste.

Evaluation of Alternatives

The Superfund law and the NCP require that the EPA, in consultation with DEQ and USFS, evaluate and compare the remedial cleanup alternatives based on the nine NCP criteria. These nine criteria are derived from the Superfund law and are presented in Figure 4.

Any selected remedy must meet the threshold criteria of "overall protectiveness of human health and the environment" and "compliance with ARARs." Only the alternatives that meet these criteria are considered further by EPA. The balancing criteria of long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short term effectiveness; implementability; and cost are used by the EPA to identify and consider advantages and disadvantages between the alternatives. The modifying criteria, State acceptance and community acceptance, are

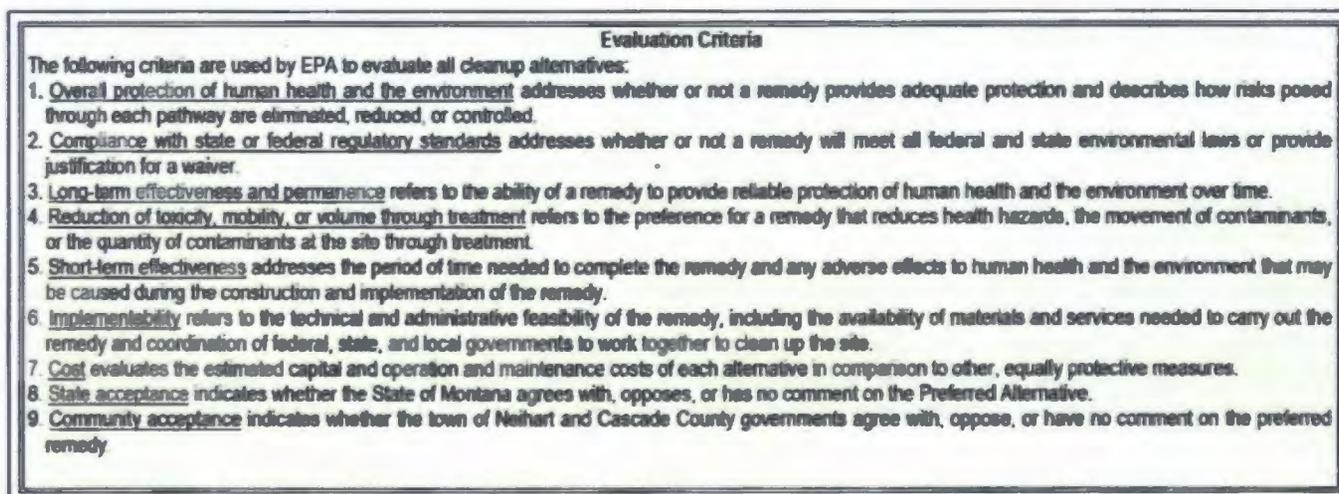


Figure 4: Nine EPA Evaluation Criteria used for Cleanup Alternatives

evaluated as the preferred alternative is selected and more thoroughly evaluated after the public comment period.

The EPA evaluates these criteria in detail in both the "Detailed Analysis" and the "Comparative Analysis of Alternatives" sections of the feasibility study. The EPA, along with DEQ and USFS evaluated the five alternatives using the threshold and balancing criteria. A summary of the individual alternatives is provided below.

Overall Protection of Human Health and Environment

The No-Action and No-Action with Monitoring alternatives are not protective since they do nothing to prevent migration of mine waste or exposure of humans and the environment. Both repository alternatives (4 and 5) and the off-site State permitted solid waste landfill alternative (3) are equally protective because they would prevent migration of mine waste and protect humans and the environment.

Compliance with ARARS

The two repository alternatives are equally able to comply with ARARs. The no action and no-action with monitoring alternatives do not comply with ARARs such as regulations pertaining to floodplain management, the Clean Water Act, the Montana Water Quality Act, and Montana solid waste regulations. ARARs would not apply to an existing off-site State permitted solid waste landfill in terms of location and design for the landfill (ARARs apply to on-site actions only). ARARs regarding the hauling of materials to the landfill, before leaving the CSCMD site, would be complied with for the two repository alternatives and the off-site disposal area alternative.

Long Term Effectiveness and Permanence

The two repository alternatives and the off-site State permitted solid waste landfill alternative are permanent methods for reducing exposure to mine waste. Assuming the repositories and landfill were properly maintained, they should be permanent and effective in the long-term. The no action and no-action with monitoring alternatives are not effective at reducing exposure to mine waste in the long-term and are not permanent.

Reduction of Toxicity, Mobility, and Volume through Treatment

None of the alternatives involve treatment, so all alternatives rank equally under these criteria.

Treatment of mine wastes may be addressed in OU specific feasibility studies. While the wastes being placed in the repository or landfill may not be treated, the remedy will reduce the mobility of the waste by isolating them in a protective repository or landfill that will effectively contain the hazardous substances.

Short Term Effectiveness

The two repository alternatives would be effective in preventing migration of mine waste and protecting human health and the environment in the short-term. The development of the Mackay Gulch repository can begin as soon as the location is accessible and would allow for relatively quick site preparation and construction. The development of the Silver Dyke Glory Hole repository will likely take 6 months to 1 year to stabilize the high walls on the southern and eastern sides to reduce physical hazards to construction workers. The Silver Dyke Glory Hole repository alternative would not allow for scheduled excavation and disposal of contaminated soils in the town of Neihart OU1 remedial action as well as the removal action at the former Silver Dyke tailings impoundment, scheduled to proceed in 2014. The off-site landfill alternative would be less effective at protecting human health and the environment in the short-term. Anticipated risks are associated with occupational hazards to workers using heavy construction equipment for transportation to the licensed solid waste landfill and increased traffic risks due to the long hauls associated with this alternative. The no action alternatives (1 and 2) are not effective in the short-term.

The alternatives are ranked for short-term effectiveness, from most effective to least effective.

1. Mackay Gulch repository (Alternative 4) ranked highest because site development will not delay the proposed 2014 tailings removal. This is most protective of the community and the environment and also provides the on-site borrow source needed, reducing additional impacts to the community.
2. Silver Dyke Glory Hole repository (Alternatives 5) ranked next highest because site development would not prevent residential soils and tailings removals, but may delay them.
3. Off-Site Disposal at a Licensed Facility (Alternative 3) ranked as less effective than alternatives 4 and 5 because of the risks associated with the transport of solid waste materials to the solid waste landfill approximately 68 miles away.
4. No Action (Alternatives 1 and 2) ranked lowest because they are not effective in the short-term.



Photo 4: Acid mine drainage from the Moulton Mine North of the town of Neihart.

Implementability

Both repository alternatives are technically and administratively feasible. Necessary materials are available. The construction of the Mackay Gulch requires less technical expertise because it does not involve the blasting required at the Silver Dyke Glory Hole. Construction of both repository alternatives can be completed with standard construction labor and equipment available in the area. The development of the Silver Dyke Glory Hole repository will require additional technical expertise to address site specific conditions (e.g. blasting of the southern headwall to address safety concerns and construction of the haul road). Long term operation, maintenance, and monitoring would be necessary to ensure the integrity of the repositories. EPA will need to resolve access issues prior to use of the locations as repositories.

Utilizing an existing State permitted solid waste landfill will require an agreement with the licensed landfill to accept the large volume of mine waste contemplated for removal at the CSCMD site, and the necessity to work with the county and state road maintenance personnel concerning the adverse effects on roads of hauling excavated mine waste to a repository and this issues make this alternative less implementable.

The alternatives are ranked for implementability, from most implementable to least implementable.

1. No Action (Alternative 1) ranked highest because no-action is easiest to complete.
2. No Action with Monitoring (Alternative 2), no-action with continued monitoring, ranked the next highest because it requires minimum continued monitoring at the CSCMD site.
3. Mackay Gulch Repository (Alternative 4) ranked next highest because it is technically and administratively feasible, and the construction methods are less technical than Alternative 5.
4. Silver Dyke Glory Hole Repository (Alternative 5) ranked next because site development requires more technical expertise than Alternative 4.
5. Off-site Disposal at a Licensed Facility (Alternative 3) ranked the least implementable because of the agreements necessary to transport and place wastes at the off-site landfill, as well as the uncertainty of whether agreement between the parties can be reached. Additional effort will be required to move large amounts of mine waste (approximately 1.2 million cubic yards) 68 miles to the off-site landfill.

Cost

Proposed alternative costs consist of direct and indirect capital costs and long-term (30-year) operation and maintenance costs. Direct capital costs pertain to construction, materials, land, and transportation for proposed alternatives. Indirect costs pertain to design, legal fees, and permits. O&M costs pertain to maintenance and long-term monitoring and are presented as a present worth value. The alternative costs are ranked for cost, from lowest to highest (rounded to the highest \$1,000).

1. No Action (Alternative 1) – \$0
2. No Action with Monitoring (Alternative 2) – \$268,000
3. Silver Dyke Glory Hole Repository (Alternative 5) – \$17,065,000
4. Mackay Gulch Repository (Alternative 4) – \$20,025,000
5. Off-site Disposal at a Licensed Facility (Alternative 3) – \$90,304,000

State and Community Acceptance

State and community acceptance will be evaluated through the community involvement process. As members and representatives of the State, local governments, and community provide comments, remedial action alternatives will be re-assessed and potentially modified. State, local government, and community concerns will be considered by the EPA during preparation of the Record of Decision.

Key Guidance Documents

Key guidance documents used in the study and evaluation of remedial options for the CSCMD site are as follows:

- The NCP regulations (found at 40 CFR Section 300), and the statutory requirements of CERCLA—especially Section 121 of CERCLA, 42 U.S.C. Section 9621 are the mandatory requirements that the EPA (and DEQ as the support agency) must follow in selecting a remedy.
- In addition, the EPA uses guidance as appropriate in the remedy selection process. Key guidance documents used for the CSCMD are as follows:

- *A Guide to Principal Threat and Low Level Threat Wastes*, OSWER No. 9380.3-06FS (EPA, November 1991)
- *Rules of Thumb for Superfund Remedy Selection*, OSWER No. 9355.0-69 (EPA, August 1997)
- *Incorporating Citizen Concerns into Superfund Decision Making*, OSWER No. 9230.0-18 (EPA, January 1991)
- *The Role of Cost in the Superfund Remedy Selection Process*, OSWER No. 9200.3-23FS (EPA, September 1996)
- *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, OSWER No. 9200.1-23P (EPA, July 1999).
- *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, EPA OSWER Directive 9355.3-01 (EPA 1998)

These and other guidance documents are available at:

<http://www.epa.gov/superfund/policy/remedy/index.htm>

Copies are also available from the EPA upon request.

Preferred Alternative

EPA, in consultation with DEQ and the USFS, proposes the following preferred alternative. This section presents the rationale used in selecting the repository locations and the recommended approach for developing the repositories. The preferred alternative includes a phased approach to development. The preferred remedial alternative does not preclude the future use of a repository screened out in the initial screening.

The agencies have decided that both Alternative 4 (Mackay Gulch) and Alternative 5 (the Silver Dyke Glory Hole) are preferred locations for repositories at the CSCMD site. The selection of an on-site repository satisfies the mine waste disposal recommendation in the Neihart OU1 ROD.



Photo 4: Boiler located at the Compromise Mine just north of the town of Neihart

The Preferred Alternative achieves substantial risk reduction and is feasible, implementable, and cost effective. It can be implemented in a near term time frame, and at substantially less cost than the off-site disposal option. It does not satisfy the statutory preference for treatment as a principal element of the remedy, unless treatment of wastes is part of the remedial decisions for OU2 and OU3. EPA will need to resolve access issues prior to use of the locations as repositories.

Phased Approach

Since it is the easiest to implement, the Mackay Gulch repository will be developed first to meet the timeline requirements for the ongoing Silver Dyke tailings impoundment site removal and the town of Neihart OU1 remedial action. While waste is being placed in the Mackay Gulch Repository, the Silver Dyke Glory Hole Repository will be developed to begin accepting waste when the Mackay Gulch repository is full. The rationale behind this decision is that the estimated 1.2 million cubic yards of mine waste at the CSCMD site will eventually require both repositories. These two repositories have the capacity to hold the majority of the mine waste from the CSCMD site. The development of Mackay Gulch will also produce cover soil and topsoil for the Silver Dyke Glory Hole Repository. This phased approach for constructing two repositories will meet the short-term and long-term needs of the CSCMD site and is implementable.

Community Involvement

EPA, DEQ and the USFS provide information regarding this action and the CSCMD site through public meetings, the Administrative Record file for this action and administrative record files for the ongoing removal and three OUs, and announcements in local newspapers. EPA, DEQ and the USFS encourage the public to gain a more comprehensive understanding of the CSCMD Site and the Superfund activities that have been or are being conducted at the site.

EPA, DEQ and the USFS will accept written or oral comments on this Proposed Plan.

Written Comments

Send written comments to:

Carpenter Snow Creek Repository Selection Comments
Roger Hoogerheide
U.S. EPA Region 8 (8MO)
10 W. 15th St.; Suite 3200
Helena, MT 59626

Email comments to:

Hoogerheide.Roger@epa.gov

You may also comment in-person on the record at the public meetings listed below.

Public Meetings

The EPA will hold a public meeting on August 7, 2014, from 6:30 to 8:30 p.m. at the Community Center in Neihart, Montana.

This will be an opportunity to provide written or oral comments.

Who to Contact with Questions or Concerns

U.S. Environmental Protection Agency

Roger Hoogerheide, Remedial Project Manager
406-457-5031
hoogerheide.roger@epa.gov

Montana Department of Environmental Quality

Keith Large, State Project Officer
(406) 841-5039
klarge@mt.gov

Public Comment Period

EPA will accept written comments on this Proposed Plan for 30 days beginning on July 30, 2014, and ending on August 29, 2014. EPA will make its final decision on the cleanup only after considering public comments. At the end of the comment period, EPA will include a responsiveness summary addressing the comments in the ROD. EPA will place all written comments and the Responsiveness Summary in EPA's Administrative Record for this action at the Carpenter Snow Creek Site.

Documents

The Administrative Record for this action at the CSCMD site contains the documents that have been used to make decisions on siting a secure disposal location for the CSCMD Site. There is also an administrative record for the OU1 remedial decision. Administrative records for the other OUs are in development. The administrative records can be reviewed at:

EPA Records Center
10 West 15th Street, Suite 3200
Helena, MT 59626

Phone: (406) 457-5046
Monday through Friday

Information Repositories
Great Falls Public Library
301 2nd Ave North
Great Falls, MT 59401

Monarch/Neihart Community Center
Neihart, MT 59463