UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop STREET
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

Ref: 8EPR-ER

ACTION MEMORANDUM

SUBJECT: Request for a Removal Action and Exemption from the 12-month and $2 Million Statutory Limits for a CERCLA Removal Action at the Pennsylvania Mine Site in Summit County, Colorado

FROM: Paul Peronard, On-Scene Coordinator
Emergency Response Unit

THRU: Laura Williams, Supervisor
Emergency Response Unit

David Ostrander, Director
Emergency Response and Preparedness Program

TO: Martin Hestmark, Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the removal action and request exemption from the 12-month and $2 million statutory limits for a removal action described herein for the Pennsylvania Mine Site (Site) in Summit County, Colorado.

The conditions existing at this Site present a threat to public health and the environment and meet the criteria for initiating a removal action under 40 CFR section 300.415(b)(2) of the National Contingency Plan (NCP). The proposed removal action addresses threats from both the acid mine discharge that is currently draining from the mine as well as tailings and other mine waste found on the surface.

Based on the nature of the Site and the anticipated work, there are no nationally significant or precedent-setting issues associated with this removal action. Furthermore, this time-critical removal action will not establish any precedent for future Site actions nor commit the United States Environmental Protection Agency (EPA) to a course of action that could have a significant impact on future responses or resources.

II. SITE CONDITIONS AND BACKGROUND

The CERCLIS ID for this Site is CON000802652. This time-critical removal action addresses arguably the largest anthropogenic source of heavy metals in the Peru Creek/Snake River watershed (EPA Tech Memo 2012). The primary contaminants of concern are dissolved heavy metals including aluminum, cadmium, copper, iron, lead, manganese and zinc. Conditions existing at the Site present an endangerment to human health and the environment and meet the criteria for initiating a removal action under 40 CFR section 300.415(b)(2).

Site Name:	Pennsylvania Mine Site
Superfund Site Id (SSID):	08MW
NRC Case Number:	
CERCLIS Number:	CON000802652
Site Location:	Summit County, Colorado
Lat/Long:	39.600004/-105810003
NPL Status:	Not an NPL site
Removal Start Date:	
Category of Removal:	Time-Critical Removal Action

A. Site Description

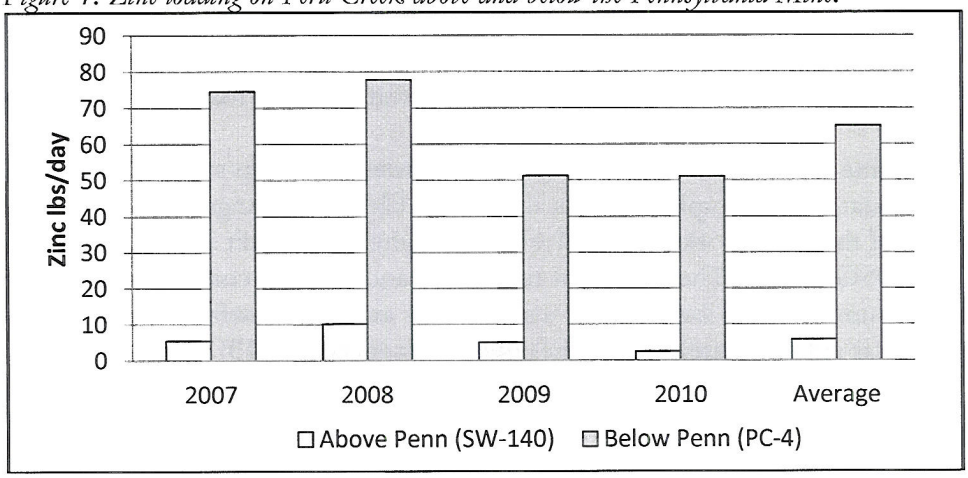
1. Removal Site Evaluation

The Pennsylvania Mine was initially developed in 1879. It produced gold, silver, lead, copper and zinc and had its biggest production year in 1893 when it shipped 7,000 tons of ore (NWCCOG 2006). The mine was developed on six levels, known as A, B, C, D, E and F with F being the lowest level. Adits were constructed at levels C and F. The mine continued regular operations until 1908 and was then worked intermittently until the mid-1940s when it was abandoned (NWCCOG 2006).

Since the mine was abandoned, metals-laden effluent has flowed from the level F adit, down a steep channel and directly into nearby Peru Creek, which is a tributary of the Snake River. In addition to this acid mine drainage, significant waste and tailings deposits remain on the surface near both the level C and level F adits. These deposits are often eroded into the creek during large runoff events.

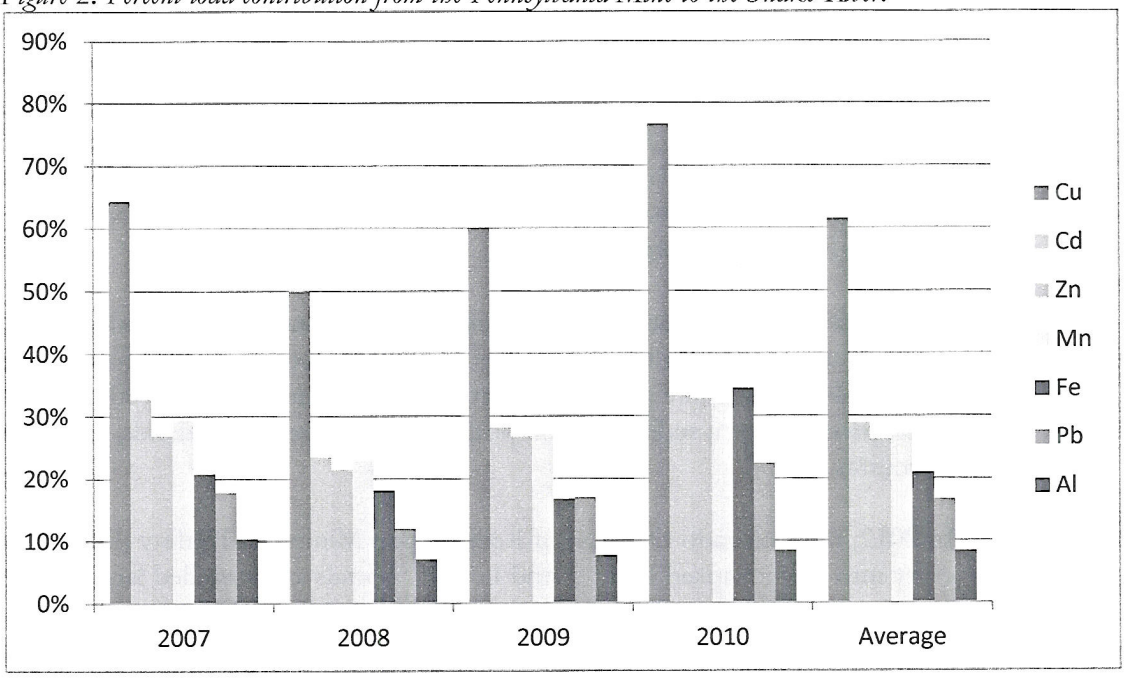
Both Peru Creek and the Snake River are listed on Colorado's Clean Water Action section 303(d) list of impaired water bodies (CDPHE 2007). Data collected since the 1980's by various parties suggest that the mine is the largest single anthropogenic source of heavy metals in the Peru Creek and Snake River watershed (EPA Tech Memo, 2012). Figure 1 illustrates how the concentration of one representative contaminant in Peru Creek, zinc, increases significantly as the creek flows past the mine site. On average, zinc, aluminum, manganese, and iron exhibit four to fourteen-fold increases in daily metals concentrations in Peru Creek as the creek passes the mine site. Copper increases the most dramatically with a forty six-fold increase (EPA Tech Memo 2012).

Figure 1. Zinc loading on Peru Creek above and below the Pennsylvania Mine.



While the Pennsylvania Mine is clearly a large contributor to the impairment of Peru Creek, its effect on the Snake River downstream is also significant (Figure 2). On average, more than 25% of the cadmium, zinc, and manganese in the Snake River are attributable to the mine; and the mine accounts for 62%, 17% and 8% of the copper, lead and aluminum in the Snake River, respectively (EPA Tech Memo 2012).

Figure 2. Percent load contribution from the Pennsylvania Mine to the Snake River.



2. Physical Location

The Pennsylvania Mine is located in central Colorado, roughly 8 miles east of the Keystone Ski Resort in the Front Range of the Rocky Mountains (Attachment A). The mine sits on the northwest slope of Decatur Mountain and on the south side of the east-west trending Argentine Valley, approximately one-quarter mile south of Peru Creek. It is roughly 3.5 miles

upstream or east of the confluence of Peru Creek with the Snake River. The Snake River flows into Dillon Reservoir approximately 9 miles downstream of its confluence with Peru Creek. Dillon reservoir is a major municipal water supply for the Denver metropolitan area.

The mine is located in alpine terrain characterized by steep-sided glaciated valleys and unvegetated, rocky upland ridges and peaks. Elevations range from 10,900 feet at the lowest level of the mine workings, to 11,130 feet at the level F adit and 11,450 feet at the level C adit (USGS 1974). The mine is at timberline and weather conditions are characterized by short summers and long, snowy winters. The average snowfall at the nearby Keystone Ski Resort is approximately 230 inches (wiki.answers.com 2013).

3. Site Characteristics

The historic workings of the Pennsylvania Mine are found on both public and private land. Public land at the Site is managed by the United States Forest Service (USFS) and is part of the White River National Forest. There are several mining claims and other unimproved private property at and near the Site. The nearest private residence is located approximately two miles west of the Pennsylvania Mine Site.

The area is a popular year-round recreational destination. Recreational activities include off-highway driving, camping, hiking, biking, running, cross-country skiing and back-country skiing.

In 2010, EPA delineated and prioritized the waste piles located near the level C and F adits based on the concentration of heavy metals in the soil (Attachment B). This data is summarized in Table 1. Approximately 9,200 ft^3 or 2% of the waste at Level F and 124,000 ft^3 or 48% of the waste near Level C are located on property owned by the USFS. Highly contaminated sediments can also be found both in Peru Creek and in several washes that drain the Site into the creek.

Additional surface features at the Site include a 400-square-foot cinder block building formerly used for water treatment pilot studies, buried piping that formerly transported water from the adit to a pilot treatment area but is currently believed to be plugged with metal precipitants, a sedimentation pond, two constructed wetlands, a mill and other historic structures.

In 2012, the Colorado Division of Reclamation Mining and Safety (DRMS) reestablished entry into the collapsed Level F and Level C portals and installed large culverts in both portals to protect the openings from further rock fall. DRMS entered the underground mine workings and determined that a) the drift in Level F is the largest source of metals loading to the adit's discharge and b) the crosscut in Level F is the largest contributor of flow. DRMS also identified several areas of competent rock within which bulkheads could be constructed.

Table 1: Characteristics of Waste Piles near the Level C and F Portals

Location	Ownership	Waste Pile ID	Priority	Volume (ft^3)	
Level C	Private	AGS33-S3	Medium		7,778
		PC05	High		2,738
		PC12	High		107,419
		PC14	High		15,166
				Subtotal	**133,101**
	USFS	AGS33-S3	Medium		45,900
		PC04	High		46,274
		PC12	High		28,476
		PC12	High		3,407
				Subtotal	**124,057**
				Total Level C	**257,158**
Level F	Private	AGS110-S1	High		6,986
		AGS110-S2	High		11,717
		AGS117-S2	High		44,382
		AGS120-S1	Low		7,500
		PC10	Low		19,081
		PC11	High		36,432
		PC17	High		94,368
		PC18	High		130,017
		PC19	High		10,245
		PC20	Medium-High		6,940
				Subtotal	**367,668**
	USFS	AGS117-S2	High		7,195
		PC20	Medium-High		2,009
				Subtotal	**9,204**
				Total Level F	**376,872**
				Grand Total	**634,030**

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

Cadmium, copper, lead and zinc are listed as hazardous substances as provided at section 101(14) of CERCLA. Aluminum, iron and manganese can be defined as pollutants or contaminants under section 101(33) of CERCLA.

Numerous sampling and monitoring data have been collected by several organizations at the Pennsylvania Mine since the 1980s (CMLRD 1989). These data show that the mine is one of the largest, if not the largest, anthropogenic source of dissolved heavy metals in the Snake River watershed (EPA Tech Memo, 2012) and that exceedances of Colorado's water quality standards in Peru Creek range from 20 to 50-fold for cadmium, manganese, lead, and zinc, 120-fold for iron and 300-fold for aluminum (BIT 1994).

Beginning in 2006, EPA conducted additional sampling at the Pennsylvania Mine to further characterize the water quality of the Level F adit effluent. Dissolved metal concentrations

from this effort for aluminum, cadmium, copper, iron, lead, manganese, and zinc are presented in Table 2.

Table 2: Concentration of Dissolved Metals in Pennsylvania Mine Discharge (mg/L)

Date	Al	Cd	Cu	Fe	Pb	Mn	Zn
5/11/2006	10	0.11	1.2	20	0.004	31	23
5/25/2006	11	0.13	<0.01	22	0.007	33	26
6/8/2006	19	0.16	<0.01	23	0.013	30	39
6/22/2006	29	0.13	<0.01	52	0.024	33	46
7/13/2006	50	0.41	6.6	77	0.031	83	66
7/9/2007	62	0.28	11	99	0.024	45	56
9/26/2007	31	0.20	7.5	31	0.060	52	41

5. NPL Status

The Site is not currently on the Superfund National Priorities List (NPL).

6. Maps, Pictures, Other Geographic Representations

A map of the Peru Creek Vicinity is available as Attachment A and the Mine Waste Delineation as Attachment B.

B. Other Actions to Date

1. Previous Actions

The following actions have been taken by EPA to investigate the threat to public health and the environment, and to evaluate potential treatment options at the Pennsylvania Mine Site. These actions were used to inform the removal action proposed in this document.

- 2007 – The EPA Federal Facilities program initiated a Preliminary Alternatives Analysis (PAA) to evaluate the feasibility and cost associated with treatment of the Pennsylvania Mine adit discharge. The PAA was modeled after EPA's guidance for conducting an Engineering Evaluation/Cost Analysis (EE/CA) and was never finalized.

- 2008 – On behalf of the EPA, the Colorado Department of Public Health and Environment (CDPHE) completed a CERCLA Preliminary Assessment of the Pennsylvania Mine Site and Cinnamon Gulch.

- 2008 – On behalf of the EPA, the CDPHE completed a CERCLA Site Inspection of the Pennsylvania Mine and Cinnamon Gulch.

- 2008 – The EPA Site Assessment Unit initiated work on a Hazard Ranking System (HRS) package. This HRS package was never finalized.

- 2009 – The EPA Federal Facilities program initiated an EE/CA intended to evaluate alternatives for managing mine waste and tailings piles at the Pennsylvania Mine and Cinnamon Gulch. This EE/CA was never finalized.

- 2010 – The EPA Emergency Response Unit completed a Removal Assessment of the Pennsylvania Mine. This assessment looked at the feasibility and costs associated with addressing numerous mine features in the watershed.

- 2012 – DRMS, in partnership with the EPA Emergency Response Unit, CDPHE and Summit County, initiated portal rehabilitation and underground investigation work at the Pennsylvania Mine. This work is still ongoing and will be phased into this removal action.

No previous EPA removal actions have been conducted at this Site.

2. Current Actions

There are no current removal actions at this Site.

C. State and Local Authorities' Roles

1. State and Local Actions to Date

Significant efforts have been made by various state and local stakeholders to not only document the quantity and quality of water in the Pennsylvania Mine, Peru Creek, and the Snake River but to also investigate strategies to reduce the mine's impact on Peru Creek. These stakeholders include the Snake River Watershed Task Force (SRWTF), Northwest Colorado Council of Governments (NWCCOG), Summit County, CDPHE, DRMS (formerly Colorado Mined Land Reclamation Division (CMLRD)).

In the 1980s, CMLRD developed a passive treatment system in an attempt to remove heavy metals from the Level F adit drainage. CMLRD installed a pipeline to carry the mine drainage from the adit to a leaching system that was buried upgradient of a revegetated tailings wetland. The system increased metals concentrations in the upper portion of the wetland but studies found that the mine's discharge flowed primarily on the surface of the wetland and the adsorption of metals into the wetland was limited.

In 1990, CMLRD also constructed a chemical treatment system using limestone neutralization, a gravity-driven mixing zone and a settling pond for sludge removal (CMLRD 1989). The system only operated for a short time because of chemical inefficiency, mechanical problems, and equipment failure (BIT 1994). This approach was redesigned in 1993 and included partial neutralization with reactive grade magnesium oxide (MgO), a settling pond, and final treatment in a sulfate reducing bioreactor (BIT 1994). Further work was discontinued before the new design could be implemented in part because of liability issues.

In 1994, the Department of Minerals and Geology, Inactive Mine Section, constructed two bioreactors with assistance from Volunteers for Outdoor Colorado. The bioreactors did not prove to be an effective strategy over the long term (Volunteers of Outdoor Colorado 1994).

In 2006, NWCCOG, the Keystone Center, SRWTF, and the Blue River Watershed Group prepared a Technology Alternatives Analysis (NWCCOG, 2006), which provided a summary of Site information and explored additional applicable methods for treating the mine effluent.

As previously discussed, DRMS rehabilitated the collapsed level C and F portals, installed culverts to protect the openings from further rock fall and investigated the underground mine workings in 2012.

2. Potential for Continued State/Local Response

The Colorado Division of Reclamation, Mining and Safety (DRMS) has already begun work investigating the underground mine workings. The investigation work will continue through the summer of 2013. The expertise of DRMS with hard rock mine reclamation work and experience at Pennsylvania Mine will make them important sources of information to support this removal action.

In addition, other local stakeholders such as Trout Unlimited and Summit County may be able to provide invaluable assistance with regards to post-removal Site control.

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

The conditions at the Site present a threat to public health and welfare and meet the criteria for initiating a removal action under 40 CFR section 300.415(b)(2).

Per 40 CFR 302.4, heavy metals are listed as hazardous substances and have been detected entering Peru Creek in high concentrations as the creek passes the Pennsylvania Mine. The Site conditions present a direct threat to public health and the environment. Exposure to these metals could lead to both acute and chronic health effects in both humans and wildlife. Because of the dangerous nature of the contaminants involved and the concentrations in which they have been found on the Site, conditions present a threat to public health and welfare and meet the criteria for initiating a removal action under 40 CFR section 300.415(b)(2).

All of the factors from 40 CFR section 300.415(b)(2) were considered but the factors cited below form the basis for EPA's determination of both the threat presented and the appropriate action to be taken:

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

Dissolved metals in Peru Creek and the Snake River downstream of the Pennsylvania Mine are acutely toxic to fish and invertebrates. These conclusions are supported by several lines of evidence including 1) calculated hazard quotient values using water quality data; 2) direct toxicity testing; and

3) Site-specific observations of fish and invertebrate populations. Under current conditions, the metals concentrations in Peru Creek and significant portions of the Snake River prevent the survival of trout populations and other fish species, and likely restrict the diversity and abundance of benthic invertebrate communities.

Potential pathways of human exposure to Site contaminants include ingestion of airborne dust from mine waste dumps and consumption of fish obtained from the Snake River downstream of the Site. Other potential pathways include consumption of surface water emanating from the Site and groundwater in the vicinity of the Site.

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

Overland flow that develops during snowmelt and rainfall events entrains contaminated sediments from exposed waste piles and deposits the sediment into Peru Creek.

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

Seasonal flooding is a regular occurrence in this high alpine environment be it from intense summer rain storms, rapid springtime snowmelt or a combination of the two. There is a demonstrated short lag time between heavy precipitation and/or rapid melting and an increase in discharge from the mine. In the summer of 2007, dramatic increases in Pennsylvania Mine discharge occurred after several heavy precipitation events. The estimated discharge from the mine reached approximately 3,800 gpm or 8.5 cubic feet per second (cfs) on two occasions (August 3 and August 8). During this period, a fish kill occurred in the Snake River downstream of its confluence with Peru Creek (Summit Daily News 2007).

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

Several efforts have been made to address the influence of Pennsylvania Mine on water quality conditions in Peru Creek and the Snake River. These efforts, both by EPA and other state and local stakeholders, have not substantially addressed the release of hazardous substances into Peru Creek.

IV. ENDANGERMENT DETERMINATION

Exposure to the heavy metals associated with acid mine drainage have a well known detrimental effect on both ecosystems and human health. The actual or threatened releases of these hazardous substances from this Site, if not addressed by implementing the response action described in this action memorandum, present an endangerment to public health, welfare or the environment.

V. EXEMPTION FROM STATUTORY LIMITS

A. Emergency Exemption

1. There is an immediate risk to public health or welfare or the environment. Heavy metals have been detected entering Peru Creek in high concentrations as the creek passes the Pennsylvania Mine. Exposure to these metals could lead to both acute and chronic health effects in both humans and wildlife. Due to the dangerous nature of the contaminants

involved and the concentrations found at the Site, conditions present a threat to public health and welfare and meet the criteria for initiating a removal action under 40 CFR section 300.415(b)(2).

2. Continued response actions are immediately required to prevent, limit or mitigate an emergency. There are seven phases to the proposed removal action. EPA's removal activities will be conducted based on DRMS investigations to identify and design a bulkhead location and to explore major pathways by which surface water is entering mine workings.

3. Assistance will not otherwise be provided on a timely basis. Several efforts by EPA and other State and local stakeholders have not substantially addressed the release of hazardous substances into Peru Creek.

VI. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

The proposed removal action addresses issues both above and below ground. Due to the complexity of the project and the typically short summer construction season, the proposed action will be sequenced over several phases and years of construction. It is important to note that each phase will be followed by a brief period of monitoring and, depending upon the results of this monitoring, some later phases may not be required.

The proposed action will be carried out under EPA's time-critical removal authorities as defined in the NCP, 40 CFR part 300. However, the execution of the work will rely on an effective partnership between EPA, CDPHE, the DRMS, the United States Forest Service (USFS), and Summit County.

There are three phases to the proposed removal action and four additional phases that might be required based on the results of the work that is proposed to be funded in this document. It is important to note that EPA's removal activities work will be informed by investigation activities conducted by DRMS. DRMS will be conducting detailed underground investigations on levels C and F in 2013-14. The objectives of this investigative work will be to a) identify and design bulkhead locations and 2) explore major pathways by which surface water is entering the mine workings.

Phase 1: Site Preparation
Description: The areas around the C-adit, F-adit and the Mill will be improved to support future work. Existing waste piles will be consolidated and reworked in place to account for additional waste that will be generated during underground operations. The drainage in these locations will be improved to prevent further erosion of exposed waste. Locations of significant contaminated deposits in the creek bed downstream of the mine will be identified and removed. These contaminated sediments will be added to the consolidation piles at level F. Obvious sources of surface water infiltration into the underground mine workings will be sealed and/or redirected away from the mine. This phase will also include limited improvement and maintenance of the road leading up to

the mine. The objective of this road work is *not* to construct permanent improvements but rather, it is to protect environmental resources by properly preparing the road for construction access.

Phase 2: Underground Bulkhead #1
Description: An impermeable bulkhead will be constructed underground in the level F crosscut up gradient of its intersection with the level F drift. This bulkhead will be constructed in the granite gneiss and quartz/biotite schist geologic formations found in the proximity of sampling point FXC2.

Phase 3: Reclaim Waste Piles
Description: The waste and tailings at level C, level F and the mill will be capped in place with suitable topsoil and vegetation to prevent both erosion and the leaching of contaminants through the piles.

Phase 4: Seal-off Level C Surface Water Pathways (if necessary)
Description: If significant surface water pathways are discovered at and/or above level C during the underground reconnaissance (Phase 2), these pathways will be sealed and/or surface water inputs will be diverted.

Phase 5: Underground Bulkhead #2 (if necessary)
Description: If necessary, a flow-through bulkhead will be constructed underground in level F down gradient of the intersection of the crosscut and the drift.

Phase 6: Construction of Passive Treatment System (if necessary)
Description: If necessary, a *passive* treatment system will be constructed within the large culvert that was installed at the level F portal in 2012 and/or underground immediately outside the portal in level F. This passive treatment system will be hidden from view.

Phase 7: Post-removal Site Control (if necessary)
Description: If a passive treatment system is installed, it will be necessary to excavate and replace the treatment media after approximately 20 years. It may also be necessary to perform long term sampling and monitoring.

2. Contribution to Remedial Performance

These efforts and the removal action proposed in this document can only help to substantially mitigate the existing contamination. These activities and the proposed removal action will not interfere with any future Superfund remediation activities should they occur in the future.

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

This is a time-critical removal action; thus, an EE/CA is not required.

4. Applicable or Relevant and Appropriate Requirements (ARARs)

The ARARs identified to date are provided in Attachment C. In accordance with the NCP, all ARARs for the Site will be attained to the extent practicable given the scope of the project and the urgency of the situation.

5. Project Schedule

	2013	2014	2015	2016	...	2035
Underground Investigations(DRMS)	↔					
Phase 1: Site Preparation	↔	↔				
Phase 2: Underground Bulkhead #1		↔				
Phase 3: Reclaim Waste Piles		↔	↔			
Phase 4: Seal-off Level C Surface Water Pathways (if necessary)		↔				
Phase 5: Underground Bulkhead #2 (if necessary)			↔			
Phase 6: Construction of Treatment System (if necessary)				↔		
Phase 7: Post-removal Site Control (if necessary)				↔	↔	↔

B. Estimated Costs*

The estimated costs to support Phases 1, 2 and 3 are provided below. A representative portion of these costs will be offset by a monetary contribution from the USFS. In addition, DRMS has agreed to provide both funding and technical assistance for Phase 2 of this effort.

Proposed Costs

Description	Funding
EPA Contract (ERRS)	$1,600,000
EPA Contract (START)	$200,000
Subtotal Proposed Extramural Costs	$1,800,000
20% Contingency	$360,000
TOTAL PROJECT CEILING for PROPOSED WORK	**$2,160,000**

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

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

Delayed action may increase the health risks to the local population and environment posed by heavy metals.

VIII. OUTSTANDING POLICY ISSUES

None

IX. ENFORCEMENT

A separate Enforcement Addendum provides a confidential summary of enforcement action for the Site.

The total EPA costs for this removal action, based on full-cost accounting practices that will be eligible for cost recovery, are estimated to be $2,700,000. Direct costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of Site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States' right to cost recovery.

X. RECOMMENDATION

This decision document represents the selected removal action for the Pennsylvania Mine Site in Summit County, Colorado, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the Site.

Conditions at the Site meet the 40 CFR section 300.415(b)(2) criteria for a removal action and the CERCLA section 104(c) emergency exemption from the $2 million and 12-month limitations, and, I recommend your approval of the proposed removal action. The total project ceiling, if approved, will be $2,160,000; of this amount, an estimated $2,160,000 will be funded from the Regional removal allowance.

Approve: _____ Date: 6/19/13

Martin Hestmark
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

Disapprove: _____ Date: _____

Martin Hestmark
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

ATTACHMENTS

Attachment A: Map of Peru Creek Vicinity
Attachment B: Map of Mine Waste Delineation
Attachment C: Applicable or Relevant and Appropriate Requirements

LIST OF REFERENCES

Boulder Innovative Technologies. 1994. Pennsylvania Mine Drainage, Phase 1, Appendices A-G, Laboratory, Field Piloting and Acidic Mine Drainage Treatability Study, Program Years 1993 – 1994, and the Pennsylvania Mine Drainage Treatment Project, Conceptual Sludge Feasibility Study. Prepared for Colorado Department of Health, Colorado Division of Minerals and Geology. May 27, 1994.

Colorado Department of Public Health and Environment. 2007. Stream Classifications and Water Quality Standards - Regulation 33.

Colorado Mined Land Reclamation Division (CMLRD). 1989. Application for Passive Treatment of Mine Drainage – Pennsylvania Mine Drainage Treatment Project: April, 14 sections.

Northwest Colorado Council of Governments (NWCCOG). 2006. Pennsylvania Mine - Mine Scarred Lands (MSL) Demonstration Project, Technology Alternatives Analysis.

Summit Daily News. 2007. "Recent Survey Confirms Snake River Fish Kill." August 21, 2007.

U.S. Environmental Protection Agency (EPA). 2012."Technical Memorandum: PENNSYLVANIA MINE METALS LOADING ANALYSIS AND IMPACTS ON THE SNAKE RIVER". REGION 8. JANUARY 2012.

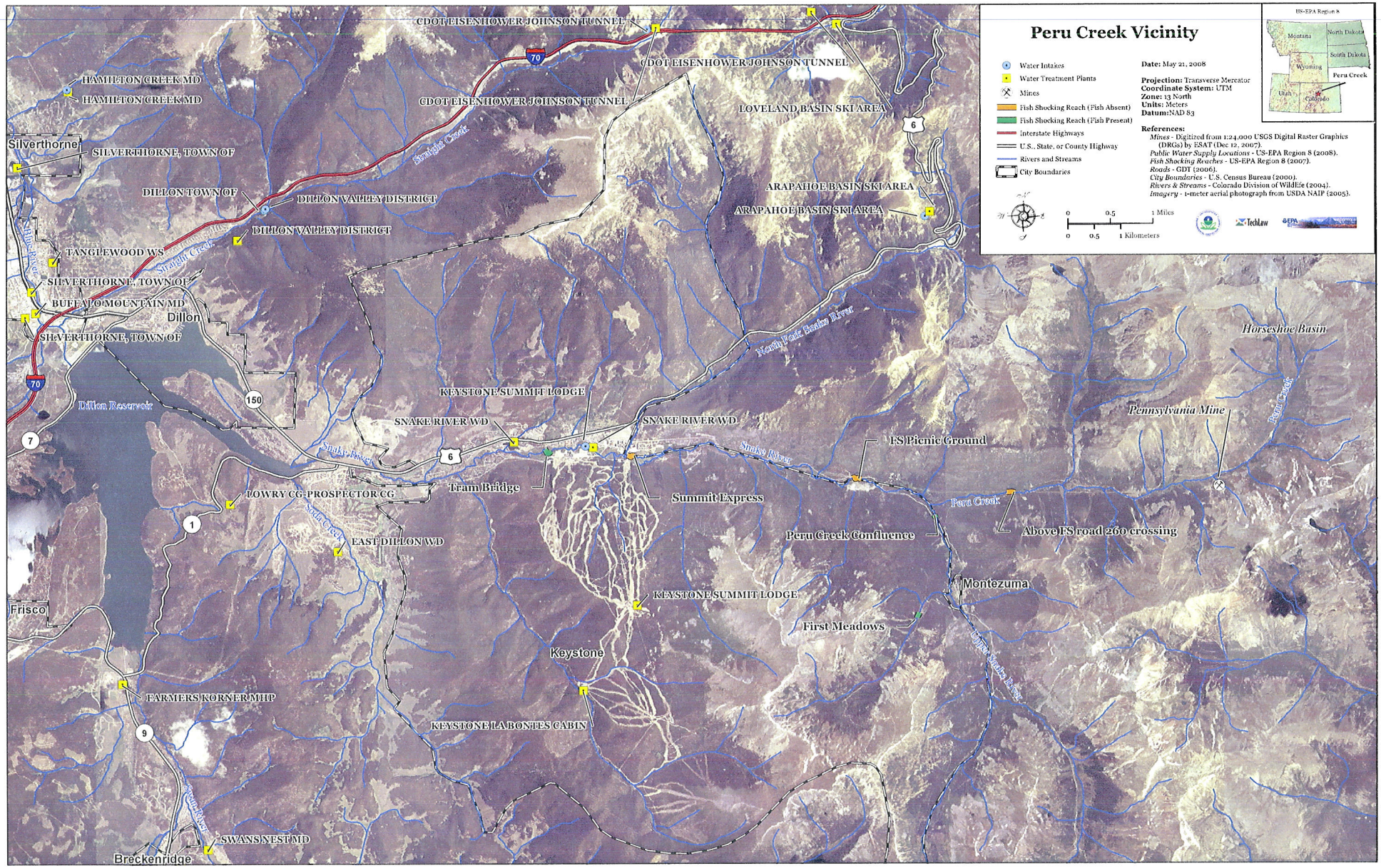
U.S. Geological Survey (USGS). 1974. 7.5 Minute Topographic Quadrangle, Montezuma, Colorado.

Volunteers of Outdoor Colorado.1994. Peru Creek – Pennsylvania Mine Project Bioreactor Construction and Revegetation.1994.

Wiki answers.com,
http://wiki.answers.com/Q/What_is_the_average_snowfall_for_keystone_ski_resort. February 2013.

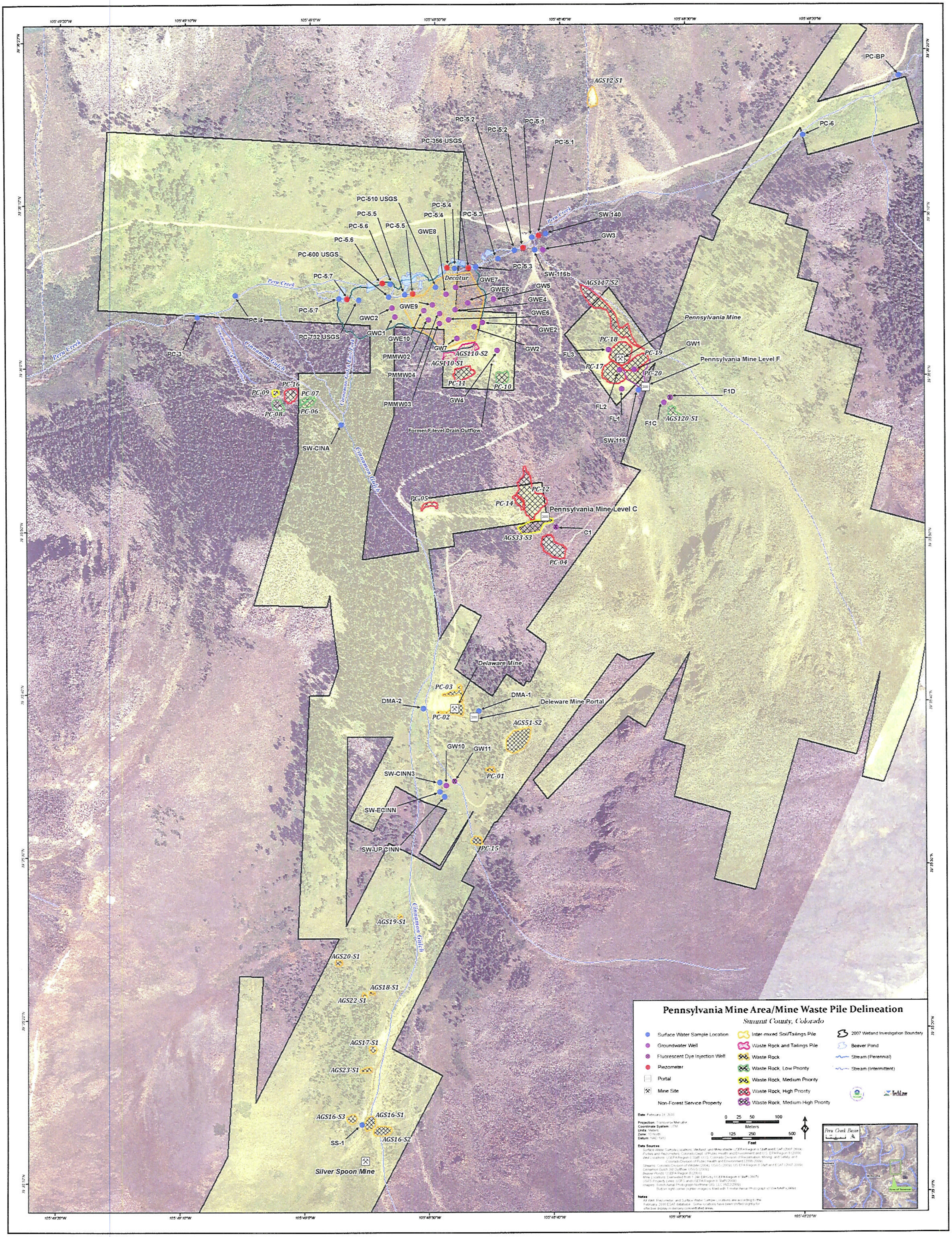
Attachment A

Map of Peru Creek Vicinity


Peru Creek Vicinity
Water Intakes
Water Treatment Plants
Mines
Fish Shocking Reach (Fish Absent)
Fish Shocking Reach (Fish Present)
Interstate Highways
U.S., State, or County Highway
Rivers and Streams
City Boundaries
Date: May 21, 2008
Projection: Transverse Mercator
Coordinate System: UTM
Zone: 13 North
Units: Meters
Datum: NAD 83
References:
Mines - Digitized from 1:24,000 USGS Digital Raster Graphics (DRGs) by ESAT (Dec 12, 2007).
Public Water Supply Locations - US-EPA Region 8 (2008).
Fish Shocking Reaches - US-EPA Region 8 (2007).
Roads - GDT (2006).
City Boundaries - U.S. Census Bureau (2000).
Rivers & Streams - Colorado Division of Wildlife (2004).
Imagery - 1-meter aerial photograph from USDA NAIP (2005).
0 0.5 1 Miles
0 0.5 1 Kilometers
TechLaw
EPA
US-EPA Region 8
Montana
North Dakota
South Dakota
Wyoming
Utah
Colorado
Peru Creek
CDOT EISENHOWER JOHNSON TUNNEL
HAMILTON CREEK MD
SILVERTHORNE, TOWN OF
DILLON TOWN OF
DILLON VALLEY DISTRICT
TANGLEWOOD WS
BUFFALO MOUNTAIN MD
LOVELAND BASIN SKI AREA
ARAPAHOE BASIN SKI AREA
KEYSTONE SUMMIT LODGE
SNAKE RIVER WD
Tram Bridge
LOWRY CG-PROSPECTOR CG
EAST DILLON WD
FARMERS KORNER MHP
KEYSTONE LA BONTES CABIN
SWANS NEST MD
Summit Express
FS Picnic Ground
Peru Creek Confluence
Above FS road 260 crossing
Pennsylvania Mine
Horseshoe Basin
First Meadows
Montezuma
Keystone
Dillon
Silverthorne
Frisco
Breckenridge
Dillon Reservoir
Straight Creek
Blue River
Snake River
North Fork Snake River
Soda Creek
Peru Creek
70
6
7
1
9
150

Attachment B

Map of Mine Waste Delineation


Pennsylvania Mine Area/Mine Waste Pile Delineation
Summit County, Colorado
Surface Water Sample Location
Groundwater Well
Fluorescent Dye Injection Well
Piezometer
Portal
Mine Site
Non-Forest Service Property
Inter-mixed Soil/Tailings Pile
Waste Rock and Tailings Pile
Waste Rock
Waste Rock, Low Priority
Waste Rock, Medium Priority
Waste Rock, High Priority
Waste Rock, Medium-High Priority
2007 Wetland Investigation Boundary
Beaver Pond
Stream (Perennial)
Stream (Intermittent)
TechLaw
Date: February 23, 2010
Projection: Transverse Mercator
Coordinate System: UTM
Units: Meters
Zone: 13 North
Datum: NAD 1983
0 25 50 100
Meters
0 125 250 500
Feet
Data Sources:
Surface Water Sample Locations, Wetland, and Mine Waste: USEPA Region 8 Staff and ESAT (2007-2009)
Portals and Piezometers: Colorado Dept. of Public Health and Environment and U.S. EPA Region 8 (2009)
Well Locations: USEPA Region 8 Staff, UOS, Colorado Division of Reclamation, Mining, and Safety, and Colorado Division of Public Health and Environment (2008-2009)
Streams: Colorado Division of Wildlife (2004); USGS (2009); US EPA Region 8 Staff and ESAT (2007-2009)
Cinnamon Gulch 3rd Outflow: USGS (2009)
Beaver Ponds: USEPA Region 8 (2008)
Mine Locations: Delineated from 1:24K DRG by USEPA Region 8 Staff (2007)
USFS Property Lines: USFS and USEPA Region 8 Staff (2009)
Imagery: 6-inch Aerial Photograph Northline GIS, LLC (6/22/2009)
Bottom right corner (lighter image) is filled with 1 meter Aerial Photograph USDA NAIP (2006)
Notes:
All Well, Piezometer, and Surface Water Sample Locations are according to the February 2010 ESAT database. Some locations have been shifted slightly for effective display in densely concentrated areas.
Peru Creek Basin
Area of Interest
105°49'20"W
105°49'10"W
105°49'0"W
105°48'50"W
105°48'40"W
105°48'30"W
105°48'20"W
Peru Creek
Cinnamon Gulch
PC-BP
PC-6
AGS12-S1
PC-5.2
PC-5.2
PC-5.1
PC-5.1
PC-356 USGS
PC-510 USGS
PC-5.5
PC-5.5
PC-5.6
PC-5.6
PC-5.4
PC-5.4
PC-5.3
PC-5.3
GWE8
SW-140
GW3
PC-600 USGS
PC-5.7
PC-5.7
Decatur
SW-116b
GWE7
GWE5
GW5
GWE4
GWE6
GWE2
AGS117-S2
Pennsylvania Mine
PC-4
PC-3
GWC2
GWE9
GWC1
GWE10
PC-732 USGS
GW7
GW2
PC-18
PC-19
GW1
Pennsylvania Mine Level F
FL3
PC-17
PC-20
PMMW02
PMMW04
PMMW03
AGS110-S2
AGS110-S1
PC-11
PC-10
GW4
F1D
PC-09
PC-16
PC-07
PC-08
PC-06
FL2
FL1
F1C
AGS120-S1
SW-116
SW-CINA
Former F-level Drain Outflow
PC-05
PC-12
PC-14
Pennsylvania Mine Level C
AGS33-S3
C1
PC-04
Delaware Mine
PC-03
DMA-2
DMA-1
Deleware Mine Portal
PC-02
AGS51-S2
GW10
GW11
PC-01
SW-CINN3
SW-ECINN
SW-UP CINN
PC-15
AGS19-S1
AGS20-S1
AGS18-S1
AGS22-S1
AGS17-S1
AGS23-S1
AGS16-S3
AGS16-S1
AGS16-S2
SS-1
Silver Spoon Mine

Attachment C
Applicable or Relevant and Appropriate Regulations (ARARs)

I. INTRODUCTION

40 CFR 300.415(i) provides that fund financed removal actions under CERCLA section 104, 42 U.S.C. § 9604, attain, to the extent practicable considering the exigencies of the situation, all state and federal applicable or relevant and appropriate requirements (ARARs). In considering whether compliance with ARARs is practicable, EPA will consider the urgency of the situation and the scope of the removal action being conducted. See 40 CFR §§ 300.415(i)(1) and (2).

This document identifies potential ARARs for the removal action to be conducted at the Pennsylvania Mine Site. The following ARARs or groups of related ARARs are each identified by a statutory or regulatory citation, followed by a brief explanation of the ARAR and how and to what extent the ARAR is expected to apply to the activities to be conducted under this removal action.

Substantive provisions of the requirements listed below are identified as ARARs pursuant to 40 CFR § 300.400. ARARs must be attained during and at the completion of the removal action. See, Preamble to the National Oil and Hazardous Substances Pollution Contingency Plan, 55 Federal Register (FR) 8695 (March 8, 1990). No federal, state or local permit will be required for the portion of any removal action conducted entirely on site in accordance with Section 121(e) of CERCLA, 42 U.S.C. § 9621(e).

II. TYPES OF ARARs

ARARs are either "applicable" or "relevant and appropriate." Both types of requirements are mandatory under the NCP. *See* CERCLA § 121(d)(2)(A), 42 U.S.C. § 6921(d)(2)(A). *See also* 40 CFR § 300.430(f)(1)(i)(A) (note that that these references apply to remedial actions). Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental and facility siting laws that specifically address a hazardous substance, pollutant, contaminant, removal action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. *See* 40 CFR § 300.5.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to hazardous substances, pollutants, contaminants, locations, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate. *See* 40 CFR § 300.5.

The determination that a requirement is relevant and appropriate is a two-step process: (1) determination if a requirement is relevant and (2) determination if a requirement is appropriate. In general, this involves a comparison of a number of site-specific factors, including an examination of the purpose of the requirement and the purpose of the proposed CERCLA action; the medium and substances regulated by the requirement and the proposed action; the actions or activities regulated by the requirement and the removal action; and the potential use of resources addressed in the requirement and the removal action. When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable. See, CERCLA Compliance with Other Laws Manual, Vol. I, OSWER Directive 9234.1-01, August 8, 1988, p. 1-11.

ARARs are contaminant, location, or action specific. Contaminant specific requirements address chemical or physical characteristics of compounds or substances on sites. These values establish acceptable amounts or concentrations of chemicals which may be found in or discharged to the ambient environment.

Location specific requirements are restrictions placed upon the concentrations of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs relate to the geographical or physical positions of sites, rather than to the nature of contaminants at sites. Action specific requirements are usually technology based or activity based requirements or limitations on actions taken with respect to hazardous substances, pollutants, or contaminants. A given cleanup activity will trigger an action specific requirement. Such requirements do not themselves determine the cleanup alternative, but define how chosen cleanup methods should be performed.

Many requirements listed as ARARs are promulgated as identical or near identical requirements in both federal and state law, usually pursuant to delegated environmental programs administered by EPA and the state. The Preamble to the NCP provides that such a situation results in citation to the state provision and treatment of the provision as a federal requirement. Also contained in this list are policies, guidance or other sources of information which are "to be considered" in the implementation of the removal action. Although not enforceable requirements, these documents are important sources of information which EPA and the Colorado Department of Public Health and Environmental (CDPHE) may consider, especially in regard to the evaluation of public health and environmental risks; or which will be referred to, as appropriate, in developing cleanup actions. *See* 40 CFR Section 300.400(g)(3); Preamble to the NCP, 55 Fed. Reg. 8744-8746 (March 8, 1990). These final ARARs will be set forth as performance standards for any and all removal work plans.

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
FEDERAL				
National Historic Preservation Act	16 USC § 470 et seq., 30 CFR Part 63, Part 65, Part 800	Regulates impacts to historic places and structures	Applicable	Applicable if historic places and structures are impacted by response actions. Will be complied with to the extent practical.
The Historic and Archaeological Data Preservation Act of 1974	16 USC 469	Protects sites with archeological significance	Applicable	Applicable if sites of archeological significance are impacted by response actions. To be considered to the extent practicable.
Historic Sites Act of 1935, Executive Order 11593	16 USC §§ 461 et seq.	Regulates designation and protection of historic places	Applicable	Applicable if designated historic places are impacted by response actions. Will be complied with to the extent practical.
The Archaeological Resources Protection Act of 1979	16 USC §§ 470aa-47011	Regulates removal of archeological resources from public or tribal lands	Applicable	Applicable if archeological resources exist on public or tribal lands affected by the response action. Will be complied with to the extent practical.
Section 404, Clean Water Act	33 USC 1251 et.seq. 33 CFR Part 330	Regulates discharge of dredge or fill materials into waters of the United States	Relevant and Appropriate	To be complied with to the extent practical, considering the exigencies of the removal action.
Executive Order No. 11988 Floodplain Management	Executive Order No. 11988, 42 F.R. 26951	Regulates construction in floodplains	Relevant and Appropriate	Removal action is limited in scope. Will be complied with to the extent practical.

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
Fish and Wildlife Coordination Act	16 USC § 661 et seq. 40 CFR § 6.302(g)	Requires coordination with Federal and State agencies to provide protection of fish and wildlife	Applicable	Applicable if impacts to fish and wildlife will occur. Will be complied with to the extent practical.
Endangered Species Act	16 USC §§ 1531-1543 50 CFR Parts 17, 402 40 CFR § 6.302(b)	Regulates the protection of threatened or endangered species.	Applicable	Applicable if threatened or endangered species are identified. Will be complied with to the extent practical.
Executive Order No. 12962 Recreational Fisheries	16 USC §742 a-d and e-j; 16 USC §661-666c; 42 USC §4321; and 16USC §1801-1882	The order contains a requirement that Federal agencies, to the extent permitted by law and where practicable and in cooperation with State and Tribes, improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities.	Relevant and Appropriate	To be considered to the extent practicable. Removal action is limited in scope.
National Pollutant Discharge Elimination System (NPDES)	40 CFR Parts 122, 125, pursuant to 33 USC § 1342	Regulates the discharge of pollutants to waters of the U.S.	Relevant and Appropriate	To be complied with to the extent practical, considering the exigencies of the removal action.
Clean Water Act Federal Water Quality Criteria	40 CFR Part 131 Quality Criteria for Water, 1986, pursuant to 33 USC § 1314	Sets standards for surface water to protect aquatic life and human health	Relevant and Appropriate	To be complied with considering the exigencies of the removal action to the extent practical.
Federal Total Maximum Daily Loads (TMDLs)	Clean Water Act 33 USC 1313; 40 CFR Part 130.7	Requires states to identify impaired waters and to establish total maximum daily loads to ensure that water quality standards can be attained	Relevant and Appropriate	To be considered to the extent practical.

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
STATE				
Colorado Effluent Limitations	5 CCR 1002-62, pursuant to CRS § 25-8-305	Establishes limitations on effluent	Applicable	Will be met to the extent practicable considering the exigencies of the removal action.
Colorado Hazardous Waste Regulations	6 CCR 1007-3, pursuant to CRS § 25-15-101 et. seq.	Regulates generation, storage and disposal of hazardous waste, and the siting, construction, operation, and maintenance of hazardous waste disposal facilities	Relevant and Appropriate	Will be considered to the extent practical.
Colorado Fugitive Dust Control Plan/Opacity Regulation No. 1	5 CCR 1001-3, pursuant to CRD 25-7-101 et. seq.	Regulates fugitive emissions generated during construction	Relevant and appropriate	Contemplated actions would not trigger permit requirements; however dust control will be required. Will be considered to the extent practical.
Colorado Mined Land Reclamation Regulations	2 CCR 407-1 Rule 3, pursuant to CRS 34-32-101 et. seq.	Regulates all aspects of mining, including reclamation plans and socioeconomic impacts	Relevant and Appropriate	While on-site removal actions do not require permits, the substantive requirements of these regulations are relevant and appropriate to mine reclamation activities including reclamation of waste rock and re-vegetation.

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
Colorado Environmental Covenants Law	CRS §§ 25-15-317 to 327	Requires environmental covenants (ECs) or notices of environmental use restrictions (RNs) whenever residual contamination not safe for all uses is left in place or an engineered feature or structure that requires monitoring, maintenance, or operation is included in the remedy	Applicable (Substantive Provisions)[1]	See footnote
Colorado Wildlife Commission Regulations	2 CCR 406, pursuant to CRS § 33-2-101 et. Seq.	Establishes specific requirements for protection of wildlife	Relevant and Appropriate	Will be considered to the extent practical.
Colorado Species of Special Concern and Species of Undetermined Status	Colorado Division of Wildlife Administrative Directive E-1, 1985, modified	Protects species listed on the Colorado Division of Wildlife generated list.	Relevant and Appropriate	Will be considered to the extent practical.
Colorado Non-game, Endangered, or Threatened Species Act	CRS §§ 33-2-101 to 108	Standards for regulation of non-game wildlife and threatened and endangered species	Relevant and Appropriate	Will be considered to the extent practical.
Historic Places Register	CRS §§ 24-80.1-101 to 108	The State historic preservation officer reviews potential impacts to historic places and structures.	Applicable	Applicable if historic places and structures are impacted by removal actions. Will be considered to the extent practical.

[1] The substantive provisions of CRS §§ 25-15-317, et seq. are ARARs. Creation of a legal EC or RN is dependent on compliance with procedural or administrative provisions at the discretion of CDPHE. CDPHE states that if the EC or RN presented to CDPHE for acceptance or approval includes appropriate land use restrictions, is signed or approved by the landowner, and follows the provisions of the Colorado Environmental Covenant Statute, CDPHE will accept the EC or RN. Further, CDPHE states that ECs and RNs will only be modified or terminated to reflect changes made to the Superfund remedy.