U.S. Bureau of Land Management
Royal Gorge Field Office
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ACTION MEMORANDUM

SUBJECT: Documentation of a Time-Critical Removal Action at the Venture Mine, within the Sugarloaf Mining District, near Leadville, Lake County, Colorado

FROM: Melissa Smeins, Geologist
Royal Gorge Field Office, Bureau of Land Management

TO: Keith Berger, Field Manager
BLM, Royal Gorge Field Office

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of a time-critical removal action at the Venture Mine Site, ("Site") located within the historic Sugarloaf Mining District Site in the Sawatch Mountain Range in the Southern Rockies of central Colorado. This action is being taken pursuant to Section 104(a) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 U.S.C. § 9604, as amended, and Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300.

This removal action will mitigate threats posed by acid mine drainage (AMD) generated by surface water traveling over mine waste and tailings located on public land that is under the jurisdiction, custody and control of the U.S. Bureau of Land Management (BLM) and a small portion of private property located five miles west of Leadville, Colorado. The Site encompasses approximately 7 acres of uplands and stream shorelines.

The majority of the Site is on public land; however, approximately one acre or 14% of the Venture Mine shaft and waste rock piles are on private lands.

II. SITE CONDITIONS AND BACKGROUND

Site Name:	Venture Mine, Sugarloaf Mining District
Site Location:	Lake County, Colorado
Lat/Long:	39.247789/-106.398364

A. Site Description

1. Removal Site Evaluation

The Site is located in the Little Frying Pan Gulch (LFPG), in the Sugarloaf Mining District in Lake County, approximately five miles west of Leadville, Colorado. The Site includes the Gertrude-Venture Mine Complex, located in Section 24, Township 9 South, Range 81 West, of the Sixth Principal Meridian, Colorado.

The mines in this area operated during the 1880s and again shortly after the early 1900s. During that time, miners deposited substantial volumes of waste rock into the LFPG, creating a series of large dumps constricting the ephemeral stream channels.

There are multiple sources of contamination within LFPG; however, the primary source of contamination to the Lake Fork from this area is the physical mobilization of mine waste sediment into the surface water system. The waste rock dumps associated with historic mining are on both Federal and private lands and have elevated metals concentrations when compared to un-impacted soil concentrations above the historic mining sites. The erosion of these waste dumps, either from precipitation run-on/runoff or from the associated stream/gulch, transports metal-laden sediment downstream into the receiving streams of LFPG, Colorado Gulch, and onto adjacent soil creating kill zones as well as airborne distribution of the fine sediments. Metals also enter the surface water system through AMD due to interaction of water with waste rock and direct AMD additions from draining adits. Draining adits are not part of the project work, but occur at several locations in the watershed on private and federal lands. Water in LFPG is primarily from precipitation and seeps, but also includes water from draining mine adits. The surface water system is continually being 'recharged' with metals and acidity throughout the entirety of the LFPG because there are multiple sources for AMD generation. Contamination associated with LFPG extends down the gulch into its receiving tributaries, such as Colorado Gulch and the Lake Fork. Water upstream of the Site periodically exhibits low pH. A measurement of 3.63 was recorded in 2014.

2. Physical Location

The Site is approximately seven acres in size that includes one large mine waste dump that is located within and immediately adjacent to LFPG. The LFPG basin of the Lake Fork Watershed is greater than 9,800 feet in elevation and is a tributary drainage for Colorado Gulch. LFPG discharges into Colorado Gulch, and Colorado Gulch discharges into the Lake Fork approximately 1.5 miles downstream of Sugarloaf Dam at Turquoise Lake. The Lake Fork is a tributary to the Arkansas River. Below Sugarloaf Dam, the Lake Fork flows approximately four miles before its confluence with the Arkansas River.

The Lake Fork receives drainage from a number of tributaries located in the Sugarloaf Mining District. These include Sugarloaf Gulch, which contains the Dinero and Nelson Mine Complex, Strawberry Gulch, and Colorado Gulch. Colorado Gulch receives water from the East and West Fork of LFPG, both of which contain numerous historic mining sites that have been the focus of past and present response actions conducted by the Lake Fork Watershed Working Group (LFWWG) (Attachment 1). The West Fork of LFPG flows through multiple mine complexes, including the Stillings Mine, Golden Curry Mine, Gertrude and Venture Mines. The largest complex is the Gertrude-Venture Mine Complex, which is located at the confluence of the East and West Fork of LFPG. The Tiger Mine Complex is located just upstream in the East Fork of LFPG. The T.L. Welsh Mine complex is located just downstream of the Venture Mines (Attachment 2).

3. Site Characteristics

The Little Frying Pan Gulch demonstrates seasonal flow regimes that are controlled by snowmelt and summer storm events. Peak flow generally occurs from mid-May to mid-June, with secondary peaks during summer monsoon events. Little Frying Pan Gulch is an intermittent stream that can dry up in late summer. The entire LFPG area is approximately 1500 meters long starting at the top of the west fork of the LFPG. The Site includes the west fork of the LFPG directly above the confluence with the east fork of the LFPG and the LFPG below the confluence.

The Lake Fork Watershed is predominantly composed of Precambrian metamorphic and granitic rocks that were uplifted during the Laramide Orogeny, 80-35 million years ago (Cappa and Bartosh, 2007). The Arkansas Valley Graben, and bounding valley faults, is the northern most extent of the Rio Grande Rift, which formed approximately 27 million years ago (Cappa and Bartosh, 2007).

Soils in the watershed are fairly thin above the Arkansas River Valley although some areas contain substantial deposition of glacial till. NRCS soil map units of GrE (Granile gravelly sandy loam) and TrE (Troutville gravelly sandy loam) are associated with the watershed (SSURGO, 2010). Both units are found on slopes of 3 to 35˚ in mountainous regions and are made of parent materials that consist of moderately coarse-textured gravelly alluvium, colluvium, and glacial till (SSURGO, 2010). Depths to root restrictive layers are typically greater than 40 inches. Runoff over these soils is medium to high which promotes erosion (SSURGO, 2010). On the valley floor, where slopes are gentle, soils are sandy and loamy. There are areas of riparian marsh soils near the Lake Fork as well as at inlets of tributaries.

Flow in the watershed originates as both surface runoff, from direct precipitation and snowmelt, as well as baseflow from seeps and abandoned adit openings. Fractured bedrock aquifers are the primary sources of groundwater in the watershed. Snowmelt runoff from the higher elevations markedly augments the flow of the Lake Fork and its tributaries. Peak flow occurs between late May and early June from snowmelt (Walton-Day and Poeter, 2009). Occasionally, large amounts of summer rainfall and spring runoff alter drainage morphologies. Ephemeral runoff has been observed to erode mine waste dumps. This has been hypothesized to affect water quality, with the mobilization of heavy metals and mine waste sediment that are deposited at locations downstream (LFWWG, 2012).

The watershed is predominantly coniferous forest dominated by lodgepole pine. Slopes within the watershed tend to be steep with minimal undergrowth and scattered with pine needle litter. The southern end of the watershed is an open, high mountain valley dominated by riverine, riparian and wetland habitats. The valley basin transitions with increased elevation, into a montane and sub-alpine ecosystem. The beginning of the alpine zone (alpine tundra) may vary, but is generally considered to be between 11,200 feet and 11,700 feet in elevation.

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

A site-specific streamlined human health and ecological risk assessment for the Site was completed for the BLM in 2016 (TechLaw/ECM, 2016). This assessment used dissolved water quality data to assess aquatic risk at the Site. Aquatic life at the Site is minimal at present, due to adverse impacts from the waste rock piles. Site concentrations were compared with ecological Ambient Water Quality Criteria (AWQC) to assess aquatic risk using the hazard quotient (HQ) approach. HQ ratios (Site concentration/AWQC) above 1.0 were considered to pose a potential aquatic risk. The highest HQs for water samples collected at the Site were 350 for aluminum, 531 for zinc and 931 for cadmium, indicating the potential for significant risk impacts.

Human exposure at the Site was considered minimal; however, the maximum detected concentration of lead in LFPG, 102 µg/L, was well above the federal action level for drinking water of 15 µg/L. Although the human and ecological risk assessments were focused on water in the stream, the adjacent waste rock piles were considered to be the ultimate source of risk at the Site. The nearest drinking water wells are located downstream about 1 mile.

Lead

There is a potential for humans to come into direct contact with material in the pile. Lead is classified as a B2 carcinogen by EPA, and lead compounds are known to cause acute health effects (the classification as a carcinogen is the result of animal studies determining that these compounds are probable human carcinogens). Lead can enter the body via ingestion and inhalation. Children appear to be the segment of the population at greatest risk from toxic effects of lead. Initially, lead travels in the blood to the soft

tissues (heart, liver, kidney, brain, etc.). Then, it gradually redistributes to the bones and teeth where it tends to remain. Children exposed to high levels of lead have exhibited nerve damage, permanent mental retardation, colic, anemia, brain damage, and death. Lead is a hazardous substance as defined by Section 101(14) of CERCLA. The most serious effects associated with markedly elevated blood lead levels include neurotoxic effects such as irreversible brain damage.

Aluminium

Aluminum is ubiquitous; the third most common element of the earth's crust. It is naturally released to the environment from the weathering of rocks and volcanic activity. Human activities such as mining also result in the release of aluminum to the environment. Aluminum levels in surface water is usually very low, however, in acidic waters or water high in humic or fulvic acid content, the concentration of soluble aluminum increases due to the increased solubility of aluminum oxide and aluminum salts. The general population is primarily exposed to aluminum through the consumption of food items, although minor exposures may occur through ingestion of aluminum in drinking water and inhalation of ambient air.

There are numerous studies that have examined aluminum's potential to induce toxic effects in humans exposed via inhalation, oral, or dermal exposure. Most of these findings are supported by a large number of studies in laboratory animals. Occupational exposure studies and animal studies suggest that the lungs and nervous system may be the most sensitive targets of toxicity following inhalation exposure. Respiratory effects, in particular impaired lung function and fibrosis, have been observed in workers exposed to aluminum dust or fumes; however, this has not been consistently observed across studies and it is possible that co-exposure to other compounds contributed to observed effects.

There is limited information on aluminum toxicity following dermal exposure. The EPA has not evaluated aluminum or aluminum compounds for carcinogenicity. Aluminum can be defined as a pollutant or contaminant under section 101(33) of CERCLA.

Cadmium

There is potential for humans to come into contact with material in the pile. Cadmium is classified as Group B1, probably carcinogen. Cadmium can accumulate in aquatic organisms and agricultural crops. It is typically ingested and enters the system through the digestive tract. The acute (short-term) effects of cadmium in humans through inhalation exposure consist mainly of effects on the lung, such as pulmonary irritation. Chronic (long-term) inhalation or oral exposure to cadmium leads to a build-up of cadmium in the kidneys that can cause kidney disease. Exposure to lower levels for a long time can cause bones to become fragile and break easily. Ingesting high levels of cadmium severely irritates the stomach leading to vomiting and diarrhea and sometimes death. Health effects in children appear to be similar to the effects seen in adults. Cadmium is a hazardous substance as defined by Section 101 (14) of CERCLA.

Copper

Copper is an essential element necessary for maintaining good health in humans, but high doses can be harmful. Oral ingestion of high amounts of copper may cause vomiting diarrhea, stomach cramps, and nausea. Chronic ingestion of high amounts of copper can cause liver and kidney damage. Copper is a hazardous substance as defined by Section 101 (14) of CERCLA.

NPL Status

The Site is neither on nor currently being considered for inclusion on the Superfund National Priorities List (NPL).

Maps, Pictures, Other Geographic Representation

Site maps are included as Attachment 1 and 2.

B. Actions to Date

Previous Actions

Beginning in 2000 several environmental studies were conducted within the Historic Sugarloaf Mining District:

- Between 2002 and 2014, the Lake Fork Watershed Working Group conducted several sampling events to investigate metals loading sources to the Lake Fork. Water sampling occurred during both high and low flow conditions. Results determined that during low flow, Colorado Gulch is not a significant source of metal loading into the Lake Fork, but during high flow Colorado Gulch can contribute up to 80% of zinc loading into the Lake Fork (CMC NRM, 2004). This study determined that the majority of dissolved metals loading can be attributed to the East Fork of LFPG predominantly due to the Tiger Mine Complex located upstream of the Venture Mine site.
- In 2005, the Matrix Design Group was contracted by the Colorado Water Conservation Board to conduct a watershed evaluation of the Lake Fork. The primary goals of the project were to analyze the Colorado Gulch tributary system by compiling existing information on LFPG, to identify areas of concern in the watershed, and to develop potential strategies for addressing those issues (Matrix, 2005). No new data was collected during this effort. This study concluded that there are two primary water quality concerns within LFPG. The primary concerns are the AMD from the Tiger Tunnel, Venture Shaft, and Cabin Shaft. The secondary water quality concerns are the contact of runoff with mine waste dumps located within LFPG. The Venture Shaft, a nearly vertical shaft that is likely connected to the adit that is the source of the adjacent waste rock dumps, is only known to discharge during high flow conditions. The Cabin Shaft similarly discharges only during high flow conditions. While the Matrix report provides preliminary data and design alternatives, further on-the-ground investigations, data collection, and analysis have been conducted since the culmination of that report.
- Mine openings at the Site were closed to prevent human and animal access in 2007 due to safety concerns.
- In 2007, Colorado Division of Reclamation Mining and Safety (CDRMS) sampled and assessed mine waste dumps throughout the Sugarloaf Mining District, including LFPG. During the 2007 investigation, sampling was conducted in order to determine a physical rating, total metal concentration, and the acid production and metal leaching potential (method by Smith, Ramsey, & Hageman, 2000) of the mine dumps. The waste dumps were physically ranked against each other by comparing five criteria which included: erosion potential, salt crust, kill zone, amount of vegetation on the dump, and distance to the base of the drainage. The scale for each criteria is a numeric value that ranges from one through five, with a five value indicating the highest likelihood of an environmental impact.
- In 2014, Colorado Mountain College (CMC) conducted additional geochemical characterization of mine waste throughout LFPG. During the 2014 investigation composite sediment samples were collected at mine waste dumps throughout LFPG and

were analyzed with an X-Ray Fluorospectormeter (XRF) for total metals content (Attachment 4).

- In August 2010, CMC Natural Resource Management (NRM) personnel conducted a reconnaissance event in the West Fork of LFPG in order to better understand the hydrology of the gulch and to identify the source(s) of contamination within the gulch. During spring runoff, from early May through early to mid-July, surface water flows through the west fork of LFPG, and enters LFPG at the confluence with the east fork of LFPG. Field investigations during low flow conditions have determined that intermittent flow, through a combination of surface and groundwater, is present just downstream of the Cabin Shaft to a point just above the Gertrude-Venture. At this point, surface flow transitions to what is suspected to be mine workings and bedrock fractures. During low flow conditions, flow does not reach the Gertrude-Venture Complex or lower LFPG. Flow in LFPG is perennial and that receives discharge from groundwater and other sources during low flow conditions. Below the Gertrude-Venture complex water daylights and then disappears in several places throughout LFPG.
- Based on findings from the CMC NRM August 2010 reconnaissance, a bromide (Br-) tracer study was conducted to determine if surface and/or ground water from the West Gulch of LFPG was hydrologically connected to the surface water flows in lower LFPG and subsequently to the Lake Fork via Colorado Gulch during low flow conditions or if it instead was routed through the Siwatch Tunnel drainage and entered the Lake Fork via the Siwatch Wetlands. The Siwatch Tunnel is a 2,000-foot, continuously draining, production tunnel transecting the West Fork of LFPG south-east and discharging near the Lake Fork of the Arkansas River (Figure 1). Historic mining data (Singewald, 1955) indicates a possible connection between the Venture Shaft and the Siwatch Tunnel located lower in the watershed, however this study did not confirm a connection.
- This study shows that remediation efforts would need to focus on high flow conditions, when it is known that water from the West Fork of LFPG reaches Colorado Gulch and eventually the Lake Fork.
- A Removal Site Evaluation (RSE) was completed by BLM in March of 2016 which characterized the mine tailings at the Site. The RSE documented that elevated levels of aluminum, arsenic, cadmium, lead and zinc are present in the waste rock and mine tailings as a result of the silver ore processing procedures. The screening level risk assessment in the RSE concluded that humans and biota accessing the Site were exposed to metal concentrations well above risk-based screening levels. There are no signs of aquatic life in the LFPG, or in Colorado Gulch below the confluence with the LFPG. This lack of aquatic life is primarily due to the high metals concentrations in surface water.

From 2002 forward, the Lake Fork of the Arkansas Watershed Working Group, including the BLM , U.S. Forest Service (USFS), Bureau of Reclamation, land owners, CMC, Colorado State Forest Service (CSFS), Colorado Parks and Wildlife (CPW) and private entities, have been coordinating and conducting surface water sampling throughout the watershed in order to assess baseline conditions and evaluate potential impacts from multiple sources in the Lake Fork of the Arkansas Watershed. These actions and other Site-specific investigations were used to inform the removal action detailed in this document.

C. State and Local Authorities' Role

The BLM is exercising its delegated CECLA authority as the lead agency to address contamination at the Site. In this capacity the BLM has coordinated with State and local agencies to identify potential applicable or relevant and appropriate requirements.

Significant efforts have been made by various federal, state and local stakeholders to quantify the quality of water in the historic Sugarloaf Mining District. These stakeholders include an organized watershed group that includes the CMC, USFS, BLM, the U.S. Geological Survey, and CDRMS.

The state and local authorities have contributed their staff time and have obtained outside funding to implement this work in concert with BLM. DRMS is also contributing staff time and some funding to manage the implementation of the work. CMC will also assist with project reclamation post-removal using 319 grant funds. The BLM will continue to coordinate with state and local representatives and keep them apprised of all activities related to this removal action.

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 the environment, and meet the criteria for initiating a removal action pursuant to CERCLA Section 104(a) and 40 CFR 300.415(b) (2) of the NCP.

Pursuant to 40 CFR 302.4, the heavy metals found at the Site are listed as hazardous substances and have been detected at levels that present a direct threat to public health and the environment. Exposure to these metals could lead to both acute and chronic health effects in wildlife. Because of the unstable conditions and dangerous nature of the contaminants and the concentrations in which they have been 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 300.415(b)(2) of the NCP.

The EPA and BLM have 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;*

The toxic metals in the waste rock piles present an actual exposure to ecological aquatic level receptor groups and potential exposure to humans recreating in the Site. Potential pathways of human and animal exposure include ingestion while walking and/or inhalation of airborne dust from mine waste dumps.

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

Soil concentrations of greater than 1,000 mg/kg lead were identified in the Site Area. Overland flow that develops during snowmelt and rainfall events entrains contaminated soils from exposed waste piles and deposits them as sediment into SG, LFPG, and Colorado Gulch. Dissolved metals concentrations in the surface water exceed ambient water quality criteria for cadmium, copper, lead and acidity.

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

Annual snowmelt runoff and seasonal high intensity precipitation events both mobilize waste rock material along streams throughout the mining district. This contributes to increased migration of the toxic

metals in the waste rock across the Site in SG and LFPG into Colorado Gulch where the mine waste is deposited.

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

There are no other federal or state mechanisms that are available to respond to the release.

IV. ENDANGERMENT DETERMINATION

Exposures to the heavy metals associated with waste rock have a detrimental effect on both human health and ecosystems. While elevated concentrations of some heavy metals occur naturally in certain areas, the Site contains metals concentrations substantially greater than conditions found in natural settings. In addition, the mine wastes are highly mobile due to the unstable nature and location of the deposition on the ground surface directly adjacent to the Little Frying Pan Gulch. The actual or threatened releases of these hazardous substances from the Site, if not addressed by implementing the response action described in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

The following cleanup actions will reduce the potential for environmental exposure to cadmium, copper, lead, and acidity from contaminated Site mine wastes and will mitigate the ongoing significant metals-loading of Lake Fork of the Arkansas. Goals of this project are also to improve the water quality of the Lake Fork by reducing mobilization of mine waste sediment, metals loading, and acidity in the Little Frying Pan Gulch, to improve aquatic habitat and water quality for trout, and to continue the collaborative approach to watershed restoration in the Lake Fork Watershed

This removal action will be conducted by the BLM pursuant to its lead agency authority for work on Federal land, which includes the Site and the consolidation repository. CDRMS will be conducting the contractor bidding process for the work and will implement the cleanup activities with the selected contractor, with respective oversight from the BLM. CMC NRM will be helping with the work by utilizing its heavy equipment program to install run-on/runoff diversion ditches and stream restoration work after waste pile removal has occurred.

Funds are being provided for this removal action by Freeport McMoRan Inc. as part of their community policy program. CDRMS will also be providing cash and in-kind match for the Sec. 319 sub-award project.

Proposed time critical removal actions include the following:

- Prepare mine waste consolidation area: tree removal, chip and stockpile trees, excavate and stockpile approximately 7,200 cubic yards of soil and subsoil for use as cover.
- Excavate and consolidate approximately 5400 cubic yards of mine waste rock in LFPG (see Attachment 2 for piles to be excavated). The consolidation area will consist of one cell located in the eastern portion of the Site on BLM land. The design includes a combination of minimum 4:1 side slopes, a soil cap, and a vegetated cover. This is a cost-effective solution that allows for more efficient long-term management of the Site.

- Install in-channel structures such as log jams, grade control, log barriers, and sediment settling basins in both gulches to reduce erosion and to collect any residual sediment.
- Repair, restore, and re-vegetate excavated areas to protect against erosion; and restore stream channel through the work areas.

The mine waste and tailings at the Site are, for the most part, visually apparent (have a distinct yellow-orange color, lack of organic material). Accordingly, excavation of the wastes will be guided by visual cues; however, where not visually obvious, soil sampling and XRF analysis may also be utilized by the contractor on waste piles on both Federal and private land to determine where excavation of waste rock is necessary. In some cases, the geology and topography of the Site will be considered to determine depth of excavation. Excavations will cease if there is risk of de-stabilizing an existing slope. In general, the adherence to a numeric clean-up target is greatly dependent upon the geological setting and conditions found throughout the excavation of waste materials.

Applicable or Relevant and Appropriate Requirements

This time-critical removal action will attain, to the extent practicable, considering the exigencies of the situation, applicable or relevant and appropriate requirements, ("ARARS"). In determining whether compliance with an ARAR is practicable, the lead agency may consider appropriate factors, including the urgency of the situation and the scope of the removal action to be conducted. Identified ARARs are included as Attachment 5.

Project Schedule

Work is expected to start in mid-August. The goal is to have all work completed in the 2016 field season, but completion is dependent on weather conditions.

B. Estimated Costs*

Move and Consolidate Tailings in Repository	$335,000
Total Removal Action	**$335,000**

*BLM 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 BLM as set forth in Section 107 of CERCLA.

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

A delay in action or no action at this Site will result in the continued migration or threat of migration of hazardous substances off-site into the LFPG and leave unabated the actual or potential threats to the public health and/or the environment.

VII. OUTSTANDING POLICY ISSUES

None

VIII. ENFORCEMENT

There are no current regulatory enforcement activities under CERCLA, the Clean Water Act, the Clean Air Act, or the Resource Conservation and Recovery Act.
A separate Enforcement Addendum will be prepared if needed.

IX. RECOMMENDATION

This decision document provides the basis for and memorializes the decision to select the time critical removal action at the Site. It was developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the Site.

Conditions at the Site meet the NCP Section 300.415(b) criteria for a removal action and I recommend your approval of the proposed removal action. The total project ceiling, if approved, will be $495,000; of this amount, an estimated $0 will be funded directly from BLM. $335,000 will be provided by Freeport-McMoRan Inc.

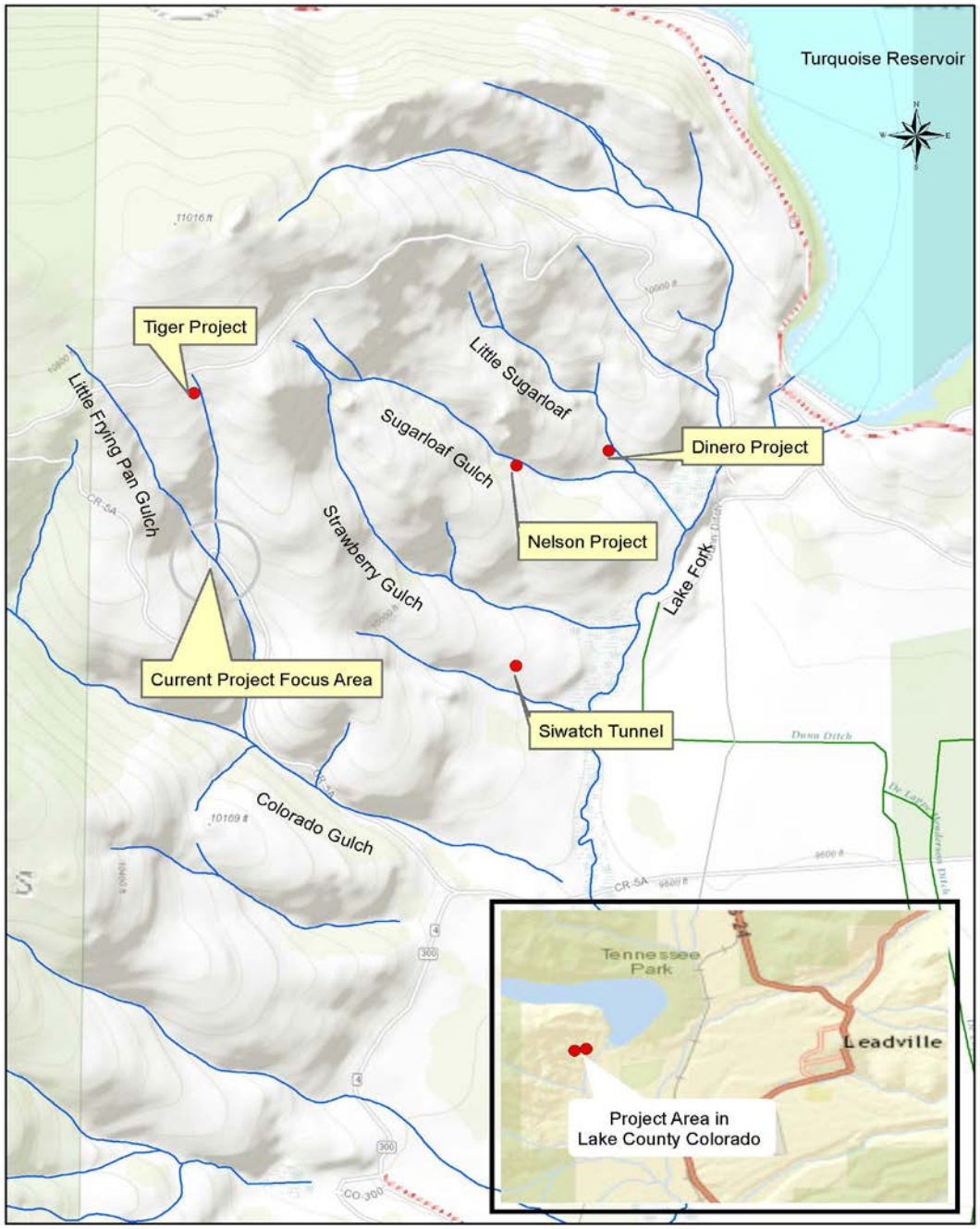
Approve: _____ Date: 8/12/16
Keith Berger, Field Manager
USDOI-Bureau of Land Management, Royal Gorge Field Office

Disapprove: _____ Date: _____
Keith Berger, Field Manager
USDOI-Bureau of Land Management, Royal Gorge Field Office

Attachments:

Attachment 1: Location Map of Venture Mine Site
Attachment 2: Detail Map of Venture Mine Site
Attachment 3: Maximum Concentrations of Metals in Reference Samples.
Attachment 4: Sediment XRF Results compared to screening criteria.
Attachment 5: ARAR List.
Attachment 6. References

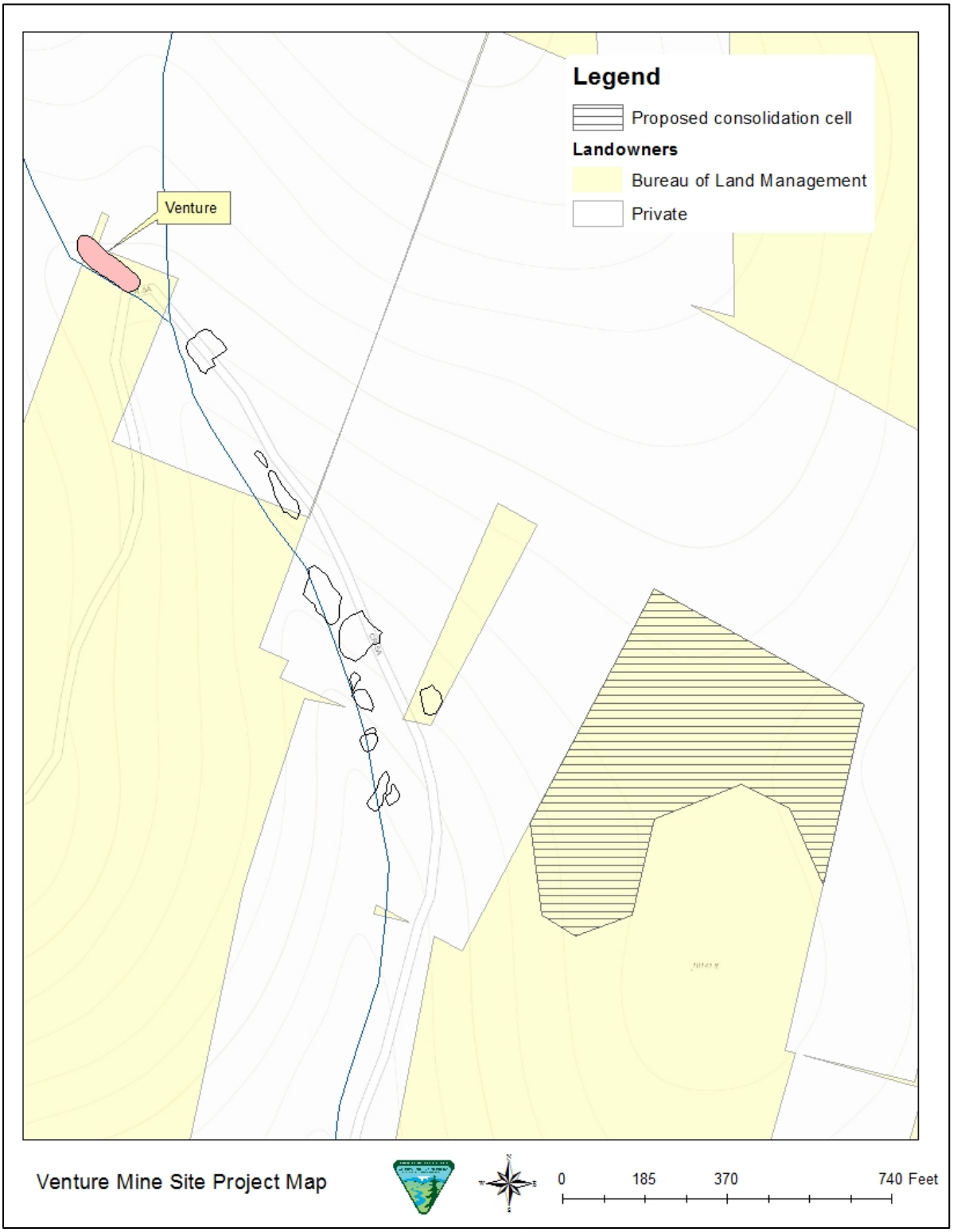
Attachment 1. Overview map of Historic Sugarloaf Mining District



Little Frying Pan Gulch Project Area Overview

0 0.1 0.2 0.4 0.6 0.8 Miles

Attchment 2a. Map showing Venture Mine Site in LFPG



Attachment 3- Maximum Concentrations of Metals in Reference Samples, Venture Mine - Sugar Loaf Mining District, Lake County, CO

	Site Sample Location		Overall MDC of Reference Sample Locations		Arithmetic Means of MDCs at Reference Sample Locations		Reference Sample Locations									
	LPFW-11						CS		LFPW-01		LFPW-05		LFPW-09		LFPW-10	
Metals	**MDC Total Metals**	**MDC Dissolved Metals**	**Total Metals**	**Dissolved Metals**	**Total Metals**	**Dissolved Metals**	**MDC Total Metals**	**MDC Dissolved Metals**	**MDC Total Metals**	**MDC Dissolved Metals**	**MDC Total Metals**	**MDC Dissolved Metals**	**MDC Total Metals**	**MDC Dissolved Metals**	**MDC Total Metals**	**MDC Dissolved Metals**
Aluminum	6,358	6,321	6,927	6,972	3,366	3,989	1,531	1,598	181	52	6,580	6,572	4,975	4,750	6,927	6,972
Arsenic	ND	ND	ND	ND	N/A	N/A	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	72	64	58	58	27	26	9.60	7.11	0.61	0.53	32.34	31.96	34.76	34.85	57.57	57.87
Copper	78	79	59	58	27	26	25.02	21.81	2.46	1.32	58.50	58.00	16.80	16.70	33.70	33.10
Iron	4,402	2,988	42,670	42,410	10,307	10,123	42,670	42,410	125.00	28.00	2,243	2,123	5,574	5,672	922	380
Manganese	14,580	14,660	45,930	45,530	26,241	26,187	45,930	45,530	143.00	116.00	22,910	22,720	34,980	35,120	27,240	27,450
Lead	63	102	27	24	19	10	17	3.90	ND (<2)	ND (<2)	26.90	23.80	21.00	19.10	26.00	3.10
Selenium	18	ND	17	19	9	10	17.20	19.20	ND (<2)	ND (<2)	9.00	8.20	9.10	10.30	8.10	9.20
Zinc	6,943	7,204	12,980	15,780	5,910	8,687	7,014	6,990	171.00	166.00	7,390	7,417	1,996	15,780	12,980	13,080

Notes:
All concentrations are in micrograms per Liter (µg/L).
CS = Cabin Shaft, MDC = Maximum Detected Concentration, N/A = Not applicable, ND = Not detected

Attachment 4 - Sediment XRF Results compared to Residential RSL, Venture Mine, Sugar Loaf Mining District, Lake County, CO

Sample ID		Chromium	Manganese	Iron	Copper	Zinc	Arsenic	Silver	Cadmium	Lead
Residential RSL		*120,000*	*1,800*	*55,000*	*3,100*	*23,000*	*0.68*	*390*	*71*	*400*
Venture-1	LFP-17	<LOD	237	20,766	<LOD	822	25	83	<LOD	2,568
Venture-2	LFPW-06	45	128	30,739	35	395	54	96	<LOD	899
Venture-2b	LFPW-06	<LOD	175	28,397	43	405	52	95	<LOD	880
Venture-3	LFPW-06	<LOD	<LOD	17,350	<LOD	1,343	<LOD	129	<LOD	3,933
Venture-4	LFPW-06	<LOD	<LOD	9,572	10	735	<LOD	252	<LOD	2,200
Venture-5	LFPW-05	44	<LOD	38,647	35	503	26	89	<LOD	965
Venture-6a	LFPW-03	<LOD	<LOD	16,495	<LOD	374	18	134	<LOD	2,374
Venture-6b	LFPW-03	<LOD	<LOD	21,928	<LOD	463	54	162	<LOD	2,106

Results in mg/kg

Attachment 5 – Applicable or Relevant and Appropriate Requirements

Chemical-Specific ARARs

Media	Citation	Applicability
Surface Water	Clean Water Act, Section 303, Water Quality Standards; National Toxics Rule (40 CFR 131.6) CDPHE, Water Quality Control Commission. Regulation No. 32 Classifications and Numeric Standards for Arkansas River Basin	Federal and State requirements related to the quality of surface water including Little Frying Pan Gulch and other rivers and streams in the area of the Venture Mine Site.

Location –Specific ARARs

Media	Citation	Applicability
Water bodies	Section 404, Clean Water Act (CWA) 33 CFR 330	Regulates discharge of dredge or fill materials into waters of the United States.
Wetland	Executive Order 11990-Applies to Federal Actions affecting wetlands. Actions must be implemented to minimize the destruction, loss or degradation of wetlands. Compensatory mitigation for unavoidable impacts to wetlands may be required.	Federal requirements applying to portions of the Venture Mine Site located in possible wetlands area adjacent to Little Frying Pan Gulch.
Floodplain	Executive Order 11988-Applies to Federal Actions affecting floodplains. Actions must be implemented to minimize potential harm to or within the floodplain and to restore or preserve floodplain valued.	Federal requirements applying to portions of the Venture Mine Site located on the Little Frying Pan Gulch floodplain or removal actions affecting the floodplains.

Action-Specific ARARs

Media	Citation	Applicability
Hazardous and Solid Waste	RCRA Subtitle C-Hazardous Waste Characteristics, Contained-in Policy, and Land Disposal Restrictions (40 CFR Part 261 and 268). These sections, however, will not apply due to the Bevill exemption for mining waste. RCRA Subtitle D-Non-hazardous Solid Waste (40 CFR Parts 257 and 258). Applies to the management of non-hazardous solid waste. State of Colorado Regulations Pertaining to Solid	Federal and State requirements related to the management of solid waste generated from the removal actions performed at the Venture Mine Site.

	Waste Disposal Sites and Facilities, 6 CCR 1007-2 CDPHE, Hazardous Materials & Waste Management Division, 6 CCR, 1007 Parts 260-264)	

Attachment 6. References

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Walton-Day, K. and Poeter E., 2009, Investigating hydraulic connections and the origin of water in a mine tunnel using stable isotopes and hydrographs. Applied Geochemistry. v. 24. p. 2266-2282.