



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON D.C. 20460

**ACTION MEMORANDUM**

**SUBJECT:** Documentation of an Emergency Removal Action at the Gold King Mine Release Site, San Juan County, Colorado, initiated pursuant to the On-Scene Coordinator's delegated authority under CERCLA Section 104 and a Request for Approval and Funding to Continue the Emergency Removal Action including Exemptions from the 12-Month and \$2 Million Statutory Limits on Removal Actions

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Site ID# A8K9

**I. PURPOSES**

The purposes of this Action Memorandum are to document the decision to initiate an emergency removal action pursuant to the On-Scene Coordinator's delegated authority under CERCLA Section 104 and request and document approval and funding to continue the emergency removal action including exemptions from the 12-Month and \$2 million statutory limits for the ongoing activities since the beginning of the response and proposed activities described herein for the Gold King Mine Release Site (Site). The major components of this removal action include: stabilizing the Gold King Mine waste rock dump, temporary treatment of the acid mine discharge in treatment ponds, removal of waste rock deposited in Cement Creek from the Gold King mine release, flow control measures in

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<sup>1</sup> Effective on December 15, 2015, the Office of Solid Waste and Emergency Response (OSWER) became the Office of Land and Emergency Management (OLEM). 80 Fed Reg 77575 (December 15, 2015). The AA for OLEM now carries out all of the functions and duties of the AA for OSWER.

the adit/portal, ground control for the underground workings, treatment of the acid mine discharge in an interim water treatment system, provision of alternative water supplies, and provision of feed for livestock.

This emergency removal action was implemented following the release of approximately three million gallons of accumulated acid mine water from within the Gold King Mine into Cement Creek which is a tributary to the Animas River. Removal actions to stabilize the Gold King Mine Site are continuing and monitoring of the watershed to assess potential impacts from the release was terminated in mid-December 2015. There continues to be a threat or potential threat to public health and the environment such that the criteria for initiating and continuing a removal action continues to exist under 40 CFR 300.415(b) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

In accordance with the Superfund Removal Guidance for Preparing Action Memoranda (“AM Guidance”) (OSWER Sept. 2009), removal actions that may affect other sovereign nations, including Indian Tribes, are issues of national significance, and require concurrence from the EPA Office of Land and Emergency Management (OLEM). This emergency removal action is considered nationally significant or precedent setting as the release may have had an impact or threatened to impact resources of the Southern Ute Indian Tribe, Ute Mountain Ute Tribe, and the Navajo Nation as acid mine water from this release flowed into the Animas River and San Juan River.

Pursuant to the Superfund Delegation of Authority 14-2, the Assistant Administrator of OLEM (AA/OLEM) and Regional Administrators are delegated the authority to respond to any release or threatened release of a hazardous substance, pollutant, or contaminant, pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Section 104, and 40 CFR Part 300 of the NCP. This authority is subject to several limitations. Two limitations that are particularly relevant to the removal actions proposed are the following:

- Removal actions costing more than \$6 million and requiring an emergency exemption from the \$2 million statutory limit must be approved by the AA/OLEM.
- Regional Administrators may exercise these authorities only at sites located within their respective Regions, unless there is a memorandum of agreement that authorizes cross-boundary emergency response.

Since the AA/OLEM must approve this removal action, and this removal action crosses Environmental Protection Agency (EPA) Regional boundaries, and there is no memorandum of agreement in place between the three affected Regions, this Action Memorandum is prepared for direct approval of the AA/OLEM.

## **II. SITE CONDITIONS AND BACKGROUND**

Site Name:	Gold King Mine Release
Superfund Site ID (SSID):	A8K9
NRC Case Number:	1124824

SEMS Number:	TBD
Site Location:	Gladstone, San Juan County, Colorado
Lat/Long:	37.8946/-107.6384
NPL Status:	Non NPL
Removal Start Date:	8/5/2015

## A. Site Description

### 1. Removal Site Evaluation

The Gold King Mine is located within the Cement Creek watershed, a component of the upper Animas River watershed. The watersheds are within the volcanic terrain of the San Juan Mountains and contain some 400 abandoned or inactive mine sites, which have been the focus of both large- and small-scale mining operations generally occurring between 1871 and 1991.

Many inactive and abandoned mines exist within a two-mile radius of the Animas River headwaters including: the Upper Gold King, Sunnyside Mine/American Tunnel, Grand Mogul, Mogul, Red and Bonita, Eveline, Henrietta, Joe and John, and Lark mines. Some of these mines produce flows of acid mine drainage between 30 to 300 gallons per minute (gpm) that directly or indirectly enter Cement Creek and eventually reach the Animas River. The Animas River and many of its tributaries, including Cement Creek, carry elevated concentrations of hazardous substances (heavy metals) due to both acid rock/mine drainage generated from mining activities and from naturally mineralized sources. This emergency removal action is associated with a release of acid mine water and mine waste sediments containing heavy metals from the Gold King Mine. This release occurred during an EPA removal assessment on August 5, 2015.

It is estimated that approximately three million gallons of acid mine water was released into Cement Creek which is a tributary to the Animas River. The primary environmental concern from this spill was the short-term surge of acid mine water containing sediment and heavy metals which presented a potential threat to the downstream portions of the Animas River (Colorado, Southern Ute Indian Tribe, and New Mexico), San Juan River (New Mexico, Navajo Nation, Ute Mountain Ute Tribe), and Lake Powell (Utah, Navajo Nation, Arizona). These water bodies are used for drinking water for human consumption, water for livestock consumption, irrigation water, and various recreational uses, including fishing and boating. The release flowed downstream as an orange-colored plume through Silverton and Durango, Colorado, and into New Mexico. The plume was substantially diluted as the Animas River joined the San Juan River (near Farmington, NM) by water releases from the Navajo Lake Dam into the San Juan River. See Attachment 1, Map of Gold King Mine Release Path.

## **2. Physical Location**

The Gold King Mine is in the Cement Creek watershed which originates in the San Juan Mountains in San Juan County, Colorado. The mine portal is approximately 9 miles north of the town of Silverton, Colorado, at 11,439 feet above mean sea level (AMSL). The latitude is 37.8945 and longitude is -107.6384. Average snowfall at the mine site is approximately 12 feet per year and construction seasons are of limited duration, typically July through mid-October. Sampling measures associated with the response were conducted from the mine site down Cement Creek, the Animas River (Colorado, Southern Ute Indian Tribe, and New Mexico), San Juan River (New Mexico, Navajo Nation, Ute Mountain Ute Tribe), and to Lake Powell (Utah, Navajo Nation, Arizona)(see Attachment 1).

## **3. Site Characteristics**

The Gold King Mine began operation in the late 1880s and continued underground mining operations until the mid-1900's. Colorado issued a permit in 1986 for operations to re-work three historic interconnected portals – the Level 7, Number 1, and Sampson portals. A new adit was constructed at the Level 7 portal as part of these permitted mine operations to bypass a collapse in the original Level 7 portal. None of the four permitted portals discharged mine drainage at that time as Sunnyside's American Tunnel, located immediately below in Gladstone, drained the mining district.

The nearby Sunnyside Gold Mine operated until 1991 and conducted water treatment on the discharge from the American Tunnel that ranged from approximately 1400 to 2100 gpm. In 1995, the Sunnyside Gold Corporation installed the first of three plugs (bulkheads) to seal off drainage flows from the American Tunnel. The flow from the Gold King Mine as well as the inactive Mogul, and Red and Bonita Mines experienced significantly increased drainage following the plugging of the American Tunnel. The Gold King Mine was discharging approximately 200 gpm or more of acid mine drainage since 2005. In addition, even after plugging, the American Tunnel continued to flow at about 100 gpm. From 2009 to through August, 2015, the combined flows from the Mogul, Red and Bonita, Gold King mine adits and the American Tunnel into Cement Creek have ranged from 600 to 800 gpm or about 314-420 million gallons per year, with increases in metals loadings observed 40 miles downstream in the Animas River.

The two Gold King Mine Level 7 portals had partially collapsed prior to 2008 when the State of Colorado Division of Reclamation, Mining and Safety (DRMS) began reclamation work. While DRMS was performing filling work around the observation pipe and drainage pipe that they had installed, the Level 7 portal timbers collapsed and loose soils and debris completely covered the pipes. These collapsed materials and accumulated soils prevented EPA personnel from accessing the mine workings to evaluate the source of water discharging from the

mine. EPA's 2014 and 2015 investigations of the disturbed slope and hillside above and around the adit portal showed no sign of water seepage other than the drainage at the base of the collapsed material and water draining from the pipe installed outside of the blockage.

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

The release of three million gallons of acid mine water and mine waste sediments that occurred on August 5, 2015 at the Gold King Mine resulted in a spike of elevated metals concentrations flowing through the waters of Cement Creek. The dissolved concentration of discharged metals included zinc (24,000 micrograms per liter ( $\mu\text{g/L}$ )), lead (11  $\mu\text{g/L}$ ), arsenic (1.2  $\mu\text{g/L}$ ), and iron (70,000  $\mu\text{g/L}$ ). The spike concentrations had significantly decreased at Baker's Bridge, thirteen miles north of Durango, with concentrations of zinc (1700  $\mu\text{g/L}$ ), lead (1.56  $\mu\text{g/L}$ ), arsenic (0.5  $\mu\text{g/L}$ ), and iron (189  $\mu\text{g/L}$ ). These metals are listed as hazardous substances under 40 CFR §302.4, with the exception of iron. (Note: total metal concentrations in water are higher. These numbers are meant to document the actual release of hazardous substances.)

#### **5. NPL Status**

The Site is not listed on the NPL.

#### **6. Maps, Pictures, Other Geographic Representations**

See Attachment 1, Map of Gold King Mine Release Path.

### **B. Other Actions to Date**

#### **1. Previous Actions**

Prior to undertaking the removal assessment discussed above, EPA had periodically sampled the water discharging from the Gold King Mine. The Colorado DRMS had also conducted reclamation activities at the Gold King Mine as described below.

In 2008 and 2009, DRMS conducted reclamation work at the Gold King Mine using bond forfeiture funds (Project Summary Phase 1, 2008 and Project Summary Phase II, 2009). Both the old and new Level 7 adit portals, which had partially collapsed, were backfilled after DRMS installed drainage pipe. The two adit portals are located within approximately 100 feet of each other. The western portal is the older with the newer eastern portal constructed in 1985. The correct distinction between the "old" and "new" portals is based on interviews in 2015 with the mining engineer and survey information from 1986, which differs from the DRMS Project Summary information. An observation pipe and a drainage pipe were installed in the east portal (incorrectly referred to as the "old portal" in

the DRMS Project Summary, 2009). After the timbers collapsed during closure of the portal, discharges from the drainage pipe continued to drain at roughly 200 gpm from the east portal; the same flow rate as was observed prior to the collapse. A concrete ditch was installed to receive discharge from the east portal and a 3-inch flume was installed between the concrete ditch and the half round high-density polyethylene (HDPE) pipe.

After the reclamation work, acid mine drainage discharged from the east portal and flowed from the discharge pipe into the cement channel, through the flume, into the half round HDPE pipe, down the east face of the waste rock pile, and into the North Fork of Cement Creek. Intermittent discharges from the west portal flowed through a small channel and over the site access road and down slope to the west. The North Fork of Cement Creek joins with the main stem of Cement Creek downstream of the Red and Bonita Mine.

Since 2009, EPA and the United States Bureau of Land Management (BLM) have been conducting investigations, assessments and sampling efforts in the Upper Animas Mining District Site, which includes the Gold King Mine, in an effort to better characterize the many potential sources contributing to the degradation of water quality of the Animas River upstream and downstream from Silverton. As part of EPA's and BLM's efforts, the discharges from the Gold King Mine have been sampled two times each year (spring and fall) for water quality, flow volume and total and dissolved metals. From 2009 through June 2015, discharge rates from the Gold King Level 7 adit have been observed to range from approximately 12 to 252 gpm. The discharge water pH ranged from 2.3 to 5.1 standard units. Discharge from the Gold King Level 7 adit, as measured from 2009 through 2014, contained the following concentration ranges of metals: cadmium at 36.1 µg/L to 138 µg/L, copper at 2450 µg/L to 12100 µg/L, aluminum at 7200 µg/L to 60000 µg/L, iron at 46,700 µg/L to 257,000 µg/L, manganese at 23,500 µg/L to 34,200 µg/L, and zinc at 13,000 µg/L to 41,900 µg/L.

The results of a Screening Level Ecological Risk Assessment (ERA) (February 2013) conducted by EPA strongly suggested that the fish community in the Animas River at and below Silverton would experience high stress under conditions at the time of the assessment. For example, the surface water hazard quotient for zinc in the Animas River below the confluence with Cement Creek was approximately 4, which is four times the expected no-effects level. In addition, the study identified aluminum, copper, lead, and zinc as major risk drivers to insectivorous birds ingesting surface water, sediment, and aquatic invertebrates from the Animas River at and below Silverton. Metals concentrations measured in the substrate of the Animas River at and below Silverton were expected to be highly toxic to benthic invertebrates. Fish population studies conducted by the Colorado Division of Wildlife during the same timeframe as the assessment found no fish in the Animas River below Cement Creek for approximately 2 miles.

In August/September 2014, the EPA initiated a removal assessment at the Gold King Mine to investigate the collapsed portal and begin the process to rehabilitate the portal to allow later assessment of mine water sources prior to bulkhead work at the Red and Bonita Mine. The Animas River Stakeholders Group (ARSG), Colorado DRMS, BLM and local governments were all consulted and briefed on EPA's removal action at the Red and Bonita Mine and planned assessment of the Gold King Mine.

In August and early September 2014, EPA constructed a lined retention pond at the base of the southeast corner of the waste dump to capture solids that could be released during the portal excavation, rehabilitation, and initial mine entries.

During the week of August 25, 2014, discharges from the Gold King Mine through the flume was measured at approximately 112 gpm. On September 11, 2014, prior to any excavation work at the adit, discharges were less than 12.6 gpm and the intermittent flow west of the primary discharge point was less than 5 gpm.

On September 11, 2014, during an initial attempt to investigate the old blockage, EPA exposed a portion of the loose rock and debris and adit timbers. Operations were discontinued that day. The following day, EPA installed piping to capture the ongoing mine drainage and direct it to the existing drainage system previously installed by DRMS. The installed piping was secured in place with geo-fabric, crushed rock, and quick dry concrete. The portal area was then backfilled with crushed rock and compacted to stabilize the area around the portal for future work. EPA then demobilized at the Site as seasonal weather would limit the ability to conduct additional work.

The EPA remobilized at the mine site in July, 2015 in conjunction with the Removal Action being conducted at the Red and Bonita Mine. At that time, the Gold King Mine discharge flow measured 69 gpm. On July 24, 2015, the EPA's ERRS contractor began grading the mine dump and installing a trench for the piping necessary to manage water from the mine discharge prior to attempting to open the adit. Piping and plumbing plans were being developed to convey water to an existing retention pond. In addition, on July 30 and 31, construction of a pad and manifold piping system was started to provide filtration of the acid mine drainage as necessary to control sediment in the water during the initial debris removal.

## **2. Current Actions**

On August 4, 2015, the initial investigative excavation of soil and rock debris in front of the portal blockage was started. On August 5<sup>th</sup>, while continuing to excavate soil above the collapsed mine portal as part of the planned investigation, a small leak was observed approximately 15 to 20 feet above the anticipated elevation of the floor of the adit. Work stopped and the excavator moved back from the excavation area. The hole had begun to enlarge and water was pouring out resulting in the washout of the blockage in the adit and release of acid mine

water from the Gold King Mine. The release was ultimately estimated at approximately three million gallons. The release of the mine water washed out an estimated 10,000 cubic yards of waste rock dump, the majority of which deposited at the North Fork of Cement Creek and Cement Creek confluence. The release entered into Cement Creek which is a tributary to the Animas River.

Immediately after the release, the EPA team at the Gold King Mine Site began taking steps to stabilize conditions at the mine. EPA Region 8 was able to initiate water quality sampling of the watershed as a sampling team was in the area for another project and were quickly diverted to begin taking water quality samples from the Animas River.

Since the release, EPA constructed a series of settling ponds to retain and treat the significantly increased mine water volume discharging from the Gold King Mine portal. The road to the mine site has been repaired and the mine entrance has been stabilized.

The EPA and its response partners have conducted significant sampling within the Animas and San Juan Rivers and Lake Powell, which includes water quality samples within the Rivers and Lake, sediment samples within the Rivers and Lake, water quality and sediment samples within potentially affected irrigation ditches, water quality samples of shallow private wells that are potentially influenced by the river due to their close proximity to the river, and public drinking water intakes as determined appropriate by EPA in consultation with its response partners. EPA has provided alternative drinking water for human consumption, water for livestock consumption, and water for irrigation purposes to areas where use of water from the Animas and San Juan River was restricted. Additionally, feed for livestock was provided where open grazing livestock were fenced to restrict access to the rivers.

EPA Region 9 utilized a cooperative agreement with the Bureau of Indian Affairs (BIA) to assist with distribution of livestock water on the Navajo Nation.

## **C. State, Tribal, and Local Authorities' Role**

### **1. State, Tribal, and Local Actions to Date**

State, Tribal, and local authorities have provided assistance to EPA by conducting independent and joint sampling activities and conducting independent and joint community outreach activities to help citizens and media stay informed of response activities. Additionally, they have provided notifications and assisted affected users regarding the status of the river system and established call centers for questions from the public. These partners also have provided Public Information Officers and other support activities. All of these activities have been and are conducted both jointly with and independently from the EPA response activities.



The La Plata County Sheriff issued an order closing the Animas River to all watercraft from the north County line (San Juan County, Colorado) to the south County line (at the Colorado/New Mexico State line). Further, all such watercraft were to be removed from the Animas River within the area. The Sheriff made this decision after consultation with the EPA, CDPHE, the San Juan Basin Health Department, and representatives of the Southern Ute Indian Tribe.

## **2. Potential for Continued State, Tribal, or Local Response**

State, Tribal, and local assistance through partnerships are vital as the EPA seeks consultation and recommendations to determine appropriate activities to assess impacts from the Gold King Mine release.

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

Conditions at the Site present a threat to public health and the environment, and meet the criteria for initiating a removal action under 40 CFR 300.415(b) of the NCP.

EPA has considered all of the factors described in 40 CFR 300.415(b) 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 release from the Gold King Mine resulted in a potential exposure to users of downstream drinking water systems from elevated concentrations of heavy metals identified in affected rivers. As a precautionary measure, drinking water systems downstream of the Gold King Mine along the Animas and San Juan River Systems closed water intakes until after the spill plume passed and the drinking water systems determined it was appropriate to reopen the intakes. Likewise, agricultural users shut off water intakes to avoid irrigating crops or watering their livestock with river water until the users determined it was appropriate to reopen the raw water intakes.

Recreational use of the Animas River was also closed by local officials as a precautionary measure to ensure unacceptable potential exposures (incidental ingestion, extended duration of exposure) did not occur. This included paddlers (rafting, kayaking, canoeing, and paddle boarding), fisherman (both private and commercial), and tubers, as well as swimmers. Once local officials reopened the river, a state health advisory warned people not to drink untreated water from the river and to wash their hands thoroughly with soap and water if they contacted sediment or surface water.

Although there were no documented impacts to aquatic wildlife associated with the release, there was a potential for exposure of aquatic wildlife to elevated concentrations of heavy metals identified in the rivers.

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

As a precautionary measure drinking water systems downstream of the Gold King Mine along the Animas and San Juan River Systems closed water intakes as determined by the local, State, and Tribal authorities after consultation with EPA. This was done to avoid receiving potentially contaminated raw water and continued until the spill plume passed by intakes and the drinking water systems determined it was appropriate to reopen the intakes.

Metal concentrations measured both before and after the release in the substrate of the Animas River at and below Silverton are highly toxic to benthic invertebrates. Fish population studies conducted by the Colorado Division of Wildlife prior to the release found no fish in the Animas River below Cement Creek for approximately two miles.

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

Local, state, and tribal governments are assisting the EPA to the extent possible and providing assistance both from an operational and public information dissemination standpoint by insuring that affected local citizens and tribal members are provided with appropriate assistance. There are no other appropriate federal or state entities that have the funding resources to respond to the release.

#### **IV. ENDANGERMENT DETERMINATION**

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

#### **V. EXEMPTION FROM STATUTORY LIMITS**

Site conditions meet the emergency exemption criteria specified in this request for an exemption from the 12-Month and \$2 million statutory limit. The emergency exemption criteria are the following: (i) continued response actions are immediately required to prevent, limit, or mitigate an emergency; (ii) there is an immediate risk to public health or welfare or the environment; and (iii) such assistance will not otherwise be provided on a timely basis.

##### **A. Emergency Exemption**

1. There is an immediate risk to public health or welfare or the environment: The sudden release of up to three million gallons of acid mine water containing sediment and heavy metals presented an immediate risk to public health or welfare or the environment.

2. Continued response actions are immediately required to prevent, limit, or mitigate an emergency: The sudden release of the acid mine water from the adit left the unstable mine portal open and exposed to the elements, allowing it to continue to weather and further collapse. The flood of acid water eroded the steep slopes of the waste rock dump, and washed out the mine road as it flowed downhill. Much of the sediments and rock from the waste dump and the road were deposited into the Cement Creek drainage. After the sudden release on August 5th, the acid mine water flowing from the portal stabilized over a period of a week at approximately 600 gpm, which is significantly increased from recent historical discharges. It has remained near 530 gpm since mid-August. Imminent winter conditions (up to 12 feet of snow through the winter) followed by spring snowmelt may result in substantial additional erosion and de-stabilization of the waste dump and mine slopes. Continued work to stabilize the mine site and workings before winter conditions shut down response actions were required to ensure protection of downstream human health, welfare and the environment. The necessary response actions will not be completed prior to the winter shutdown and will require additional work to resume in July, 2016 to complete stabilization of the mine.
3. Such assistance will not otherwise be provided on a timely basis: There are currently no entities other than EPA that have the funding to adequately address this issue. Other entities may be able to provide ongoing technical assistance to EPA but have limited funding.

## VI. ACTIONS AND ESTIMATED COSTS

### A. Actions

#### 1. Action Description and Post Removal Site Controls (PRSCs)

##### Region 8 (Colorado, Southern Ute Indian Tribe, Ute Mountain Ute Tribe)

- Mobilized additional personnel to the mine site, established incident command in Durango and Farmington and Area Command in Durango;
- Restore access to the Gold King Level 7 Mine; reinforced access road; widened and maintained road; re-graded and stabilized the mine waste dump;
- Stabilize the Gold King Mine portal and establish ground control in the adit to provide safe access to work on the adit and prevent ground collapse near the portal. Construct a portal shed structure with lockable gate to secure portal area;
- Controlled the continuing flow of acid mine drainage from the Gold King Mine, including installation of temporary drainage piping and surge protection;
- Continued 24 hour emergency water treatment; constructed a water conveyance (HDPE pipe) from portal to temporary treatment area in Gladstone;

- Developed additional retention pond capacity at Gladstone for temporary treatment options and to handle potential surge events from the Gold King Mine;
- Evaluated treatment technologies and installed an interim water treatment system to treat portal drainage through November 2016;
- Manage and/or properly dispose of water treatment solids from temporary treatment ponds and interim water treatment system;
- Post-removal site controls for on-site disposal of water treatment solids may be required and will be developed based upon suitability of a disposal location, coordination of long-term management requirements (restricted access, maintenance, and funding), and site-specific criteria (elevation, impact of snow/winter conditions, or other conditions not currently known);
- Removed waste rock deposited in the North Fork/Cement Creek channel to the waste dump or other repository onsite;
- Constructed a suitable storage location for waste rock materials deposited in North Fork/Cement Creek channel;
- Implemented Best Management Practices (BMPs) for surface water management and sediment control before waste rock removal started along creek channels;
- Alternative water supplies have been provided for human consumption during shutdown of river water supply and for private wells that have exceedances of drinking water standards; future provision of alternative water for human consumption may be provided as determined appropriate by EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the State of Colorado and the Southern Ute and Ute Mountain Ute Tribes;
- Alternative water has been provided for livestock during the shutdown of river water supplies; future provisions for livestock water will be provided as determined appropriate by EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the State of Colorado and the Southern Ute and Ute Mountain Ute Tribes;
- Alternative water supplies have been provided for agricultural irrigation during the shutdown of river water diversions; future provisions for agricultural irrigation will be provided as determined appropriate by the EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the State of Colorado and the Southern Ute and Ute Mountain Ute Tribes.

#### Region 6 (New Mexico)

- Alternative water supplies have been provided for human consumption during shutdown of river water supply; future provision of alternative water for human consumption may be provided as determined appropriate by EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the State of New Mexico, as applicable;

- Alternative water and feed has been provided for livestock during the shutdown of river water supplies; future provisions for livestock water and feed will be provided as determined appropriate by EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the State of New Mexico, as applicable;
- Alternative water supplies have been provided for agricultural irrigation during the shutdown of river water diversions; future provisions for agricultural irrigation will be provided as determined appropriate by the EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the State of New Mexico.

#### Region 9 (Navajo Nation)

- Alternative water supplies have been provided for human consumption during shutdown of river water supply; future provision of alternative water for human consumption may be provided as determined appropriate by EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the Navajo Nation;
- Alternative water and feed has been provided for livestock during the shutdown of river water supplies; future provisions for livestock water and feed will be provided as determined appropriate by EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the Navajo Nation;
- Alternative water supplies have been provided for agricultural irrigation during the shutdown of river water diversions; future provisions for agricultural irrigation will be provided as determined appropriate by the EPA, supported by data on metals concentrations in surface water and sediment and in consultation with the Navajo Nation.

### **2. Contribution to Remedial Performance**

This effort will, to the extent practical, contribute to any future remedial effort at the Site should any remedial actions be conducted.

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

An EE/CA is not required for an emergency removal action.

### **4. Applicable or Relevant and Appropriate Requirements (ARARs)**

Given the nature of this emergency removal action, all federal and state ARARs were not identified at the time the response was initiated. The EPA shall, to the extent practicable, considering the exigencies of the situation, attain applicable or

relevant and appropriate requirements (ARARs) under federal environmental or state environmental and facility siting laws that are identified on a timely basis. A list of potential ARARs can be found in Attachment 2.

## 5. Project Schedule

Mine site stabilization activities have discontinued for the winter. Interim Water Treatment System operation is planned to continue through November 2016. Mine adit stabilization activities are scheduled to resume in 2016.

## B. Estimated Costs\*

<b>Region 8</b>	<b>Emergency Ceiling (1)</b>	<b>Proposed Increase</b>	<b>Proposed Ceiling</b>
Contractor costs (ERRS/START)	\$ 5,500,000	\$ 6,856,000	\$ 12,030,440
Other Extramural Costs (USCG Strike Team)	\$ 500,000	\$ 0	\$ 500,000
Other Extramural Costs (ICP Facility)		\$ 300,000	\$ 300,000
Other Extramural Costs (Local and Federal Response Costs)		\$ 750,000	\$ 750,000
<b>SUBTOTAL</b>	<b>\$ 6,000,000</b>	<b>\$ 7,906,000</b>	<b>\$ 13,580,440</b>
Contingency (20%)	-		\$ 2,716,088
<b>R8 Removal Project Ceiling</b>	<b>\$ 6,000,000</b>		<b>\$ 16,296,528</b>
<b>Region 6</b>			
Contractor costs (ERRS/START)	\$ 580,000	\$ 0	\$ 580,000
<b>SUBTOTAL</b>	<b>\$ 580,000</b>	<b>\$ 0</b>	<b>\$ 580,000</b>
Contingency (20%)	\$ 116,000		\$ 116,000
<b>R6 Removal Project Ceiling</b>	<b>\$ 696,000</b>		<b>\$ 696,000</b>
<b>Region 9</b>			
Contractor costs (ERRS/START)	\$ 827,000	\$ 0	\$ 827,000
Other Extramural Costs (USCG Strike Team)	\$ 170,000	\$ 0	\$ 170,000
Other Extramural Costs (BIA)	\$ 850,000	\$ 0	\$ 850,000
Other Extramural Costs (NTUA)	\$ 400,000	\$ 0	\$ 400,000
<b>SUBTOTAL</b>	<b>\$ 2,247,000</b>	<b>\$ 0</b>	<b>\$ 2,247,000</b>
Contingency (20%)	\$ 449,400		\$ 449,400
<b>R9 Removal Project Ceiling</b>	<b>\$ 2,696,400</b>		<b>\$ 2,696,400</b>
<b>Combined (R8, R6 and R9) Total Removal Project Ceiling</b>			<b>\$ 19,688,928</b>

\*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.

(1) Verbal ceiling obtained

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

A delay in action or no action at this Site would increase the actual or potential threats to the public health and/or the environment.

## **VIII. OUTSTANDING POLICY ISSUES**

Removals involving contamination that may affect other sovereign nations, including Indian Tribes, is one of seven categories designated as nationally significant or precedent-setting (NSPS). Specific procedures are required for requesting Headquarters concurrence on these actions.

## **IX. ENFORCEMENT**

A separate Enforcement Addendum provides a confidential summary of current and potential future enforcement actions 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 \$25,887,434.

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 costs from this estimate will affect the United States' right to cost recovery.

## **X. RECOMMENDATIONS**

This decision document represents the selected removal action for the Gold King Mine Release Site in San Juan County, Colorado, 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 we recommend your approval of the proposed removal action. The total project ceiling, if approved, will be \$19,688,928.

APPROVE



Mathy Stankislaus  
Assistant Administrator  
Office of Land and Emergency Management

1/13/16  
Date

**Attachments:**

Attachment 1: Map of Gold King Mine Release Path

Attachment 2: List of Potential ARARs





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON D.C. 20460

**ACTION MEMORANDUM**

**SUBJECT:** Documentation of an Emergency Removal Action at the Gold King Mine Release Site, San Juan County, Colorado, initiated pursuant to the On-Scene Coordinator's delegated authority under CERCLA Section 104 and a Request for Approval and Funding to Continue the Emergency Removal Action including Exemptions from the 12-Month and \$2 Million Statutory Limits on Removal Actions

**FROM:** Shaun McGrath  
EPA Region 8 Administrator

A handwritten signature in blue ink, appearing to be "SM", written over the name and title of Shaun McGrath.

Ron Curry  
EPA Region 6 Administrator

Jared Blumenfeld  
EPA Region 9 Administrator

**TO:** Mathy Stanislaus  
Assistant Administrator  
Office of Land and Emergency Management<sup>1</sup>

Site ID# A8K9

**I. PURPOSES**

The purposes of this Action Memorandum are to document the decision to initiate an emergency removal action pursuant to the On-Scene Coordinator's delegated authority under CERCLA Section 104 and request and document approval and funding to continue the emergency removal action including exemptions from the 12-Month and \$2 million statutory limits for the ongoing activities since the beginning of the response and proposed activities described herein for the Gold King Mine Release Site (Site). The major components of this removal action include: stabilizing the Gold King Mine waste rock dump, temporary treatment of the acid mine discharge in treatment ponds, removal of waste rock deposited in Cement Creek from the Gold King mine release, flow control measures in

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<sup>1</sup> Effective on December 15, 2015, the Office of Solid Waste and Emergency Response (OSWER) became the Office of Land and Emergency Management (OLEM). 80 Fed Reg 77575 (December 15, 2015). The AA for OLEM now carries out all of the functions and duties of the AA for OSWER.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON D.C. 20460

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**FROM:** Shaun McGrath  
EPA Region 8 Administrator

Ron Curry  
EPA Region 6 Administrator

A handwritten signature in black ink, appearing to read "Ron Curry", with a horizontal line underneath.

Jared Blumenfeld  
EPA Region 9 Administrator

**TO:** Mathy Stanislaus  
Assistant Administrator  
Office of Land and Emergency Management<sup>1</sup>

Site ID# A8K9

**I. PURPOSES**

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WASHINGTON D.C. 20460

**ACTION MEMORANDUM**

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**FROM:** Shaun McGrath  
EPA Region 8 Administrator

Ron Curry  
EPA Region 6 Administrator

Jared Blumenfeld  
EPA Region 9 Administrator

A handwritten signature in black ink, appearing to be "JB", written over the name Jared Blumenfeld.

**TO:** Mathy Stanislaus  
Assistant Administrator  
Office of Land and Emergency Management<sup>1</sup>

Site ID# A8K9

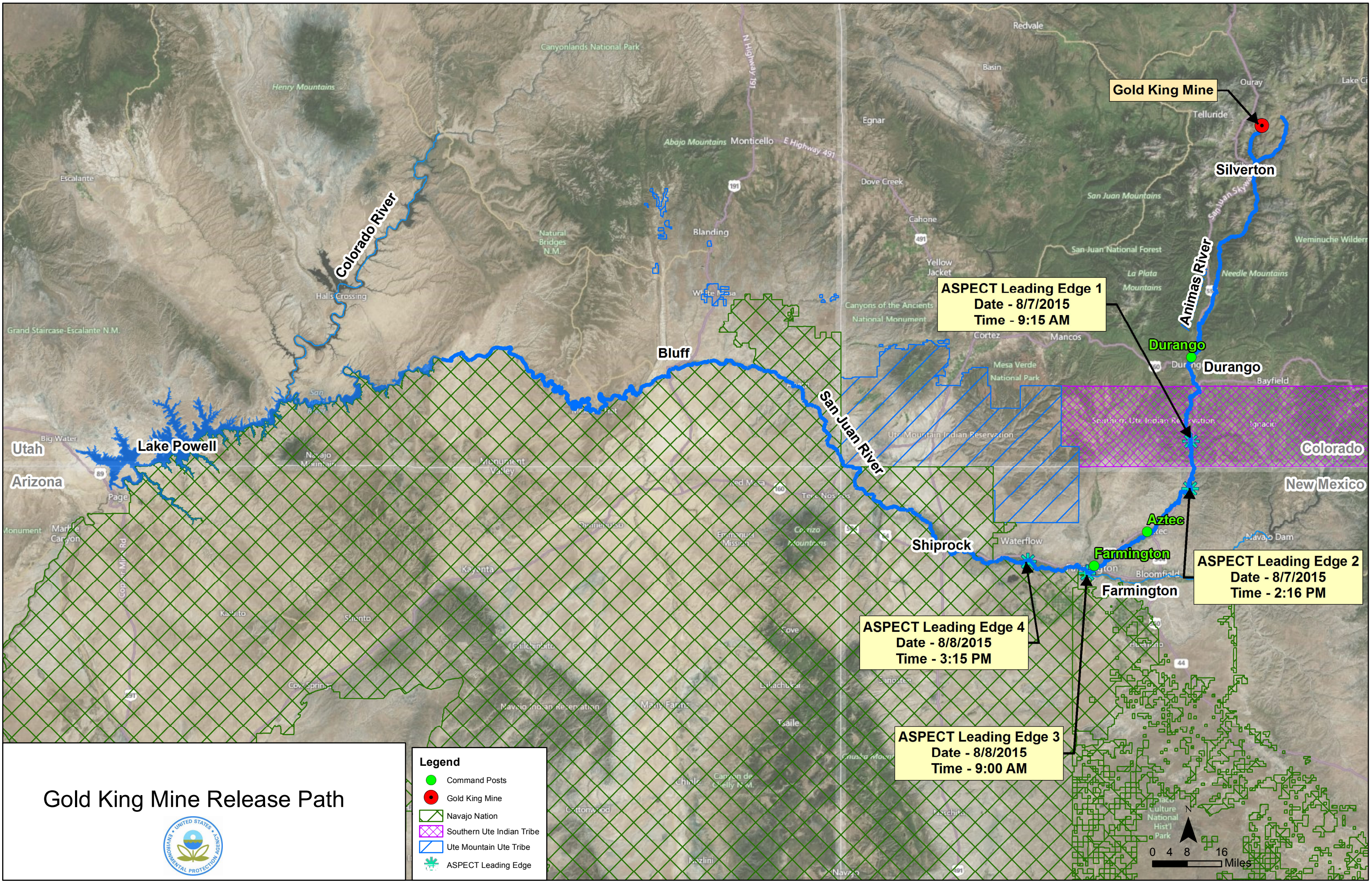
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- Legend**
- Command Posts
  - Gold King Mine
  - Navajo Nation
  - Southern Ute Indian Tribe
  - Ute Mountain Ute Tribe
  - ✦ ASPECT Leading Edge

# Gold King Mine Release Path



**ASPECT Leading Edge 1**  
 Date - 8/7/2015  
 Time - 9:15 AM

**ASPECT Leading Edge 2**  
 Date - 8/7/2015  
 Time - 2:16 PM

**ASPECT Leading Edge 4**  
 Date - 8/8/2015  
 Time - 3:15 PM

**ASPECT Leading Edge 3**  
 Date - 8/8/2015  
 Time - 9:00 AM



Attachment 2  
Applicable or Relevant and Appropriate Regulations (ARARs)

This table contains a listing of potential Federal and State ARARs for the Gold King Mine Release Site Removal Action

Standard, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
<b>ACTION SPECIFIC</b>				
<b>FEDERAL</b>				
Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (RCRA Subtitle D)	40 C.F.R. § 257.3-1(a) (Floodplains); 40 C.F.R. § 257.3-7(b) (Air)	Regulates the generation, storage, handling and disposal of solid waste.	Applicable	RCRA Subtitle D specifically regulates non-hazardous solid waste; portions of these regulations may be applicable if it is decided to dispose of water treatment residuals on-site.
Hazardous Materials Transportation Act	(49 U.S.C. §§ 5101-5128; 49 C.F.R. §§ 107, 171-177)	Regulates transportation of hazardous materials.	Applicable	Applicable to the transportation of water treatment residuals and waste rock on-site under the proposed removal action.
<b>STATE</b>				
Colorado Water Quality Control Act, and Colorado Discharge Permit System Regulations	C.R.S. § 25-8-101 <i>et seq.</i> ; 5 C.C.R. § 1002 <i>et seq.</i>	Establishes program for permitting discharges of contaminants into waters of the United States within Colorado.	Applicable	The substantive provisions of the CPDES program are potentially applicable to point source discharges under the proposed removal action. (i.e., potential discharges from the interim treatment facility)
Colorado Solid Waste Disposal Sites and Facilities Act	6 C.C.R. § 1007-2, pursuant to C.R.S. § 30-20-100.5 <i>et seq.</i>	Establishes standards for the licensing, locating, constructing, and operating solid waste disposal facilities	Applicable	This regulation is specifically for non-hazardous solid waste. These regulations may be applicable if it is decided to dispose of water treatment residuals on-site.
Colorado Water Quality Control Act, Storm Water Discharge Regulations	5 C.C.R. § 1002-61	Regulates discharge of storm water during construction activities.	Applicable	Best Management Practices will be implemented to control storm water discharges or run-off during Removal Activities.
Colorado Air Pollution Prevention and Control Act	5 C.C.R. § 1001-3, pursuant to C.R.S. § 25-7-101 <i>et seq.</i>	Regulates fugitive emissions during construction.	Applicable	On-site Superfund actions do not require permits; however, fugitive emissions will be controlled by implementing dust control during any dirt moving or construction activities.
Colorado Noise Abatement Statute	C.R.S. § 25-12-101 <i>et seq.</i>	Regulates permissible noise levels.	Applicable	Noise controls will be implemented throughout the Removal Action; most notably work is expected to occur between 0700 and 1900 hrs.

Standard, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
Colorado Mined Land Reclamation Regulations	2 C.C.R. § 407-1, pursuant to C.R.S. § 34-32-101 <i>et seq.</i>	Regulates reclamation of mining activities.	Relevant and Appropriate	The proposed removal action is similar to reclamation at a mining operation and the substantive provisions of these regulations will be incorporated as appropriate. The reclamation provisions of these regulations are relevant and appropriate to proposed removal actions involving plugging of adits, water control measures and treatment and disposal of waste piles...
Colorado Noxious Weed Act	8 C.C.R. § 1206-2, pursuant to C.R.S. § 35-5.5-101 <i>et seq.</i>	Defines and sets forth noxious weed management regulations.	Applicable	
Colorado Air Quality Control Act	5 C.C.R. §§ 1001-1, 3, 8, 10	Establishes emissions standards for PM10 and lead. Pursuant to the Colorado Air Pollution Prevention and Control Act, applicants for construction permits are required to evaluate whether the proposed source will exceed NAAQS. Applicants are also required to evaluate whether the proposed activities would cause the Colorado ambient standard for PM10 to be exceeded. Colorado regulates fugitive emissions through Regulation No. 1.	Applicable	Compliance with applicable provisions of the Colorado air quality requirements will be achieved by adhering to a fugitive emissions control plan prepared in accordance with Regulation No. 1. The proposed removal action is not projected to exceed the emission levels for lead, although some lead emissions may occur.
New Mexico Ground Water Quality Control Regulations	20.6.2 New Mexico Administrative Code (NMAC)	Establishes NM ground water regulations on concentrations of metals and chemicals.	Applicable	The NMWQCC regulations will apply for metals and chemicals where the NMWQCC regulated concentration is lower than the Federal MCL.
New Mexico Surface Water Quality Control Regulations	20.6.4 NMAC-Water Quality Standards for Interstate and Intrastate Surface Waters	Establishes NM surface water regulations on concentrations of metals and chemicals	Applicable	The NMWQCC regulations will apply for metals and chemicals where NMWQCC regulated concentration is lower than the Federal MCL.
New Mexico Air Quality	20.2 NMAC	Establishes ambient air quality standards, performance standards for specific sources of air pollutants, and specifies monitoring methods.	Applicable	Potentially applicable if response activities involve sources subject to regulation.

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
<b>LOCATION SPECIFIC</b>				
<b>FEDERAL</b>				
Protection of Floodplains	E.O. 11988 §§ 1, 2(a)(2) (Floodplain Management)	Requires federal agencies to take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Requires federal agencies to consider alternatives to avoid, to the extent possible, adverse effects and incompatible development in the floodplain. Design or modify its action in order to minimize potential harm to or within the floodplain.	To Be Considered	Presence of Floodplains designated as such on a map. Federal actions that involve potential impacts to, or take place within, floodplains
Protection of Wetlands	E.O. 11990 §§ 1(a), 2(a)	Requires federal agencies to take action to minimize the destruction, loss or degradation of wetlands and to preserve and enhance beneficial values of wetlands. Requires federal agencies to avoid undertaking construction located in wetlands unless: (1) there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.	To Be Considered	Presence of Wetlands. Federal actions that involve potential impacts to, or take place within, wetlands
Clean Water Act Section 404	33 U.S.C. § 1251 <i>et seq.</i> ; 40 C.F.R. §§ 230, 231	Requires federal agencies to avoid, to the extent possible, adverse impacts associated with destruction or loss of wetlands. Regulates the discharge of dredged or fill material into waters of U.S. Consultation with the Regional Response Team required.	Applicable	If wetlands are present these may be applicable. If discharge of dredge and fill material is necessary these are applicable.



Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
Endangered Species Act	16 U.S.C. § 1531 <i>et seq.</i> ; 50 C.F.R. § 402.	Protects endangered species and threatened species and preserves their habitat. Requires coordination with federal agencies for mitigation of impacts.	Applicable	Threatened and endangered species have been identified in the Animas and San Juan Rivers well downstream from the Gold King Mine and the activities proposed in the action memo are not expected to impact those species. EPA will coordinate with the appropriate federal and state agencies.
Fish and Wildlife Coordination Act	16 U.S.C. § 661 <i>et seq.</i>	Requires coordination with federal and state agencies on activities affecting/modifying streams or rivers if the activity has a negative impact on fish or wildlife. Requires coordination with federal and state agencies to provide protection of fish and wildlife in water resource development programs; regulates actions that impound, divert, control, or modify any body of water.	To Be Considered	If it appears that the proposed removal activities may impact wildlife resources, EPA will coordinate with both the U.S. Fish and Wildlife Service and the Colorado Department of Natural Resources.
National Historic Preservation Act (NHPA)	54 U.S.C. § 300101 <i>et seq.</i> ; 36 C.F.R. §§ 63, 65, 800	Requires the preservation of historic properties included in or eligible for the National Register of Historic Places and to minimize harm to National Historic Landmarks.	Applicable	If historical or cultural features are discovered or identified, EPA will comply with the substantive provisions of the NHPA to the extent practicable.
The Historic and Archeological Data Preservation Act of 1974	54 U.S.C. §312501 <i>et seq.</i>	Establishes procedures to provide for preservation of historical and archeological data which might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity program.	Applicable	If scientific, prehistoric, or archeological features are identified in areas in an area where the terrain is to be altered, EPA will preserve the data related to these features to the extent practicable.
<b>STATE</b>				
Colorado Non-game, Endangered, or Threatened Species Act	C.R.S § 33-2-101 <i>et seq.</i>	Protects endangered and threatened species and preserves their habitats. Requires coordination with the Division of Wildlife if remedial activities impact on state-listed endangered/threatened species or their habitat.	Applicable	Standards for regulation of non-game wildlife and threatened and endangered species.

Standard, Requirement, Criteria, or Limitation	Citation	Description	Applicable or Relevant and Appropriate	Comments
Colorado Natural Areas	C.R.S. § 33-33-101 <i>et seq.</i>	The Colorado Natural Areas Program maintains a list of plant species of special concern for the State. Coordination with Division of Parks and Outdoor Recreation is recommended if activities will impact listed species.	Applicable	EPA will coordinate with the Division if it encounters plant species of special concern.
State Solid Waste Disposal Sites and Facilities Act	C.R.S. § 30-20-101-118; 6 C.C.R. § 1007-2	Establishes location standards for solid waste management facilities	Applicable	The proposed removal activities may include the siting of a solid waste management unit.