U.S. ENVIRONMENTAL PROTECTION AGENCY
POLLUTION/SITUATION REPORT
Rico Argentine Mine - Removal Polrep
Initial Removal Polrep

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region VIII

Subject: **POLREP #1**
Initial
Rico Argentine Mine
08BU
Rico, CO
Latitude: 37.6927729 Longitude: -108.0303502

To:
From: Steven Way, OSC
Date: 11/28/2011
Reporting Period:

1. Introduction

1.1 Background

Site Number:	08BU	**Contract Number:**	
D.O. Number:		**Action Memo Date:**	1/11/2011
Response Authority:	CERCLA	**Response Type:**	Time-Critical
Response Lead:	PRP	**Incident Category:**	Removal Action
NPL Status:	Non NPL	**Operable Unit:**	OU 1
Mobilization Date:		**Start Date:**	5/31/2011
Demob Date:		**Completion Date:**	
CERCLIS ID:		**RCRIS ID:**	
ERNS No.:		**State Notification:**	
FPN#:		**Reimbursable Account #:**	

1.1.1 Incident Category

CERCLA Time-Critical Removal Action

1.1.2 Site Description

1.1.2.1 Location

The Rico Argentine Mine Site is located north of the town of Rico, in Dolores County, Colorado, in portions of Sections 24 and 25, Township 40 North, and Range 11 West. The general Site location is shown in Figure 1. Rico is 45 miles due south of Telluride in southwestern Colorado. The Site is adjacent to the Dolores River and extends into Telescope Mountain and its related mine workings. The St. Louis Tunnel Adit and associated settling ponds are located on the eastern edge of Dolores County approximately ½ mile north of the town of Rico. The settling ponds area is on the eastern bank of the Dolores River and occupies about 80 acres at an altitude of 8,800 feet. It is adjacent to the San Juan National Forest.

1.1.2.2 Description of Threat

The recent samples (June 2010) from the mine adit flow before entering the settling ponds showed total zinc concentrations at 8,300 ug/L (dissolved zinc was at 7,700 ug/L). The zinc concentration in the outfall to the Dolores River was 4,100 ug/L (dissolved zinc concentration was at 3,900 ug/L). Other heavy metals being released that may pose a threat include cadmium and copper. Significant releases of this mine water to the alluvial groundwater occur from the settling ponds at the Site. An estimated 68,000 cubic yards (cy) of lime precipitate sludge is contained in the settling ponds. Settling pond sludge contains heavy metals at percent levels (e.g. 4.4% zinc), and some of the ponds high water levels relative to the top of the dikes increase the potential threat that sludge and metals-laden water will overtop the ponds and flow into the Dolores River. For example,

Pond 18 water level in June 2010 was within one foot of the top of embankment along the Dolores River. This is the same pond embankment that failed previously.

Sensitive ecosystem impacts are potentially occurring due to the ongoing releases to the Dolores River, which is considered a Cold Water Aquatic Life Class 1 by the state of Colorado. The metals concentrations being released into the environment exceed the low flow assimilative capacity of the river segment as determined by the State 2008 Water Quality Assessment (WQA).

1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results

The area is bound to the west by the Dolores River and U.S. Forest Service land on the east. A portion of many of the ponds sit within U.S. Forest Service land boundaries. The remaining land is within several privately-held mining claims with different owners. In some cases, the ownership of specific parcels is uncertain. In 2000, an emergency removal was performed to address overtopping of one of the ponds. EPA's response consisted of raising and reinforcing the riverside embankment of the pond, adding an additional culvert between the pond and downgradient ponds, and installing overflow riprap as a backup drain path.

The St. Louis Tunnel Adit drains historical mine workings extending several thousand feet into Telescope Mountain and Dolores Mountain to the east and southeast, respectively. The St. Louis Tunnel is or was directly hydraulically connected to the mine workings of the former Pigeon, Logan, Wellington, Mountain Spring, Argentine, Blaine, and Blackhawk mines. The flows are reported to generally range from 2 to 3.3 cubic feet per second in the 2008 State WQA. The Blaine Mine Adit was discharging to Silver Creek as late as 2000. Flow was later diverted back into the workings of the Argentine Mine, which connects to the Argentine Shaft and through a drift to the St. Louis Tunnel. Based on an Atlantic Richfield 2000 sampling report, metals concentrations in the Blaine mine water included 7,000 ug/L cadmium, 5,200 ug/L copper, 844,000 ug/L iron, 505 ug/L lead, 149,000 ug/L manganese, and 230,000 ug/L zinc.

The adit discharge treatment historically consisted of a lime addition and precipitation of heavy metals into a series of 19 settling ponds at the Site. As of 1996, the estimated volume of lime-precipitation/metals sludge was in excess of 68,000 cy in 10 settling ponds. The settling ponds are unlined and surrounded by earthen dikes/berms. The construction material and geotechnical stability of the dike system is not known. The aerial extent of the system of settling ponds was reported to be within the 100-year floodplain of the Dolores River (Watershed Plan for the East Fork of the Dolores River in Dolores County, Grayling Environmental, August 17, 2006). A recent hydrology analysis (HEC-RAS model) performed for EPA of a limited segment of the river along the reach of the settling ponds indicates that the 100-year flood event would not be expected to overtop the pond system. However, the existing embankments will be impacted by 100-year event flood stage water to within approximately one foot of the top of the settling pond dike. This does not account for potential downstream channel constraints that may develop at the bridge that would likely cause back water levels to rise even higher.

The upper, largest pond, Pond 18, is estimated to contain the largest volume of impounded treatment sludge (approximately 24,000 cy wet). It is adjacent to the Dolores River and had little remaining freeboard at the dike along the river. In June 2010, for example, the sludge and water were measured to be less than 12 inches from the top of the dike embankment. During a second inspection in September 2010, beaver damming caused pond water to overtop the lower pond (Pond 5) banks and bypass the outfall structure. Pond 18 was drained by the PRP (ARCO) in October 2010.

2. Current Activities

2.1 Operations Section

2.1.1 Narrative

There are two general elements to the work required to meet the objectives for this Removal Action. The first involves removal of metals precipitate sludge from the settling ponds, and the second, water management of the discharge from the St. Louis Tunnel to control flow and/or reduce the metals concentration in the effluent to levels deemed protective of water quality and aquatic life in the Dolores River. Water management may take the form of active water treatment, reduction in flows or a combination thereof to meet effluent limits in the discharge to the river. The actions will be implemented in a phased approach to achieve the stated objective. The phased work will include: 1) actions with the settling ponds and associated sludge; and 2) conducting the necessary investigations and developing the engineering designs required to implement the actions associated with a water management system for adit discharge.

2.1.2 Response Actions to Date

- Site preparations by ARCO began in late May 2011 including installing monitoring equipment to provide continuous flow measurements from the St Louis Tunnel Adit and the outfall to the Dolores River.
- Acid mine drainage source water investigations, using a tracer dilution method, were initiated by EPA in June to assess whether Silver Creek flow is lost to subsurface features near the Blaine and Argentine adits.
- The Pond 18 water treatment solids interim management cells were constructed, and solids removal was performed through mid October 2011. Approximately 7,500 cubic yards of lime precipitation sludge was placed in several trial cells designed to evaluate dewatering efficiency. A portion of the precipitation solids (8,000 cy) was left in Pond 18 pending infiltration study results to determine the pond bottom permeability.
- Drying cell area geochemical analysis of the historical calcine tailings was performed to determine if drainage from the lime precipitation solids will contribute to leaching of hazardous constituents.
- Geotechnical analyses and samples were collected from the pond dike along the Dolores River and inter-pond embankments to perform stability analyses.
- Monitoring wells were installed in the ponds area to evaluate potential groundwater chemistry changes from the drying cell operations and to gather data for future pond system design and operation.
- Flood and channel hydraulic analyses for the Dolores River were initiated to determine armoring requirements/stability.
- St Louis Tunnel Adit drilling was conducted in October/November to obtain geologic data and structural information on the collapse area to begin evaluating hydraulic control options.
- Underground mine workings investigations were performed by EPA and Colorado DRMS personnel to assess mine water chemistry, flow pathways, structural reliability of workings, and develop recommendations for rehabilitation needed to ensure access and continued transport of water to the St. Louis Tunnel. ARCO supported these efforts during the implementation of a tracer study in October and subsequent monitoring. The results indicated that a significant percentage of the acid water and metals load reporting to the St. Louis Tunnel originates in the Blaine/Argentine mine works.
- Samples of mine water from inside the Argentine Mine workings, which is upslope of the Blaine, contained extremely high metals concentrations. For example, zinc was measured at 2,460 milligrams per liter (mg/L). It is likely that water from this mine drains to the Blaine workings.
- A coffer dam upgrade was constructed 500 ft inside the Blaine Adit by the property owner to ensure that acid mine water did not discharge from the portal to Silver Creek and continues to flow to the Argentine Shaft. However, blockages exist in the workings between the coffer dam and the Argentine Shaft that impede flow.

2.1.3 Enforcement Activities, Identity of Potentially Responsible Parties (PRPs)

- A Unilateral Administrative Order (UAO) was issued to the Atlantic Richfield Company (ARCO) in May 2011 to implement the Removal Action specified in the Work Plan.

2.1.4 Progress Metrics

Waste Stream	*Medium*	*Quantity*	*Manifest #*	*Treatment*	*Disposal*

2.2 Planning Section

2.2.1 Anticipated Activities

2.2.1.1 Planned Response Activities

- Work on pond solids removal will continue in 2012 following the winter season shut-down.
- Repository design and construction planned for 2012 pending geotechnical analysis this winter; a temporary repository is potentially required to manage solids pending final repository construction.
- Mine workings rehabilitation work is needed to ensure that acid mine drainage within the Blaine Adit continues flowing to the St. Louis Tunnel via the Argentine Shaft.

2.2.1.2 Next Steps

- Water treatment analysis reporting is due to EPA from ARCO in November.
- Analyze tracer investigation and flow data and develop plans for additional underground investigations focused on controlling influent water and potential management of acid mine drainage within the workings.
- Continue work with historical mine maps to refine the site model computer mapping.

2.2.2 Issues

2.3 Logistics Section

No information available at this time.

2.4 Finance Section

No information available at this time.

2.5 Other Command Staff

No information available at this time.

3. Participating Entities

No information available at this time.

4. Personnel On Site

No information available at this time.

5. Definition of Terms

No information available at this time.

6. Additional sources of information

No information available at this time.

7. Situational Reference Materials

No information available at this time.