

U.S. ENVIRONMENTAL PROTECTION AGENCY  
POLLUTION/SITUATION REPORT  
Golf Tunnel - Removal Polrep  
Initial Removal Polrep



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
Region VIII

**Subject:** POLREP #1  
Initial  
Golf Tunnel  
08WB  
St. Elmo, CO  
Latitude: 38.7061550 Longitude: -106.2992912

**To:**  
**From:** Hays Griswold, OSC  
**Date:** 10/29/2014  
**Reporting Period:** June 20, 2011 - October 29, 2014

## 1. Introduction

### 1.1 Background

<b>Site Number:</b>	08WB	<b>Contract Number:</b>	
<b>D.O. Number:</b>		<b>Action Memo Date:</b>	7/30/2013
<b>Response Authority:</b>	CERCLA	<b>Response Type:</b>	Time-Critical
<b>Response Lead:</b>	EPA	<b>Incident Category:</b>	Removal Action
<b>NPL Status:</b>	Non NPL	<b>Operable Unit:</b>	
<b>Mobilization Date:</b>	1/2/2014	<b>Start Date:</b>	1/2/2014
<b>Demob Date:</b>	10/30/2014	<b>Completion Date:</b>	
<b>CERCLIS ID:</b>	CON00082843	<b>RCRIS ID:</b>	
<b>ERNS No.:</b>		<b>State Notification:</b>	
<b>FPN#:</b>		<b>Reimbursable Account #:</b>	

#### 1.1.1 Incident Category

Golf Tunnel is a time-critical removal action

#### 1.1.2 Site Description

The tunnel (also called an "adit," driven at the mine's 2,200 level) is located on the western slopes of Chrysolite Mountain adjacent to Chalk Creek at an elevation of 10,360 feet. It is a mill-level cross-cut, driven to access underground mine workings including the Mary Vein below the main workings. Discharging a constant 60 to 165 gpm year-round, it is the lowest working level of the Mary Murphy Mine. The Tunnel flows into a small pond that discharges into a small unlined channel prior to entering the South Fork of Chalk Creek (See Attachment 2) about 200 feet away.

##### 1.1.2.1 Location

Golf Tunnel is one of many mining facilities within the Chalk Creek Mining District. The district is in the upper reaches of Chalk Creek near the small historical mining town of St. Elmo, CO. Golf Tunnel is located at Latitude 38° 40' 49.44 N and Longitude -106° 21' 31.97" W.

##### 1.1.2.2 Description of Threat

Golf Tunnel discharges acid mine drainage (AMD) water at 53 gpm containing significantly elevated concentrations of several heavy metals. It is demonstrated that the zinc and other metals have increased since 2010 and are above acute and chronic concentrations of water quality standards (WQS) (79 and 69, respectively for zinc, based on the site-specific hardness of 50 mg/L). For example, zinc was detected at 87 ug/L in Chalk Creek upstream of the Golf Tunnel adit discharge and at 510 ug/L downstream of the Golf Tunnel discharge.

Although survey data indicate the trout population is present and appears to be reproducing, it is noted that the population is less robust in the reaches associated with the adit discharge. The degree of chronic effects to the population cannot be evaluated without a significant level of effort that would have to occur over an extended period of study. The adit flow and measured concentrations of metals indicate that the Golf Tunnel and the associated Mary Murphy 1,400 level discharge are significant contributors of mine-related heavy metals into Chalk Creek.

**1.1.3 Preliminary Removal Assessment/Removal Site Inspection Results**

The watershed first came under scrutiny in 1986 after a fish kill at the Colorado Division of Wildlife Chalk Cliffs Fish Rearing Unit. The kill was attributed to elevated concentrations of metals in Chalk Creek during spring runoff. Water quality sampling at that time found zinc and cadmium at levels exceeding state water quality standards. The effects were a reduction of the number of brown trout and elimination of young fish for a 12-mile stretch below the mining district.

Metal concentrations in Chalk Creek peaked in the vicinity of the Mary Murphy Mine and the Iron Chest tailing piles. At that time it was suspected that interaction between mine drainage, creek flows and the tailing piles contributed most of the metals in the stream. A loading analysis developed from flow and metals concentration data showed that 85 percent of the metals load exiting the main adit was attributed to one inflow from the north drift on the Mary Vein. The inflow constituted only 1.5 percent of the total discharge from the adit, but at high flow the tunnel out-flow had a total zinc concentration of 190,200 micrograms per liter (ug/L).

Contaminated inflow was traced back to an ore chute on a high-sulfide stope (mined-out portion of vein) on the north vein, which drained 15 gpm. This same high-concentration source also accounts for 70 percent of the zinc load discharging from the Golf adit.

**2. Current Activities**

**2.1 Operations Section**

**2.1.1 Narrative**

The original Golf Tunnel Action Memorandum was time-critical removal action signed on June 20, 2011. The original project was to install as many as two engineered reinforced bulkheads (massive plugs) to stop the flow of the contaminated water coming out of the Golf Tunnel and, thereby, suffocate the reaction that generates AMD.

Since the original Action Memorandum was approved, it has been determined that the U.S. Environmental Protection Agency (EPA) may need to perform substantially more work at greater cost to rehabilitate and plug the tunnel than originally estimated. This was substantiated when all bids for construction of the bulkhead came in significantly higher than expected.

**2.1.2 Response Actions to Date**

Although originally intended to be conducted in 2011, other regional and project priorities delayed the actual start until 2014. In addition, because costs increased considerably, the State of Colorado Division of Reclamation, Mining and Safety (DRMS) came up with some funds to rehabilitate 1500 feet of the tunnel to facilitate installing the plug. The rehabilitation was completed at the end of 2013.

The engineered massive 34 feet by approximately 12 feet in diameter concrete plug was installed in August of 2014. Before installing the plug, the location was widened to key the plug into the tunnel. The tunnel walls were barred and power washed clean for a good bond with the concrete. Three grout ring permeable hoses were installed on the tunnel walls prior to concrete emplacement in order to pump at very high pressure an expanding sealant between the cured concrete and tunnel wall to ensure a complete seal.

A six inch diameter stainless steel pipe was installed to run through the plug and fitted with a valve to provide a relief mechanism should it become necessary. A one inch pipe was also installed to run through the plug for sampling purposes. A strain guage was also installed to monitor pressures on the plug.

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

There are no enforcement activities

**2.1.4 Progress Metrics**

<i>Waste Stream</i>	<i>Medium</i>	<i>Quantity</i>	<i>Manifest #</i>	<i>Treatment</i>	<i>Disposal</i>
NA					

**2.2 Planning Section**

NA

**2.3 Logistics Section**

No information available at this time.

**2.4 Finance Section**

Total cost of the project to date is \$1.1M.

**2.5 Other Command Staff**

NA

**3. Participating Entities**

Colorado State Division of Reclamation, Mining and Safety

**4. Personnel On Site**

One EPA, three to four ERRS contractor personnel, four to five Harrison Western subcontractor personnel.

**5. Definition of Terms**

NA

**6. Additional sources of information**

NA

**7. Situational Reference Materials**

NA

POLREP #1 Last Updated 11/28/2016