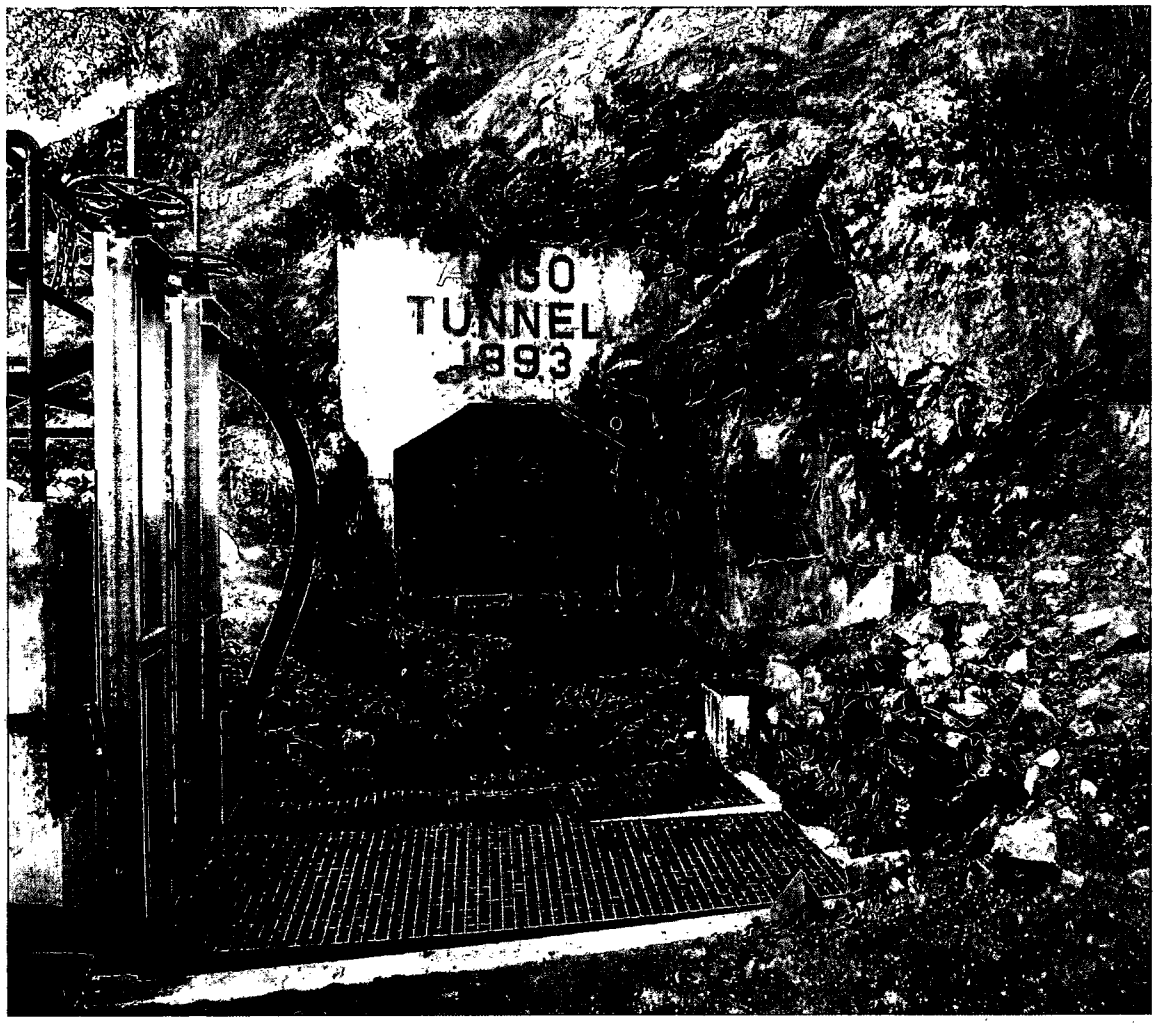
1286278 - R8 SDMS

CENTRAL CITY/CLEAR CREEK SUPERFUND SITE

EXPLANATION OF SIGNIFICANT DIFFERENCES

OPERABLE UNIT 3 ARGO TUNNEL DISCHARGE

FLOW-CONTROL BULKHEAD



August 2014

Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

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1.0 INTRODUCTION

Site Name: Central City/Clear Creek Superfund Site (Site) Operable Unit 3 (OU3)
Site Location: Clear Creek and Gilpin Counties, Colorado
Site ID: COD 980717557

1.1 Lead and Support Agencies

The Colorado Department of Public Health and Environment (CDPHE) is the lead agency. The U.S Environmental Protection Agency (EPA) is the support agency.

1.2 Legal Authority for Explanation of Significant Differences

Under Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund), as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA), the EPA is required to publish an Explanation of Significant Differences (ESD) when significant, but not fundamental changes, are proposed to the previously selected remedy. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Sections §300.435(c)(2)(1) and 300.825(a)(2), set forth the criteria for issuing an ESD and requiring that an ESD be published if a modification to the remedy is taken that differs significantly in either scope, performance, or cost from the remedy selected in the Record of Decision (ROD) for the Site.

1.3 Statement of Purpose

This ESD presents the details of significant differences to the remedy selected in the September 30, 1991 OU 3 ROD for the Site and as specifically related to the Argo Tunnel discharge. The remedy is fully described in the 1991 ROD.

In general, OU 3 encompasses the five mine adit discharges, including the Argo Tunnel, identified during the OU 1 Remedial Investigation (RI); plus the OU 2 waste rock piles or tailings impoundments associated with the five discharges. The addition of the Site to the National Priorities List (NPL) in 1983 opened the entire Clear Creek watershed, located in both Clear Creek and Gilpin counties, to the Superfund process as a study area from which various sources of metals contamination were delineated for remedial action.

This ESD provides a brief history of the Site and Argo Tunnel discharge and the Argo Tunnel Water Treatment Facility (ATWTF). It describes the original remedy as selected in the 1991 OU 3 ROD pertinent to the Argo Tunnel discharge, and explains the need for the construction of a flow-control bulkhead in the tunnel to address the potential of uncontrolled surge events.

1.4 Administrative Record

This ESD and its supporting documentation will be incorporated into the Administrative Record pursuant to 40 C.F.R. part 300.825(a) (2) of the NCP. The Administrative Record file is available for public review at the following locations:

Clear Creek Watershed Foundation
c/o: J. David Holm/Executive Director
P. O. Box 1963 Idaho Springs, Colorado 80452
(303) 567-2699

U.S. EPA Region 8 Superfund Records Center (by appointment only)
1595 Wynkoop Street
Denver, Colorado 80202-1120
(303) 312-7273 or toll free 800-227-8917

Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
4300 Cherry Creek Drive South
Denver, Colorado 80246
(303) 692-3300

For additional information contact:

- Les Sims, USEPA Region VIII, (303) 312-6224
- Jim Lewis, CDPHE, (303) 692-3390

2.0 SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

2.1 Site History

The Clear Creek/Central City Superfund Site is located on the east slope of Colorado's Front Range, approximately 30 miles west of Denver. The Clear Creek drainage basin ranges in elevation from approximately 5,700 feet to more than 13,000 feet.

The Clear Creek basin drains an area of approximately 400 square miles. Flows in the main stem of Clear Creek average from 20 - 40 cubic feet per second (cfs) during low flow conditions, to 400 - 900 cfs during periods of high flow. Clear Creek and its tributaries receive drainage from numerous mine tunnels and/or are in contact with mine waste dumps. Water quality data indicates that Clear Creek and its tributaries have elevated heavy metal concentrations in various stream reaches. The Colorado Water Quality Control Commission has classified the main stem of Clear Creek as a Class I cold water stream capable of protecting and maintaining a diversity of cold water biota. However, acid mine drainage and impacts from mining-related waste have considerably reduced the abundance and diversity of aquatic biota in the basin.

The Site was selected for addition to the NPL in September 1983 due to presence of heavy metals in the environment. Since that time, the EPA and the CDPHE have conducted investigations and made decisions regarding remedial actions at specific locations within the 400-square-mile site boundary.

As typical at Superfund sites, the complex technical, administrative and legal issues at the Site have warranted dividing the Site into separate management areas known as operable units. The Clear Creek/Central City Site is divided into three operable units to address heavy metal contamination in the Clear Creek basin. A brief description of the three operable units follows.

Operable Unit #1 was designated to address the discharge of acid mine water from five tunnels. The Operable Unit #1 ROD was signed in September 1987. Operable Unit #2 was designated remediation of mine waste piles in immediate proximity to the five discharging tunnels referenced above. The Operable Unit #2 ROD was signed in March 1988. Operable Unit #3 was originally designated to address control of surge events from the Argo Tunnel. The ROD for Operable Unit #3 was delayed pending the outcome of Phase II investigations.

In 1988, CDPHE, as the lead agency, initiated the Phase II investigation to take a comprehensive view of the approximately 400-square-mile Clear Creek drainage basin. The Operable Unit #3 ROD was designated to address threats identified in the Phase II investigations. The OU #3 ROD superseded the original OU #1 and OU #3 RODs. The OU #2 ROD remained unchanged by the OU #3 ROD.

The Argo Tunnel is located toward the eastern end of the city of Idaho Springs, Clear Creek County, Colorado at an elevation of 7,550 feet above mean level (refer to Figure 1). The Argo Tunnel was developed between 1893 and 1910 for a distance of 4.16 miles in a northerly direction from Idaho Springs to Central City. The tunnel was designed to serve as a water drainage and ore haulage tunnel for the mines whose underground workings intersected the tunnel.

The Argo Tunnel has a history of surge events where acidic metals-laden mine water was released to the environment. The first recorded event occurred in 1943 when miners working on one of the 13 laterals connected to the tunnel intercepted a large volume of naturally impounded water that was released. Four miners were killed as a result of the event. A second event occurred in 1980 as a result of a rock collapse in one or more areas of the tunnel. An unknown volume of water that had been stored during mining operations was released and the water entered Clear Creek from the tunnel portal. The surge event forced the closure of six drinking water intakes located within the Golden, Colorado area. It is unclear when another event will occur, but over time, the potential is very real.

Figure 1. Location map of the Argo Tunnel portal, Argo Mill Building, Argo Tunnel Water Treatment Facility (ATWTF) and Clear Creek.

2.2 Contamination

The Argo Tunnel discharge is a metals-laden acidic mine water with a pH between 2 and 3 standard units and contains numerous dissolved phase metals that exceed both water quality and drinking water standards. Prior to the implementation of the OU 3 ROD and the construction of the Argo Tunnel Water Treatment Facility, the Argo discharge flowed directly to the main stem of Clear Creek. The toxicity of the discharge precluded the development of aquatic resources in the main stem

from the point where the discharge entered Clear Creek to the city of Golden.

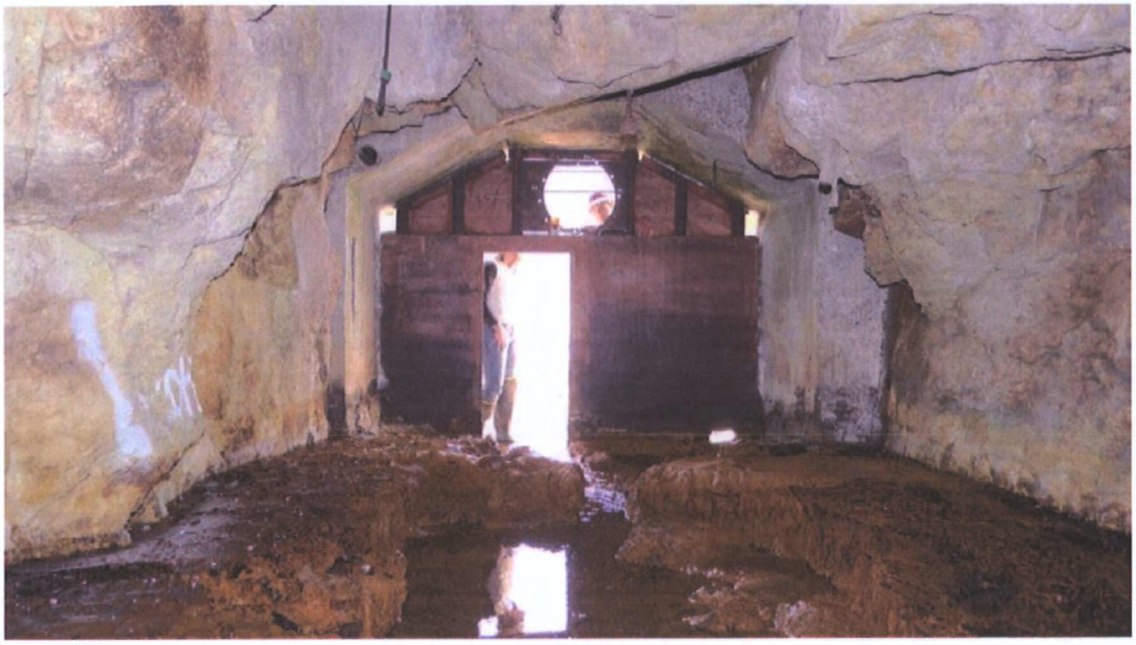

Figure 2. View to the south at the portal of the Argo Tunnel and the metals-contaminated sludge accumulated on the bottom of the tunnel. This material, along with the tunnel discharge, has been released to the environment during past surge events. The addition of the bulkhead will confine this sludge and the discharge behind the bulkhead, protecting the water quality of Clear Creek and enhancing the overall remedy.

2.3 Summary of the Selected Remedy

The OU 3 ROD selected remedy specific to the Argo Tunnel discharge requires "active treatment of the mine discharge to levels which allow state stream standards, and state table value standards to be met". This requirement is currently achieved through the active chemical treatment system at the Argo Tunnel Water Treatment Facility, which began operations in 1998.

The ATWTF not only treats the Argo Tunnel discharge, typically on the order of 200 gallons per minute during low-flow periods, but the plant also treats the acidic and metals-laden Big Five Tunnel discharge (located 1.3 miles west of the facility), at approximately 50 gallons per minute during low-flow periods, and the metals contaminated groundwater that is conveyed from Virginia Canyon, located approximately 0.3 mile to the west of the plant, at approximately 50 gallons per minute during low-flow periods. Both discharges reported to the main stem of Clear Creek in the past and impacted the water quality of Clear Creek.

Treatment of the Argo and Big Five Tunnel discharges as well as the Virginia Canyon groundwater has resulted in significant improvements to the water quality of Clear Creek, which currently supports a Brown Trout fishery.

3.0 BASIS AND DESCRIPTION OF SIGNIFICANT DIFFERNCES

The basis for this ESD is to address the potential of a surge event from the Argo Tunnel to Clear Creek. The OU3 ROD contemplated the need for a flow-control bulkhead to be constructed within the Argo Tunnel to prevent uncontrolled surge events similar to those that have occurred in the past. However, the ROD considered the bulkhead as a no action item.

A surge event from the tunnel would likely overwhelm the ATWTF, resulting in a fish kill on the main stem and compromising the city of Golden's drinking water supply. Although the Golden drinking water treatment plant can close their drinking water intakes and store water in their holding ponds for raw water feed, this contingency is only utilized during summer high water demands and the supply is only for 24 hours. The flow-control bulkhead will prevent surge events lasting longer than 24 hours providing protectiveness for the Golden drinking water plant.

Should a surge event reach Clear Creek it would likely compromise the investments and efforts of state and federal agencies, as well as those of local stakeholder groups, to improve the water quality of Clear Creek, the Clear Creek fishery and the Clear Creek riparian corridor. The ATWTF located at the portal of the Argo Tunnel could be at risk and result in costly repairs. In addition, the event would flow from the tunnel on to adjacent land owner property before reaching Clear Creek and the downstream water user's intakes.

3.1 Supplemental Information

GeoTrans, Inc., under contract with the EPA (contract number 68-C-02-092) prepared a Remediation System Evaluation Report (RSE) for the Argo Tunnel Water Treatment Facility dated September 27, 2007. In general, an RSE involves a team of expert scientists and engineers, independent of the site, conducting a third-party evaluation of site operations. It is a broad evaluation that considers the goals of the remedy, site conceptual model, above-ground and subsurface performance, and site closure strategy. The evaluation includes reviewing site documents, visiting the site, and compiling a report that includes recommendations to improve the system.

RSE recommendations were provided in the following four categories:

- Improvements in remedy effectiveness
- Reductions in operation and maintenance costs
- Technical improvements
- Gaining site closeout

The recommendations in the RSE were intended to help identify opportunities for improvements. Recommendations were provided in three of the four categories: effectiveness, cost reduction and

technical improvement. Two of the recommendations provided in the RSE to improve facility system effectiveness as related to the addition of a flow-control bulkhead were:

- Further consideration should be made of the risks associated with future blowouts of the Argo Tunnel and the costs of implementing blowout control. The agencies should come to a decision whether or not to move forward with blowout control. The majority of this recommendation would be implemented by CDPHE and EPA staff.

- Evaluate if the discharge of acidic and metals-laden ground water from Virginia Canyon should be better controlled during high flow events by either bypassing flow from the Argo Tunnel discharge or by increasing storage or treatment capacity. The majority of this recommendation would be implemented by CDPHE and EPA staff. Increased storage capacity could be achieved by implementing blowout control.

3.2 Description of Significant Differences - Proposed Action

In support of the above referenced RSE recommendations, the CDPHE procured design services for a flow-control bulkhead. The Schematic Design Report (Shannon and Wilson, December 31, 2013) contains the following bulkhead design goals. These goals support the RSE recommendations for remedy effectiveness:

- Eliminate surge events that could overwhelm the ATWTF and negatively impact the water quality of Clear Creek, or otherwise impact downstream water users;

- Store the mine pool behind the bulkhead to allow sufficient storage capacity for collection of surge event flows;

- Maintain a constant flow to the ATWTF, reducing treatment costs by eliminating seasonal high flow periods in late spring/early summer, which will eliminate the need to by-pass during the spring recharge period; and,

- Provide a cost-effective solution. The construction cost of the bulkhead is estimated to be $500,000 based upon the Shannon and Wilson 60 percent design value estimate.

The construction of the flow-control bulkhead will not fundamentally change the overall remedy selected in the OU3 ROD, nor will it interfere with the current treatment technology or facility operations during or after construction completion. Rather, it will enhance the remedy protectiveness. The flow-control bulkhead supplements the ATWTF as a component of the remedy.

4.0 SUPPORT AGENCY COMMENTS

CDPHE is the lead agency for the Site. EPA has reviewed the revised remedy and supports the implementation of the remedy as presented in this ESD.

5.0 STATUTORY DETERMINATIONS

The modification to the current Argo Tunnel remedy selected in the 1991 OU3 ROD, as presented in this ESD, was made in accordance with all applicable regulatory and statutory requirements as required by Section 121 of CERCLA. Treatment of the Argo Tunnel discharge will continue to meet Applicable or Relevant and Appropriate Requirements (ARARs) with the inclusion of a flow-control bulkhead. The bulkhead will provide unsurpassed protection to the environment that currently is not a part of the remedy.

Considering the new information that has developed and the changes that have been made to the selected remedy, CDPHE and EPA believe that the revised remedy is protective of human health and the environment, complies with federal and state requirements, and is cost effective. In addition, the revised remedy utilizes permanent solutions to the maximum extent practicable for the Site.

6.0 PUBLIC PARTICIPATION ACTIVITIES

CDPHE described its plans to construct a flow-control bulkhead in the Argo Tunnel in the November 2011 and October 2012 Site Update Fact Sheets. This fact sheet is mailed to approximately 150 interested people.

CDPHE as the lead agency will publish a notice of availability and a brief description of the ESD in the Clear Creek Courant as required by NCP 40 C.F.R. part 300.435(c)(2)(i)(B).

The ESD will be made available to the public by placing it in the Administrative Record file and information repository (NCP 40 C.F.R. parts 300.435(c)(2)(i)(A) and 300.825(a)(2)). The ESD will be included on the CDPHE website as well.

A formal public comment period or community meeting is not required when issuing an ESD. CDPHE is not considering either a comment period or meeting because the modification to the existing remedy does not fundamentally change the remedy, the remedy technology or the compliance with state and federal requirements.

7.0 REFERENCES

Camp Dresser & McKee Inc. June 8, 1987. Remedial Investigation Report Clear Creek/Central City Site.

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GeoTrans, Inc. September 27, 2007. Remediation System Evaluation, Clear Creek/Central City Superfund Site Argo Tunnel Water Treatment Plant, Idaho Springs, CO.

Gormley Consultants, Inc. April 1988. Final Work Plan Argo Tunnel Discharge Control Investigation Clear Creek/Central City Site.

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United States Environmental Protection Agency. July 1999. A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents.

Signed by:

Martin Hestmark

9/12/14

Martin Hestmark
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation
EPA Region 8

Date

Gary W. Baughman

8/12/14

Gary W. Baughman
Division Director
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment

Date