Rico Argentine St. Louis Tunnel Site Project Update

May 2012

Site Description

The Rico-Argentine St. Louis Tunnel Site, located north of Rico, Dolores County, Colorado, is impacted from historic mining and material processing. The site consists of the St. Louis Tunnel and associated mine workings, a building and silo from past water treatment operations, two ponds containing calcine tailings produced by roasting pyrite ores for sulfuric acid generation, and a complex of open ponds. The ponds and other site features were constructed in the Dolores River floodplain of materials found on site, including natural stream and hillside deposits and waste rock.

The St. Louis Tunnel is connected to mines on Telegraph Hill to the north and mines in the Rico-Argentine mining district (near Silver Creek) to the south. The first approximately 200 feet of the St. Louis Tunnel behind the portal structure collapsed and the tunnel is partially exposed to the surface.

Water that enters the mine workings via infiltration of precipitation and groundwater through subsurface pores and fractures becomes contaminated as it contacts highly mineralized surfaces.

The majority of water that enters the mine workings is discharged from the St. Louis Tunnel into a series of ponds, with flows varying seasonally from approximately 700 gallons per minute (gpm) to 1500 gpm. Water discharging from the St. Louis Tunnel contains elevated concentrations of metal contaminants that impact water quality and environmental receptors. The primary contaminants of concern at this time are cadmium and zinc.

St. Louis Ponds

Water previously discharged from the Blaine Tunnel into Silver Creek, but in 1983 a coffer dam was placed within the tunnel to direct the water to lower workings that are connected to the St. Louis Tunnel and the Blaine Tunnel discharge ceased.

In 1984, a slaked lime water treatment system began operation to treat water that discharges from the St. Louis Tunnel. The system treated mine discharge water with lime to increase pH and precipitate metal contaminants. The treated water flowed through the ponds where the metal precipitate was allowed to settle before the water was discharged to the Dolores River. Water treatment ceased in 1996, but mine discharge water has continued to flow through the ponds, and sludge containing metal precipitates remain in the ponds.

During 2010 and 2011, Atlantic Richfield Company and the Environmental Protection Agency performed work at the site to prevent the likelihood of a releases of contaminants from the site and to determine the best means of long-term water management. The efforts focused on stabilizing the current pond system, managing the pond sludge using on-site drying and disposal, identifying means to reduce the amount of water and contaminants that flow from the St. Louis Tunnel, and determining the best means of managing the contaminated water such that water quality standards are met in the Dolores River. Water samples were collected monthly and flow meters were installed for continuous flow measurements of the St. Louis Tunnel discharge. A temporary drying facility for pond sludge was designed and constructed and 7,500 cubic yards of sludge from Pond 18 were placed in the temporary drying facility during 2011. Geologic, geotechnical, and hydrologic evaluations of potential permanent drying facility and solids repository locations were performed in 2011 and additional information needed for effective facility designs was identified. Similar work was performed on the pond berms, including the flood dike that separates the pond system from the Dolores River to the west. Vulnerable zones in the flood dike were identified for fortification in 2012.

The collapsed portion of the St. Louis Tunnel was investigated to determine whether actions are required to ensure all of the mining impacted water is directed to a future water treatment system. Two borings intercepted the

St. Louis Tunnel and a transducer was placed in one of the borings to monitor the water level in the mine.

The Rico-Argentine area mines were investigated to determine if highly contaminated water can be captured and removed from the system at the source before it enters the crosscut that leads to the St. Louis Tunnel. Reducing high-contaminant concentration sources to the St. Louis Tunnel discharge could reduce the type and amount of long-term treatment required and potentially reduce the extent of support features such as drying and disposal facilities. The investigation showed that water flows freely from the Blaine Tunnel to the St. Louis Tunnel and that a consistent inflow of water occurs between these two points. Water treatment technologies potentially applicable to treating the St. Louis Tunnel discharge and water that could be collected from the Blaine Tunnel were identified.

Recent Activities

Work performed during the first half of 2012 included the following.

- Continuation of water quality sampling and flow measurements and regular pond maintenance.
- Design and construction of flood dike improvements that will reduce the risk the ponds could be breached during flooding or storm events. Riprap was added to several locations along the flood dike, steep slopes were flattened where needed for long-term stability, filters were installed at two seep locations, and the flood dike adjacent to Pond 9 was raised to provide adequate freeboard during a 100-year flood event. Storm water controls were used during construction to prevent releases of sediment to the Dolores River.
- Planning for gathering additional information for locating and designing a solids drying facility and solids repository and for identifying appropriate hydraulic controls for the collapse area of the St. Louis Tunnel.
- A flow test was performed in the Blaine Tunnel to determine the volume of water that can be intercepted. This information will assist with planned work underground and with evaluating potential alternatives for treating highly contaminated mine water from the upper workings and potentially reducing the flow to the St. Louis Tunnel.

Additional Work Planned for 2012

Additional work anticipated for 2012 includes the following:

- Evaluation of drying characteristics in drying cells and removal of dried solids to a temporary storage facility.
- Continuation of investigations to identify permanent drying facility and solids repository locations and appropriate designs. Plans are in place for additional geotechnical sampling, analyses, and evaluations to supplement the work performed during 2011 and previously. At this time, it is expected that up to 29 borings, 4 monitoring wells, 12 test pits, several geotechnical surveys, and analysis of samples from key locations will be performed. Upon review and analysis of the data generated by this evaluation, preliminary design of solids drying and disposal facilities will begin.
- Planning for removal of pond solids from Pond 15 is in progress. The work will include dredging of solids, and temporary placement in Ponds 13, pending a determination as to where a permanent storage facility will be constructed. Pond 15 solids removal is expected to begin in August 2012.
- Bench scale testing of ion exchange treatment using Blaine Tunnel water and additional evaluation of lime treatment and passive treatment technologies for treating St. Louis Tunnel discharge water will be performed this year. Temporary treatment is being planned for evaluating the metals and flow contribution from the Argentine/Blaine mine workings.
- The Blaine tunnel will be rehabilitated to allow safe access for removal of a blockage that may cause backup of water in the tunnel and overtopping of the coffer dam.

Contacts

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