Gold King Mine, Colorado

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Introduction

Wednesday, August 5th, 2015, the EPA investigated an old mining site in Silverton, Colorado, to assess ongoing water releases, treatment of mine water, and the feasibility of further mine remediation (*EPA, 2022*). During excavation above an old adit (Figure 5), a pressurized 3-million-gallon acid mine drainage began leaking above the mine tunnel and was released via a heavy equipment disturbance into Cement Creek. Copious amounts of heavy metals, such as lead, arsenic, mercury, and cadmium, flowed into the Animas and San Juan rivers. Once the metals were exposed to air and water, they generated a red-to-orange coloration (Figure 1.) as acids from the metals diluted into the rivers. Approximately 190 tons of solids mixed into 3,043,067 gallons of water (*EPA, 2022*), almost the size of 9 football fields. The waste plume was transferred into surrounding areas of recreational, agriculture, livestock, and drinking water usage.

Figure 2. Map of the affected rivers of the Gold King Mines Spill, (Los Angles Times, 2015)

Figure 1. Aninmas River Spill (Commons Wikimedia, 2015)

Containment/Responders/Treatment

Due to the flow rate of the river and the lack of dams, the response to stop the contamination or pump out the water was not possible. It was decided to let the contamination dilute, becoming less acidic, and for solids to settle onto the riverbeds. Several surrounding organizations were called to the emergency by EPA for monitoring and treatment, along with public statements on water quality conditions. The U.S. Geological Survey (USGS), U.S. Agency for Toxic Substances and Disease Registry (ASTDR), New Mexico Environment Department, Colorado Fish and Wildlife Conservation Office, Navajo Nation and the Bureau of Indian Affairs, Southern Ute Indian Tribe Water Quality Program (*EPA, 2022*) were all responders. The EPA created settlement ponds (figure 3.) near the portal to continue water treatment and ongoing flow from the Gold King Mine by adding lime and sodium hydroxide, neutralizing acids, and removing solids. The treated water was then discharged into Cement Creek at a pH of 5.0-5.5.

Figure 5. Plug entrance of the Gold King Mine Spill (flickr, 2015)

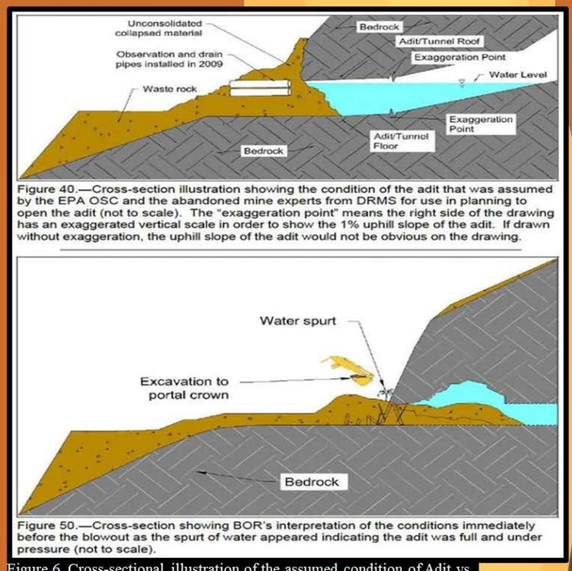

Figure 40.—Cross-section illustration showing the condition of the adit that was assumed by the EPA OSC and the abandoned mine experts from DRMS for use in planning to open the adit (not to scale). The "exaggeration point" means the right side of the drawing has an exaggerated vertical scale in order to show the 1% uphill slope of the adit. If drawn without exaggeration, the uphill slope of the adit would not be obvious on the drawing.

Figure 50.—Cross-section showing BOR's interpretation of the conditions immediately before the blowout as the spurt of water appeared indicating the adit was full and under pressure (not to scale).

Figure 6. Cross-sectional illustration of the assumed condition of Adit vs. BOR's interpretation of conditions (The Denver Post, 2015)Cross-sectional

Figure 3. Satellite view of Anima and San Juan near Farmington, NM post spill (flickr, 2015)

Figure 4. Settling Pools created by EPA for water treatment (flickr, 2015)

Public Perception

Many local companies were shut down for the first eight days of the spill. Even after several days of testing to ensure the human safety of the water, tourists and residents still hesitated to return. Local businesses filed millions of lost income claims and lawsuits. None of these claims have been paid out due to the EPA claiming governmental immunity; several lawsuits and settlements are still pending today. The spill reached local Navajo Nation agriculture areas that use the San Juan River, which caused both physical damages of crop yield and cultural damage. Since water carries a cultural significance, even after a year of the spill, some indigenous communities still refuse to use the water from the river. EPA responded by delivering over one million gallons of agricultural water estimating $1.1 million and $157,000 for costs used during the response (*EPA 2022*). These have been the few attempts at accountability they have made.

Abandoned Mines in The US

Approximately 38,991 total abandoned mine sites across the US (USDA) were abandoned or inactive before January 1, 1981 (*USDI*). These mines were left as ore was extracted and depleted. The operations were abandoned, leaving the bi-products of heavy metal waste to enter surrounding watersheds or settling solids in large cavities like Gold King. One of the EPA's reasoning for being on Gold King Mine is part of the Abandoned Land Mines Superfund Program (AML). They were investigating remediation for abandoned mines that pose environmental risks, such as contaminated watersheds and acid mine drainage into the surrounding mountainous regions of Colorado. The Gold King Mine accident is an example of the critical value of analytics before excavation and the worst-case scenario situations if these mines are left unevaluated.

Released King Gold Mine Spill Footage (House Committee on Natural Resources, 2016)

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