

Interim Water Treatment Plant at Gladstone, Colo. 2017





Gold King Level 7 Mine Adit Fall 2016

The Interim Water Treatment Plant at Gladstone, Colorado, treats discharge from the Gold King Mine.

This photo shows the stabilized mine portal.





Gold King Level 7 Mine Adit Fall 2016

Inside the Gold King Mine, EPA stabilized the adit (tunnel) to prevent future collapse. Mine discharge flows through an open channel and pipe system to the Interim Water Treatment Plant.





Main Conveyance Pipeline with Backup Pipeline

Mine discharge flows through the conveyance pipeline from the Gold King Mine adit to the Equalization/Storage Ponds at the Interim Water Treatment Plant at Gladstone.





Equalization/Storage Ponds at Gladstone

Mine discharge flows through two Equalization/Storage Ponds (left) on its way to the the Interim Water Treatment Plant (right).

These ponds provide a place for flows to equalize. They also serve as additional storage capacity in the event of a temporary shutdown of the Interim Water Treatment Plant.





Interim Water Treatment Plant

From the Equalization/ Storage Ponds, water flows through a buried pipeline to the Interim Water Treatment Plant.

The large Geotextile dewatering bags on the right hold Water Treatment Solids removed by the treatment plant.





Mine discharge enters through pipes from Equalization/Storage Ponds. **Reactor Tank**

Lime Silo and Lime Slurry Mixing Tank

619

BU

12

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ALEXCO



Photo courtesy of Alexco Environmental Group

Reactor Tank and Clarifier

(Note: This photo was taken prior to the 2016 building enclosure.)

In the reactor tank, low pH mine discharge water is neutralized with lime slurry, which precipitates dissolved metals.

In the clarifier, a polymer is added to clump (flocculate) metals and assist in their removal.





Clarifier viewed from above

(2015 prior to enclosure in building)

Mine discharge flows through the Rapid Mix Tank, the Flocculation Tank, the Clarifier and the Effluent Trough.

Treated water flows from the Effluent Trough to Cement Creek.





In the Rapid Mix Tank, polymer is added and mechanically mixed with the incoming mine discharge.

Rapid Mix Tank

(2015 prior to enclosure in building)





In the Flocculation Tank, the polymer clumps heavy metals and sediments, so they can be separated from the treated water.

Flocculation Tank (2015 prior to enclosure in building)





The Settling Tank is designed to separate clean water, which flows to the top, from clumped (flocculated) heavy metals that settle to the bottom of the tank.

Settling Tank

(2015 prior to enclosure in building)





Effluent Trough (2015 prior to enclosure in building)

From the Effluent Trough, treated water flows through a pipeline to Cement Creek.





Treated water flowing into the Effluent Trough.

Effluent Trough



Photo courtesy of Alexco Environmental Group



Pipeline from Interim Water Treatment Plant to Cement Creek

Treated water flows from the Clarifier through a pipeline and is discharged to Cement Creek.





Treated Water being discharged from the Pipeline (clear) to Cement Creek (cloudy)

Photo courtesy of Alexco Environmental Group





Solids Hopper of the Clarifier

From the Solids Hopper of the Clarifier, water treatment solids flow through a pipeline to Geotextile Bags for dewatering.





Interim Water Treatment Plant Control System

The Interim Water Treatment Plant is controlled by Programmable Logic Controllers (PLC) that can be accessed on a tablet, either at the facility or remotely.





Geotextile Bag

Four Geotextile Bags are used at the plant to passively dewater treatment solids and make them more dense. The solids are held in the bags, while water is released.





Geotextile Bag on the left of this photo has been filled, while the one on the right has not.

Geotextile Bags





Water Treatment Solids

Each Geotextile Bag retains water treatment solids (sludge). The sludge shown here is 15% solids. Once filled, the sludge is mechanically removed from the bags and dried further in the open air.





Water Treatment Solids Drying Area

Water treatment solids are being placed in the Drying Area south of the Interim Water Treatment Plant.





Treated Water being discharged to Cement Creek





Winter is beautiful at Gladstone, but extreme weather presents operational and maintenance challenges, such as avalanche concerns when accessing the site, -30°F temperatures at night, and heavy snowfall making access in and around the plant difficult.





For More Information:

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