Your Water, Wastewater, & Materials Dewatering Partner

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COPPER MINE STORMWATER RETENTION BASIN

Objective

This copper mine had a sediment lagoon full of unconsolidated sediment from storm water runoff and site water reclamation. Previous attempts to mechanically remove the sediment from the pond resulted in damage to the pond liner and significant additional expense to repair the liner. Previous methods also resulted in the inconvenience of disrupting day to day operations of the facility. Facility managers searched for alternative dewatering processes to remove the sediments from the pond as economically and efficiently as possible without interruption of operations. The objective was to remove the material and dewater it so the solids could be harvested and run back through the facility again. Dredging the pond would allow space for the coming year and capture the precious metals the pond contained. Dredging the sediment into Geotube® containers was selected as the most efficient process for this project and dredging operations to remove the sediments were performed in the fall of 2008.

Lagoon prior to commencement of operations

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Location: *Utah*

Products: *TenCate™ GT500D Geotube® Containers*
Solve 9330- Emulsion Polymer

Equipment: *Polymer Make-down Unit*

Geotube® Container Sizing

Geotube® containers are manufactured from high strength polypropylene fabric and designed to allow water to escape through the pores of the fabric while retaining the chemically-conditioned solids. 60-ft. circumference by 100-ft. long GT500 Geotube® containers were selected for this operation. This 100 ft. length fit well in the containment area and provided approximately 530-cubic yards of storage in each container.

Chemical Conditioning

A representative sample of the digester residual was collected and sent to the WaterSolve LLC laboratory for testing. Dewatering polymers were evaluated based on water release rate, water clarity, and flocculent appearance. In addition, the dosing rate was determined during bench-top dewatering experiments and recommendations were provided to the facility during this phase of the program. Polymer(s) that flocculated and dewatered these residuals most effectively were re-evaluated with lower doses in order to isolate the most efficient dewatering and flocculating polymer. Solve 9330 was the recommended polymer for dewatering this residual in Geotube® containers. WaterSolve recommended using Solve 9330 at a rate of 50-ppm in order to achieve greater than 20-percent solids in Geotube® containers for subsequent passing of a paint filter test and excavation.

The raw dredged sample (left) was conditioned with 66-ppm of Solve 9330 (center). The filtrate collected from the Geotube® container is on the right.

Geotube® containers were filled to the maximum height of 7.5-ft.

The Result

WaterSolve was contracted to dewater residual dredged from the lagoon as it was being pumped into the 60-ft circumference by 100-ft. long Geotube® containers. Two polymer make-down units were plumbed together to administer the proper dose of polymer during operations. A fire hydrant supplied the make-down units with adequate water for the chemical feed system. An inch and a half water line from the make-down units injected the made-down polymer (Solve 9330) into the 8-inch pipeline line going to the Geotube® containers. A sample port located on the 8-inch pipeline prior to the Geotube® containers was used to draw samples for visual observations of the inline floc. Adjustments to Solve 9330 dose were made in response to visible observations of the inline samples, filtrate quality, and filtrate release volume from the Geotube® container. Neat (concentrated) polymer demand varied from 2 to 20 gallons per hour and was supplied in 250-gallon totes. The pumping rate to the Geotube® containers was approximately 1,500-gpm. One containment area was constructed on-site with room for 4 Geotube® containers on the bottom layer and 3 stacked on the second layer. The containers were manifold with 8-inch valves from the trunk-line and 6-inch port elbows connecting them to the fill ports of the containers.

Lagoon shown near the end of dredging.

Containers were stacked to minimize the space requirement.