TENCATE Geotube®

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Geotube® Containers Offer Innovative Solution for Disposal of Coal Mine Slurry Waste

TenCate™ helps North River Mine continue processing coal by utilizing first ever large-scale Geobag® disposal method.

In 2007, the North River Mine coal processing plant in Berry, Alabama was in a bind. Due to new regulatory restrictions, available area, and construction scheduling, the plant was facing a possible interruption of the primary disposal methods of its refuse – a waste stream of almost 1.5 million gallons of slurry per day. The mine needed to continue processing coal for shipment in order to meet customer needs, however conventional disposal methods of surface impoundment or injection into abandoned underground mine workings were not possible. An alternative disposal method was necessary for the plant to continue operation.

Mike Windle, Plant Supervisor at North River Mine, began evaluating new disposal methods. According to Windle, Geotube® technology stood out immediately. "The Geotube® method had multiple benefits of containment and dewatering, stability of the dewatered cake for reclamation of the site," said Windle, "and there was no need to rehandle the materials." Since Geotube® containers were already being used to successfully dewater various types of sludge wastes, it was suggested that Geotube® technology could provide the processing plant with the waste disposal they needed.

TenCate™ develops and produces materials that function to increase performance, reduce cost, and deliver measurable results by working with our customers to provide advanced solutions. TenCate™'s Geotube® technology has been used to deliver high performance solutions around the globe in more than 50 countries. Over 2,000 dewatering projects have taken advantage of Geotube® containers since 1991.

Initial Testing

To determine if Geotube® technology would dewater the waste slurry to an acceptable moisture content, full-scale tests were conducted at the mine in August 2007. Two

Geotube® technology, perfectly suited to both dewater and contain materials, solved the slurry waste disposal issues facing the North River Mine. This large-scale project involved 3 bag fields, 240 Geotube® containers, and 200,000 cubic yards of coal slurry waste being pumped and dewatered.

100-ft. long test bags were used, along with a chemical treatment pump, tanks, and pipe manifold to allow for required polymer injection. Slurry was pumped directly into the bags from the preparation plant underflow.

A volume of about 500 gallons per minute was processed alternating between the two containers. As the bags were filled with the slurry mixture, clear water flowed from them draining into the wastewater sediment pond below. The effluent was almost completely clear. After roughly two days, water ceased to flow from the bags and they were stable. The test proved successful, and design began for a full-scale dewatering set-up.

Clear effluent draining during the initial testing phase.

Implementation

Due to the volume of slurry to be processed, the mine sought a safe and efficient plan that would allow the containers to be reclaimed in place, instead of opening them and transporting the material to the course refuse disposal area. "This was the first time that the use of geosynthetic bags had been utilized for disposal of slurry waste from a mine washing facility on such a large scale," said Ed Trainer, TenCate™ Market Manager. "Careful consideration had to be taken in order to ensure the Alabama Surface Mine Commission would permit the project."

(More)

"A plan was developed to construct bag fields upstream from the existing South Slurry Pond on the mine property. The effluent water would drain to the pond, which provided an environmentally safe vessel for the resulting effluent."

Upon receiving permits from the Alabama Surface Mine Commission, site preparation began. In order to maximize utilization of the bag fields, a stacked pyramid of four layers of Geotube® containers was designed. A manifold system, along with a polymer tank and pumps, was implemented to fill and manage the flow to multiple containers at once. A swinging ladder 8-inch dredge was placed into the slurry pond to pump the slurry into the containers. The dredge was initially operated on a 24-hour basis with two 12-hour shifts per day. A crew of five to six men managed the containers and operated the dredge.

This set-up was capable of pumping 1,750 gallons of slurry per minute into the containers. The first layer of containers was filled from one side to the other allowing the next level of containers to be placed on top. This process continued until the desired level of four layers was reached. A second bag field was constructed prior to completion of the first. This provided two workable layout areas for continuous operation, eliminating downtime for the dredge and providing time for the containers to drain. A total of three bag fields were constructed and utilized during this project.

Productivity averaged 1,750 cubic yards per 24-hour day. The completed project utilized 240 Geotube® containers, and a total of 200,000 cubic yards were pumped and dewatered. Once all the bags in the fields were full and dewatered, the site was then ready for reclamation. Eventually, the bags were covered with earth and then topsoil. All of the bag field sites were very stable and no problems were encountered during the covering operation. Once reclamation was complete, the entire field was mulched and seeded. The entire project was completed without an accident or environmental incident.

A Geotube® representative can work with an organization to administer a small-scale test to evaluate material and to provide recommendations as to the best dewatering approach. To learn more, call 1-888-795-0808 or visit www.geotube.com.

Preparing the first bag field site. It measured two acres.

This multiple manifold system controlled the flow of slurry between the Geotube® units.

Each bag field accommodated four levels of stacked Geotube® units. The project was designed so that the bags on the bottom level were systematically filled from one side to the other, allowing the second level bags to be placed safely on top of the bottom layer. This continued until the fourth layer was added (above right.)

How Geotube® Dewatering Technology Works

Dewatering with Geotube® technology is a three-step process.

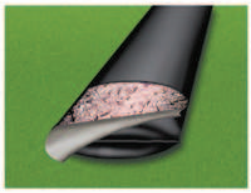
In the ***confinement*** stage, the Geotube® container is filled with dredged waste materials. The Geotube® container's unique fabric confines the fine grains of the material.

In the ***dewatering*** phase, excess water simply drains from the Geotube® container. The decanted water is often of a quality that can be reused or returned for processing or to native waterways without additional treatment.

In the final phase, ***consolidation***, the solids continue to densify due to desiccation as residual water vapor escapes through the fabric. Volume reduction can be as high as 90 percent.

Step 1: Filling

Step 2: Dewatering



Step 3: Consolidation

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