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 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.

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.”
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.