Mine Supervisor Chooses Innovative Solution for Disposal of Coal Mine Slurry Waste

Geotube® Containment and Dewatering technology was used to dispose of slurry waste from North River Mine.

At the North River Mine in Berry, AL, two waste streams are created from the processing plant, coarse rock and fine rock particles. Coming from the processing plant, the fine rock particles are suspended in water forming a slurry. This slurry is normally disposed of via surface impoundments or injected into abandoned underground mine workings. The volume of this waste stream is very significant and expensive to dispose of. At the North River Mine approximately 1,000 gallons per minute is created on a 24-hour basis.

In 2007, a possible interruption of the primary disposal methods due to new regulatory restrictions, available area, and construction scheduling prompted investigation of a third method of slurry handling. The mine needed to continue processing coal for shipment to be able to meet customer commitments. This required slurry disposal. Faced with finding an alternative disposal method, Mike Windle (left), Plant Supervisor at the North River Mine recalled a meeting he had with old friend and former colleague, Tim LeBlanc, J.F. Brennan Co. Tim had told Mike about using TenCate Geotube® technology on projects where they were dredging contaminated sediments.

Combining Experience and Innovation

Mike made the decision early in life to pursue a career in mining. He earned his degree in mining engineering at the University of Alabama and like all long-time miners, during his career Mike has experienced boom and bust cycles. He was involved in shutting down mines and closing processing plants until the boom of recent years when coal demand shot up and prices along with it. Over his career, and during the past seven years working at North River Mine, he's seen lots of technologies come and go.

Mike Windle evaluated a number of interim alternatives for disposing the slurry waste. Geotube® technology provided the benefits of containment and dewatering, stability of the dewatered cake for reclamation of the site and it eliminated rehandling the material. Mike invited Ed Trainer, Market Manager for TenCate™ and Tim LeBlanc to a meeting at the North River Mine to discuss how this innovative technology would work.

As the world's leading provider of woven and non-woven geosynthetics and industrial fabrics, TenCate™ engineered a high strength textile for the application of

containment and dewatering of mining residuals, contaminated sediments and sludge. TenCate's™ Geotube® technology has been used to deliver high performance solutions around the globe in more than 50 countries. Since 1991, over 2,000 dewatering projects have used Geotube® containers. One of the big advantages of Geotube® dewatering technology is that it can be sized to fit the project. The technology is used in operations requiring massive amounts of capacity and in facilities needing dewatering once every quarter.

To prove the efficiency of Geotube® dewatering, a full scale trial was performed.

To determine if this technology would dewater the waste slurry to an acceptable moisture content, full scale tests were conducted at the mine in August 2007. With years of experience working with processing chemicals, Mike understood how important proper chemical conditioning of the waste slurry was to achieving optimum release of bound water in order to get maximum consolidation of the solids and produce clear effluent from the tubes. The test was successful.

Upon receiving permits from the Alabama Surface Mine Commission, site preparation began. Vegetation was removed and topsoil stored for later reclamation of the dewatering cell. A 6" layer of drainage aggregate was placed and covered with 3" of crushed limestone. Rock drains and safety berms were installed around the perimeter.

The site was prepared for the Geotube® containers.

One 4-layer stack of Geotube® containers was buried before another four layers were placed and filled on top.

To minimize the footprint for the containers, a stacked pyramid of four layers of tubes was designed. J.F. Brennan Co. was hired to dredge the waste slurry and manage the Geotube® dewatering. A manifold system allowed the contractor to fill and manage the flow to multiple tubes at once. A swinging ladder 8 inch dredge was placed into the slurry pond to pump the slurry to the tubes. 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 tubes and operated the dredge. Productivity averaged 1,750 cubic yards per twenty-four hour day. A total of 200,000 cubic yards were pumped and disposed of during the project utilizing 240 containers with a combined length of 42,000 linear feet. "I chose to work with TenCate™ because of its track record" said Mike. "We couldn't stand a failure." Asked if he'd use Geotube® technology in the future, Mike said "Yes, it works; the bags are extremely tough and durable." He said the Alabama Surface Mine Commission was "totally impressed by it."

A manifold system was used to control the flow between the Geotube® units.

A dredge pumped slurry waste from the lagoon to the Geotube® containers.

Once all the bags in the field were full and dewatered, the site was then ready for reclamation. The Geotube® technology worked extremely well and provided an alternate method of coal mine slurry waste disposal for North River Mine. With the interim disposal project completed, Mike could again enjoy his free time bow hunting for deer in the Alabama wilderness.

When moisture content reached 35 percent, the tubes were covered for reclamation.

TENCATE Geotube®

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