TENCATE Geotube

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Geotube® Dewatering Technology Used To Alleviate Acid Runoff Problem From Mine Tailings

Construction on I-99 in Pennsylvania unearths pyretic rock; Geotube® units used to contain minerals that could contaminate groundwater.

Many states are faced with the problem of dealing with tailings and residues from mining, road building, and other sources that pose a threat to groundwater. Residues can come from both old inventories of stockpiled material, as well as those materials recently excavated in order to provide roads and access to mining areas. The leachate from these tailings produces an iron oxide material that can, if not monitored and controlled, flow into drinking water, streams, and rivers.

Such was the case during construction of Interstate 99 near Skytop Mountain, PA. Road construction unearthed pyretic rock from previous mining operations. The pyrite and marcasite in the rock combine with oxygen, water, and bacteria to create a substance known as ARD, which contains acid, heavy metals, and sulfates. Heavy metals of concern include iron, aluminum, manganese, and zinc. Acidic drainage from this material can have a pH lower than three.

More than 700,000 cubic yards of pyretic material were uncovered during construction, and would require treatment to prevent water contamination. To help solve the problem, managers turned to Geotube® dewatering technology.

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. For this situation, Geotube® dewatering technology would provide a cost-effective way to help contain hazardous materials, isolate them, and allow effluent to be released back into local waterways safely.

As a first step in the process to evaluate Geotube® dewatering technology, a simple, bench scale test called the Rapid Dewatering Test (RDT) was used. The RDT takes a small sample of the material that needs to be treated and determines how effective Geotube® dewatering technology will be with the specific chemistry and makeup of the slurry. The RDT allows for variations in polymer additives to be tested and evaluated quickly and at minimal expense. The test is accurate enough so that the results can effectively predict how Geotube® dewatering technology will work in full-scale operation.

Geotube® units being used at the I-99 site near Skytop Mountain, PA. Geotube® dewatering technology was used to contain heavy metals and other contaminants from pyretic rock unearthed during road construction. This prevented acid runoff problems.

At the I-99 site, the RDT demonstrated that Geotube® dewatering technology would be an effective method for dewatering and containing the heavy metal content of the slurry.

First, the acid runoff from the pyretic rock collects in sediment ponds, then is pumped into a sedimentation tank. Polymer is mixed into the solution in tank, then mixed into the

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contaminated slurry before it enters the Geotube® unit. The polymer bonds with solids and minerals in the slurry, allowing water to drain from the Geotube® unit, while solids are trapped behind.

The results of the process demonstrated the value of Geotube® dewatering technology. Total solids increased to 35.4%, while substantially more heavy metals were contained (see chart below).

The effluent from the process was almost completely clear, compared to dirty brown before treatment, and the water quality was good enough so that the effluent could be released into local waterways without additional treatment.

A TenCate Geotube representative can work with an organization to administer a small-scale test like the RDT to evaluate material and to provide suggestions as to the best dewatering approaches.

To learn more, visit www.geotube.com or call 1-888-795-0808.

Initial System Configuration

Collection and Treatment Pond

Final System Configuration

Element	2005 Sludge Slurry Prior to Processing	2006 Dried/Dewatered Sludge From Geotube® Container
Total Iron	38,090 mg/kg (dry)	53,562 mg/kg (dry)
Total Aluminum	17,925 mg/kg (dry)	25,505 mg/kg (dry)
Total Manganese	1,525 mg/kg (dry)	1,798 mg/kg (dry
Total Solids	1.15%†	35.4%

†May have been influenced by polymer recirculation in the pond sampled

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How Geotube® Dewatering Technology Works

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

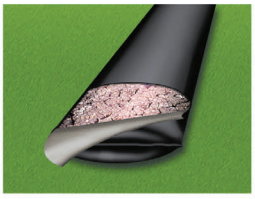
In the ***confinement*** stage, the Geotube® container is filled with dredged waste materials. The Geotube® container's unique fabric confines the fine grains of the material.

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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