Your Water, Wastewater, & Materials Dewatering Partner

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Dewatering Contaminated Residuals

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Inside this issue:

Location:

Massachusetts

Products:

TenCate™ GT500D\

Geotube ® Containers

Solve 154 Polymer

Equipment:

Polymer Make-down unit

Mixing Manifold

Sample and injection

The two raceway tunnels were each over 600’ long with a 200’ branch connected to the tunnel on the left.

Objective

A consulting firm was awarded the contract for removing contaminated residuals from a raceway (canal-like structure) in Massachusetts. The raceway was built in the 1840’s and provided water to a direct drive hydropower generator that ran a textile plant. Over the course of time, polychlorinated biphenyls (PCBs) had accumulated in the raceway along with oth- er oils and contaminants. The objectives for this public and private partnership were to use a hydraulic dredge and/or a mechanical excavator to remove the contaminated residuals from the raceway and dewater them in Geotube® containers for subsequent disposal. The filtrate water from the Geotube® container was treated through an onsite water treatment plant and discharged into the river. This portion of the project included dredging and dewatering over 1,400’ of under- ground tunnel and approximately 400’ of exterior raceway which discharged into the river.

WaterSolve, LLC was tasked to evaluate the site residuals and recommend an appropriate chemical conditioning program. WaterSolve, LLC was later contracted to supply the equipment as well as the manpower to operate the chemical feed system.

Geotube® Container Sizing

Geotube® containers are manufactured from high strength polypropylene fabric and designed to allow effluent water to escape through the pores of the fabric while retaining the chemically-conditioned solids. The estimates indicated there was approximately 2,500 cubic yards of residuals to be collected. The lay-down and containment area allowed for two 80’ circumference by 143’ long GT500 Geotube® containers each having the capacity of 1,287 cubic yards.

Chemical Conditioning Program

In July of 2009, WaterSolve, LLC received a two gallon sample of the raceway residuals. A dewatering performance trial was performed to determine the most effective chemical conditioning program. Dewatering polymers were evaluat- ed based on water release rate, water clarity, and flocculant appearance. A dual product chemical conditioning program consisting of Solve 426 and Solve 154 performed the best during the trial and was recommended for the project. The initial trial recommended that the raceway residual should be diluted 1 to 1 with water for effective conditioning. The recommended dose was 66-ppm of Solve 426 and 100-ppm Solve 154 for the diluted raceway residuals.

The Result

In August of 2009, the contractor had prepared the containment site for the two 80' circumference by 143' long Geotube® containers. A pump with a 4" discharge feed line was placed in the raceway for the dredging operation. WaterSolve, LLC plumbed one ten gallon per hour chemical feed pump to inject the Solve 426 neat followed by a make-down unit to inject the polymer Solve 154.

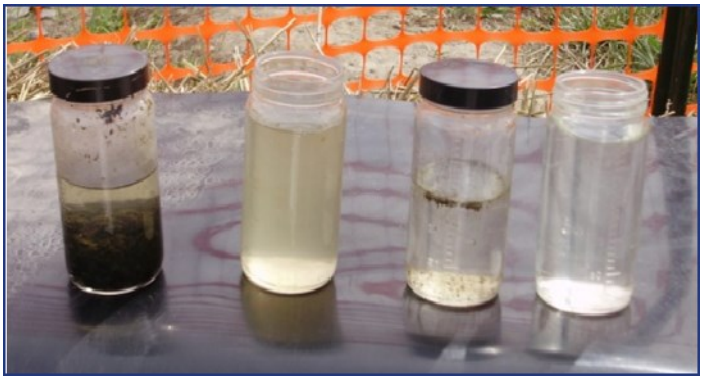
The Geotube® containers were on a pad approximately 30' above the dredge and water flow from the dredge was estimated at 300 to 400-GPM. As dredging began, there was frequent starting and stopping due to debris in the raceway including bricks, tires, pipes, steel beams, wood, and rocks.

Field Changes

The outer raceway water became very cloudy with silt that was difficult to floc and did not effectively settle in the Geotube® containers. At the request of the contractor, WaterSolve, LLC performed additional jar testing on-site to make adjustments to the chemistry to remedy the silt cloud in the raceway water. The jar testing revealed the combination of Solve 154 and Solve 9248 would capture the silt much better than the initial process. An additional make-down unit was delivered to the site to inject the polymer Solve 9248. The water clarity improved but the irregular flow of the dredge solids made it difficult to treat an optimum dose for clarity. The water exiting the Geotube® containers was not clear enough to go directly to the water treatment plant and a higher dose of polymer would risk an overfeed that could deter the performance of the treatment system. Additional field jar testing revealed a very low dose of the two polymers would floc the cloud in the effluent water. Effluent water from the raceway was then pumped to the south Geo- tube® container and treated with a low dose of Solve 154 and Solve 9248.

This process was very effective and two additional polymer make-down units were delivered to the site for this process. The south Geotube® container became a polishing container and the north container became the dredge residual container. A dam was constructed in the sump between the containers and a pump transferred water from the south container to feed the water treatment plant while the north container effluent water returned to the raceway. As the job progressed, excavators were used to gather mud and place it in a container with a screen over it to help separate debris. Water was added and the slurry was pumped to the north (dredge) Geotube® container.

Polymer make-down units and related piping.



From left to right, the above jars show; the conditioned dredge residual, the effluent water from the dredge Geo- tube® container, the effluent after further treatment, and the filtrate from the polishing Geotube® container.

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