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Steel Manufacturing Settling Lagoon

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Objective

An eight-acre settling lagoon at this major steel manufacturing facility in northern Ohio required removal of the solids which had accumulated over several years of operation to increase hydraulic retention time, reduce short circuiting, and improve solids settling. Facility managers searched for alternative dewatering processes to remove the solids from the pond as economically and efficiently as possible. The objective was to remove the material from the lagoon and dewater it to pass a paint filter test in order to effectively handle, excavate and haul off-site for economical disposal.

Chemical Conditioning

A representative composite sample of lagoon residual was collected and delivered to the WaterSolve, LLC laboratory for testing. Several dewatering polymers were evaluated based on water release rate, water clarity, and flocculent appearance. In addition, dosing rate(s) were determined during bench-top dewatering experiments and recommendations provided to the facility during this phase of the program. Polymers that flocculated and dewatered these residuals most effectively were re-evaluated with lower doses in order to isolate the most efficient dewatering and flocculating polymer. Solve 9248 was the recommended polymer for dewatering this residual in Geotube® containers as a single polymer application.

The Solution

Several alternative methods were evaluated and it was determined that dredging the material from the lagoon into Geotube® containers with chemical conditioning to facilitate the solids/water separation was the most effective. 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 project was commenced and completed during the fall of 2008.



Lagoon residual conditioned with Solve 9248 at the project site.



Location: *Ohio*

Products: *TenCate™ Geotube®
Containers
Solve 9248- Emulsion*

Equipment: *WSLP-2400 Polymer
Make-down Unit*

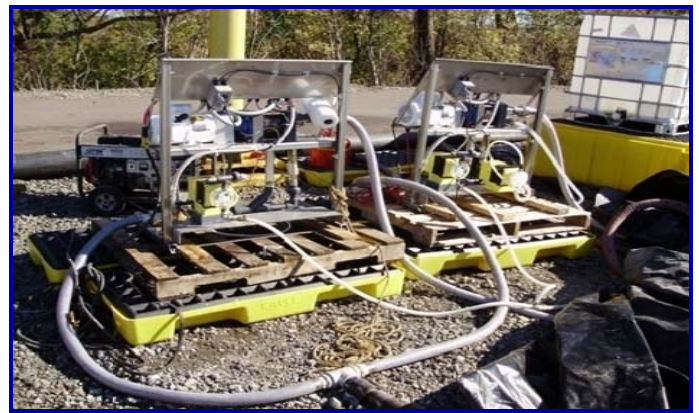
The Result

WaterSolve was contracted to dewater residual dredged from the lagoon as it was being pumped into 80- ft by 200-ft long Geotube® containers. Two Model WSLP-2400 Polymer make-down units were plumbed together to administer the proper dose of polymer during operations. A 2-inch hose from the make-down units injected the made-down polymer (Solve 9248) into the 8-inch pipeline line going to the Geotube® containers. Sample ports located on the pipeline prior to the Geotube® containers were used to draw samples for visual observations of the conditioned residuals. Adjustments to the polymer dose were made in response to visible observations of the inline flocculated samples collected periodically via these sample ports. Geotube® container filtrate quality and the filtrate release volume from the Geotube® container were continuously observed during dredging operations. Neat (concentrated) polymer (Solve 9248)

demand varied from 2 to 25-gallons per hour and was supplied to the site in 250 gallon totes. The pumping rate to the Geotube® containers was approximately 2,000-gpm an inline booster pump to maintain pressure. Two containment areas were constructed, each holding five Geotube® containers. Each container was supplied with an 8-inch shutoff valve coming off the manifold header and a 90-degree elbow connecting them via a flexible hose to allow for the containers to fill to their maximum height. Once each container reached the maximum height of 8-feet, the valve directing flow to the individual container was turned off and the container was allowed to dewater without additional flow. After the level in the container dropped, additional flow was directed to the container. The sequence of filling and dewatering varied based on several factors and was continuously monitored by WaterSolve personnel.



Dredge pumped at approximately 2,000-gpm with the assistance of an in-line booster pump.



Note the lagoon is in the background. Piping and polymer make-down units and a polymer tote.



Geotube® containers were filled .



Supernatant from the Geotube® containers was diverted and