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Biosolids Storage Lagoons

Objective

Two offline biosolids storage lagoons (1 MG each) at this Wastewater Treatment Plant were designated by USEPA for dredging and disposal. The lagoons were offline for 20 years, contaminated with PCBs and metals, and had a dense cover of vegetation growing on the surface. Initial surveys estimated that approximately 12,000 yd³ of biosolids residual at 10 to 12-percent dry weight solids had consolidated in the lagoons. The objective of this project was to dredge the storage lagoons down to the original clay liners, dewater the residual to greater than 25-percent dry weight solids, transport, and dispose of the dewatered residual in a designated local landfill.

The Solution

It was calculated that 900 ft x 60-ft circumference Geotube® container would be needed to dewater and contain this dredge volume to greater than 20-percent solids. The resulting volume and mass of residuals at 20-percent solids would be 746 cubic yards and 635 tons, respectively. WaterSolve completed installation of the Geotube® containers, temporary piping, and polymer make-down and feed equipment (WSLP-2400) in August 2006. In order to maximize the containment and consolidation efficiency of the Geotube® containers, WaterSolve recommended that the facility refill the Geotube® containers at least three times in order to maximize their containment capacity and dewatering efficiency. In order to facilitate dewatering in the Geotube® containers, non-potable water was mixed (1:1) with excavated biosolids residual prior to polymer addition. Removal of vegetation and other debris was facilitated with a solids screen prior to hydraulic pumping to the Geotube® containers.

WaterSolve's Chemical Conditioning

WaterSolve performed a bench-top dewatering trial for this biosolids residual sample collected from the storage lagoons in July. 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 were provided for this dewatering project.

WaterSolve recommended using 213J for its excellent water release rate and clarity. The dose rate of 300-ppm was used in order to achieve 20-percent solids and subsequent passing of a paint filter test for solids hauling. From bench testing, expected time to reach a project objective was three to four weeks in Geotube® containers. The site was hydraulically and mechanically excavated. The south lagoon was excavated down to its clay liner as 1 MG of biosolids residual was transferred to the north lagoon.

Inside this issue:

Location:

Georgia

Products:

60 x 100 feet Geotube® Containers
Solve 213J
Solve 216C

Equipment:

WSLP-2400 Polymer
Make-down unit
Mixing Manifold
Sample and injection ports

Surface vegetation and other debris were removed by excavator, chipped, hauled, and disposed of at the designated landfill. Six Geotube® containers were laid out and manifold together in the new processing and dewatering pad. A submersible solids pump was used to initiate pumping, but was continually clogging with vegetation and debris. Therefore, solids were mechanically excavated through a solids screen positioned over a 30-yd³ hopper. Non-potable water (200 gpm) was added to the hopper, a 25-hp boat motor was used for mixing, and a submersible pump moved the material to the Geotube® containers. Filtrate water from the Geotube® containers was channeled to a 4-inch trash pump where it was conveyed to a storm water retention pond for further treatment and discharge.

Mechanical excavation of vegetation and other debris from a 1-MG biosolids storage lagoon prior to hydraulic dredging to Geotubes® containers for further processing (i.e., dewatering and consolidation).

Injection of polymer with WaterSolve's WSLP-2400 make down unit.

The south storage lagoon was used for Geotube® containers after initial excavation of biosolids into the north lagoon.

The Result

WaterSolve's WSLP-2400 was used to condition the sludge slurry inline with Solve 213J (300 to 350 ppm). After the first Geotube® container was filled to capacity, release of free water from subsequent Geotube® containers decreased significantly. Chemical conditioning evaluation was repeated, and Solve 216C (300 ppm) was identified as a better flocculent for the mixed lagoon sludge slurry. With the change in chemical conditioning program, Geotube® containers were pulse-filled over 18 days of operations with greater than 20-percent dry weight solids. Excavation, disposal, and site clean-up were performed on schedule and the Geotube® containers easily met the 25-percent solids project objective.

TENCATE Geotube®