

Application **Light Industrial Wastewater Treatment Plant**

Location **Elwood, IL**

Product **GT500 Geotube® Containers**

The Challenge

Stepan Company is a global manufacturer of specialty and intermediate chemicals used in consumer products and industrial applications. Stepan is a leading merchant producer of surfactants, which are the key foaming and cleaning ingredients in consumer and industrial cleaning compounds including detergents, shampoos, lotions, toothpastes and cosmetics. Stepan's Millwood Plant (Elwood, IL) currently processes its wastewater with an aerobic digestion wastewater treatment plant and stores liquid residuals in a 5 MG onsite lagoon, which is subsequently land applied (on- and off-site) by local contractors on an as needed basis. Due to periods of inclement weather and the rising costs of land application, WaterSolve, LLC was tasked to evaluate the lagoon sludge for a chemical conditioning program and potential use of Geotubes® for containment, dewatering, and either landfill disposal or land application of sludge cake as an alternative to their current residuals management strategy.



The Solution

WaterSolve, LLC identified a chemical conditioning program (Solve 9248) and recommended Geotube® Containment and Dewatering Technology to Stepan's environmental managers as a cost effective and efficient method for handling residuals. Geotube® containers, which are manufactured from high strength polypropylene fabric, are designed to allow effluent water to escape through the pores of the fabric while retaining the solids. WaterSolve completed installation of three 60' circ. x 100' long Geotube® containers, temporary piping, and polymer make-down & feed equipment in May 2006. Stepan personnel prepared two lay-down areas with crushed-stone berms (1' high) and dewatering pads, Site A for one Geotube® and Site B for the other two containers. Stepan's current land application contractor (i.e., Continental Farms) was tasked to pump the lagoon solids into the Geotubes® with a tractor-mounted Toro Pump (750 gpm). Liquid residuals (1.0 MG) at 2.0 to 4.0% dry wt solids were chemically conditioned (300 ppm) and pumped into the three Geotubes® over 60 d.



WaterSolve's LP2400 polymer make-down system @ Site A.

The Result

WaterSolve project managers observed efficient dewatering during pumping to the Geotube® containers at both sites. It was surmised that the crushed stone lay-down pad at Site B facilitated more efficient Geotube® dewatering. In addition, the groundwater well used as a water source for polymer make-down at Site B was of better “quality” than the unfiltered river water used for the Site A container, thus a more efficient in-line flock was formed during pumping to the Site B Geotubes®. This increased efficiency doubled the solids volume pumped to each Site B Geotube®, accelerated the dewatering/consolidation timeline, and subsequently decreased the time between pumping events by 50% compared to Site A. Excavation and disposal of 9 to 15% dry wt cake solids occurred after 30-60 subsequent days of drying, sufficient for this matrix to pass a paint filter test and be accepted by a local landfill. Overall, Stepan consolidated and dewatered 1.0 MG of residuals for approximately \$0.04/gallon (without disposal costs) after this first year of operations. Geotube® dewatering applications were an economical and operational option for Stepan, providing a four season alternative to their current management strategy.



A 60' x 100' Geotube® was installed @ Site A to contain and dewater approximately 300,000 gallons of lagoon residuals.



Key elements in the release of water from liquid residuals is proper polymer mixing and injection to provide good chemical conditioning.



The 60' x 100' Geotube® containers @ Site B are pumped periodically to a height of 7' to dewater and consolidate 0.6 MG of lagoon solids. Clean filtrate water from the Geotube® container is collected from the lay-down area and returned to the headworks of the facility.