Case Study

Application	**HISTORIC SHIPPING CANAL, DECOMMISSIONED REFINING FACILITY AND TANK FARM**
Location	**LOCKPORT, ILLINOIS**
Product	**GT500 Geotube® Containers**

Objective

Sediments within a historic shipping canal that flows through a decommissioned refining facility were measured to be contaminated with weathered oil and other oil-constituents (i.e., PAHs, metals, BTEX, etc.) associated with site-specific activities including refining, packaging, and transportation of oil and gasoline. A site survey estimated that approximately 125,000 yd^3 of oil-contaminated sediment at 15 to 20-percent dry weight solids had accumulated in the historic canal. One phase of site decommissioning recommended by facility managers, consultants, and Illinois EPA included hydraulic dredging and/or mechanical excavation of the contaminated sediments, dewatering and consolidation to recommended geotechnical thresholds (74% dry weight solids), and subsequent land-filling in an onsite CAMU. A pilot study was initiated in November, 2007 to evaluate performance of hydraulic dredging and subsequent Geotube® dewatering in comparison to mechanical dewatering techniques, and mechanical excavation and subsequent bulking of sediments with fly-ash. Performance objectives of Geotube® technology for containment and dewatering of 1,800 yd^3 of oil-contaminated sediments hydraulically dredged from the shipping canal included:

1. Dewatering sediments to targeted percent solids (greater than 40% dry wt solids) for subsequent excavation and disposal at a pre-determined onsite disposal facility.
2. Contain and dewater sediments dredged and pumped to a Geotube® Dewatering System at a flow rate of approximately 1,250 gpm.
3. To minimize total suspended solids (TSS) and contaminant breakthrough from the Geotube® container to be subsequently treated in a water treatment system (including oil/water separation).
4. To optimize the prescribed chemical conditioning program, feed-rate, and polymer introduction in order to meet Geotube® container and water treatment system objectives.

Geotube® Container Sizing

Four hundred feet of 45-ft circumference and 100-ft of 75-ft circumference GT500 Geotube® container were delivered November 2007 to contain and dewater approximately 1,800 yd^3 of *in situ* sediments. Onsite management received Geotube® containers from LTL carrier onsite and Metropolitan Environmental (hydraulic dredging contractor) facilitated onsite transportation and movement into the dewatering pad. Geotube® containers were unwrapped and unrolled into position by WaterSolve and Metropolitan Environmental. All five Geotube® containers were manifolded with 90-degree elbows and gate valves for simultaneous use and subsequent re-filling after dewatering. Metropolitan personnel attached a fused 8-inch HDPE discharge pipe to the 8-inch Geoport® locations on each Geotube® container by sliding a two foot section of pipe into the flange and taping the overflow sleeve to the pipe. Although secure for this application, WaterSolve recommended securing/bolting all manifolded dredge discharge pipe directly to the Geotube® standard Geoport® flange or an optional 10-inch flange upgrade, if necessary. Two 90-degree elbows and 200 ft of discharge pipe between the polymer injection port and sample port were used for inline introduction of the previously identified chemical conditioning program (Solve 213C) with sufficient mixing energy to facilitate the specified flock for subsequent water release from the Geotube® containers.

Chemical Conditioning

WaterSolve performed bench-top dewatering trials for canal sediments collected with an excavator by onsite personnel (17 March 2006). Dewatering polymers were evaluated based on water release rate, water clarity, and flocculent appearance. In addition, dosing rate(s) were determined during these bench-top dewatering experiments and recommendations provided to the facility during this phase of the program. We recommended using Solve 213C at a dose rate of 300 ppm in order to achieve greater than 40-percent solids in Geotube® containers for subsequent capping in a permanent containment installation.

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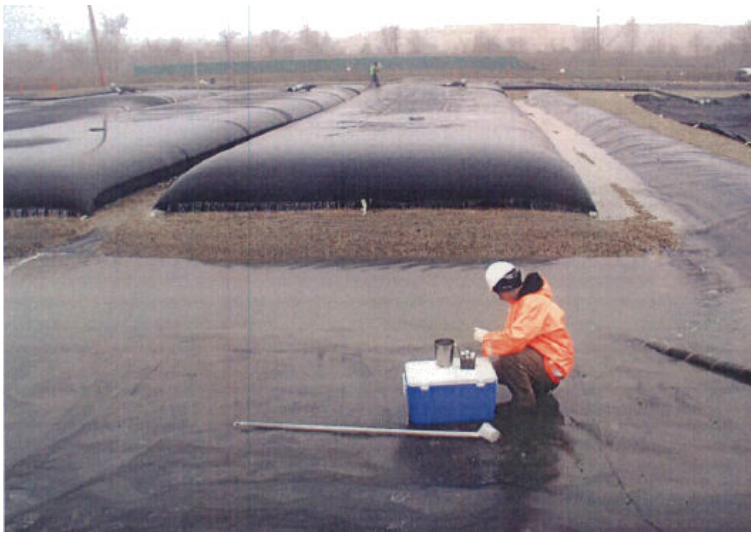
Operations

Metropolitan Environmental and WaterSolve were contracted to dredge 1,800 yd^3 of oil-contaminated sediments from a 150-ft section of the canal and dewater the residuals in 400-ft of 45-ft and 75-ft circumference Geotube® containers located in a temporary, bermed lay-down area along the canal. A WSLP-2400 (polymer make-down system with Stranco-Polyblend) and 10-gph high viscosity LMI® chemical feed pump were used to facilitate mixing/activation of Solve 213C polymer with water. The chemical-conditioning program for these contaminated sediments was verified in November of 2007. Solve 213C was introduced with a WSLP-2400 make-down system (0.5% make-down concentration) to the dredge residual at 10 to 14-gph. Adjustments to Solve 213C dose were made in response to visible observations of the inline floc (sample port), Geotube® filtrate quality, and filtrate release volume from the Geotube® containers.



Geotube® containers in operation and filtrate being sampled (left). The photo on the right shows the WaterSolve WSLP-2400 polymer make-down unit in operation.

The Result

Sediments were chemically conditioned (Solve 213C) in-line with WaterSolve's WSLP-2400 polymer make-down unit and initially dredged into three Geotube® containers (45-ft circumference x 100 lf) at 1,250 gpm over four days. As the first 300 ft of Geotube® containers approached 50-percent solids capacity, one 75-ft circumference x 100-ft long Geotube® container was brought online. The first containers were pulse-filled to capacity and the remaining volume was pumped to the larger Geotube® container. Eight days of dredging were required to fill all 400 ft of Geotube® container to 50 percent of dewatered volume capacity with greater than 40-percent dry weight solids remaining.

Geotube® containers were periodically measured for fill height (left). *In situ* sediment sample (left) compared to chemical conditioned sediment.

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