

Dewatering of Contaminated Dredge Residuals

Brian J. Mastin, PhD*, Gregg E. Lebster*, and Mike Broering*

*WaterSolve, LLC

4964 Starr St., SE

Grand Rapids, MI 49546

616-575-8693, 616-575-9031 (fax)

brianm@gowatersolve.com

ABSTRACT

Technological advances in the use and application of polymers and other chemical conditioning agents for the expedient separation of contaminated solids from water have facilitated the use of geotextile tubes for containment, dewatering, and consolidation of hydraulically excavated materials. This new and innovative technology has been successfully used to dewater fine-grained, contaminated material that contained dioxins, polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), pesticides, metals (with a lithic biogeochemical cycle), and other hydrophobic materials. The objective of these dewatering performance trials was to develop a site-specific chemical conditioning program for each potential Geotube dewatering application. Polymers were evaluated based on water release rate, water clarity, flocculent appearance, and water volume after passing through a Geotube geotextile filter. In addition, dosing rate(s) were determined during these bench-top dewatering experiments and recommendations were provided as a part of these trials. Geotube hanging bag performance evaluations were also performed with the recommended chemical conditioning program to evaluate filtrate quality and time to attain desired cake solids within the Geotube container. Once a recommended chemical conditioning program was identified, other chemical application variables were evaluated for potential full-scale operations including: 1) Use of more than one chemistry as sediment character changes with depth, debris, organic matter, and density; 2) Simultaneous or sequential application of more than one chemistry; 3) Application of an inorganic chemistry in combination with an organic chemistry; 4) Effects of mixing energy and shear energy during introduction of flocculating chemistry inline; and 5) Use of pre- and post-dilution. Overall, containment and dewatering of solids with Geotube containers (including dewatering polymer and feed equipment) costs less than \$0.02 per gal (greater than 1,250 cubic yards *in situ*), requires minimal technical assistance to install and operate, retained greater than 95-percent solids, solids were only handled once they were dried sufficiently for hauling and disposal (18 to 80-percent cake solids), did not interfere with site and facility operations, and the lay-down area for containment of 1,000 cubic yards of solids production was 672 square yards (6,050 square ft).

KEYWORDS

Dewatering, Geotube® container, contaminated dredge residuals, polymers, environmental dredging.