Dewatering of Oil-Contaminated Dredge Residuals

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ABSTRACT

Confined Disposal Facilities (CDFs) and *in situ* technologies (e.g., capping) are typically not viable risk mitigating options for oil-contaminated residuals generated during environmental dredging due to potentially toxic constituents. Under normal CDF operations, water is discharged over a weir structure or allowed to migrate through the dike walls while contaminated solids are retained within the CDF. However, oil constituents (e.g., PAHs and metals) may be lost via effluent during filling operations, surface runoff, seepage through the bottom and dike walls, volatilization, and uptake by plants and animals. Containment and dewatering technology is typically used to condition contaminated sediments such that they meet the requirements of subsequent treatment and/or disposal components of the remedial alternative as well as decrease the volume and mass of sediments that require transport, treatment, or restricted disposal. Several mechanical dewatering options (e.g., belt filter press, centrifuge, etc.) are available as short-term or long-term remedies for onsite dewatering but are capital and resource intensive for facilities and contractors that operate on competitive budgets. The objective of this study was to evaluate Geotube® containers as a dewatering option for oil-contaminated residuals generated during hydraulic dredging of a historic shipping channel and storage lagoon of a former and active petroleum refinery, respectively. Potential dewatering alternatives were evaluated by cost effectiveness, ease of operation, solids and contaminant retention, solids handling time, residual flow rates, footprint requirements, and seasonality. After inline flocculation with dewatering polymers, the permeable geotextile that forms the Geotube® container allows efficient dewatering while containing the fine grain solids. For containment and dewatering of oil-contaminated dredging residuals, use of Geotubes® (including dewatering polymer and feed equipment) cost less than $4.85/cy, required minimal technical assistance to install and operate, retained >99% solids (including contaminants), solids were only handled once they were dried sufficiently for hauling and disposal (20 to 60% cake solids), and did not interfere with facility operations. Overall, this dewatering methodology greatly reduced the volume and mass of residual solids and costs associated with hauling and disposal while allowing continual operation of facility lagoons and waterways. If time and space are available for Geotube® operations, Geotube® applications are 80 to 90% less capital intensive compared to alternative mechanical dewatering techniques.

KEYWORDS

Dewatering, Geotube® container, oil-contaminated residuals, polymers, environmental dredging.