

Cleveland Harbor's Unique Approach to Sustainable Dredged Material Management

(A Geochemical Characterization Approach for Beneficial Use of Dredge Material)

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Background/Objectives. Maintaining the Port of Cleveland's federally designated navigation channel requires the removal of approximately 250,000 cy of dredged material annually. Historically, the Port's dredged material was deemed to be too contaminated for placement in the open waters of Lake Erie and needed to be managed in a Confined Disposal Facility (CDF), in which the capacity would be exhausted by the end of 2015. To address this challenge, unique characterization and creative engineering solutions were successfully employed to increase CDF capacity by harvesting and beneficially using dredged materials.

Approach/Activities. To understand the chemical constituents of in-river sediments and dredged materials already placed in CDFs, a sampling effort was authorized by the Cleveland-Cuyahoga County Port Authority (Port). Results of CDF material characterization activities helped determine general locations of materials ideal for reuse. Findings from iterative sampling efforts provided a level of comfort regarding chemical characteristics for specific material types based on various factors such as grain size, placement depth, placement history, and water level.

To facilitate beneficial use at two local brownfields, a Materials Management Plan was prepared that compared CDF material to state and federal standards. This pre-characterization and risk assessment work, and the improved understanding of factors contributing to the potential for contaminants, led to a much greater comfort level by the state to use dredged materials with fewer restrictions. This project set several programmatic precedents through USACE and Ohio EPA. Subsequent projects further developed confidence in predicting likely contaminate levels resulting from hydraulic off-loading segregation techniques and source characterization.

Data from the sediment characterization activities completed in 2012 were evaluated for potential relationships between various factors such as likely historic source areas, placement methods, grain size, depth, and location to contaminant concentrations. Relationships between general parameters such as grain size or total organic carbon to potential chemicals of concern can assist in developing two-step, cost-effective geotechnical and geochemical screening approach to guide targeted sampling for contaminant-level verification. This could expedite beneficial use projects and preserve more available funding for other project components such as transportation and water management while still ensuring use of the material is protective of human health and the environment.

Results/Lessons Learned. Well thought out geochemical pre-characterization plans can provide confidence for consideration of the beneficial use of previously regulated dredge materials, whether harvested from CDFs or directly removed from channel/harbor maintenance dredging. The poster will discuss potential relationships between geotechnical and geochemical characterization throughout the process (pre-dredging, off-loading, processing). This review will be useful for designing cost-efficient dredged sediment characterization activities to better predict material suitability for a beneficial use project without relying on more extensive sampling programs that might result from using more traditional methods such as area (grid-based) or volumetric approaches (one sample per "X" cubic yards).