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Contaminated Sediments/Dredged Material Management for the Port of New York and New Jersey as a Component to Port Development and Revitalization*

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INTRODUCTION

Effective operation of the multi-state Port of New York/New Jersey (Port), which contributes $20 billion to the regional economy and generates nearly 170,000 jobs, is dependent on yearly navigational dredging of several million m^3 of sediment for channel maintenance and deepening. Further dredging is required for remediation of environmentally sensitive areas. However, more stringent ocean placement testing regulations in the Port region have necessitated a search for other means of handling the most contaminated dredged materials.

Here, we describe a dredged material decontamination program for the Port aimed at the creation of sediment decontamination facilities that produce a beneficial use product to obviate the need for ocean placement. These facilities, to be a viable component of an overall dredged material management plan, must be environmentally balanced and economically feasible with the predictable ability to process large volumes of dredged materials with rapid turn-around. Our program recognizes that the responsible management of contaminated dredged materials is a complex problem that requires the effective application and coordination of a variety of cross-cutting skills in order to make decontamination facilities a reality. Participants do no come from a single agency, but are *ad hoc* teams of scientists, engineers, regulators, port authorities and operators, technology development firms, federal/state/local governments, business interests and community groups, among others, who are brought together by the need to solve the complex problem of managing dredged material.

FACILITIES FOR DREDGED MATERIAL DECONTAMINATION

What differentiates our program from typical *remedial actions* is that the goal of the WRDA/ NJMR Programs is to construct *fixed* decontamination facilities that can environmentally, and cost-effectively process dredged material at capacities of at least 380,000 m^3 per year with high value beneficial use end-products. These facilities will include a *treatment train* approach to processing of the dredged materials. This will encompass material handling capabilities, storage facilities for buffering the irregular inputs from dredging projects, a decontamination technology, and finally the manufacturing of a beneficial use product. This will be a steady-state system for handling approximately 15-25% of the total yearly dredging in the Port.

The present status of the decontamination demonstration will be reviewed with emphasis on the steps taken in the evaluation and selection of decontamination technologies for full and commercial–scale implementation. The technologies considered ranged from solidification/stabilization, advanced sediment washing, to several high temperature treatments. Beneficial use end-products, essential for the placement of the treated material and for cash-flow creation, include topsoil, construction-grade cement, light-weight aggregate, structural fill, bricks and architectural glass tiles.

CROSS-CUTTING TECHNOLOGY TEAM

A. INFORMATION AND RESOURCE EXHANGE

Since 1994, the U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (USACE) and the U.S. Department of Energy's Brookhaven National Laboratory (BNL) has been investigating and demonstrating the environmental, engineering, and economic feasibility of decontaminating dredged material from the Port. This work is being funded through the Water Resources Development Acts (WRDA) of 1992, 1996 (WRDA Program). The WRDA Program has generated the impetus for the initiation of other decontamination demonstration programs. The State of New Jersey's Office of Maritime Resources (NJMR) Decontamination Program is an example where the sharing of common goals and resources with the WRDA Program will facilitate faster implementation towards an operational facility(s) by 2001/2. Other cooperative partnerships include the Port Authority of New York & New Jersey, New York State Department of Environmental Conservation, New Jersey Department of Environmental Protection, EPA Great Lakes National Program Office, State of Michigan Department

of Environmental Quality, USACE Waterways Experiment Station, Washington State Interagency Confined Multi-user Disposal Site Team (MUDS), and the Venice, Italy Port Authority.

B. SCIENTIFIC AND ENGINEERING SUPPORT ACTIVITIES

In working to bring this about, the WRDA Program has found it necessary to work on tasks that include investigations on the properties of sediments on the grain-size scale, sediment toxicity of post-treated materials, assessment of environmental impacts from process side streams, visualization of regional contaminant distributions for *hot spot* identifications, public outreach, site acquisition and facility construction, and volatile emissions from sediments and processing plants. This entails the integration and interpretation of specialized data from many different groups studying sediment related problems in the Port as well as working to obtain additional data to fill in holes in the overall picture.

C. PARTNERSHIPS TO OVERCOME BARRIERS

The success of these sediment decontamination demonstration programs requires the establishment of public-private partnerships to overcome the myriad set of barriers to go forward towards long-term, self-sustaining commercialized enterprises. Some of these barriers include (1) integration of decontamination into an overall dredged material management/option plan, (2) provision of sediment streams to the processing facilities, (3) difficulties of incremental funding during construction phases, (4) materials handling-storage capabilities, (5) facility siting, (6) beneficial use markets, (7) regulatory permitting challenges and (8) public outreach activities.

SUMMARY

Dredged material decontamination plays a role in Port development and expansion in two ways. First, by making the timely dredging for maintenance and deepening of navigational channels possible. Second, by manufacturing an array of construction materials such as aggregate, cement, bricks, and topsoil from the most contaminated dredged material for use in restoration of brownfields and other infrastructure in the Port region.

Furthermore, decontamination applied either *in-situ* or *ex-situ* conditions has a role in aquatic restoration outside of navigable channels. These restored environments then become economic drivers for the revitalization of urban watershed communities and ports within impacted regional corridors.

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