In-situ Stabilization of Contaminated Sediments for Remedial Dredging: A Pilot Study

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Outline

- NY/NJ Harbor Overview
- The Passaic River Remediation
- Technology Issues
- Deep Soil Mixing
- In-situ Stabilization Pilot
- Potential Additional Studies
PORT OF NEW YORK AND NEW JERSEY

- 15 Million People
- Largest Port on East Coast
- Largest Petroleum Port
- Naturally Shallow, 250 miles of engineered waterways
- 4-7 mcy/year dredging
- Oldest Industrialized Watershed
- 2-4 mcy/year contaminated sediment
Regional Dredged Materials Management Plan (DMMP)

- Reduce Need to Dredge
- Reduce Contamination
- Beneficially use as much as possible
- Dispose of only what cannot be used
Legacy Contamination in Sediments: PCBs, Dioxins, PAHs, Pesticides, Metals
Passaic River Contamination

- Mercury: up to 29,600 ppb
- Lead: up to 18,000 ppm
- 2,3,7,8-TCDD: up to 5,300 ppb
- Total PCB: up to 47,000 ppb
- Total DDT: up to 19,000 ppb
- Total PAH: up to 7,750 ppb
IMTT-Bayonne Demonstration Site
BioGenesis Pilot Project - 1999

Cavitation/Oxidation Unit

Collision Chamber

Sediment Aeration

[Images of equipment and processes related to the BioGenesis Pilot Project]
“Black Mayonnaise”
Conventional Equipment
Dredged Material Management is “messy”
2,3,7,8-TCDD Distribution
Deep Soil Mixing Technology

Injection Nozzles
CDSM
SOIL STABILIZATION
FOR
BERTH CONSTRUCTION
AT
PORT OF OAKLAND
Sea Floor Stabilization in Deep Water
Pilot Project Objectives

- Determine optimum slurry ratio
- Determine optimum curing time
- Show that hardened sediments can be efficiently excavated using conventional dredging equipment
- Show that minimal loss of sediments occurs with this methodology
- Document improved handling characteristics of hardened sediments
Test Section Plan
Potential Additional Studies

- Volatilization of organics/mercury from exothermic pozzolanic reaction
- Resuspension of sediments during application of cement slurry
- Treatability of hardened sediments by sediment decontamination technologies in Harbor
In the meantime……