

NJ Department of Transportation Office of Maritime Resources

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

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RTDF Meeting
Baltimore, MD*



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

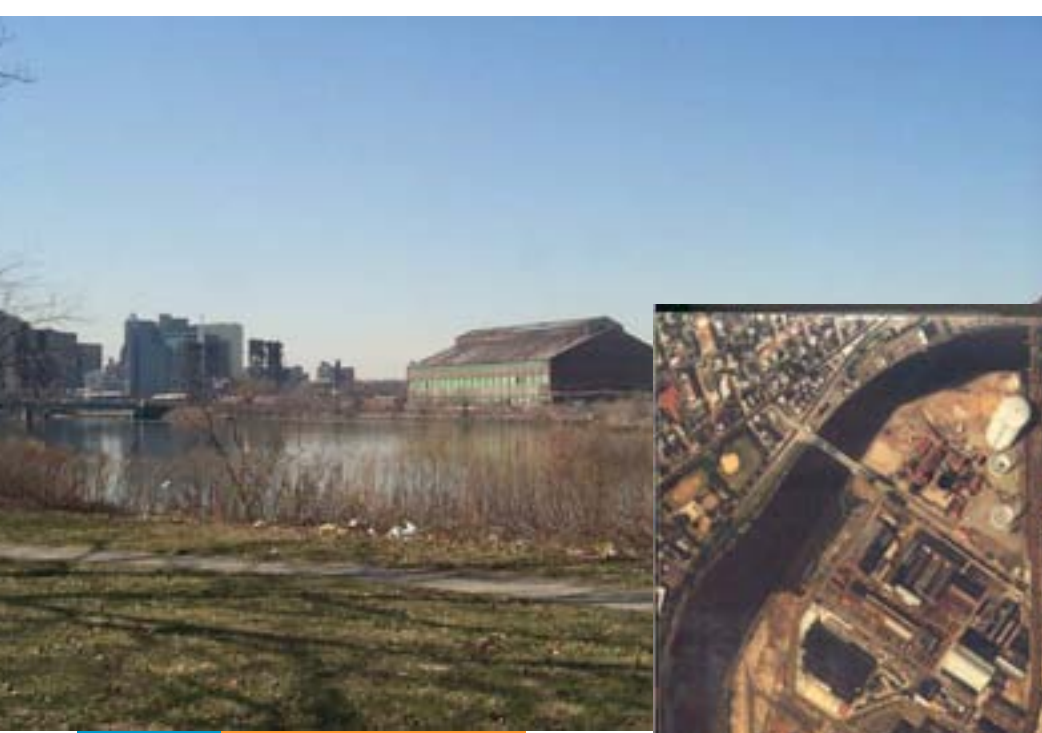
- 15 Million People
- Largest Port on East Coast
- Largest Petroleum Port
- Naturally Shallow, 250 miles of engineered waterways
- 4-7 mcy/year dredging
- Oldest Industrialized Watershed
- 2-4 mcy/year contaminated sediment



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**



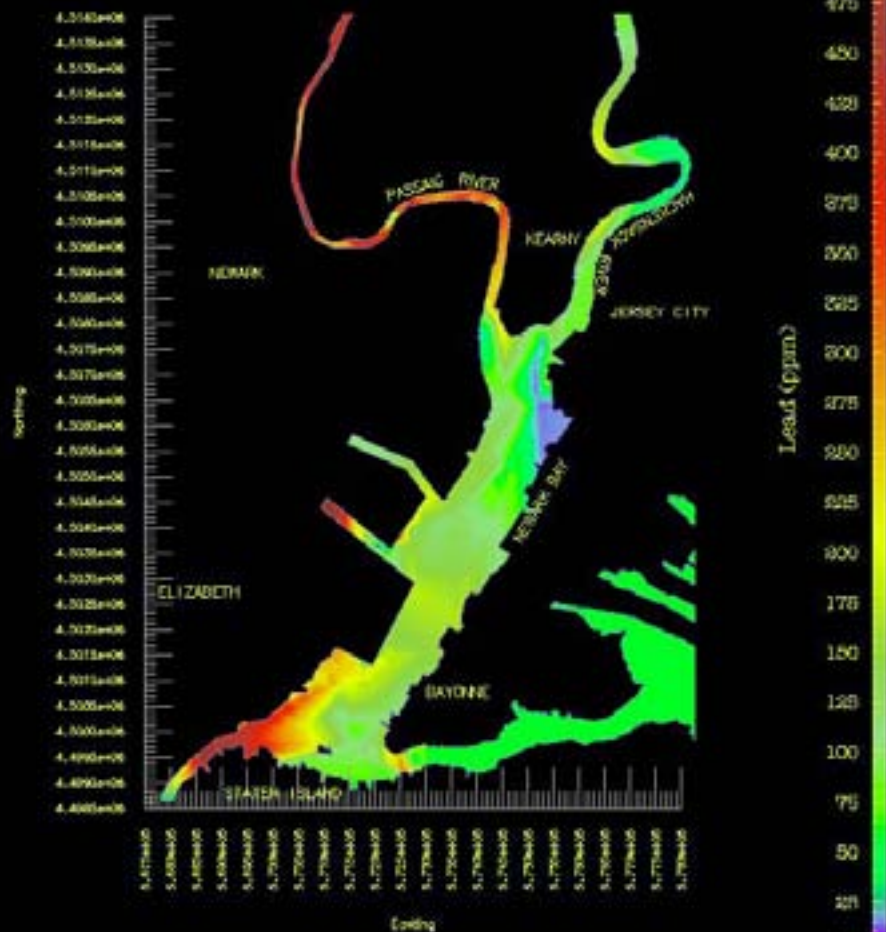


Legacy Contamination in Sediments: PCBs, Dioxins, PAHs, Pesticides, Metals



Newark Bay Lead

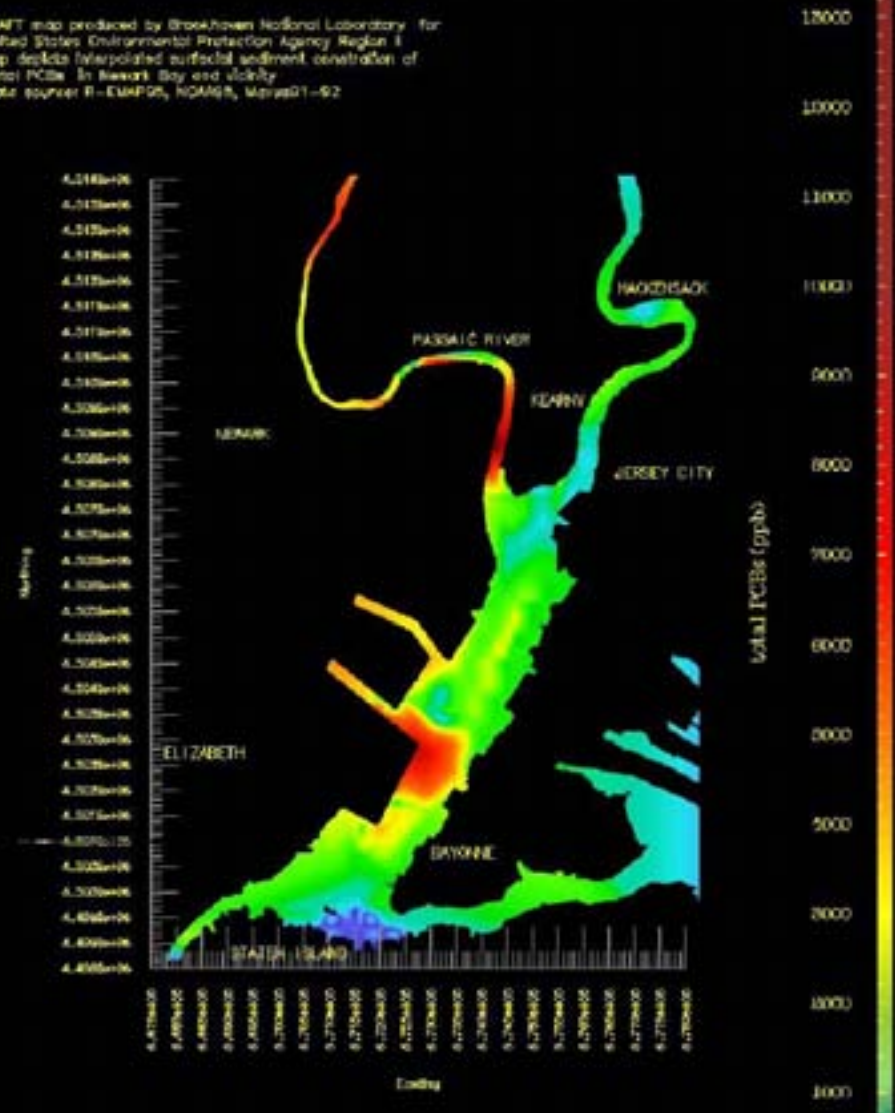
DRAFT map produced by Brookhaven National Laboratory for United States Environmental Protection Agency Region I. Map depicts interpolated surficial sediment concentration of Lead in Newark Bay, NJ, and vicinity. Data source: R-DMAP, NOAA, MAR91-92.



Surficial Lead Sediment Concentration--Newark Bay, NJ, and Vicinity

Newark Bay PCBs

DRAFT map produced by Brookhaven National Laboratory for United States Environmental Protection Agency Region I. Map depicts interpolated surficial sediment concentration of total PCBs in Newark Bay and vicinity. Data source: R-EUMPS, NOAA, MAR91-92.



Surficial Total PCBs Sediment Concentrations--Newark Bay and Vicinity

Diamond Alkali



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



"Black Mayonnaise"





Conventional Equipment



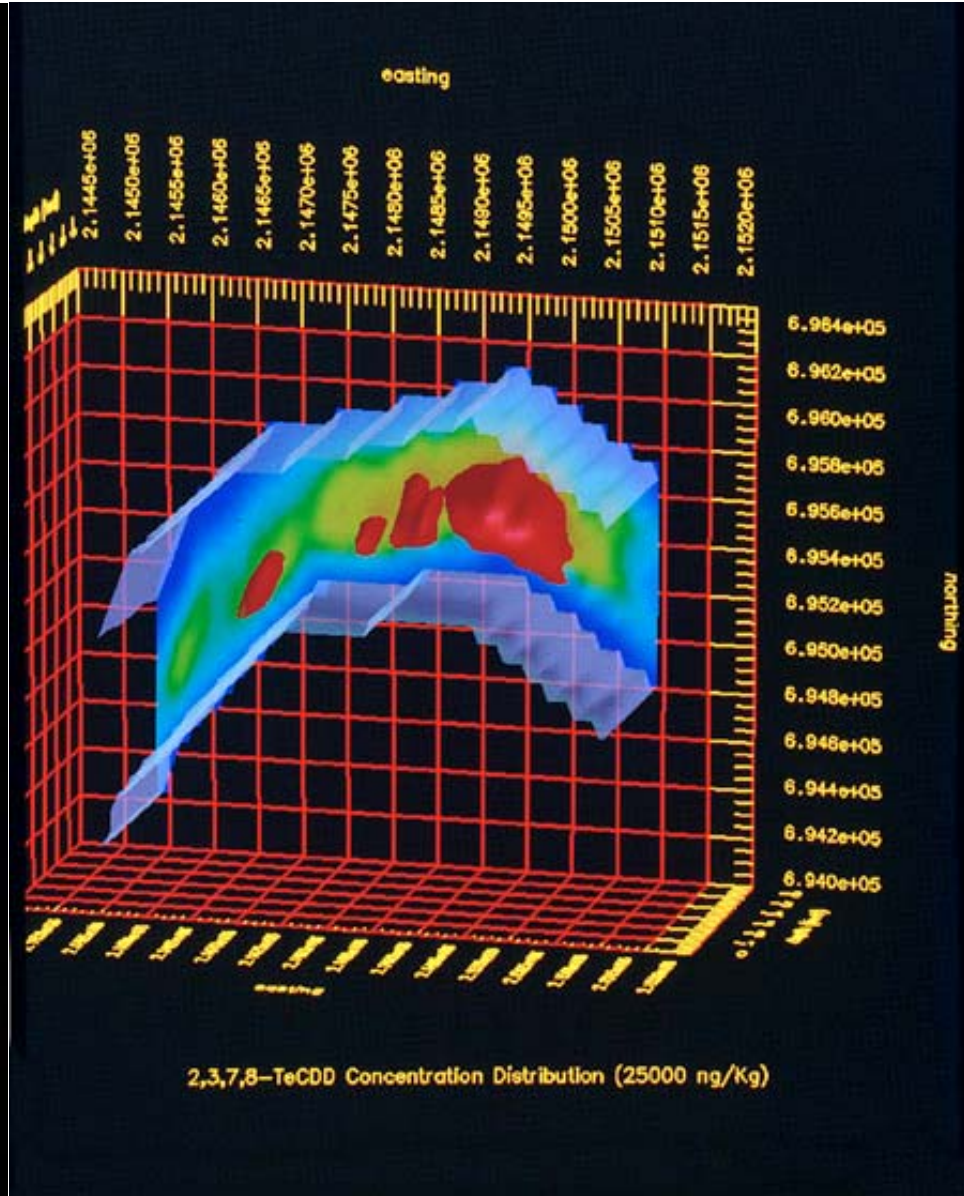
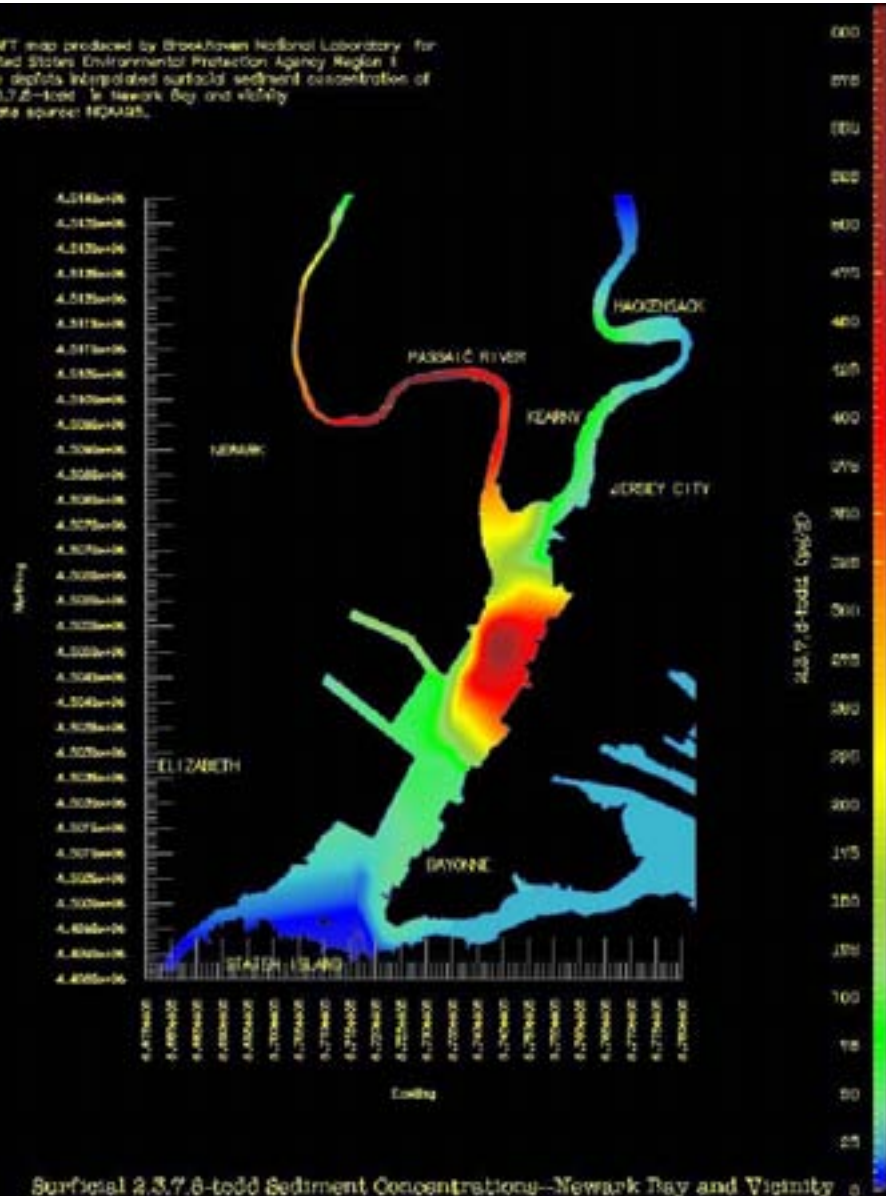


Dredged Material Management is "messy"

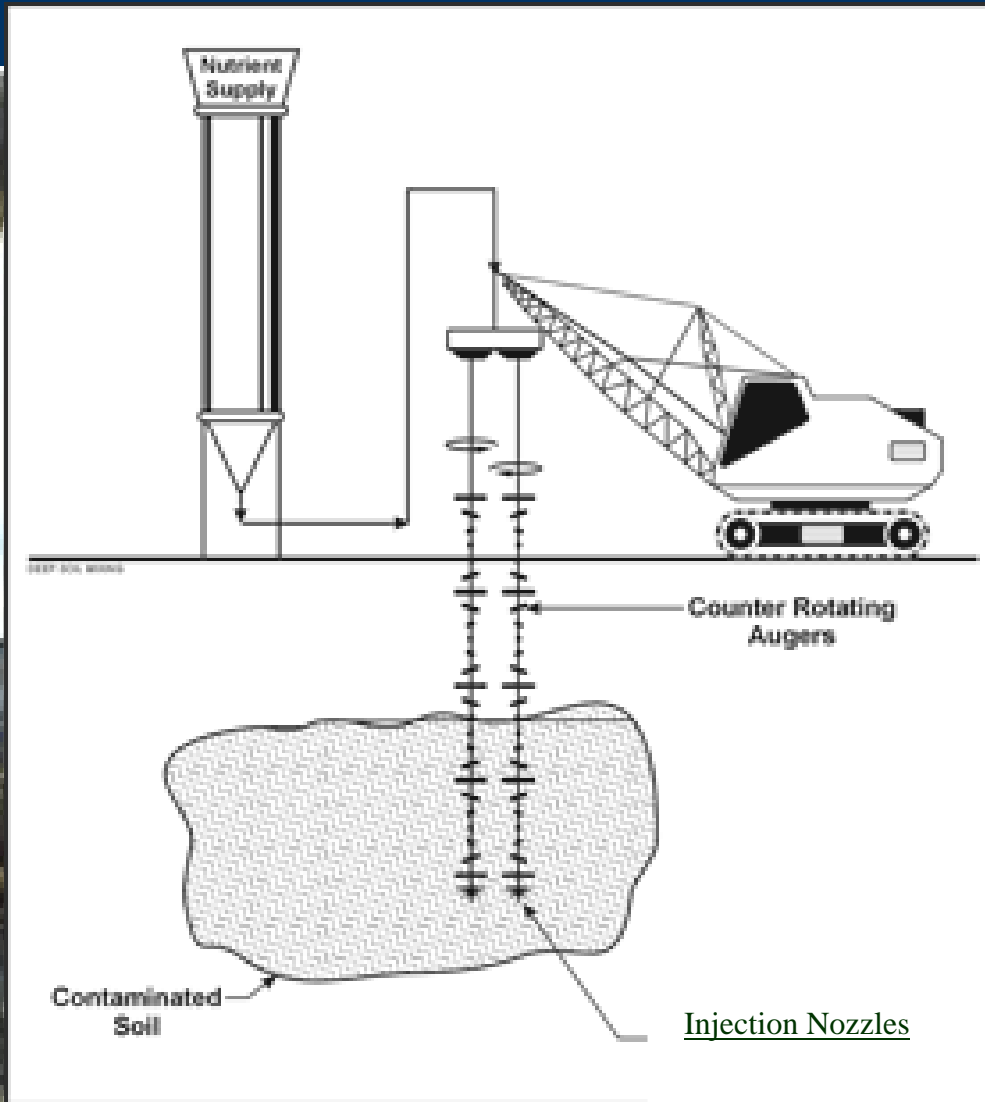


2,3,7,8-TCDD Distribution

DRAFT map produced by Brookhaven National Laboratory for United States Environmental Protection Agency Region I. Map depicts interpolated surficial sediment concentrations of 2,3,7,8-tetrad. in Newark Bay and vicinity. Data source: RQM05.

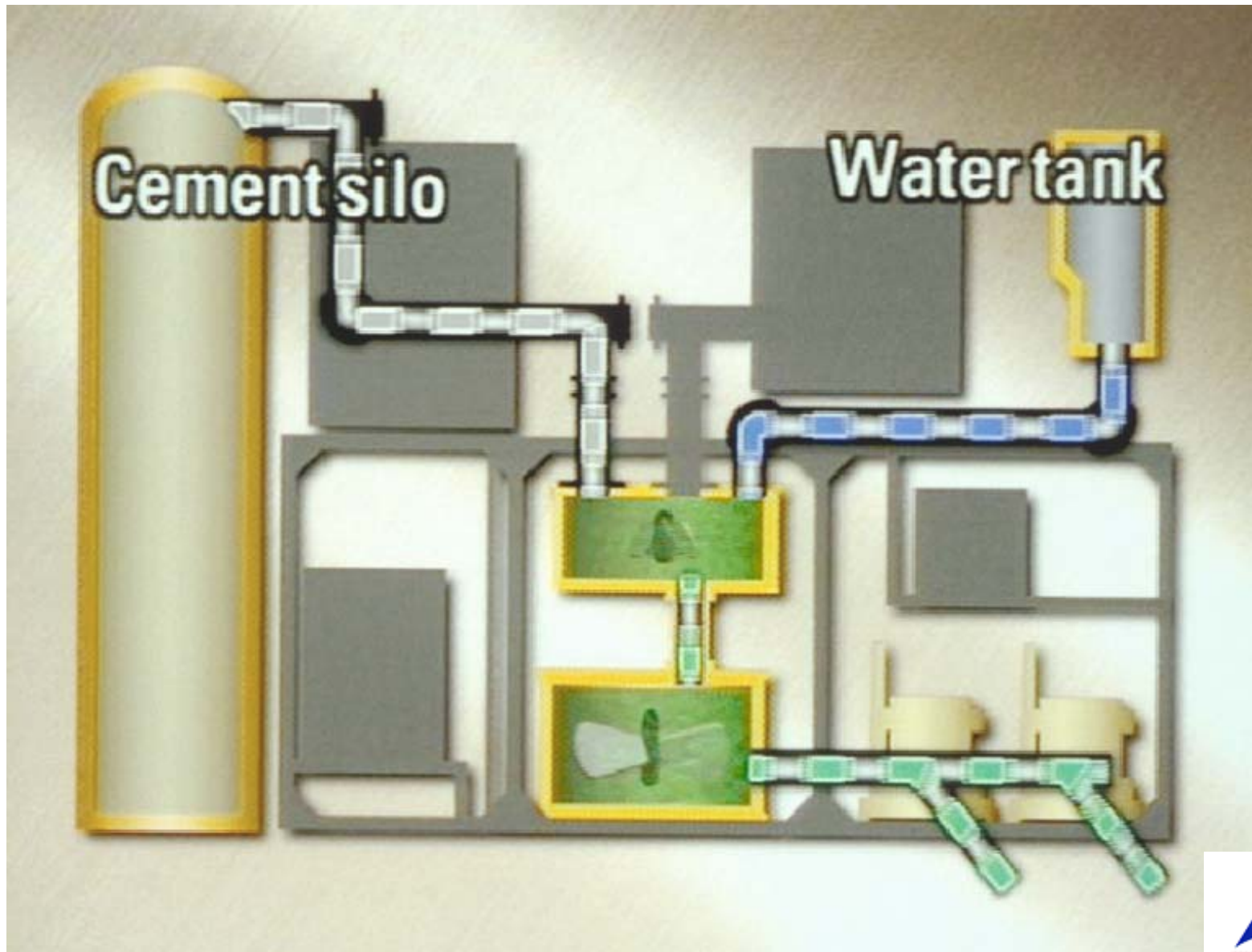


Deep Soil Mixing Technology



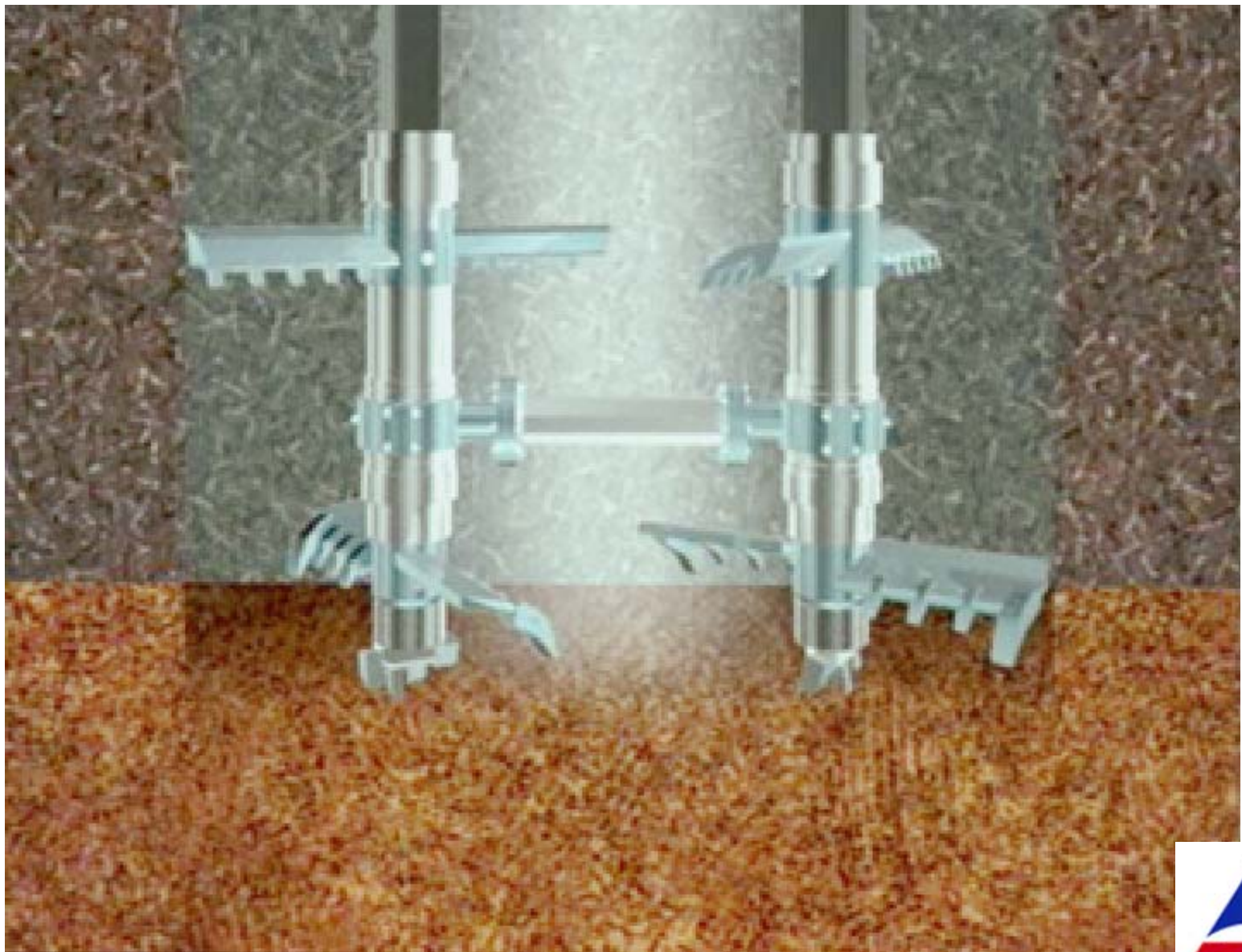


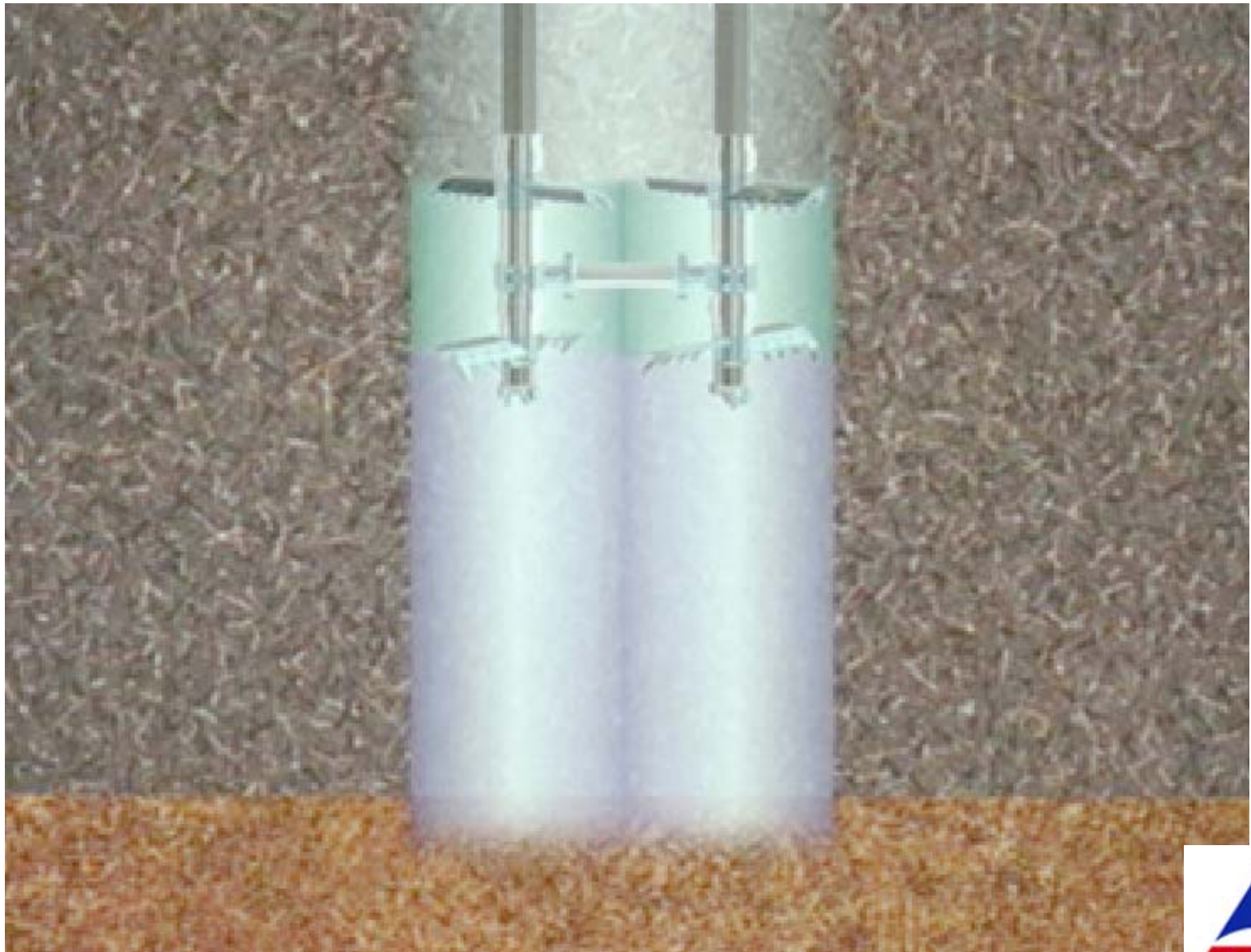
Slurry Preparation

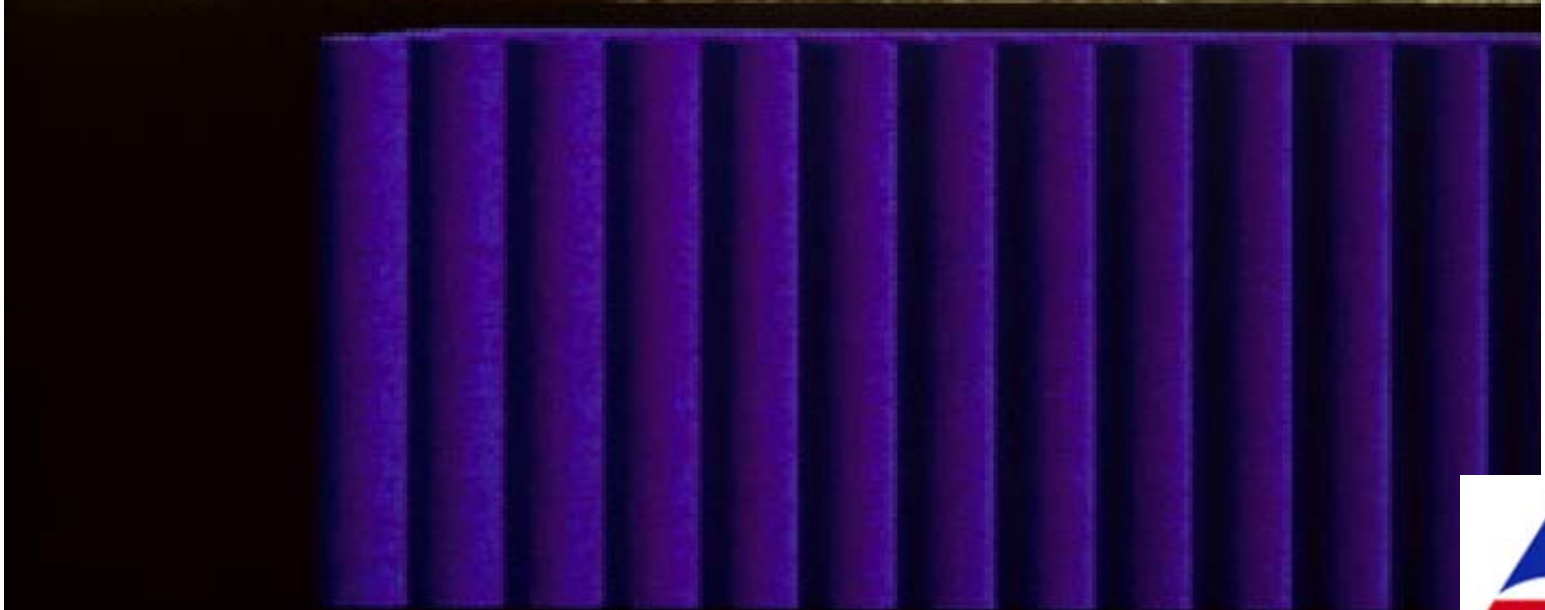














**CDSM
SOIL STABILIZATION
FOR
BERTH CONSTRUCTION
AT
PORT OF OAKLAND**

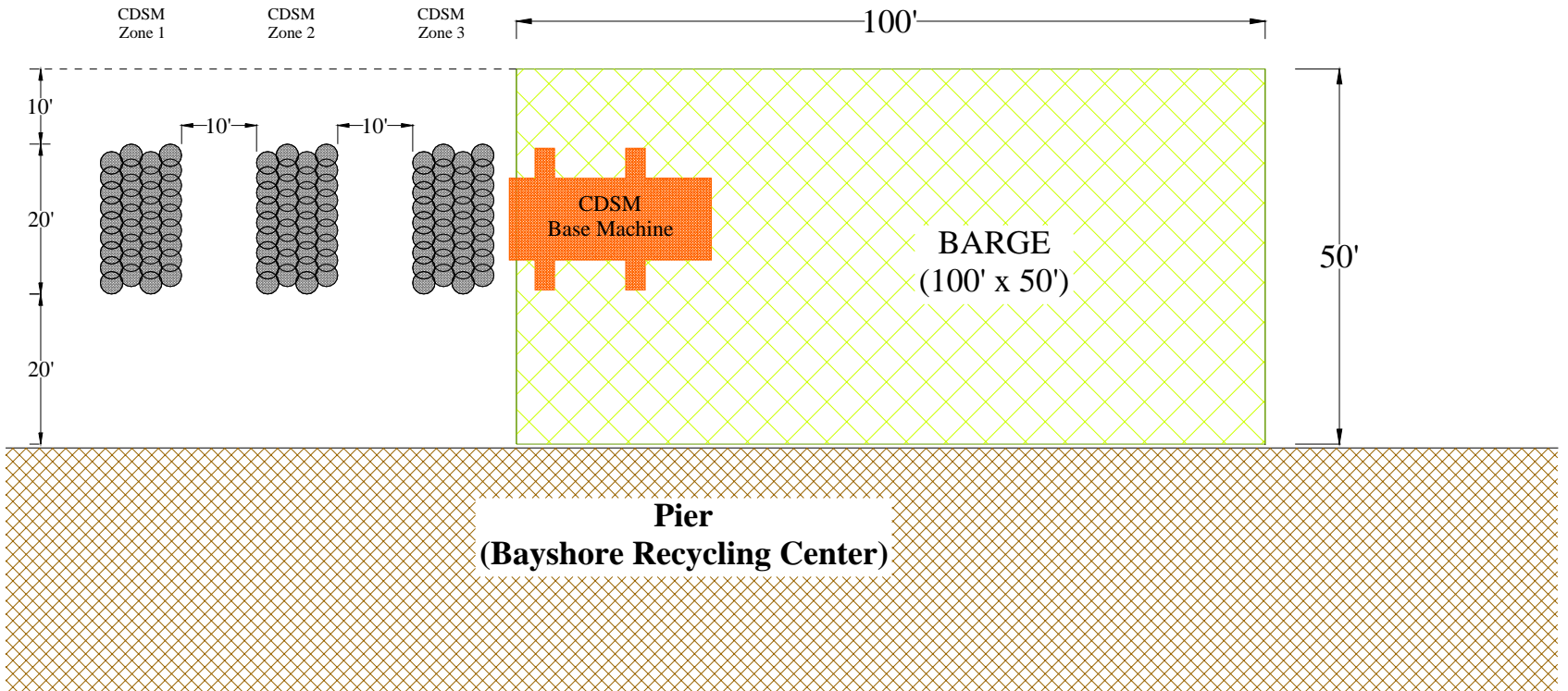


Sea Floor Stabilization in Deep Water

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

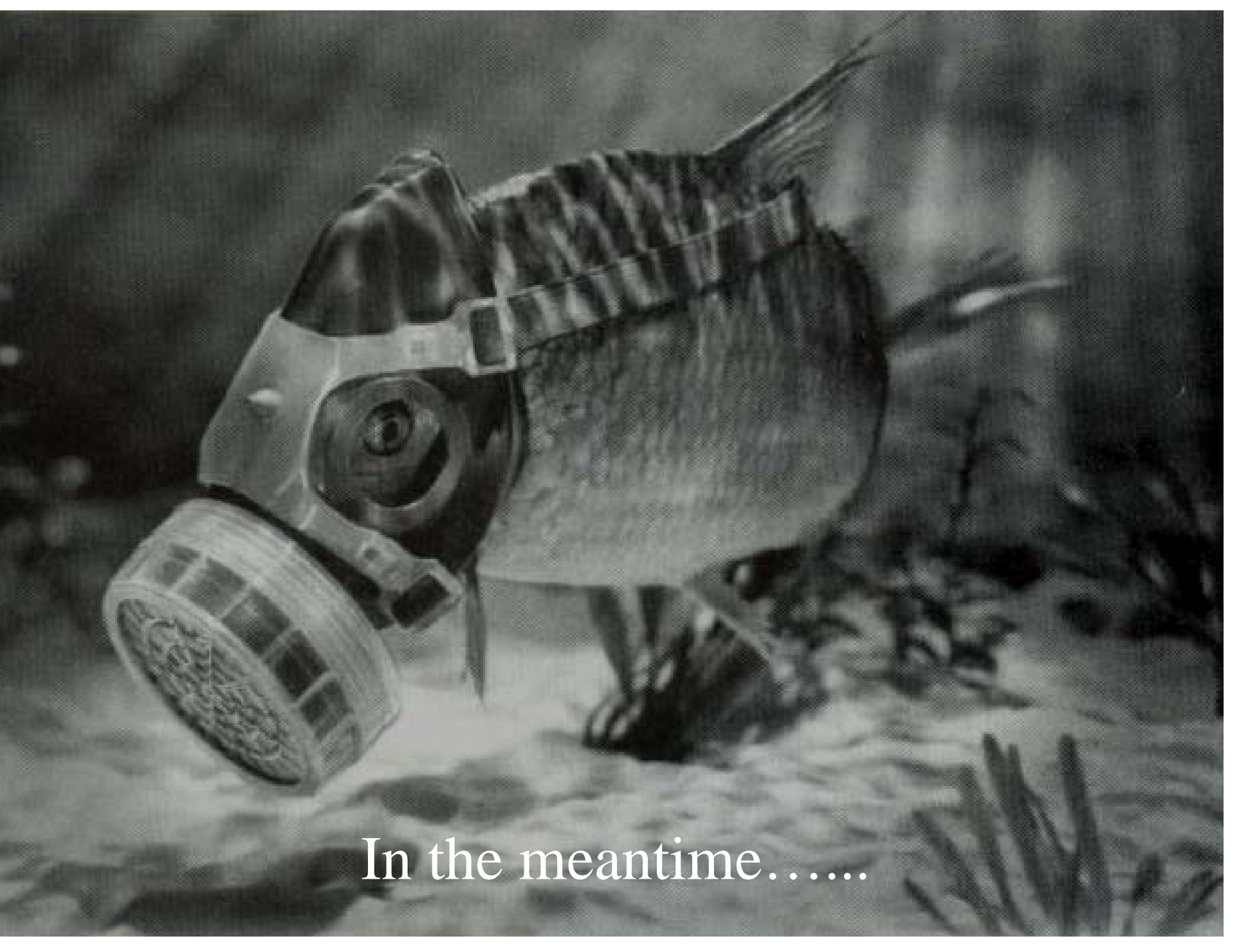
Raritan River



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.....