

POWERBOATMAN
(Propellorii handsamus)

SAILBOTER
(odorus windii)

SAILBOTERS' FALSE
AND TOTALLY
ERRONEOUS IMAGE OF
A POWERBOATMAN
(propellorii neanderthalus)

SVELTE
GAMS

PERMANENT
23°
LIST

DINNER

SHORT

P. Brantley

SEDIMENTATION REDUCTION TECHNOLOGY

DMMIWG March 7, 2001



Who We Are

- Air Guard, Inc.
 - Formed in 1992
 - Responding to a Client's need
 - Target Market: Floatables Containment
- Ocean and Coastal Consultants, Inc.
 - Founded in 1983
 - Port and Coastal Engineering

Ocean and Coastal Consultants



Air Guard, Inc.

- First Installation for Oil Spill Response
- Participated in Testing for CSO Mitigation
- Participated in ACOE Blast Mitigation Testing
- Currently Working for NJMR for Sedimentation Reduction
- Permitted by ACOE, CTDEP, NYDEC & NJDEP
- Extensive Testing at O.H. Hinsdale Wave Research Laboratory (OSU) 1992

Inland Fuel Terminals



Applications

- Spill Containment
- Floatable Debris Containment
- Sedimentation Reduction
- Blast Propagation Control
- Reduction in Stratified Flow – Salt Intrusion
- Water Quality Improvements

Dredging

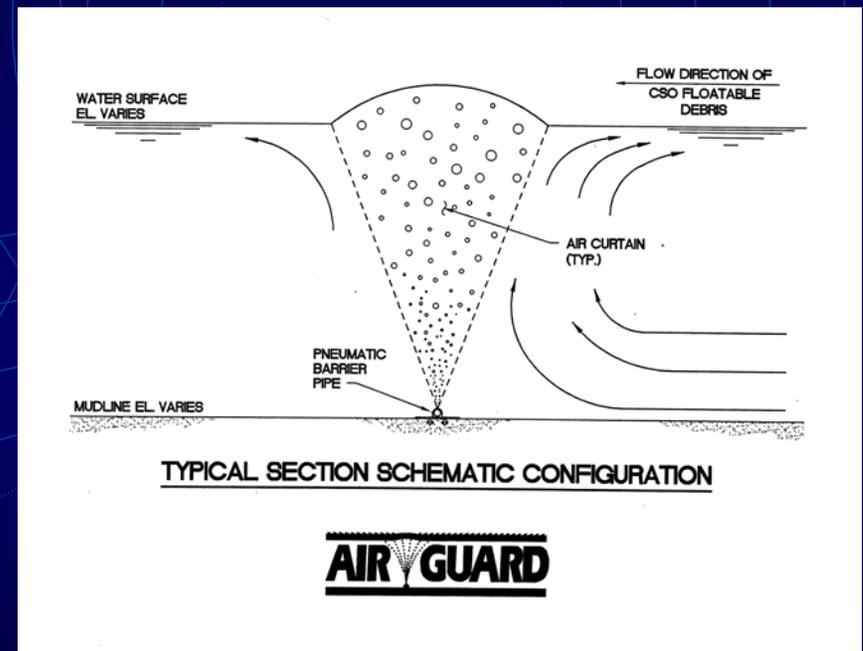


Seepage

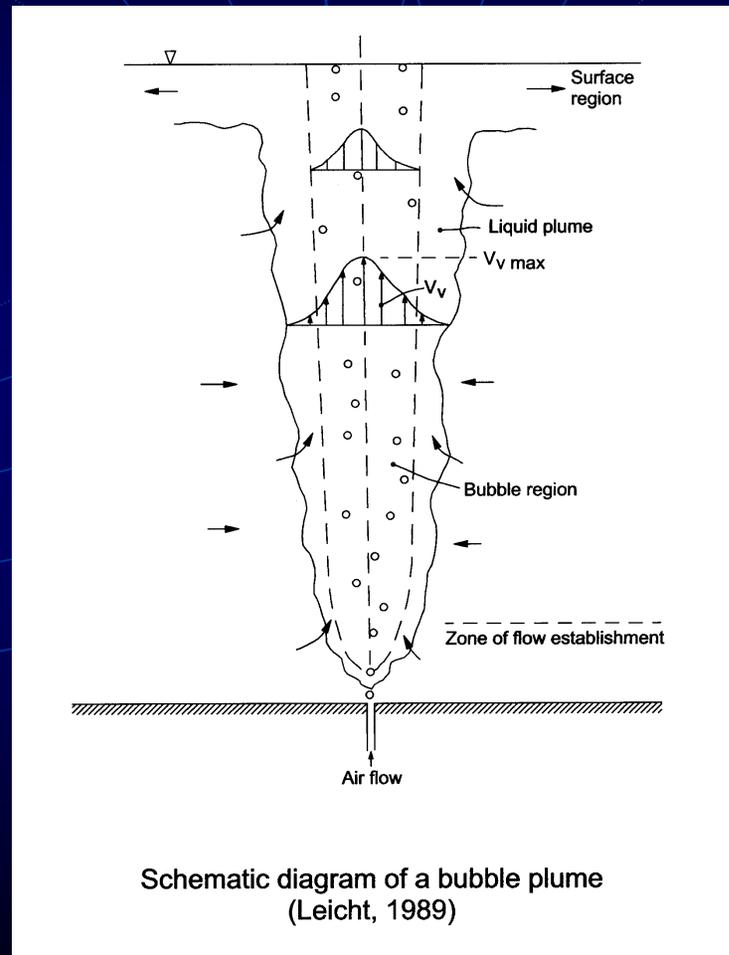


How Air Guard Works

- Compressed Air Delivered to Manifold on Harbor/River Bottom
- Air Discharged Through Orifice (Size & Spacing Critical)
- Air Bubbles Rise Towards Surface
- Drag and Lower Density Creates Vertical Current
- Vertical Current Turns Horizontal



Vertical Velocity Profile



Horizontal Velocity Profile

- Maximum at $X = 0.4 * \text{Water Depth}$
- Decays approximately proportional to $X^{-0.5}$
- Zero Horizontal Velocity found at $X = 2D$
- Strong Horizontal Velocity Found $0.20 * D$
Below Surface

Inland Fuel Terminals



NYCDEP Floatables



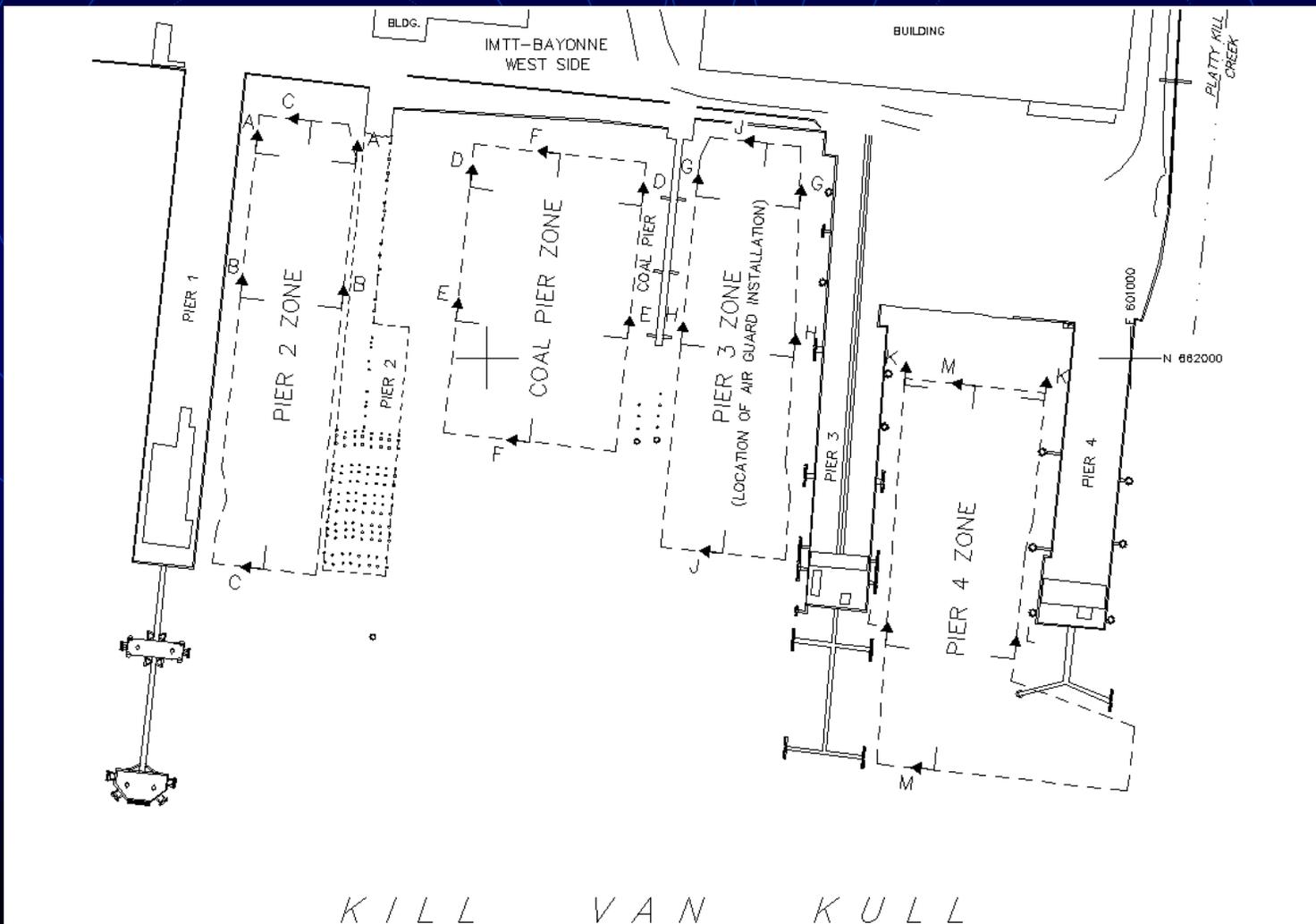
NYCDOS Test 1996



IMTT Test

- Located at Pier #3
- Required by Regulators to Monitor Adjacent Berths
- Required to Monitor Bathymetry to Federal Channel
- Required to Perform Environmental Monitoring

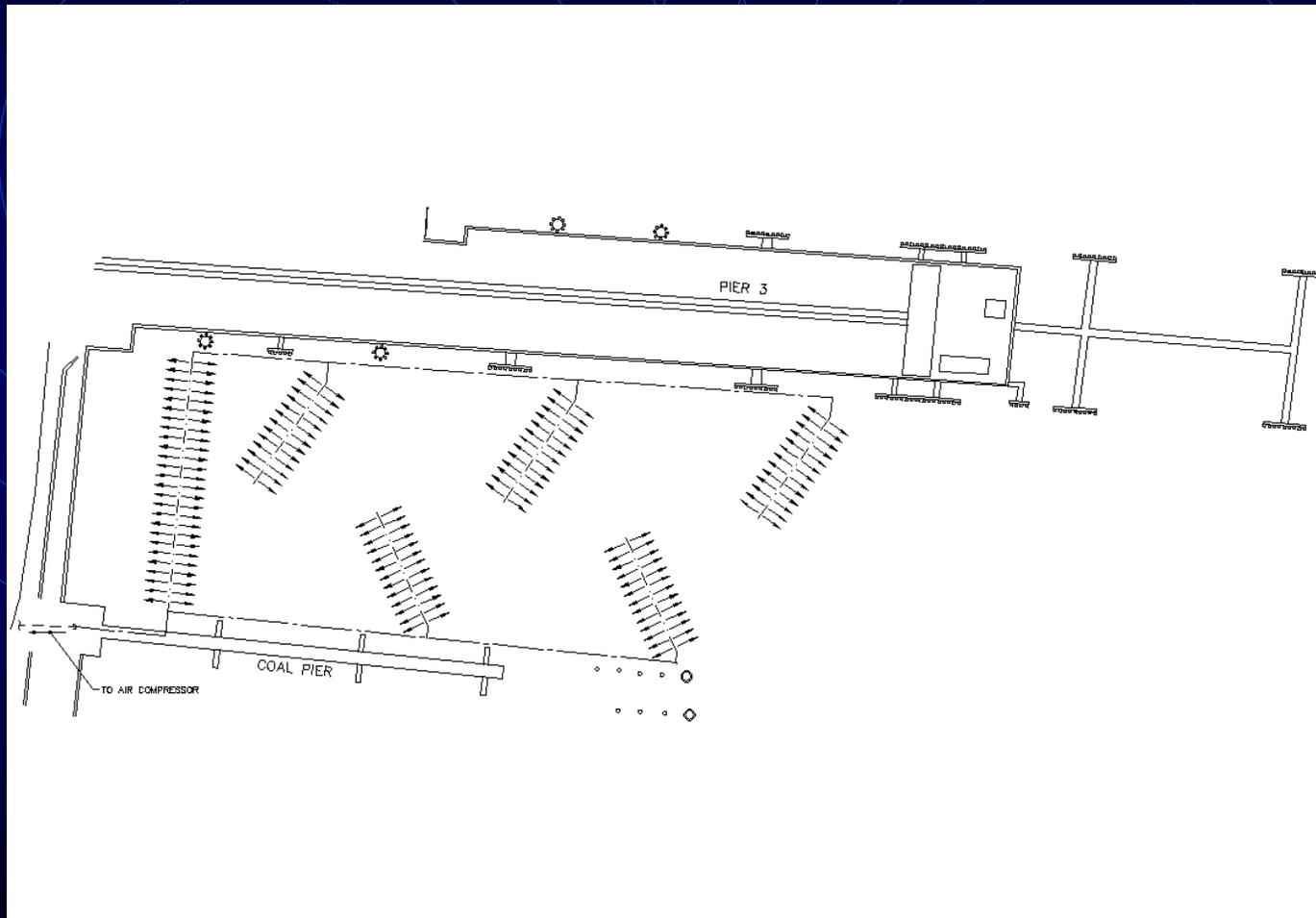
Test Site



Intent of System Design

- System Will NOT Re-suspend Sediments
- System Designed to Keep Suspended Sediment In Suspension
- Must Add Sufficient Energy to Water Column to Allow For Natural Flushing
- Must Be Removable
- Electric Compressor (Air Quality)

System Layout



View South Berth 3

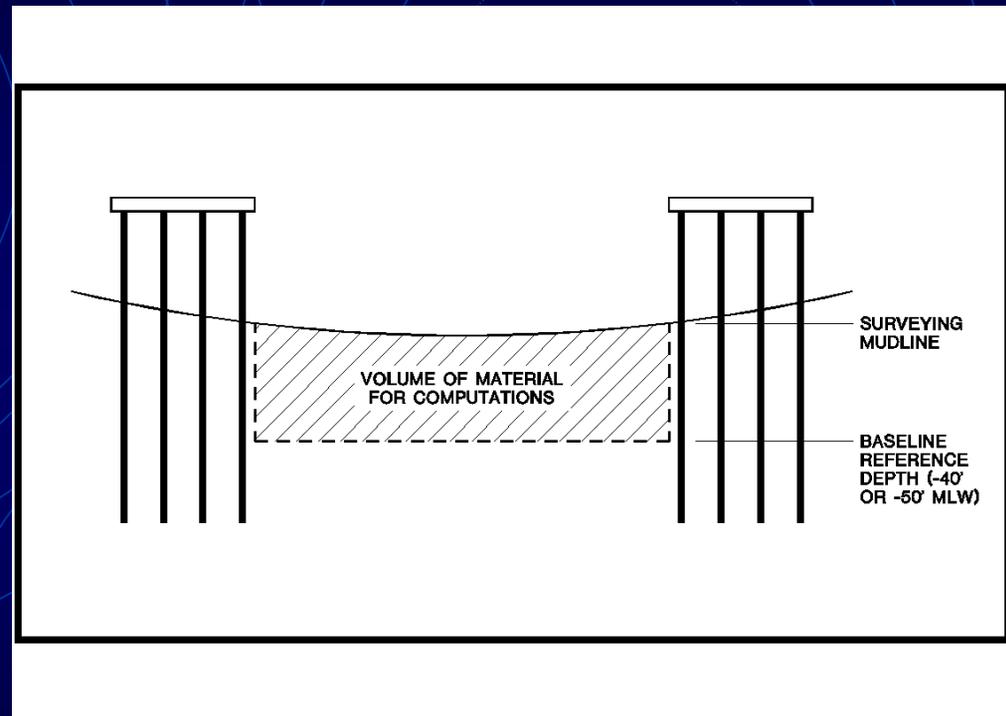


View of East Side



Sediment Volume Computation

- Data on Tight Grid
- Sub-meter Accuracy of Transducer Location
- Baseline Reference Elevation Used for Relative Volumes
- Average End Area Method Used



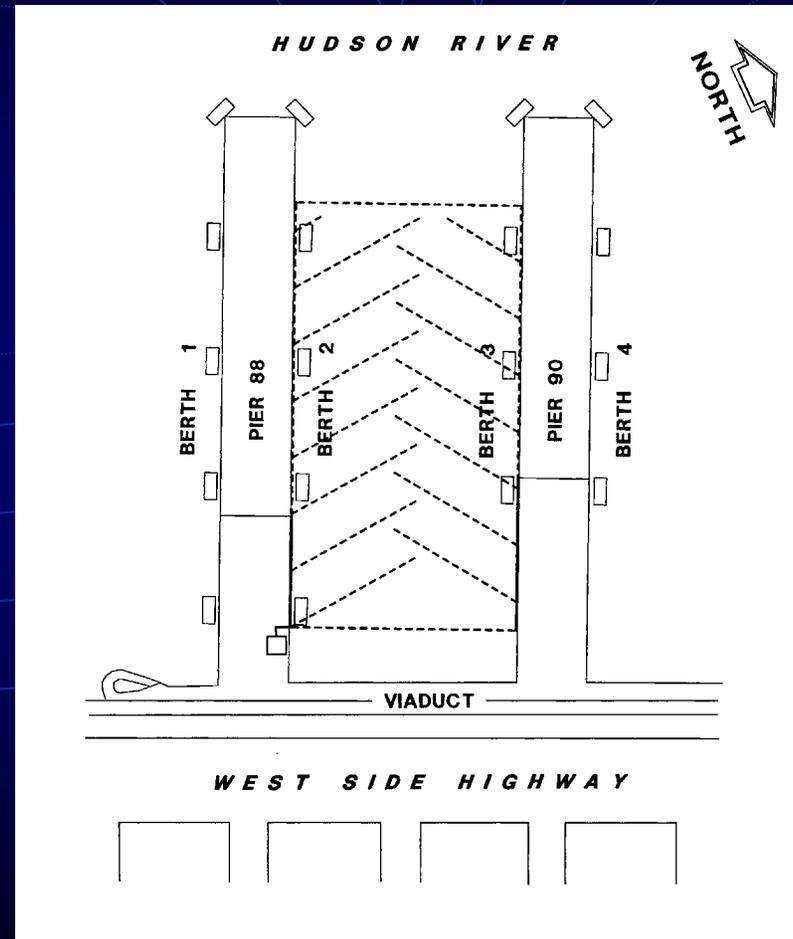
Accumulation Results 1st Year

ZONE	ACCU. VOLUME (CY)	FOOT PRINT (FT²)	AVG. SED. DEPTH (IN)
Pier #2	1,448	27,594	17.0
Coal Pier	1,085	30,218	11.6
Pier #3	500	27,905	5.8
Pier #4	447	37,023	3.9

IMTT Operational Costs

- Compressor Rated at 100% Duty Cycle. Requires Two Oil Changes Per Year (\$7,600/yr)
- At \$0.07/kWH, Annual Cost is Approximately \$55/Manifold Foot
- Two stage compressor would greatly decrease operational costs.

PST CONFIGURATION



Summary

- Air Guard System Has a Variety of Applications
- Test Indicate Barge Slip Configuration Will Obtain Positive Reduction in Sedimentation
- System Can Be Optimized to Reduce Operational Costs
- Positive Environmental Impacts

