Implemented controls should be commensurate with potential risk...
Open Water Placement
Risk Management Considerations

- Material Suitability
- Site Characterization
- Site Designation/ Selection
- Operational Considerations
- Design Evaluations
- Control Measures/ Management Actions
- Site Management Plan
- Monitoring
Material Suitability

Is proposed dredged material suitable for open water placement at the site without special management or controls?

- Physical impacts
  - MPRSA sites via site designation
  - CWA sites project specific

- Contaminant impacts
  - MPRSA via OTM procedures
  - CWA via ITM procedures
Site Characterization

- Bathymetry
- Water depth/ stratification
- Current/ wave conditions
- On-site biological resources
- Proximity to sensitive resources
Site Designation/ Selection

- **Ocean Site Designation (MPRSA)**
  - Formal Designation Process
  - EPA Designated General Use (Section 102)
  - USACE Designated Specific Projects (Section 103)
  - Final and Interim Designations

- **Site Selection in US Waters (CWA)**
Operational Considerations

- Equipment and placement techniques
- Time, rate, location, and methods of placement
- Quantity and frequency of materials placed
- Navigation and positioning
- Site controls, e.g. Buoys
- Coordinating site use among permit holders
- Monitoring
Tools to Evaluate Effectiveness

- **Water Column Dispersion**
  - STFATE or CDFATE or others

- **Placement technique, location, and rate**
  - Mound Development ~ MDFATE / MPFATE

- **Long-Term Stability and Site Capacity**
  - Consolidation ~ PSDDF
  - Erosion/Consolidation ~ LTFATE

- **Far Field Transport** ~ TABS, ICM, SSFATE
STFATE
STFATE Evaluation of Alternatives
3000 CY Barge – Single Dump

Peak Lead Concentrations

Violation of WQS outside the mixing zone

WQS = 0.032 mg/L

Max Conc on Grid
Max Conc Outside M.Z.
M.Z. Standard

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Peak Lead Concentrations

No violation of WQS outside the mixing zone

WQS = 0.032 mg/L
STFATE Evaluation of Alternatives
3000 CY Barge – Spreading

Peak Lead Concentrations

No violation of WQS outside the mixing zone

WQS = 0.032 mg/L

Max Conc on Grid  Max Conc Outside M.Z.  M.Z. Standard

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Open Water Control Measures

• **Water Column Management**
  - Submerged discharge
  - Geocontainers
  - Silt Curtains
  - Treatment (polymer addition)
  - Reduce discharge rate
  - Promote mixing (dump while under tow)

• **Benthic Management**
  - Treatment (not typically done)
  - Capping with cleaner dredged material or armor
  - Lateral confinement or CAD
  - Geocontainers
Operational Modifications

- Select different equipment type
- Select different equipment size
- Control placement operation
  - Location
  - Rate
  - Method
Submerged Discharge

- Can reduce water column dispersion
- Can improve accuracy of placement
- Pipeline configurations
- Diffuser design available
- Tremie technology
Submerged Diffuser
Silt Curtains

• **Purpose**
  - To control SS/turbidity in the water column (mainly at dredging site)

• **Advantages**
  - Can be used to protect sensitive environments
  - Can allow particles to settle out of the upper water column
  - Commercially available

• **Limitations**
  - Strong currents
    - (> 1 knot/1.5 fps)
  - High winds
  - Debris/Ice
  - Excessive wave heights
  - Fluctuating water levels
  - Must allow traffic in/out
    - Bubble curtains

Silt Curtains

White or Yellow Float Collar

Monofilament or Impermeable Vinyl Curtain

Optional 5/16" Chain curtain ballast

Brass Grommets

Float

Silt Curtain

PIPELINE

TURBID WATER

FLOCCULATED MATERIAL

SILT CURTAIN

FLUID MUD

CURRENT

BOTTOM SEDIMENT

EFFECTIVE WATERTOWER

ERDC

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Pneumatic Barrier

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Geo-containers

- Geotextiles used for solids containment
- Can reduce water column dispersion
- Can reduce capping requirements
- Engineering design approaches available
- Operational aspects need refinement
GEOTUBE DISPOSAL PHASES
Site Management Plans

- Roles and responsibilities
- Management objectives
- Specifics on operations and management
- Inspection and enforcement
- Monitoring requirements
LA-3 Ocean Dredge Material Disposal Site

Estimated barge location at initial dump point: offset from tug by 250 feet at 25 degrees azimuth

Note: The coordinates for trips #667 and #1116 are outside of the map extent.
Open Water Site Monitoring

• Need for Monitoring
  ➢ Evaluate effectiveness of management
  ➢ Evaluate environmental impacts
  ➢ Recommend modifications

• Monitoring Plan
  ➢ Clear objectives
  ➢ Testable hypotheses
  ➢ Methods and equipment

• Management Actions

• Silent Inspector
  ➢ Location
  ➢ Volume
Open Water Monitoring Tools
Summary

- Site selection / characterization
- Material suitability
- Planning the disposal operation
  - Models available
- Site controls
- Site management plan
- Monitoring
Questions??