Dredging Contaminated Sediment
Presented by: Steve Wolf

Dredging Process
Feasibility Study  Dredged Material Characterization  Permitting  Engineering & Design  Contracting  Dredging & Monitoring

Topics Covered Today
• Why dredging?
• Dredging types
• Regulations and permitting
• Managing impacts
• Implementation issues
• Evaluating success
Dredging Process

- Why dredging?
  - Dredging types
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Drivers for Selecting Dredging as a Remedy

- Risk
- Depth constraints
- Long term liability
- Acceptance as an “action”
Other Drivers for Dredging Contaminated Sediment

- Construction/Installation
  - Pipelines/outfalls
  - Coastal structures

- Navigation
  - Berths, marinas
  - Ports, channels (federal navigation projects)
  - Maintenance or improvement

- Restoration
  - Physical
  - Ecological
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Hydraulic Dredge

- Sediment removed by suction with some mechanical agitation
- Material pumped to discharge point
Hydraulic Dredge

• Variations in agitation type and size

Hydraulic Dredge

• Requires low solids content for pumping (acceptable for discharge for some clean sediment applications)
**Hydraulic Dredge**

- For contaminated sediment, containment and treatment of water is required

**Mechanical Dredge**

- Material removed with a bucket or scoop
- Requires additional handling
**Mechanical Dredge**
- Varying bucket designs
- Crane or backhoe mounted

**Mechanical Dredge**
- Varying bucket sizes
- Arc or level cut
Hybrid Dredge

- Mechanical removal of sediment
- Hydraulic transport with recirculated water

Selection of a Dredging Type

- Sediment type & debris
- Contaminant levels
- Water depth
- Mobilization and site accessibility/constraints
Overlap of Remedial & Other Types of Dredging

Technology & Operations

- Construction, Navigation, Restoration
- Dredges, barges, turbidity control measures, positioning
- Remediation

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April 29-30, 2010

NEWMOA

April 29-30, 2010

AECOM
Regulations and Permitting

Corps of Engineers Permitting Thresholds

<table>
<thead>
<tr>
<th>Project Category</th>
<th>Type of Permit</th>
<th>Permitting Timeframe</th>
<th>Dredging Volume</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>None</td>
<td>N/A</td>
<td>&lt;1,000 cy w/upland disposal</td>
</tr>
<tr>
<td>II</td>
<td>General</td>
<td>30-45 days</td>
<td>1,000-25,000 cy</td>
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<tr>
<td>III</td>
<td>Individual</td>
<td>3-6 months</td>
<td>&gt;25,000 cy</td>
</tr>
</tbody>
</table>

• Disposal also may be subject to USACE review
• Also includes review and comment by other Federal agencies
• State will have own thresholds/requirements

Overlap of Remedial & Other Types of Dredging

Regulations & Permitting

- CERCLA, State Regulations, supporting testing and guidance documents
- Rivers and Harbors Act, MPRSA, Clean Water Act, supporting testing and guidance documents
- Construction, Navigation, Restoration
Dredging Process Topics Covered

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Managing Impacts Related to Dredging

- Specification of equipment to limit release to the water column
- Specification of controls to contain releases
Managing Impacts Related to Dredging

• Additional controls for containment of water column and bed load release

Managing Impacts Related to Dredging

Water Column

• Dedicated water quality monitoring may be required
• Importance of “front end” loaded program and reliance on real-time, in-situ measurements
Managing Impacts Related to Dredging

Water Column
- Techniques available for efficient measurement in deeper waters

Air
- Booms and dredge area controls
- Ambient air monitoring

Other
- Light monitoring
- Noise monitoring
Managing Impacts Related to Dredging

Potential thin layer deposition outside dredge area
• Sediment profile imaging can identify millimeter scale layering

Managing Impacts Related to Dredging

Fisheries
• Maintenance of safe passage zone for fish
• Implementation of work windows or sequencing
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Implementation Issues – Debris

- Identification prior to start of the dredging where possible
- Dedicated removal action prior to dredging may be needed
Implementation Issues – Debris

- Significant delays
- Exacerbate water quality issues

Implementation Issues – Archaeological Finds

- Identification prior to dredging start where possible
- Develop a plan for addressing and sequencing
Implementation Issues – Water Column Impacts

- Monitoring program should allow for early warning and identification of causative agents rather than strictly compliance

Implementation Issues – Water Column Impacts

- Dredging impacts may be material, equipment, or operator related
Implementation Issues – Water Column Impacts

• Many water column issues are not directly related to the dredging

Implementation Issues – NAPL

Non-Aqueous Phase Liquid
• Dense or light components
• Specific controls may be required
Implementation Issues – How Deep?

- Required dredging depth may vary over small scale horizontal distances

- Advances in GPS and positioning software allow for tracking depth and coverage
Implementation Issues – How Deep?
• Correlation of contamination with physical characteristics

Implementation Issues – Residuals
• Nature of the majority of contaminated sediment will result in challenges related to residual material left behind after dredging.
Implementation Issues – Residuals

- Multiple causative agents that vary from site to site

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  ➔ Evaluating success
Evaluating Success - Depth

- Performance of repetitive bathymetric surveys and other imaging to track progress
Evaluating Success – Final Assessment

• Combination of techniques for overall assessment

Information Sources


• Sediment Management Work Group http://smwg.org/

• Summary of 2009 remedial dredging on the Hudson River http://www.hudsondredging.com/


• ERDC Web sites:
Thank you for your attention

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