Hudson River Remedial Design
Treatability Study Data Quality Objectives

USACE/USEPA/SMWG Joint Sediment Conference
October 26-28, 2004

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Hudson River: EPA Dredging Decision

- **Remedy Decision (2/02 Record of Decision):**
  - **Dredge** - 2.65 million cubic yards of sediments; actual amount and locations to be determined by collecting 30,000+ sediment samples
  - **Backfill** – Place 1 foot of clean fill (~1 million cy) in dredge areas
  - **Dewater** - Transport to on-shore sediment dewatering location(s) to be determined
  - **Dispose** - Transport by rail/barge (no trucks) to licensed landfills outside of the Hudson valley
  - **Restore** - Repair damage to 400+ acres of river bottom and 17 miles of shore line
  - **Source Control** - Includes implementation of GE tunnel/drain project at Hudson Falls
  - **Schedule** - 3 years for design; 6 years of dredging
- **Additional elements:**
  - **Phasing:** 2 Phases – Phase 1 a test during year 1, Phase 2 is 5 additional years
  - **Performance Standards:** Establish standards for resuspension and other parameters that will be used to evaluate project efficacy and success

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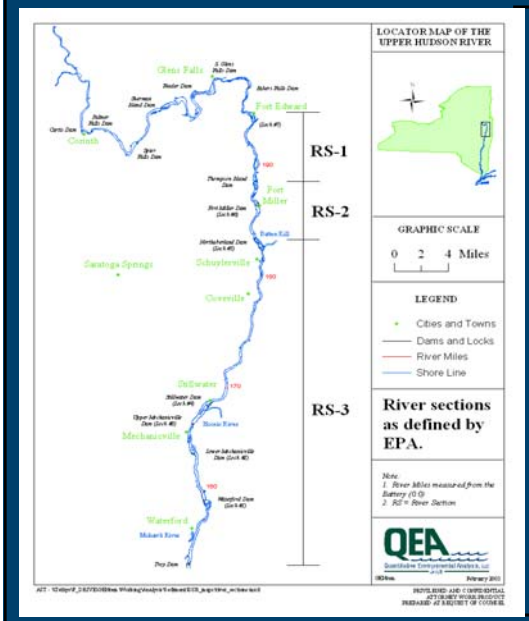
Hudson River: EPA Remedy Decision



River Section 1 (Thompson Island Pool):
- **6 miles**
- **1.5 MM cubic yards est. for removal**
- **Removal criteria: PCB inventory > 3 g/m^2 PCB tri+ PCB**

River Section 2:
- **5 miles**
- **0.6 MM cubic yards est. for removal**
- **Removal criteria: PCB inventory > 10 g/m^2 tri+ PCB**

River Section 3:
- **Lower 29 miles**
- **0.55 MM cubic yards**

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Treatability Testing – Overall Approach

- Key questions to answer
  - Determine dewatering and solids handling requirements
  - Determine water treatment requirements
  - Determine potential for PCB releases during dredging operation
- Treatability study provides supporting information to design tasks:
  - Dredging & Dredged Material Transport Design
  - Resuspension Control Systems
  - Material Handling, Dewatering, & Water Treatment
  - Final Transport & Disposal
- Results of treatability study will guide Intermediate (60%) and Final Designs

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Treatability Studies Primary DQOs

- DQO 1- Collect baseline sediment and water data for use in the treatability studies
- DQO 2- Develop sediment-water slurries that have properties similar to those expected of dredged material
- DQO 3- Determine the potential for water quality impacts caused by dredging
- DQO 4- Develop the sediment dewatering design to meet anticipated landfill acceptance or beneficial use determination requirements
- DQO 5- Develop the water processing design to meet anticipated discharge requirements
- DQO 6- Develop the disposal design to meet anticipated landfill acceptance requirements

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DQO 1- Collect baseline sediment and water data for use in the treatability studies

- DQO 1a- Determine baseline solid phase chemical and physical properties
- DQO 1b- Determine baseline aqueous phase chemical and physical properties

TS Sample Types:

- S1- Coarse-grained, low PCBs
- S2- Mixed coarse/fine-grained, moderate PCBs
- S3- Fine-grained, high PCBs
- S4- Fine-grained with low bulk density, high PCBs
- One bulk water sample

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DQO 2- Develop sediment-water slurries that have properties similar to those expected of dredged material

- DQO 2a- Develop sediment-water slurry that has properties similar to mechanical dredging and mechanical offloading.
- DQO 2b- Develop sediment-water slurry that has properties similar to mechanical dredging and hydraulic offloading.
- DQO 2c- Develop sediment-water slurry that has properties similar to hydraulic dredging and hydraulic offloading.

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Dredged Material Slurry Simulations

- M1- mechanically dredged, 80:20 solids:water (vol/vol)
- H1- hydraulically dredged high solids content, 25:75 solids:water (w/w)
- H2- hydraulically dredged typical solids content, 5:95 solids:water (w/w)

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DQO 3- Determine the potential for water quality impacts caused by dredging

- DQO 3a- Determine the required removal efficiencies of resuspension controls.
  - DQO 3a.(1) Determine an estimate of PCB release (dissolved phase and suspended particulate fraction) to the water column from the dredge head.
  - DQO 3a.(2) Determine an estimate of release of non-PCB constituents (dissolved phase and suspended particulate fraction) to the water column from the dredge head.

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DQO 4- Develop the sediment dewatering design to meet anticipated landfill acceptance or beneficial use determination requirements

- DQO 4a- Develop the sediment processing design for mechanically dredged/mechanically offloaded sediment.
  - DQO 4a.(1) Evaluate the need for solidification agents and effect of dosage (mechanically dredged/mechanically offloaded sediment).
- DQO 4b- Develop the sediment processing design for mechanically dredged/hydraulically offloaded sediment.
  - DQO 4b.(1) Evaluate size separation.
    - DQO 4b.(1a) Evaluate size separation technologies (based on particle size and density distribution) and evaluate the chemical properties of the separated solid fractions.
    - DQO 4b.(1b) Evaluate the drainage characteristics of the coarse fraction.
  - DQO 4b.(2) Determine primary sedimentation efficiency for removal of regulated chemicals bound to the particulate phase.
    - DQO 4b.(2a) Evaluate the effects of polymer treatment on solids removal.
    - DQO 4b.(2b) Evaluate the effects of primary settling on solids removal.
  - DQO 4b.(3) Quantify plate and frame filter press size and performance.
    - DQO 4b.(3a) Determine efficiency of filter press for dewatering raw slurries and settled solids (evaluate dewatering polymers, evaluate mixing/floc sensitivity to mixing or shear, and evaluate cake release).
    - DQO 4b.(3b) Optimize hydraulic and mass loading to plate and frame filter presses.
    - DQO 4b.(3c) Evaluate centrifugation.
  - DQO 4b.(4) Evaluate need for solidification agents on raw slurries and filter cake and evaluate effect of dosage.
  - DQO 4b.(5) Determine the mixing energy needed to keep slurries in suspension.

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DQO 4- Develop the sediment dewatering design to meet anticipated landfill acceptance or beneficial use determination requirements (cont.)

- DQO 4c- Develop the sediment processing design for hydraulically dredged/hydraulically offloaded sediment.
  - DQO 4c.(1) Evaluate size separation.
    - DQO 4c.(1a) Evaluate size separation technologies (based on particle size and density distribution) and evaluate the chemical properties of the separated solid fractions.
    - DQO 4c.(1b) Evaluate the drainage characteristics of the coarse fraction.
  - DQO 4c.(2) Determine primary sedimentation efficiency for removal of regulated chemicals bound to the particulate phase.
    - DQO 4c.(2a) Evaluate the effects of polymer treatment on solids removal.
    - DQO 4c.(2b) Evaluate the effects of primary settling on solids removal.
  - DQO 4c.(3) Quantify plate and frame filter press size and performance.
    - DQO 4c.(3a) Determine efficiency of filter press for dewatering raw slurries and settled solids (evaluate dewatering polymers, evaluate mixing/floc sensitivity to mixing or shear, and evaluate cake release).
    - DQO 4c.(3b) Optimize hydraulic and mass loading to plate and frame filter presses.
    - DQO 4c.(3c) Evaluate centrifugation.
  - DQO 4c.(4) Evaluate need for solidification agents on raw slurries and filter cake and evaluate effect of dosage.
  - DQO 4c.(5) Determine the mixing energy needed to keep slurries in suspension.

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DQO 5- Develop the water processing design to meet anticipated discharge requirements

- DQO 5a- Determine the removal efficiency for the water treatment train.
  - DQO 5a.(1) Evaluate treatment and settling of dewatering filtrate.
  - DQO 5a.(2) Demonstrate the removal efficiencies, effluent quality and sensitivity to hydraulic and mass loading of multimedia filters (MMF).
  - DQO 5a.(3) Demonstrate the removal efficiencies, effluent quality and sensitivity to hydraulic and mass loading of carbon adsorption.

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DQO 6- Develop the disposal design to meet anticipated landfill acceptance requirements

- DQO 6a- Determine the potential for water to be released from processed material during transport.

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TS Schedule

- All tests to be completed 90 days from receipt of acceptable samples at lab.
- Results reported and incorporated into Intermediate Design Report (IDR).
- Supplemental tests recommended in IDR, reported and incorporated into Final Design Report.

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