Multiple Dredging Methods to Remediate On-site and Off-site PCB Sediment and Soil Impacts

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Site Overview

- Historic use of Polychlorinated Biphenyl (PCB)-containing oils at a SW Ohio major steel manufacturing facility led to PCB contamination in adjacent streams (Monroe Ditch and Dicks Creek).
- Stream sediment and floodplain soils affected
- Remediation wastes both above and below Toxic Substances Control Act (TSCA) standard (≥50 parts per million (ppm)).
Permitting and Coordination

- 2006 Consent Decree Signatories: USEPA, State of Ohio and intervenors
- Permitting/National Environmental Protection Act (NEPA) Coordination:
  - US Army Corps of Engineers
  - US Fish and Wildlife Services
  - State Historian
- Mitigation planting and preservation
Stream Variations Affecting Remedial Design

- Stream Character and Habitats:
  - Channelized industrial
  - Natural/meandering
  - Riparian corridor

- Remedial methods adaptations based on habitat
- Impacts based on potential endangered/threatened species
Overview of Site and Streams
Three Phases of Dredging

- Phase I, 2010: Monroe Ditch and a portion of Dicks Creek streambed and floodplain. All segments previously channelized.
- Phase 2, 2012: Remainder of channelized Dicks Creek area (Reach 1).
- Phase 3, 2013: Dicks Creek Reach 2, more natural segment.
Phases 1 and 2: Remedial Method

- Bypass pumping and dredge in the dry: Phases 1 and 2.
- Flash flood condition precautions required.
- Dicks Creek Reach 1 gridded excavation, PCB confirmation sampling, surveying.
- 3,300’ of Monroe Ditch; 3,500’ of Dicks Creek.
By-Pass Pumping and Dry Dredge: Phases 1 and 2
Phase 3: Hand Held Dredging

- Phase 3:
  - No floodplain remediation.
  - Dredging with hand-held suction dredge equipment.
  - Trained divers used as necessary in deeper pools.
- 7,300’ stream reach remediated; all off-site (with access agreements required with 13 entities).
Design Adaptations

- Adaptations to the design necessary to:
  - provide improved water management,
  - enhance restoration design,
  - minimize risk of post-restoration erosion/destabilization,
  - enhance dredging methods/maximize sediment removal during low flow.
Hand-dredging Adaptations

- Dry season conditions left some sediment exposed.
- Adaptations:
  - Dredging below water line;
  - Backhoe;
  - Shovel/hand held equipment.
Phase 3 Removal Verification

- Sand sized and finer sediment removal required
- Concurrent Dredge and Field QC in 75’ foot work segments
- Real time decisions
- Daily surveying
Waste Management

- TSCA remediation waste management
- Phases 1 and 2: 26,000 tons TSCA; 160,000 tons Non-TSCA
- Phase 3 remediation waste: Geotube use; 6,200 tons sediment
Restoration

- Natural stream design restoration in dry dredge segments
- Phase 3 restoration via sand pumping upstream
- Floodplain vegetative plantings
- 9 acre mitigation planting area
- Environmental Covenants
Post-Remedy Monitoring

- Chemical and biological monitoring of streams on-going.
- Multiple evidences of success to date.
Lessons Learned

- Delineation and waste quantity estimation techniques
- Dry dredge and bypass pumping pros and cons
- Hand-held dredge pros and cons
- Real time field QC
- Dealing with dynamic stream environment
Questions or Additional Information

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