Northern Wood Preservers Site Sediment Remediation: EA Follow-up Program

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Presentation Outline

- Purpose:
  - To use the Northern Wood Preservers Site Sediment Remediation project as a case study of EA follow-up
  - Focus will be on how follow-up monitoring was used to change implementation of project
- Project description and EA process
- Follow-up monitoring requirements
- Results and outcomes of follow-up
- Future steps
- Summary /conclusions

Thunder Bay Harbour, Ontario

Northern Wood Preservers Site Sediment Remediation

NOWPARC (Northern Wood Preservers Alternative Remediation Concept)

- Project supported by Public Advisory Committee

Project Funded by:

- Environment Canada
- Ontario Ministry of the Environment
- Abitibi Consolidated
- Canadian National Railway Company
- Northern Wood Preservers Inc.

Project Overview

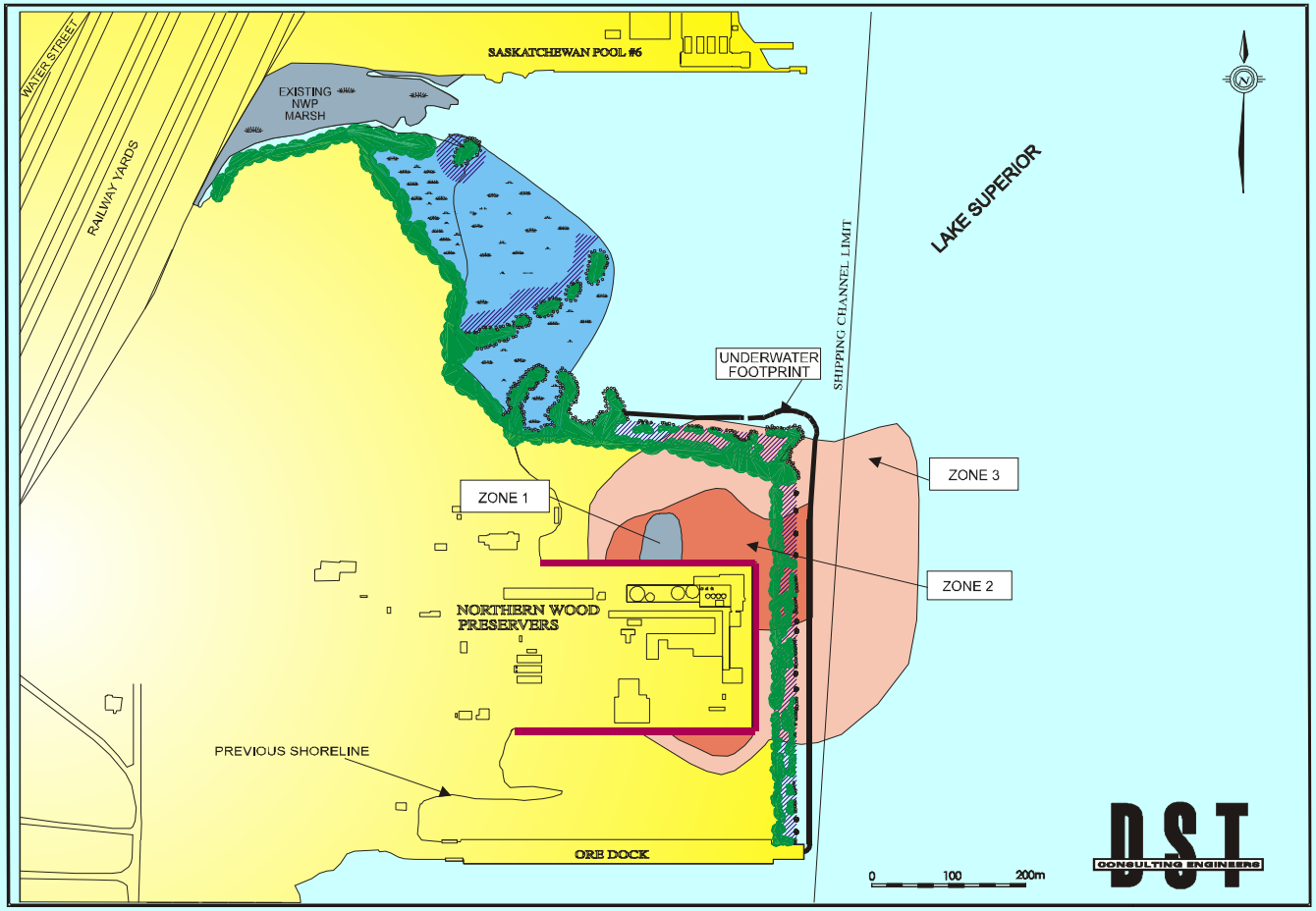
- Site studied since the late 1970s
- Pools of creosote identified around NWP's property
- Average total PAHs concentration near 10,000 ppm with peaks over 50,000 ppm
- Volume of sediment causing acute lethality to benthos 11,000 m^3
- Cleanup criteria established at 260 ppm total PAHs (CCME industrial fill quality criteria)
- Goal: Re-use of treated sediment to create new industrial land

Northern Wood Preservers
Site Plan

Project Components

- Confinement of work site with a rock-filled berm
- Removal of creosote contaminated sediment using a Cable Arm Bucket
- Treatment of removed sediment using solid phase bioremediation - Contingency Thermal Treatment
- Isolation of source with clay barrier -Contingency Waterloo Sheet Pile Wall
- Containment of work site using clean fill
- Fish and wildlife habitat restoration
- Collection and treatment of groundwater

NOWPARC Site Plan



EA Process

- Comprehensive Study under CEAA
- Environment Canada lead RA due to federal funding
- Fisheries & Oceans Canada RA due to regulatory approvals: Fisheries Act, NWPA
- Comp study completed Feb 1997
- Minister's approval May 1997 – **requirement for RAs to develop and implement EA follow-up program**

EA Follow-up Program

Components identified in CSR:

- Surface water quality
- Ground water quality
- New aquatic and terrestrial habitats
- Social –noise, odour, health & safety
- Malfunctions & accidents
- Cumulative effects
- Effectiveness of sediment treatment

Follow-up Results

Surface Water Quality:

Q: Will remediation activities impair surface water quality?

- Monitoring water quality during berm construction, site isolation, filling and sediment removal

Result: no adverse effects observed

NWP Site Berm Construction
Silt Curtain

Follow-up Results

Ground Water Quality:

Q: Are barrier and fill effective in stopping movement of contaminants?

- Monitor effectiveness of clay liner installation
- Long term ground water monitoring

Result: clay liner not creating complete seal

- contingency measure using Waterloo steel pile wall installed
- Pizometers installed throughout fill area for ground water quality and flow

NWP Site Clay Isolation Barrier

- Isolation of source with an environmental clay barrier
- Clean fill placed between clay barrier and rockfill berm
- Over 114,000 tonnes of clay placed over 600m at a cost of $500,000 CND

NWP Site - Waterloo Sheet Pile Wall

- Approximately 6000 m^2 of sheet pile placed along 560 m at a total cost of $1.9 M CND
- Wells installed throughout filled area for long term monitoring of ground water and removal of creosote

Follow-up Results

Sediment Treatment Effectiveness:

Q: Is the selected sediment treatment technology achieving cleanup targets?

- Monitor effectiveness of biological treatment process

Result: bioremediation process not meeting cleanup criteria due to higher than expected contaminant concentrations

- Off-site high temp thermal desorption treatment process implemented –treatment successful

Bioremediation of Contaminated Sediment

- Following dewatering, sediment is dumped into mixing shed through a 6 inch screen
- Daramend™ (nutrient source) is added and tilled into sediment

Thermal Desorption Treatment

- Sediment shipped by rail in sealed railcars to Princeton, British Columbia for thermal treatment

Treated Sediment Reuse in Mine Reclamation

• Sediment treated by thermal process is being used as cover material at a mine site reclamation project outside Vancouver

Follow-up Results

Aquatic Habitat Creation:

Q: Will shoreline treatments provide no net loss of productive fish habitat?

- Monitor fish populations following creation of habitat

Result: aquatic habitat creation recently completed and monitoring protocol just developed –to be implemented over 10 years

NWP Site Aquatic Habitat Creation

Follow-up Results

Terrestrial Habitat Creation:

Q: Will project activities adversely affect wildlife, and will new upland habitat provide wildlife benefits?

- Document impacts on wildlife during construction; assess wildlife use of new upland areas and vegetated buffer

Result: no impacts on wildlife observed during construction; 30 m wide buffer of native trees planted along shoreline –monitoring for successful take of trees

NWP Site
Terrestrial Habitat Creation

Follow-up Results

Social Impacts:

Q: Does noise and odour from site exceed regulatory levels? Will adjacent uses be disrupted?

- Monitor air quality during sediment removal
- Advise local business and residents of activities

Result: air quality within acceptable guidelines

- site activities had to accommodate NWP operations
- noise complaints at quarry site for rock fill

Local Quarry for Rock Fill

- Quarry access road relocated to avoid neighbouring houses

Follow-up Results

Health & Safety:

Q: Are site workers properly trained & equipped, and appropriate measures implemented?

- Project, NPW and contractors had inspectors on site to ensure H&S requirements being met

Result: problems with one contractor

- Not wearing proper equipment or using appropriate equipment
- Ministry of Labour called in to enforce situation

Worker Health & Safety During Sediment Removal

Follow-up Results

Accidents & Malfunctions:

Q: If an accident or malfunction occurs, are effects minimized or acceptable?

- Identify nature and extent of effects through appropriate monitoring programs (water and air quality during construction)

Result: a few minor instances –silt curtain failure and blow up; bulldozer slipping into water –effects were minor and localized, situation quickly addressed

NWP Berm Construction
Silt Curtain Failure

Follow-up Results

Cumulative Effects:

Q: Are cumulative effects considered in the monitoring program?

- Ensure that effects other than direct project effects are monitored

Result: Adjacent industry (Canada Malting) claimed project causing impairment to intake water; water quality monitoring design was able to show that NWP site not source of contaminants

Future Steps

- Ongoing monitoring of ground water
- Monitoring of aquatic and terrestrial habitat use
- Summary EA follow-up and monitoring report required for project partners
- EC will make report available to public through Public Advisory Committee and on our website

Conclusions

- Condition of EA approval to design and implement follow-up program was met
- Follow-up monitoring during project implementation showed mitigation measures for water & air quality were effective
- Monitoring of clay barrier and sediment treatment resulted in changes in implementation using contingency options

  →adaptive management
- Ongoing monitoring for habitat creation (short term) and ground water required (long term)