Water Management Strategy During the Solidification & Stabilization of Contaminated Sediments at the Sydney Tar Ponds Remediation Project

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What took me from the West Coast on Vancouver Island…..

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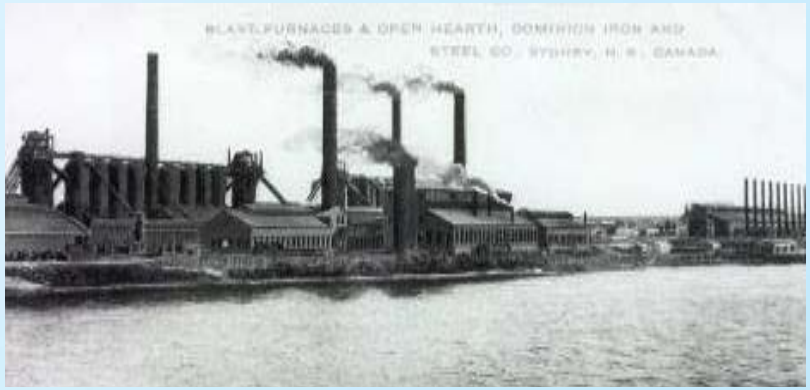
… 6,500 km to the East Coast and Cape Breton Island?

The Sydney Tar Ponds!!!

An Overview of a Unique Canadian Site



- 100 years of coking operations
- Tar Ponds: 81 acres
  - 700,000 tonnes of PAH contaminated sediments
  - 45,000 tonnes of PCB contaminated sediments
- Coke Ovens: 178 acres
  - 3,000 tonnes of PAH & VOC contaminated soil
  - 25,000 tonnes of coal tar in tar cell

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History of the Site

History of the Site

Sydney Steel Plant Employed approximately 6,000 people in it's peak.

History of the Site

History of the Site

- Coking Process Created Residual Coal Tar which was Washed down Coke Oven Brook and used as Fill Across the Site.

OWNERS

- Sydney Tar Ponds Agency
  - $400 million dedicated to this remedial project
  - Funds from the Province and Federal Governments

AECOM's ROLE

- Design Engineer
  - Proposing and Designing Solutions
  - Permit Applications
  - Creation of Major Documents such as Environmental Protection and Management Plans, Health and Safety Plans, Quality Assurance Plans
  - Development of Tender and Design Packages
- Construction Oversight
  - Ensuring Construction Matches the Design and Tender Packages
  - Ensuring the Contractor is in compliance with Nova Scotia Environment Construction Permit and other relevant regulations.
  - Dispute resolution and Contract Clarification.

AECOM's ROLE

- Design Engineer and Construction Oversight
  - Used over 23 AECOM Offices
  - AECOM Offices from 4 countries
  - Over 200 AECOM Employees have been on the project.

AECOM's ROLE

- Design Engineer and Construction Oversight
  - Remediation Project Split Up Into Seven Coke Ovens Contracts
  - Seven Tar Ponds Contracts

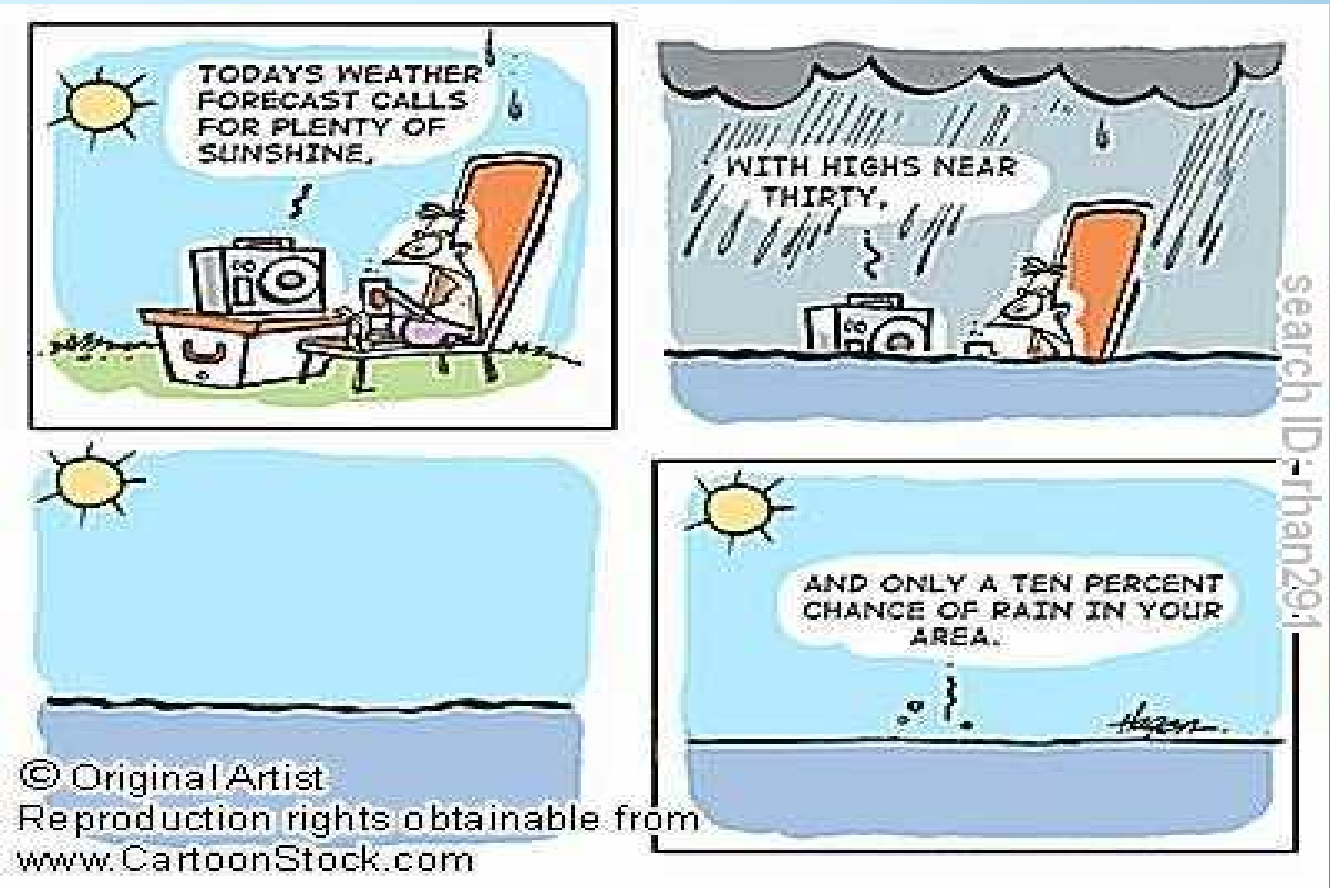

Solution
S/S Ponds
Channels
WTP
GW Collection
Coke Ovens Brook
Cutoff Wall
S/S
Tar Cell
Coke Ovens Cap
Cutoff Wall

Project Schedule

- Detailed Design Started in October 2006
- Construction Commenced in 2008
- Construction Completion Date of 2014

Why Do We Need A Water Management Strategy?

- Without the ability to manage the water, we wouldn't be able to treat the contaminated sediments.
- You either have too much water in this business or not enough.



Purpose of Water Management Strategy

1) To Protect Aquatic Life
2) Provide a Dry Area for Stabilization and Solidification

Two Major Tenders in the Remediation of the Sydney Tar Ponds

TP6A: Surface Water Diversion
MB2 Construction and Beaver Marine Joint Venture

Two Major Tenders in the Remediation of the Sydney Tar Ponds

TP6B – Stabilization and Solidification of Sydney Tar Pond Contaminated Sediments Nordlys Environmental

Review of the S/S Approach

- Control incoming flows from Coke Oven Brook and Wash Brook by diverting them from the work area using temporary pumping stations
- Control water coming from other sources using barriers
- Create a new channel within the isolated areas
- Complete in situ treatment of tar ponds sediments through solidification/stabilization

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Sources of Water

- Wash Brook – Urban Storm Water Collection Channel

Sources of Water

- Coke Oven Brook – Varied Flows

Sources of Water

- Storm Outfalls – 14 Known Outfalls into the Tar Ponds

Sources of Water

- The Tide and Sydney Harbour

Storm Outfall Management

- Storm outfalls will temporarily be directed to newly constructed ditches, and ditches lead to pump around structures.
- Long term solution is these outfalls will be directed to the newly constructed channel.

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High Flows in Coke Oven Brook

Pumping Stations – Multiple Stages

Stage 1

P1a
Wash Brook
Narrows

Min 0 L/s
Median 200 L/s
Peak 11,800 L/s

P1b
Coke Oven Brook

Min 0 L/s
Median 200 L/s
Peak 6,700 L/s

Distance of Water Pump Around

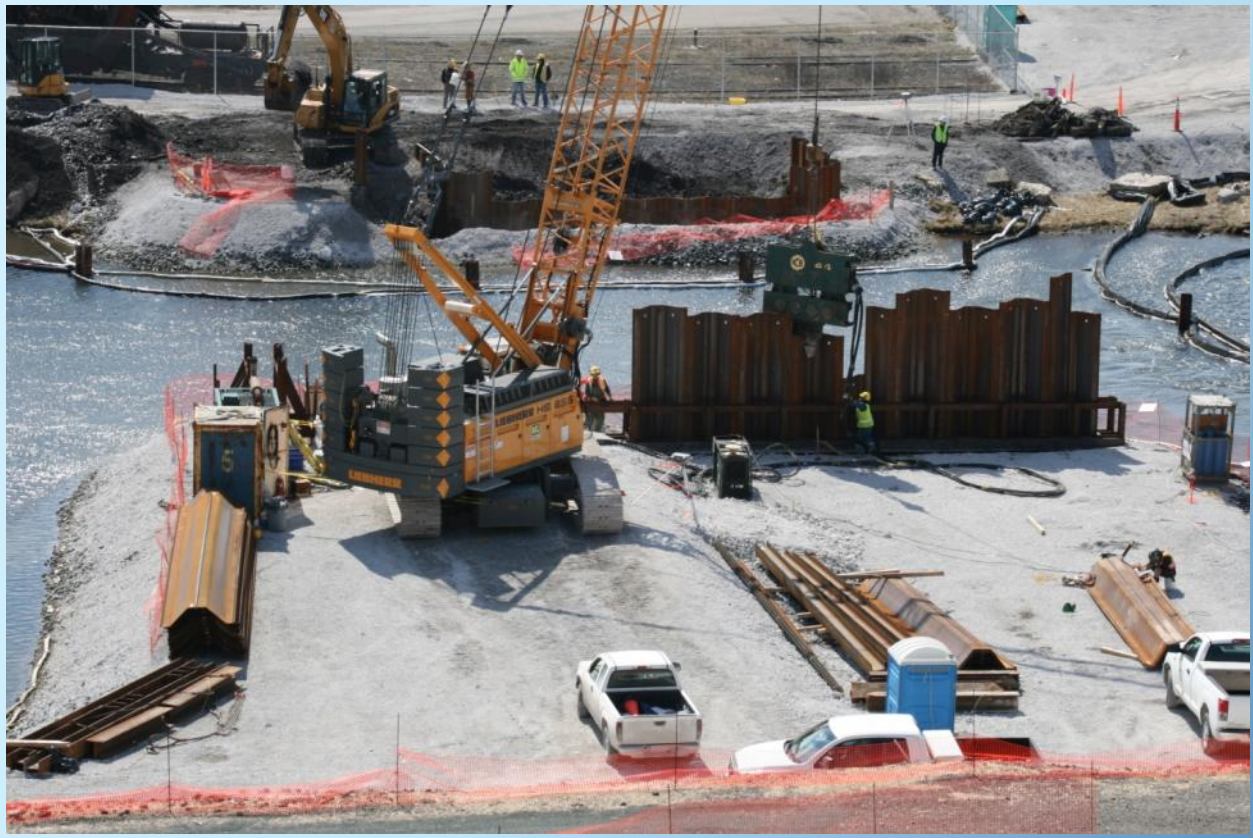
- Phase 1 - Approx. 800 m on Wash Brook

Distance of Water Pump Around

- Phase 1: Approx. 550m on Coke Oven Brook

Distance of Water Pump Around

- Phase 2 - Approx. 650 m from Ferry Street to the Narrows
- Phase 3 - Approx. 650 m from the Narrows to Battery Point



Water Pumping

Barriers

- Barriers are required to assist with isolation of work areas

Stage 3
Battery Point

1 Stage 2
r At Ferry Street

Narrows

Pumping Location

- Dissipation Structure – Constructed of Steel Sheet Piling to manage high flows and prevent dispersing contaminated sediments.

Dissipation Structures

Each Dissipation Structure is surrounded by two silt curtains and an oil absorbent boom.

Fish Removal is conducted during installation.

Dissipation Structure

- Turbidity Monitoring is conducted at 3 locations every 4 hours of active construction and compared against baseline data.

TP6B Water Management Role

- Once TP6A has completed the pump around, TP6B must manage residual water in the Tar Ponds.
- This is done by decanting water to approximately 600 mm depth and directing that water to the ditches.
- Treating or use in the mix the remainder (e.g. Pore Water, Upwelling, Precipitation)

Stabilization and Solidification

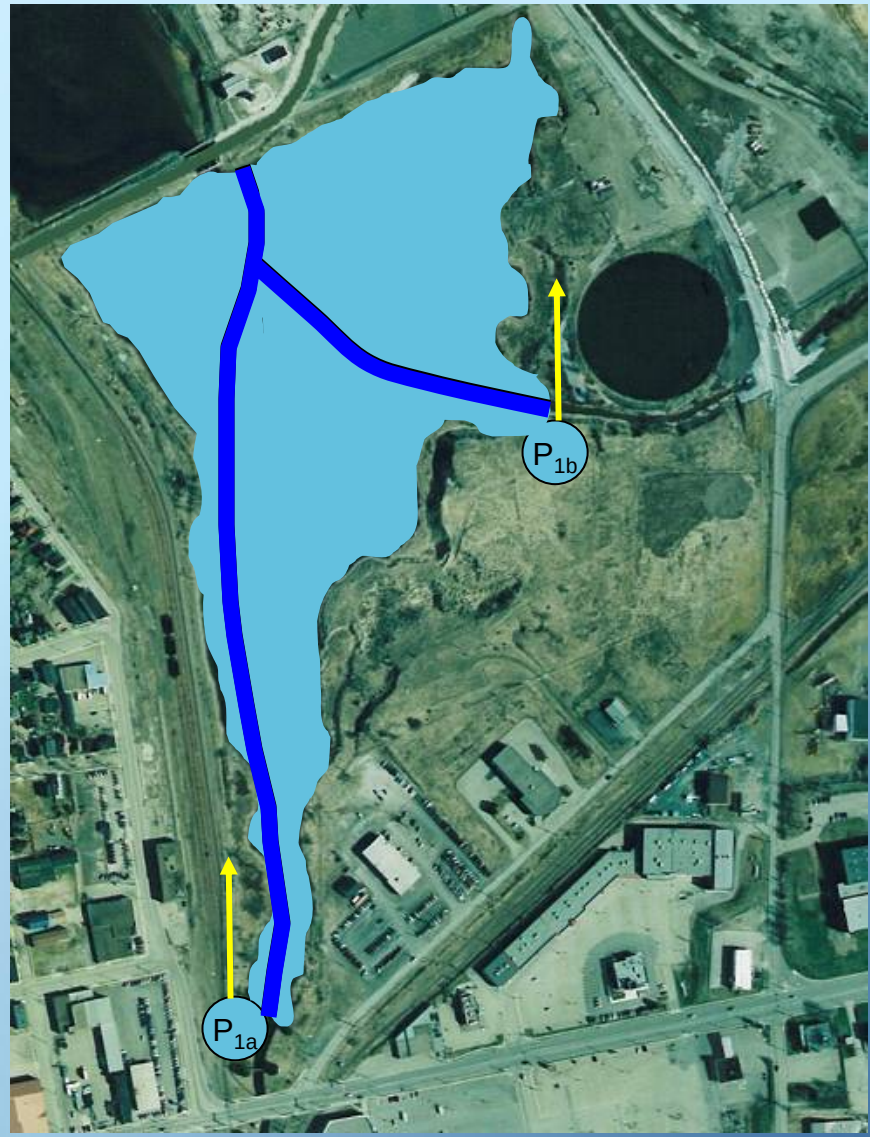
- Remedial Process can begin when the Contaminants are Relatively Dry.

Stabilization and Solidification

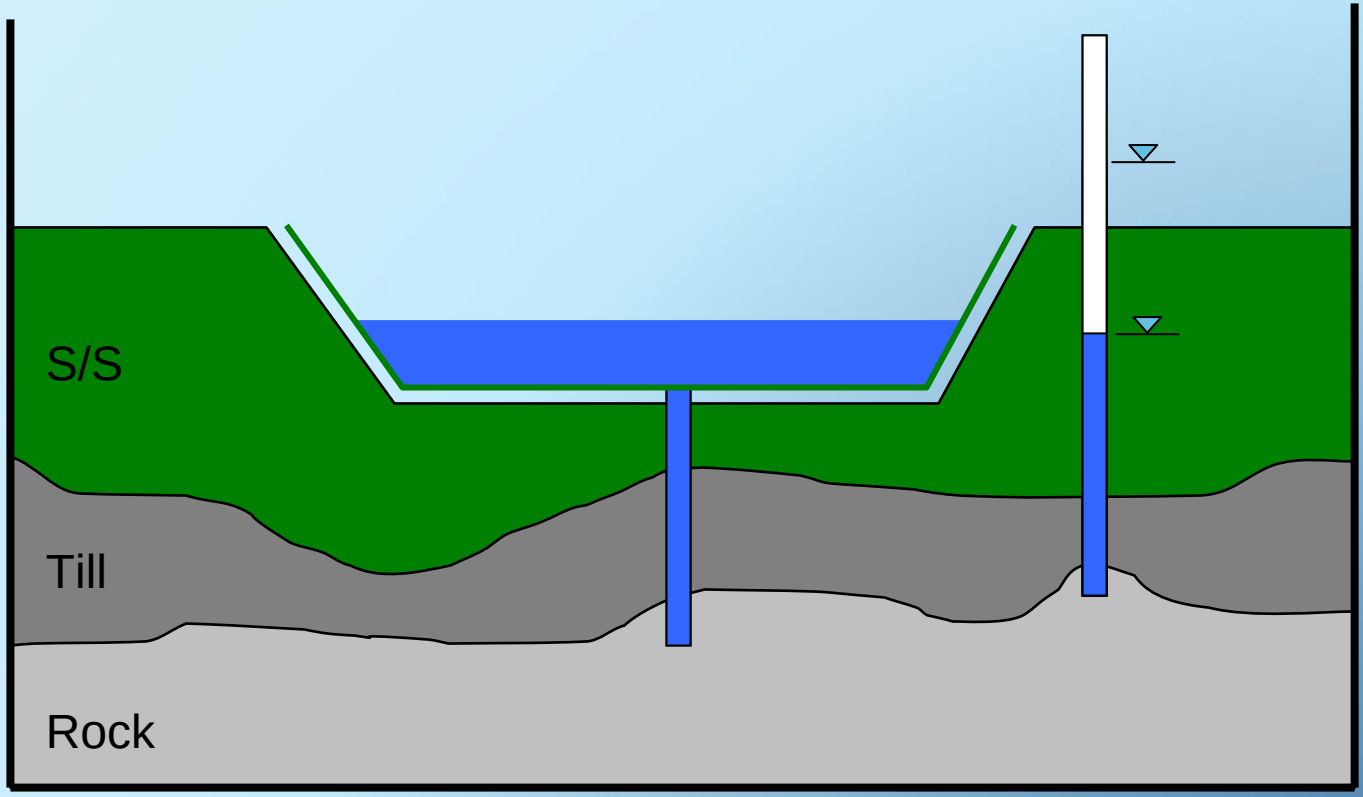
- The dryer the contaminants, the less cement is used, thus lowering the overall costs.
- Too dry and it is too difficult to mix.

New Channel – Commissioning

- Work sequenced to provide new flow channel as a first priority
- Removes the need for ongoing bypass pumping while remaining sediment is solidified.



New Channel – Uplift Pressure Control



End Result

- Successful Remediation of the Sydney Tar Ponds

QUESTIONS?

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