Remediation at the Sydney Tar Ponds and Coke Oven Sites

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Sydney Tar Ponds and Coke Ovens

Coke Ovens Site

North Pond

South Pond
The Problem
Sydney Tar Ponds & Coke Ovens Sites

- 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
The Joint Action Group (JAG) formed.

- **1996** - Federal and provincial ministers meet to consider community-based process to find acceptable solutions.

- **1998** - Three levels of government and JAG sign an MOU.

- **1999** - Ottawa, Nova Scotia, and Cape Breton Regional Municipality sign $62-million cost sharing agreement to fund scientific studies, surface clean-up and JAG activities.
The Joint Action Group (JAG)

Formed after two failed cleanup attempts

1. Sydney Tar Ponds Incinerator
2. Encapsulation

Mandate - To get unanimous consensus for method of clean up

Framework

• Roundtable
• Working groups
  ▪ Health and Safety
  ▪ Environmental
  ▪ Engineering
• Public meetings ( >1000 over 5 years )
Phase 1
Identified over 800 reports and documents related to the project (1997 – 2001 by CBCL/CRA)

Phase 2
Intensified field investigation
- Groundwater wells
- Soil sampling
- Surface run-off
- Background evaluations
- Development SSTL’s

(1998-2001 by JDAC (Jacques Whitford, Dillon, ADI and CBCL))
Tar Ponds Incinerator
Remedial Action Evaluation Reports (RAER)

Purpose
To identify potential solutions for the clean up of both the Coke Ovens site and the Tar Ponds site

Report to discuss
• Description of clean up technology
• Construction methodology
• Order of magnitude costing
• Conceptual schedule
• Economic benefits

Report not to make recommendations or select option
Selection of clean up technology to be made by JAG
Tar Ponds Encapsulation

Slag pile was to be pushed into Pond
Preliminary Engineering Design

Carried out preliminary engineering on selected clean up technologies from JAG/RAER

Tar Ponds
- Stabilization and solidification PAH impacted sediments
- Incineration PCB impacted sediments
- Final capping

Coke Ovens
- Interception barrier
- Groundwater collection & treatment
- Surface water control
- Final Cap

(2006 by EarthTech (now AECOM) and CBCL Limited)
May 12, 2004, Governments of Canada and Nova Scotia signed an MOA, which committed the two levels of government to the Remediation of Sydney Tar Ponds and Coke Ovens Sites.

The Minister of Environment and PWGSC announced an EA decision for the Sydney Tar Ponds and Coke Ovens Remediation Project in May 2005.

The panel, a joint Federal/Provincial public review by a three member independent panel, was held from April 29 to May 18, 2006.
The scope subject to environmental assessment by the panel was:

1. The removal and destruction of PCBs from the Tar Ponds, as well as the removal of the contents of the tar cell on the Coke Ovens site, with a proven technology such as high temperature incineration in a single use dedicated facility.
2. The in-place treatment of the remaining contaminated material using proven technology such as bioremediation, solidification or other appropriate technology.
3. The subsequent engineered containment of both sites.
4. Site restoration and landscaping compatible with the natural surroundings and future use.
5. Provision for the ongoing future maintenance and monitoring of the sites for 25 years after completion of the Project.

The panel considered an alternative, which was the deletion of item 1 (above); in essence the removal of incineration and S/S treatment of all sediments including PCB.

The panel report was comprised of 55 separate recommendations covering all aspects of the project.
Remedial Works

The following remedial works were carried out by the Sydney Tar Ponds Agency in preparation for the major clean up remediation:

- Relocation Coke Oven Brook
- Relocation City Water Line
- Battery Point Barrier (First Nations set aside)
- Cooling Pond
Battery Point Barrier and Cooling Pond
Coke Ovens

Brook Realignment

Relocated Waterline
The Project

• 2006 – AECOM (then Earth Tech) and CBCL awarded $30 million contract for the final design and construction oversight.

• AECOM was retained to provide overall project management support, remedial design and cost estimation, construction oversight and administration and technology review and CEAA process support for the clean up of PAH, PCB, petroleum hydrocarbon, and metal contamination.

• The intent of the Project is both to reduce risks to people and the environment, and to create social and economic benefits.
**The Plan**

<table>
<thead>
<tr>
<th>Tar Ponds</th>
<th>Coke Ovens</th>
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<tbody>
<tr>
<td><strong>Cost:</strong> $256 million</td>
<td><strong>Cost:</strong> $144 million</td>
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<tr>
<td><strong>Duration:</strong> 7 years</td>
<td><strong>Duration:</strong> 6 years</td>
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<tr>
<td><strong>Technology:</strong> Treat Material in place with stabilization and solidification, then encapsulate with a multi-layered, engineered cap</td>
<td><strong>Technology:</strong> Treat contents of tar cell (25,000 tonnes) with solidification and stabilization, encapsulate with a multi-layered, engineered cap</td>
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<tr>
<td></td>
<td><strong>Encapsulate remaining site with a clay/topsoil cap</strong></td>
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Tar Ponds and Coke Ovens Contracts
Overview by Element

Ongoing or Complete:
• Cooling Pond
• TP2 – Decontamination Facility
• TP6A – Pump Around
• TP6B – Stabilization and Solidification
• TP6D – Construction Roads
• TP7 – Capping of Tar Ponds
• CO1 – Coke Oven Brook Connector
• CO2 – Tar Cell Removal
• CO5 – Interceptor Trench
• CO7/CO8 – Coke Oven Brook and WTP
• TP6C – Ferry Street Bridge

Yet to be Tendered:
• CO6A – Coke Ovens Cap Phase 1
• CO6B – Coke Ovens Cap Phase 2
Tar Ponds Surface Cap
Fall 2008 to 2013
Solidification/Stabilization

- Bench Scale Testing
- Pilot Testing
- Full Scale Construction
Sampling for Bench Scale Testing

Locally available materials utilized as mix “ingredients”

• Portland Cement
• Slag (from the adjoining SYSCO site)
• Quicklime
• Fly Ash
Pilot Testing

- NTP Pilot Study - September 2008
- STP Pilot Study - October 2008
- 6 cells (27 m²) constructed of interlocking steel sheet pile to form isolated sediment areas
- Performance criteria
  - unconfined compressive strength (UCS), hydraulic conductivity, leachability
- Air emissions assessment
- Environmental Protection Plans (EPPs)
# Green and Sustainable Remediation (GSR) in Planning and Design

<table>
<thead>
<tr>
<th>Actions</th>
<th>Implementation</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Sequencing Plans</td>
<td>• Tar Pond contractors&lt;br&gt; • Shared site infrastructure</td>
<td>• Reduction of air emissions&lt;br&gt; • Reduces erosion&lt;br&gt; • Reduces waste material&lt;br&gt; • Reduces fuel use</td>
</tr>
<tr>
<td>Reuse options for Existing Structures</td>
<td>• Materials handling pad&lt;br&gt; • CO Brook</td>
<td>• Reduces demolition activities&lt;br&gt; • Reduces off-site disposal waste material&lt;br&gt; • Reduces fuel use</td>
</tr>
<tr>
<td>Abandon subsurface structures</td>
<td>• Coke Ovens Voids and underground infrastructure</td>
<td></td>
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# Green & Sustainable Remediation in Planning and Design - continued

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</thead>
<tbody>
<tr>
<td>Salvage Options / Recycling Options</td>
<td>• TP2 Recycling</td>
<td>• Reduces off-site disposal waste material</td>
</tr>
<tr>
<td>Stockpile cover</td>
<td>• Project Materials Management Strategy</td>
<td>• Reduces dust&lt;br&gt;• Reduces erosion&lt;br&gt;• Odour Management</td>
</tr>
<tr>
<td>Routinely evaluate treatment process</td>
<td>• SS Process QA/QC Management</td>
<td>• Reduces air emissions&lt;br&gt;• Reduces potable water use and waste water discharge&lt;br&gt;• Reduces off-site disposal waste material</td>
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Future Land Use

Highlights of the Plan:

A Commons Area including:
- Sports fields
- Outdoor concert venue
- Walking trails
- Wildlife stations
- Parking area
- Urban forest

A Greenway Trail Network with:
- Bridges
- Boardwalks
- Interpretive stations
- Outdoor exercise stations
- Rest areas

New Roads and Sidewalks for:
- Community connectors
- Business campus
- Land banking for future growth
- Commercial expansion along SPAR road

Photos from: Ekistics Planning & Design “Former Tar Ponds Site Future Use” Sowing the Seeds of Change http://www.tarpondscleanup.ca/futureuse/
District Energy (Central Heating)

- Wind Energy
- Switchgrass Energy
- Harbour or STP Heat Recovery

Ekistics Planning & Design “Former Tar Ponds Site Future Use”
Sowing the Seeds of Change
http://www.tarpondscleanup.ca/futureuse/
Underlying objectives:

• To ensure that economic benefits accrued to the greatest extent possible to Cape Breton

• To realize the sustainability imperative, i.e., that real economic value, beyond the remediation itself, would endure

Measures of success:

• Upwards of 50% of the monies have been spent in Cape Breton

• Through “set-aside” provisions, First Nations companies attained experience – now successfully competing on the open market – outstanding success

• Establishment of the Center for Sustainability in Energy and the Environment at Cape Breton University
Questions

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Sustainability Model – Tar Ponds Project

- **Economy**
  - Local Economic Benefits and Long-term Economic Growth of the Region
  - Better place to live, health benefits, long viability of Region

- **Environmental**
  - Clean up of one of the most contaminated sites in Canada

- **Social**

**Sustainability**

The image illustrates the interconnection of economic, environmental, and social sustainability, highlighting the benefits of the Tar Ponds Project.