Odour Management for a Remediation Project in an Urban Setting: Sydney Tar Ponds Remediation Project

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AECOM
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

May 2012
History of the Site

Sydney Steel Plant employed approximately 6,000 people in its peak.
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 20 AECOM Offices
  – AECOM Offices from three countries
  – Over 200 AECOM employees have been on the project

May 2012
AECOM’s ROLE

• Design Engineer and Construction Oversight
  – Remediation Project Split up into Seven Coke Ovens Contracts
  – Seven Tar Ponds Contracts
Project Schedule

- Detailed Design Started in October 2006
- Construction Commenced in 2008
- Construction Completion Date of 2014
Current Status
Project Challenge Urban Setting
Air Monitoring Program

Air Sampling Programs:

• On site occupational air sampling
• Real Time Air Sampling
• Ambient Air Sampling Program

Off Site Air Monitoring Program:

– Total Suspended Particulate Matter <50micrometers
– Metal Scan
– Particulate Matter 10
– Particulate Matter 2.5
– Total Volatile Organic Compounds
– Polycyclic Aromatic Hydrocarbons
Sydney, Nova Scotia

Smelly tar ponds upset residents..June 25th, 20??

An unbearable stench rising from the tar ponds has people gasping for fresh air as they make their way past the toxic site.

"I breathe through my mouth so I can't smell it," said Chris MacNeil, as he walked along Prince Street near the Sydney Shopping Centre, Thursday. "On really hot days it smells like rotting food." MacNeil said he's ashamed and embarrassed when he sees cruise ship visitors walking through the area. "I wouldn't want people going home thinking this is what Cape Breton is all about."

Crystal Brown moved to the Ashby area a little more than a year ago. She was surprised that the smell travelled as far as her home.

"Sometimes you open the windows to air the house out but the smell coming in is worse," said Brown. "It smells like rotten eggs. It's gross."
Permit Requirements

• Regulated by Nova Scotia Environment
• Cease all work activities if odour is deemed excessive by the Department.
• Follow odour prevention guidelines from the Environmental Protection Plan (EPP)
Nuisance Odours

What is a nuisance to some is not a nuisance to all

Sense of Smell is very complex
Even “good” odours can be an irritant in certain concentrations
Odour Complaints

Phase I Odour Complaints: 49

Tar Ponds Odour Complaint Tracking
Weekly for 2010
Odour Suppression Solutions

So what do we do?
Understanding our Odour Generating Contaminants

- Polycyclic Aromatic Hydrocarbons
- BTEX
- Raw sewage
Polycyclic Aromatic Hydrocarbons

- Polycyclic Aromatic Hydrocarbons by decreasing concentration (1)
  - Naphthalene
  - Phenanthrene
  - Benzo[a]anthracene
  - Pyrene
  - Fluoranthene
  - Anthracene

- Naphthalene and Phenanthrene comprise 60-80% of PAH Concentration

(1) Sydney Tar Ponds Clean Up Sampling Program
BTEX

- Benzene
- Toluene
- Ethylbenzene
- Xylene
- Volatile Organic Compounds
- Sweet
- Solvent
Historical Outfalls

- Raw Sewage (Storm Outfalls – 14 Known Outfalls into the Tar Ponds)

May 2012
Odour Generating Activities

- Solidification and Stabilization
- Treated Sediments
- Importation of Coke Ovens Contaminated Soils
Odour Management Plan

- Development of an Odour Management Plan
  - Define Roles for Contractor, Design Engineer and Client
  - Define Protocols
  - Odour Complaint Hotline

Dedicated “Odour Champion”
- Respond to Work Activities
- Ensure Adequate Supply of Odour Suppressant Products
Odour Management Plan

- Reduce Area of Exposed Materials
- Dedicated Crew
- Acquire and Apply Control Products
- When, Where and What to Apply
## Odour Management Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depth Determination</strong></td>
<td>Advancing test pits</td>
<td>BioSolve</td>
</tr>
<tr>
<td></td>
<td>Cell associated with test pit will be solidified and stabilized within 24 hours</td>
<td>High concentration BioSolve or short term foam</td>
</tr>
<tr>
<td></td>
<td>Cell associated with test pit will NOT be solidified and stabilized within 24 hours</td>
<td>High concentration BioSolve or Long term foam or ConCover</td>
</tr>
<tr>
<td><strong>S/S</strong></td>
<td>Within the active treatment zone</td>
<td>BioSolve</td>
</tr>
<tr>
<td></td>
<td>Cell will be disturbed within 24 hours</td>
<td>High concentration BioSolve or short term foam</td>
</tr>
<tr>
<td></td>
<td>Cell will NOT be disturbed within 24 hours</td>
<td>Long term foam or ConCover</td>
</tr>
<tr>
<td><strong>Foreign Material Importation &amp; Handling</strong></td>
<td>During importation and handling</td>
<td>BioSolve</td>
</tr>
<tr>
<td></td>
<td>Material will be disturbed within 24 hours</td>
<td>High concentration BioSolve or short term foam</td>
</tr>
<tr>
<td></td>
<td>Material will NOT be disturbed within 24 hours</td>
<td>Long term foam or ConCover</td>
</tr>
</tbody>
</table>
Odour Suppressants

- Odour Suppressing Foams
- Concover 180
- Biosolve
- Domestic Substances List - EC
- Landfill Technology
Odour Suppressing Foam

Short term foam – Rusmar 645
• Aqueous anionic surfactant mixture

Mid and Long term foam – Rusmar 900s
• Impermeable latex-based membrane
• Repels water
• Optional fragrance
• Application – Pneumatic Units
ConCover 180

Concover 180

- Three Components:
  - Recycled paper or mulch
  - Chemical bag – Calcium Sulfate (75-90%) and Bentonite (5-10%)
  - HydraGuard 42

- Longer term, water resistant product
- Application - Hydroteeder
BioSolve

Biosolve

• Anionic Surfactant
• Vapour Suppressant
• Reduce VOC Concentration
• Emulsifies and encapsulates

Application – Pressure Washer
Odour Complaints – Phase II

Phase I Odour Complaints: 49
Phase II Odour Complaints: 19

Tar Ponds Complaint Tracking
Calendar Year 2011

# of Complaints

Month

August 2008

November 2011
QUESTIONS?

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