Mitigation Measures for Redevelopment over a Former Dry Cleaner Site

Canadian Brownfield Network – Remediation Technologies Symposium - 2015

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Agenda for Today

- The Issue
- Background
- How to Overcome
- Implementation
- Final Thoughts
- Q&A
The Issue

• How do we get from A to B in 9 months?

• Business as usual for a developer/constructor?
The Issue

• How do we get from A to B in 9 months with contaminants from a former dry-cleaner?

• Experience would say .. it is a challenge
Background

- Former Mall Property … 19xx
- Full Property Redevelopment – demolition in 200x

- Phase One Environmental Site Assessment in 2013 (to O. Reg. 153/04 Standards)
- Identified former dry-cleaner operation in Mall
  - one source: 1965 City Directory
    - Location unknown
Background
Background
Background

- Plans for Redevelopment – new stand-alone building – tenant

- Wait !!! Phase One → Former Dry-cleaner possibly in area

- Phase Two ESA in January 2015 … dry-cleaner impacts? Yes/No?
Background

• Phase Two ESA …
  − Drilling and sampling … standard methods
  − Groundwater sampling in fractured shale bedrock
    • Volatile Organic Compounds
      – Perchloroethylene (Perc, PCE)
      – Trichloroethylene (TCE)
      – Cis-1,2-dichloroethylene (c-DCE)
      – Vinyl Chloride (VC)
    • Typical residuals from historical dry-cleaning operations
## Background

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Highest Concentration (µg/L)</th>
<th>Location</th>
<th>MOECC Table 3 Standard</th>
<th>Highest Concentration (µg/L)</th>
<th>Location</th>
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<tbody>
<tr>
<td>1,1-Dichloroethylene</td>
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<td>MW15-11</td>
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<tr>
<td>Vinyl Chloride</td>
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<td>MW15-03</td>
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</table>
How to Overcome

• Development plans …
  • Tenant wanted location
  • Owner wants to gain long term lease

• Schedule … Fall 2015

• Issues with impacted groundwater below location

• Can it be done?  How?
  • Determine the Critical Path
  • Review possible options and related costs
How to Overcome

- Two issues (Critical Path):

  A) Future Remediation once Built
     - Need for access, minimal interruption to tenants, method?

  B) Vapour Intrusion into Building
     - Health and safety of occupants, risk assessed acceptable?
How to Overcome

• Impacted Groundwater and new Building
  – Impacts at depth
  – No source/soil identified (below the building footprint)
  – Impacts within bedrock … difficult to reach, difficult to predict movement and migration
  – Excavation … not possible, past shows pump-and-treat is not a viable option
  – *In-situ chemical oxidation (ISCO)*?
How to Overcome

- Risk Assessment calculations …
- Possible issues with vapour intrusion \((c\text{-DCE}, \text{PCE} \text{and} \text{TCE})\)
- RMM increases highest allowable possible concentration by factor of 100

<table>
<thead>
<tr>
<th>Contaminant of Concern (COC)</th>
<th>RME Concentration</th>
<th>Groundwater Discharge to Surface Water</th>
<th>% Chemical Solubility Limit</th>
<th>Groundwater to Indoor Air (without RMM)</th>
<th>Groundwater to Indoor Air (with RMM)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>612</td>
<td>770,000</td>
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<td>51000</td>
</tr>
</tbody>
</table>

Notes:
- All concentrations are in \(\mu g/L\).
- \(\text{RME} = \text{Reasonable Maximum Estimate} (\text{maximum detected concentration in groundwater multiplied by 1.2})\)
- Shaded values indicate that the maximum detected concentration is greater than the site specific criterion.
- Property Specific Standards derived assuming non-residential use and RMM consisting of a SVE system with passive venting.
How to Overcome

• Determined that Vapour Intrusion may be an issue

• Team with Vapour Barrier Professionals
  − Terrafix … detailed design
  − Work with Development Team – Constructor

• Application/Installation of vapour collection system and Liquid Boot® impermeable barrier
Implementation

- *In-situ* chemical oxidation (ISCO)
  - Recall that new building
  - minimize tenant disruption
  - drains constructed to provide future access
Implementation

Diagram showing the implementation of a drainage system with layers of native backfill, washed stone, and filter cloth to prevent washdown/clog. The diagram also includes a cross-section view of the fractured shale and silty clay till.
Implementation

• Design system to work with building construction
Implementation

Passive SVE and Liquid Boot® Vapour Barrier Application
Implementation

↑ Testing Indoor Air
Testing Sub-slab Vapour → Sub-slab Vent
Implementation

• Tested indoor air quality → Release to Tenant

• Summa Canisters

• Results show no Concentrations of COCs (c-DCE, PCE and TCE)

• Outdoor Air and Sub-slab – Detections

• Now … focus on groundwater remediation
Final Thoughts

- Contaminants … Redevelopment (Brownfields)
  - Doesn’t have to be an impediment to progress

- Apply new technologies and products, methods
  - i.e. Liquid Boot®, Vapour Collection, MGRA tools

- Planning and Communications
  - Early stages, co-operative teamwork, knowledge
Final Thoughts

• Contributing Factors to Success
  - Stream-lined Process
  - Early Involvement … Planning
  - no Detailed Regulatory Approvals needed (timing)
  - Trusted Network of Professionals – co-operation
  - Added Cost to Development minimized
  - Timeframe met … actually early
  - Big Picture vision … know where needed to be
Q&A

Thank you

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