Brownfields & Groundwater Remediation in Massachusetts

Paul W. Locke
Assistant Commissioner
MassDEP Bureau of Waste Site Cleanup
1 Winter Street, Boston, MA 02108

(617) 556-1160  |  Paul.Locke@state.ma.us  |  www.Mass.Gov/dep
As you know by the 3rd presentation...

Brownfield Programs facilitate the assessment, cleanup (if needed) & redevelopment of previously used properties

What do we do – or do differently – in Massachusetts?

How does the protection of groundwater resources fit in?
Massachusetts Brownfields Incentives

**MassDevelopment**
Brownfields Redevelopment Fund
- Brownfields Site Assessment Program
- Brownfields Remediation Loan Program
- Housing Initiative Loans
- Priority Project Status

**Massachusetts Office of Business Development**
Brownfields Redevelopment Access to Capital (BRAC) Program:
- Insurance Premium Subsidies (up to 50%) & Quality Coverage

**Massachusetts Department of Revenue**
Brownfields Tax Credit Program

**Office of the Attorney General**
Brownfields Covenant Not to Sue Program
Massachusetts Brownfields Incentives

MassDEP Waste Site Cleanup Program

• **Semi-Privatized Cleanup**: private sector Licensed Site Professionals (LSPs) oversee assessment and cleanup work

• **Flexible Cleanup Standards**: risk-based cleanup standards take the planned reuse of the site into consideration during cleanup design

• **Technical Assistance**: MassDEP work with municipalities, non-profits and brownfield developers

• **Funding (when available)**: MassDEP has received federal grants to conduct assessment work on behalf of eligible parties.
21E Site Universe
FY1994 - 2017

Open Sites
Closed Sites

FY '94: 1,394
FY '95: 7,511
FY '96: 2,952
FY '97: 46,081
FY '98: 2,952
FY '99: 46,081
FY '00: 2,952
FY '01: 46,081
FY '02: 2,952
FY '03: 46,081
FY '04: 2,952
FY '05: 46,081
FY '06: 2,952
FY '07: 46,081
FY '08: 2,952
FY '09: 46,081
FY '10: 2,952
FY '11: 46,081
FY '12: 2,952
FY '13: 46,081
FY '14: 2,952
FY '15: 46,081
FY '16: 2,952
FY '17: 46,081
Streamlined MCP Process: Notification-to-Closure

- **Front End**
  - Notification
    - 2-Hour
    - 72-Hour
    - 120-Day
  - LRA Complete & Effective?
    - No
      - No Notification Required
    - Yes
      - Initial Site Investigation (Phase I)
        - Preliminary Response Actions
          - Immediate Response Action (IRA) (Consider CEP)
          - Release Abatement Measure (RAM)
        - Phase I Report

- **Phase I Activities**
  - Phase I Activities
    - Immediate Response Action (IRA)
    - Release Abatement Measure (RAM)

- **Phase II Activities**
  - Comprehensive Investigation (Phase II)
    - Comprehensive Site Assessment
    - Risk Characterization
    - Preliminary Response Actions
      - IRA/RAM as appropriate

- **Phase III Activities**
  - Evaluation of Remedial Alternatives
  - Selection of Remedial Alternative
  - Implementation of Selected Remedy
  - Operation, Maintenance and/or Monitoring of Selected Remedy
  - 5-Year Reviews

- **Phase IV & V Activities**
  - Permanent Solution Not Feasible
  - No Significant Risk, Source Control, etc.

- **End of Year One**
  - Tier Classification happens automatically:
    - Tier I
    - Tier II
  - Annual Compliance Fees Assessed

- **End of Year Six**
  - (extensions possible)
  - Permanent Solution

**Notes**:
- Always aware of imminent Hazard Potential (and CEP) throughout process.
- Downgradient Property Status (DPS) may be submitted anytime, if appropriate.
- Public Involvement Activities may take place at anytime.
- Site status (and all submittals) available online at Mass.Gov dep anytime following notification.
- NRD assessment, negotiation & settlement may occur at anytime.
REALLY Streamlined MCP Process: Notification-to-Closure

1. Hire a Licensed Site Professional (LSP)
3. Pay Fees
1,326 FY11 Notifications (most recent 6-yr period):

Where Are They Now?

- Permanent Solution: 76%
- Temp Soln: 1%
- ROS: <1%
- Still Working: 4%
- Tier ID: 2%
- PS/TS Not Required: 17%
(Some) Implication of LSPs

ALL parties have to have confidence in their work
  • Transparency (reports online 15 minutes after submittal)
  • MassDEP audits work
    • to evaluate cleanup at a specific site
    • To evaluate the body of work of an LSP or PRP
    • To evaluate the overall effectiveness of the program

Cleanup rules have to be clear & consistent in the absence of constant & direct MassDEP oversight
  • Detailed regulations
  • Extensive guidance
  • Requirement for MassDEP Continuing Education Credits
GROUNDWATER RULES

3 Categories of Groundwater

- GW-1 – current of future use as drinking water
- GW-2 – potential source to indoor air (vapor intrusion)
- GW-3 – discharge to surface water

ALL groundwater is considered GW-3. Groundwater at a site MAY ALSO BE GW-1 and/or GW-2. Groundwater categorization rules are in regulation (310 CMR 40.0932)
Brownfields & Groundwater
Issues To Discuss

1. Ability (or inability) to use land use restrictions to affect groundwater category or potential exposures
   • CANNOT change GW-1 or GW-3 designation using restrictions
   • GW-2 category depends (in part) on presence of building (restrictions may be applied, but...)

2. What happens when...
   • Land changes as a result of a Brownfield project?
   • Potential risk changes as a result of new toxicity information? (e.g., trichloroethylene)
Change in USEPA Toxicity Information

Considered carcinogenic to humans but most sensitive endpoint is non-cancer health effects:

- 2011 EPA released new “Reference Concentration” (RfC) of 2 µg/m³
- 2 µg/m³ is safe for short- and long-term exposure
- RfC considers developmental effects (fetal cardiac malformations) that may occur after only a few days exposure during early pregnancy
Changes in Toxicity => Changes in Levels of Concern for TCE In Indoor Air and Groundwater for POTENTIAL Imminent Hazards

<table>
<thead>
<tr>
<th>(Residential)</th>
<th>Pre-2011</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Air</td>
<td>85 µg/m³</td>
<td>6 µg/m³</td>
</tr>
<tr>
<td>Groundwater</td>
<td>300 µg/L pre-2006</td>
<td>5 µg/L</td>
</tr>
<tr>
<td></td>
<td>50 µg/L post-2006</td>
<td></td>
</tr>
<tr>
<td>Health Effect</td>
<td>Long-term Cancer Risk</td>
<td>Short-term Developmental Effect</td>
</tr>
</tbody>
</table>
Scope of the Potential Problem

• ~ 1,000(+/−) potential sites for initial screen
  Based on a database search for “TCE”, “trichloroethylene”, “chlorinated solvents”, etc. - NOT DEFINITIVE

• ~ 200 (+/−) identified for follow-up
  concentration of TCE in groundwater, proximity to receptors, etc

• ~25% (+/−) of follow-up results in addition response actions “worst sites” prioritized
MassDEP Review of Conditions at TCE Sites
Closed Under Old Standards

• MassDEP contact current owners

• MassDEP can/will conduct initial sampling to determine if current conditions require further assessment or response actions

• Primary concern is identifying any potential for exposure and mitigating that exposure, NOT enforcement
EXAMPLE:

- Site closed by former industrial owner
- Now commercial & residential
- Vapor intrusion & “Imminent Hazard” confirmed
- Sub-slab Depressurization System installed

- Monitoring well installed to evaluate potential impact to nearby buildings.
- TCE concentrations exceed the GW-2 standard
- Condo Association financially unable to install additional wells near residential buildings on adjacent street.
- MassDEP installed two driven wells to obtain VOC data and measure depth to groundwater.
- Results are pending.