Installation of Sub-Slab Depressurization Systems in Stratford, CT

NEWMOA Workshop
Providence, RI  June 11, 2007
Chelmsford, MA  June 12, 2007

Ron Curran
Remediation Section, Water Protection and Land Reuse
Connecticut Department of Environmental Protection
Introduction

• Time Critical Removal Action for Vapor Mitigation
  
  – This work was part of a CT DEP and EPA response action to prevent soil gas potentially contaminated with low levels of volatile organic compounds (VOCs) from entering homes in a neighborhood adjacent to the Raymark NPL Site.

  • The VOCs are attributed to a groundwater plume from historic discharges of chlorinated volatile organic compounds (CVOC) and other substances at the nearby Raymark factory site.
Study Area
Areas of Concern
ATSDR Health Risk Determination

- (Appendix A)
- Report Highlights
  - Exposure is occurring
  - Significant cancer and non-cancer risk
  - Large contamination source for long term
  - No current means to prevent exposure
  - Difficult to predict affected homes
Public Announcement

- DEP, EPA, DPH & Stratford DOH delivered information packages to 112 homes
  - Fact sheet (Appendix B)
  - Door to door visits
- Informational sessions
  - Four public informational meetings were held to inform the affected homeowners of the proposed plans and to allow them to ask questions and discuss concerns
- Press Release
Access Agreement

• (Appendix C)
• Each homeowner was asked to sign an access agreement granting permission for a site visit.
  – Homeowners were given the option to refuse access at any time, up to the installation.
• In case of homeowner refusal, homeowners were asked to sign the lower portion of the access agreement noting that they refused the offer.
  – Part of a one-time offer, installation at a future date would be at the owner’s expense.
• Four homeowners were sent registered letters with a closing date to reach DEP for inclusion, after refusing to sign the access agreement granting or forbidding permission.
Site Visit (Home Survey)

- (Appendix D)
- Observations Recorded:
  - Homeowner information
  - Building / Basement Characteristics:
    - Floor / wall construction
    - Number / condition of slabs
    - Additions and/or crawlspaces
  - Utility services to the home
  - Basement use
  - Homeowner preferences

Example of a site visit survey
Flooring Issues

Concrete floors with holes, cracks, and gaps

Dirt Floors
Wall Issues

Deep gaps in the fieldstone walls

Crumbling high lime mortar in the fieldstone walls
Wall Issues... Continued.

Block Walls

Finished Basement Walls
occupied spaces

basements used for hobbies

lived in basements
Multiple Slabs (Additions / Crawlspace)

Multiple slabs were encountered at larger homes with additions.

Dirt floor crawlspace and concrete crawlspace (as pictured above) were encountered.
Larger Structures (Apartments)
Existing Radon Systems  vs  Engineered SSD Systems

- Range of Coverage Area: Approximately 25% – 50%
  - Crawlspace, additional slabs, etc. typically not addressed

- Coverage Area: Goal of 100% Coverage
  - Addresses crawlspace, additional slabs, etc.
Unexpected Problems...

Hidden underneath a tiled floor, a tub was installed over a dirt pit

Water line placed in dirt trench located under the finished floor
Unexpected Problems... continued

• Access constraints
  – Crawlspace
  – Finished Areas
• Unseen underground footings
• Piping penetrations
• Piping run obstructions
• Homeowner requirements
  – Limited number / location of suction holes
  – Blower locations
  – Discharge vent locations
Preparatory Work: Sealing Basement Walls

Crumbling high lime mortar fieldstone walls before parge coat

View of the fieldstone walls after a parge coat has been applied
Preparatory Work: Sealing Basement Slabs

Concrete slab, pre-work

Concrete slab, during demolition (also visible are the fieldstone walls)

Newly installed concrete slab (also visible are the newly parged walls)
Preparatory Work: Sealing Utility Penetrations

View of a piping penetration in need of sealing

View of a sealed piping penetration
Pilot Testing

- Pilot testing suction holes and monitoring points were reviewed with the homeowner before the pilot test
- Materials used for Pilot Testing
  - Core Drill
  - Sealants
  - Pilot testing apparatus (provides various suction / flow values)
  - Micromanometer (reads pressure differentials)
  - Temporary exhaust

Views of the pilot testing apparatus and the temporary exhaust piping
Design & Homeowner Approval

Pilot Testing Data Analysis

Design signed with homeowner approval
Installation

Excavation of a horizontal suction hole

Placement of underground SSD piping prior to pouring a new basement slab

Excavation of a vertical suction hole

Placement of SSD piping into the ceiling rafters
Installed Piping

View of a newly installed vapor barrier membrane and SSD suction piping

View of hidden SSD piping in a closet

View of hidden SSD piping in a closet (in the drop ceiling)

View of a newly poured concrete crawlspace slab and SSD suction piping

View suction piping (both for the main slab and a crawlspace)
Installed SSD Components

Views of exterior SSD system components; covered GP501 fans, on/off switches, downspouts, and exhaust vent caps

View of exterior SSD system components; a GP501 fan, on/off switch, downspout, and exhaust vent cap

View of two SSD monitoring systems

Close-up view of exterior SSD system components
CTDEP “Comfort Letter”

- (Appendix E)
- System installed to address potential problem
- System will effectively eliminate vapor from soil gas entering indoor air when system is operated

Example of a CTDEP Comfort Letter
Operation & Maintenance

- (Appendix F)
- State will maintain the system(s) for as long as the ground water contamination requires system operation
- Homeowner monitors the system(s) and provides electricity
- Letter identifies who to call with questions or problems

Example of a Maintenance Agreement
Operation & Maintenance … continued

- Views of icing build-up on SSD fans
- Views of broken exhaust piping
- View of a Fire Collar installed to maintain fire code at the apartment buildings
### Property Values

#### PRE-October Announcement

<table>
<thead>
<tr>
<th>Address</th>
<th>Sale Price</th>
<th>Date of Listing</th>
</tr>
</thead>
<tbody>
<tr>
<td>498 Housatonic Ave</td>
<td>$585,000.00</td>
<td>1-18-03</td>
</tr>
<tr>
<td>550 Housatonic Ave</td>
<td>$375,000.00</td>
<td>7-26-03</td>
</tr>
<tr>
<td>338 Housatonic Ave</td>
<td>$700,000.00</td>
<td>7-26-03</td>
</tr>
<tr>
<td>600 Housatonic Ave</td>
<td>$485,000.00</td>
<td>8-9-03</td>
</tr>
<tr>
<td>100 Riverview Place</td>
<td>$205,000.00</td>
<td>9-6-03</td>
</tr>
<tr>
<td>96 Homestead Ave</td>
<td>$200,000.00</td>
<td>9-13-03</td>
</tr>
<tr>
<td>178 Housatonic Ave</td>
<td>$502,000.00</td>
<td></td>
</tr>
<tr>
<td>415 Housatonic Ave</td>
<td>$340,000.00</td>
<td>2-21-04</td>
</tr>
</tbody>
</table>

#### POST-October Announcement

<table>
<thead>
<tr>
<th>Address</th>
<th>Sale Price</th>
<th>Date of Listing</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 Burr Ave</td>
<td>$290,000.00</td>
<td>6-5-04</td>
</tr>
<tr>
<td>252 Housatonic Ave</td>
<td>$580,000.00</td>
<td>7-3-04</td>
</tr>
<tr>
<td>509 Housatonic Ave</td>
<td>$245,000.00</td>
<td>7-3-04</td>
</tr>
<tr>
<td>481 Housatonic Ave</td>
<td>$362,000.00</td>
<td>7-24-04</td>
</tr>
<tr>
<td>348 Housatonic Ave</td>
<td>$600,000.00</td>
<td>Not listed. (Hear Say)</td>
</tr>
<tr>
<td>89 Riverview Place</td>
<td>$244,500.00</td>
<td>11-27-04</td>
</tr>
<tr>
<td>472 Housatonic Ave</td>
<td>$855,000.00</td>
<td>12-11-04</td>
</tr>
</tbody>
</table>
THANK YOU

ANY QUESTIONS?