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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



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Introduction

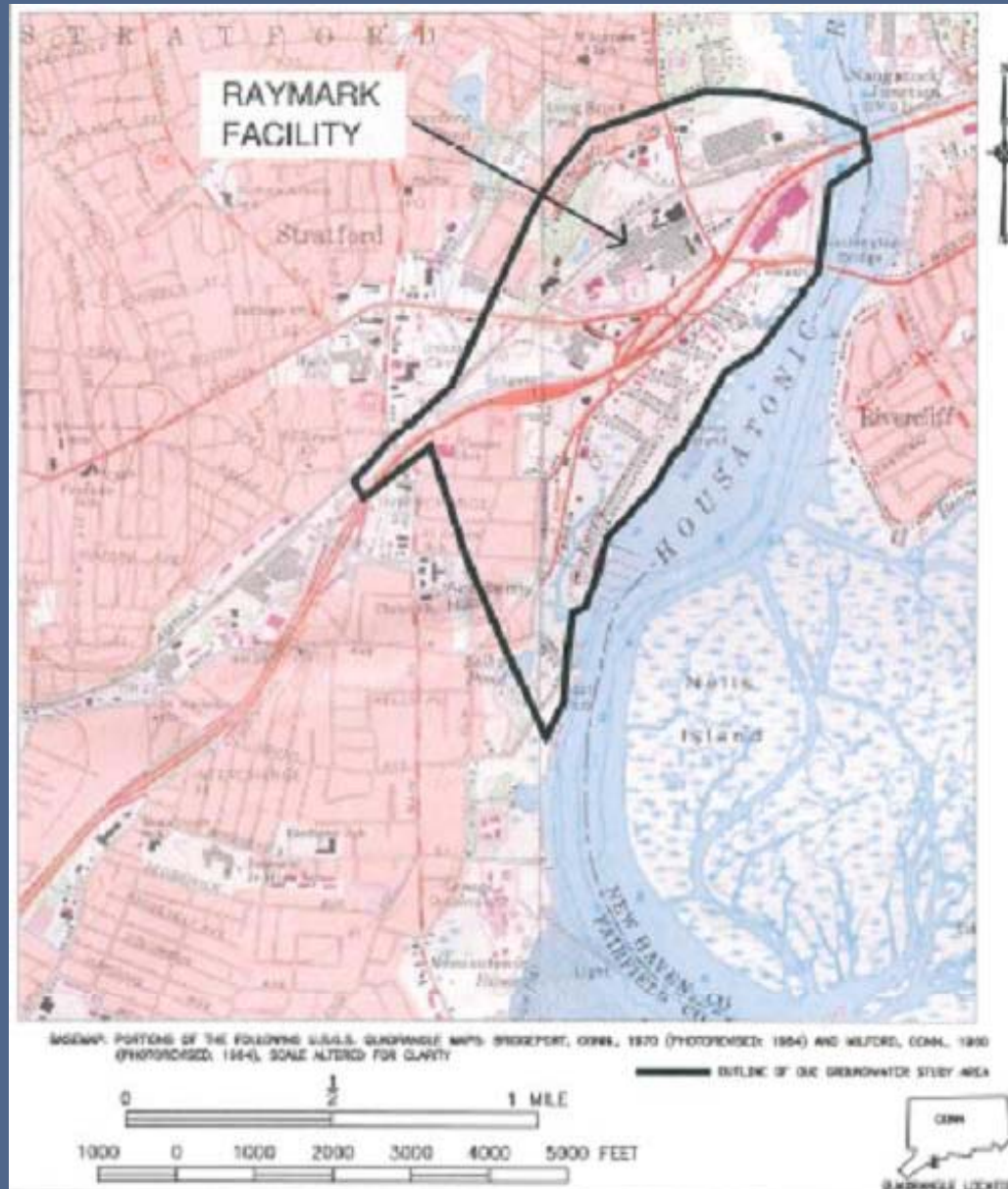
- Time Critical Removal Action for Vapor Mitigation
 - This work was part of a CT DEP and EPA response action to prevent soil gas potentially contaminated with low levels of volatile organic compounds (VOCs) from entering homes in a neighborhood adjacent to the Raymark NPL Site.
 - The VOCs are attributed to a groundwater plume from historic discharges of chlorinated volatile organic compounds (CVOC) and other substances at the nearby Raymark factory site.



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Study Area





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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 effected homes

HEALTH CONSULTATION

Evaluation of Indoor Air, Soil Gas and Groundwater Data
Sampling Phases 2, 3 and 4 (2001, 2002, 2003)

RAYMARK INDUSTRIES, STRATFORD, FAIRFIELD COUNTY, CONNECTICUT

EPA Facility Id. CTD001186618

August 15, 2003

Prepared by
The Connecticut Department of Public Health
under cooperative agreement with
The Agency for Toxic Substances and Disease Registry



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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.



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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

Home Summary Information for SSD System Installation

A. General Information

M&E Staff: _____

Address: _____

Survey Date: 1/3/03 Survey Time: 3:30 pm - 5:15 pm

Occupant/Owner: _____ Phone Number: _____

Work Number: _____ Other Contact: _____

Days / Times Available for Pilot Testing / System Installation: _____

If the Occupant is NOT the homeowner, the homeowner contact information is: Ask for Sissy

Electrical: 200 amp service
* No free slabs.

B. Building Characteristics

Type of Building: Single Family - Multiple Family (how many? _____) - Commercial - School -
(circle one) Other _____

Style of House: Ranch - Raised Ranch - Cape - Colonial - Split Level - Mobile Home -
(circle one) 2-Family - Duplex - Apartment House (# of apts _____) - Condominium (# of units _____) -
Other _____

Number of Occupants: 5 Number of Occupied Floors: 2

Has the building been renovated from the original construction? Yes

Does the building have any additions? If yes how many? Describe. Yes large addition off
back of house w/ full basement, larger than orig house & on a
separate slab.

E:\200404 (Raymond SSD FAX03)\template forms - link.html\Survey Form.doc 1 of 4



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Flooring Issues



Concrete floors with holes, cracks, and gaps



Dirt Floors



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Wall Issues



Deep gaps in in the fieldstone walls



Crumbling high lime mortar in the fieldstone walls



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Wall Issues... Continued.



Block Walls



Finished Basement Walls



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Occupied Spaces



Basements used for hobbies



Lived in basements



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Multiple Slabs (Additions / Crawlspaces)



Multiple slabs were encountered at larger homes with additions



Dirt floor crawlspaces and concrete crawlspaces (as pictured above) were encountered



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Larger Structures (Apartments)





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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.



**View of a home
with a traditional
Radon System**

**View of the home
with the Engineered
SSD System**





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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



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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



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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)



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Preparatory Work: Sealing Utility Penetrations



View of a piping penetration in need of sealing



View of a sealed piping penetration



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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

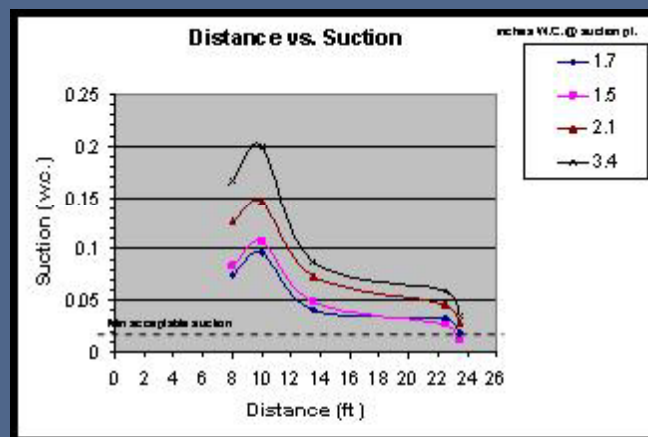
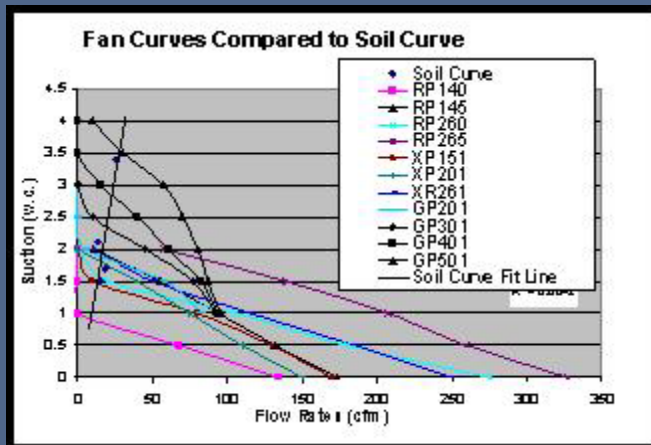




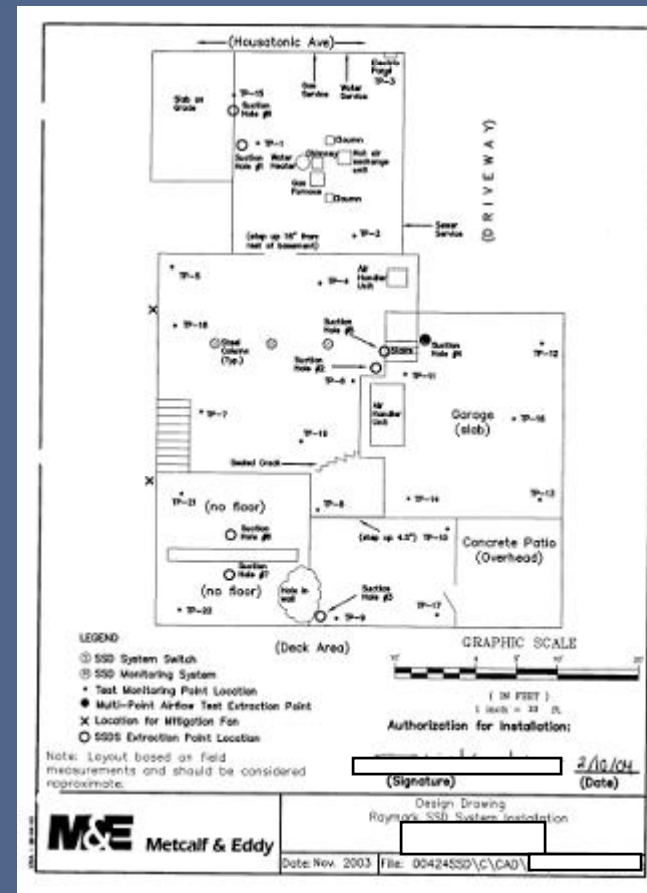
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Design & Homeowner Approval



Pilot Testing Data Analysis



Design signed with homeowner approval



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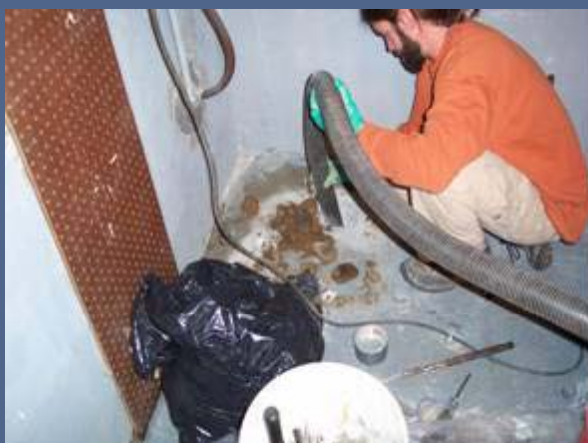
Installation



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



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Installed Piping



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



**View suction piping
(both for the main slab
and a crawlspace)**



**View of hidden
SSD piping in a
closet**



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

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





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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





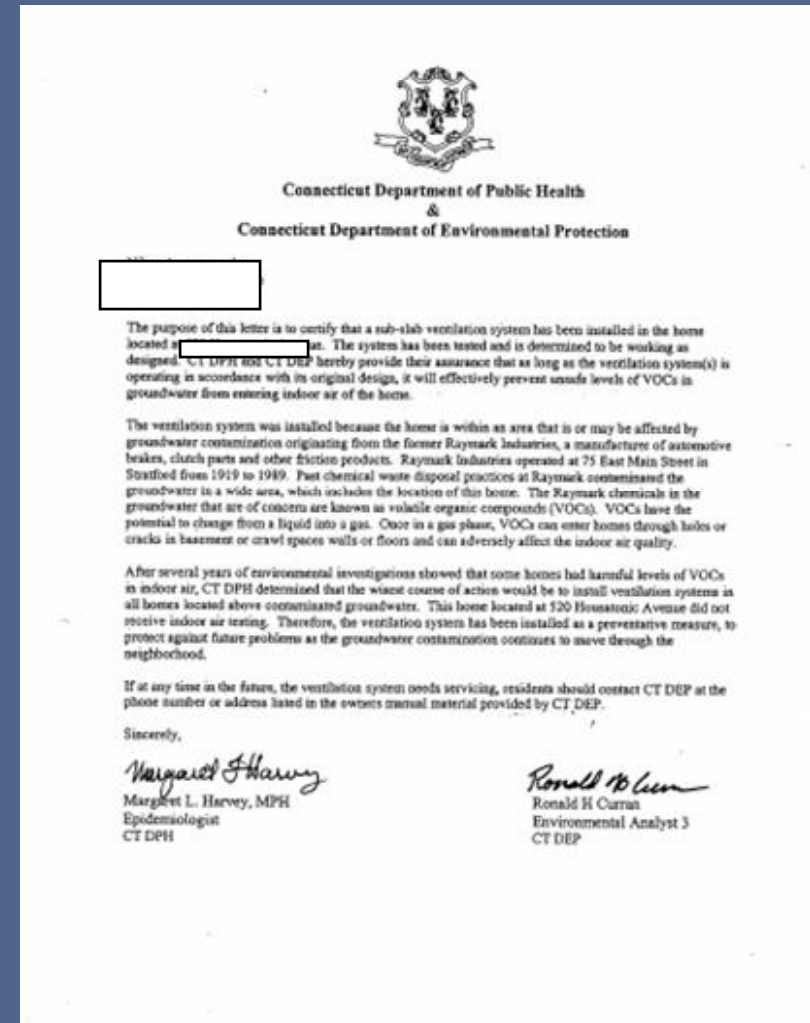
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CTDEP “Comfort Letter”

- (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**







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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**

 **STATE OF CONNECTICUT**
DEPARTMENT OF ENVIRONMENTAL PROTECTION 

June 9, 2004

[Redacted Address]

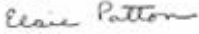
RE: Maintenance of the Sub-Slab Ventilation System

Dear [Redacted Name]:

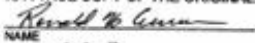
As you are aware, the Connecticut Department of Environmental Protection (CTDEP) has installed a sub-slab ventilation system at your property located at [Redacted Address], Stratford, as part of the Raymark Superfund Project. During the Raymark investigation, groundwater contaminated with volatile organic compounds from the Raymark site was identified in this area. The sub-slab ventilation system will intercept volatile organic vapors that may be migrating from the groundwater and directs these vapors harmlessly to the outside atmosphere. The sub-slab ventilation systems consist of piping and blowers. The system creates a negative pressure under the building slab thus preventing these volatile organic compounds from entering your home.

This letter is to advise you that the DEP will maintain the blower portion of the system for as long as the groundwater conditions require the system's operation. If for any reason the blower is not operating you should contact Ronald Curran of my staff at (860) 424-3764. Mr. Curran will make arrangements for the repair or replacement of the blower.

If you have any questions about the sub-slab ventilation system or if you have any problems with the blower portion of the system please contact Ronald Curran or you may contact the Remediation Program at (860) 424-3705.

Sincerely,

Elaine Patton
Director
Planning & Standards Division
Waste Management Bureau

EP/vha
cc: E. O'Keefe (Stratford DOH)
B. Mah (US EPA)

I CERTIFY THAT THIS DOCUMENT
IS A TRUE COPY OF THE ORIGINAL.

NAME
EPA-3
TITLE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

(Printed on Recycled Paper)
79 Elm Street • Stratford, CT 06108-3127



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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





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Property Values

PRE-October Announcement

ADDRESS	SALE PRICE	DATE OF LISTING
498 Housatonic Ave	\$585,000.00	1-18-03
550 Housatonic Ave	\$375,000.00	7-26-03
338 Housatonic Ave	\$700,000.00	7-26-03
600 Housatonic Ave	\$485,000.00	8-9-03
100 Riverview Place	\$205,000.00	9-6-03
96 Homestead Ave	\$200,000.00	9-13-03
178 Housatonic Ave	\$502,000.00	
415 Housatonic Ave	\$340,000.00	2-21-04

POST-October Announcement

ADDRESS	SALE PRICE	DATE OF LISTING
29 Burr Ave	\$290,000.00	6-5-04
252 Housatonic Ave	\$580,000.00	7-3-04
509 Housatonic Ave	\$245,000.00	7-3-04
481 Housatonic Ave	\$362,000.00	7-24-04
348 Housatonic Ave	\$600,000.00	Not listed. (Hear Say)
89 Riverview Place	\$244,500.00	11-27-04
472 Housatonic Ave	\$855,000.00	12-11-04



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THANK YOU



ANY QUESTIONS?