Vapor Intrusion in St. Louis Park: A Public Health Perspective

Minnesota State Bar Association,
Environmental, Natural Resources and
Energy Law Section

December 4, 2008

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Minnesota Department of Health

Background

- Early 00's: routine sampling of Edina city wells shows low levels of vinyl chloride
- MPCA initiates investigation to locate source(s)
- Investigation eventually leads to an area of VOC contamination in shallow groundwater in St. Louis Park
- Concerns over size of VOC plume and potential for vapor intrusion led MPCA to request EPA assistance in assessment
- EPA initiates Emergency Removal Assessment

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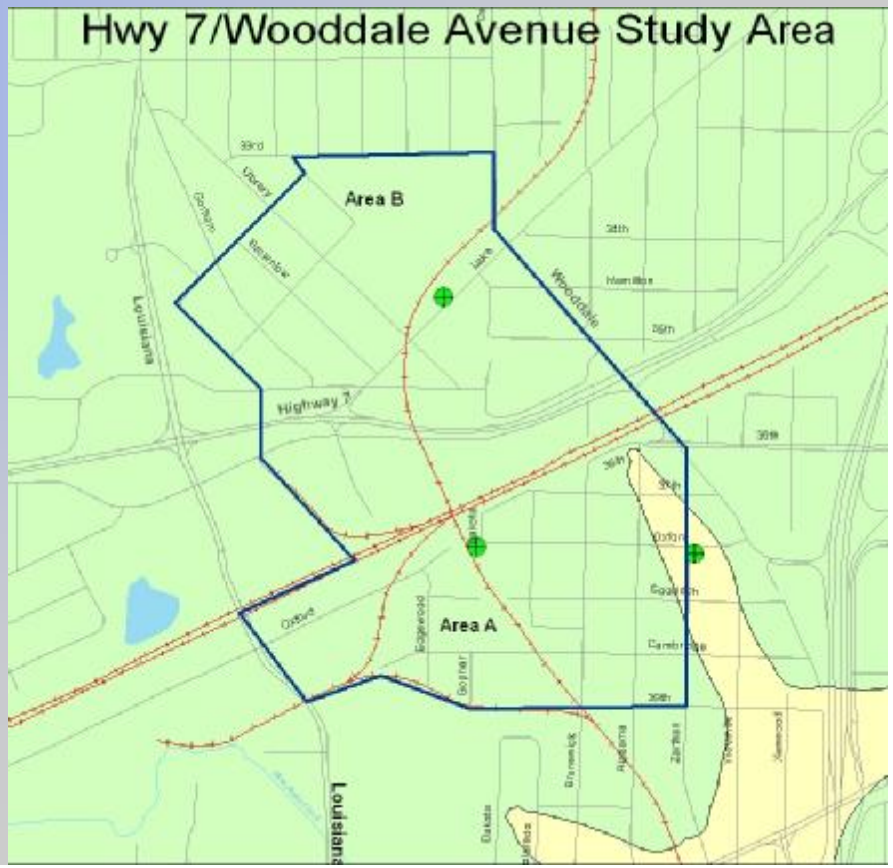
Background, cont'd

A Study Area was defined that contained:

- Hundreds of homes
- Two schools
- Houses of Worship
- Several day care facilities
- Dozens of businesses
- Multiple potential sources



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Target VOCs: Highway 7 & Wooddale Ave Vapor Study

- Tetrachloroethylene (PCE)
- Trichloroethylene (TCE)
- Vinyl chloride
- cis and trans 1,2-dichloroethene
- 1,1-dichloroethane
- 1,1-dichloroethene
- 1,1,1-trichloroethane
- Benzene
- Napthalene and 2-methylnapthalene
- 1,2,4- and 1,3,5-trimethylbenzenes

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The Process

- EPA, MPCA, MDH met with City of St. Louis Park staff late summer 2008 to discuss the site and pending vapor assessment
- MDH requested to develop screening levels for sub-slab vapor and indoor air
  - This was prior to issuance of MPCA ISVs
- MDH requested to assist with community outreach and education
  - Press events
  - Community meetings planned for Dec. 2007
  - Meetings with individual residents

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MDH's Mission

To protect, maintain and improve the health of all Minnesotans

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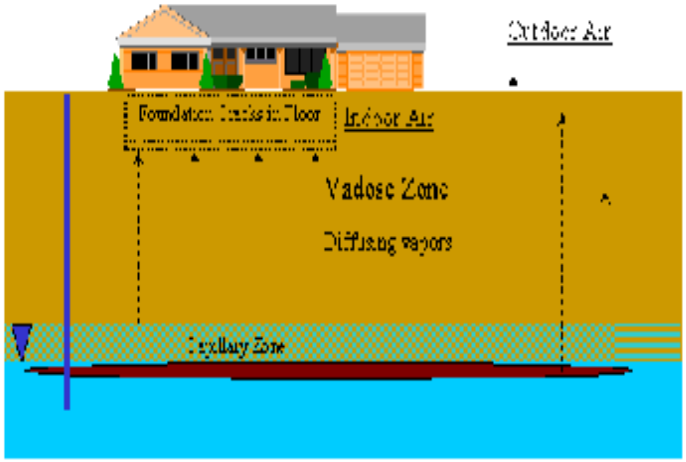
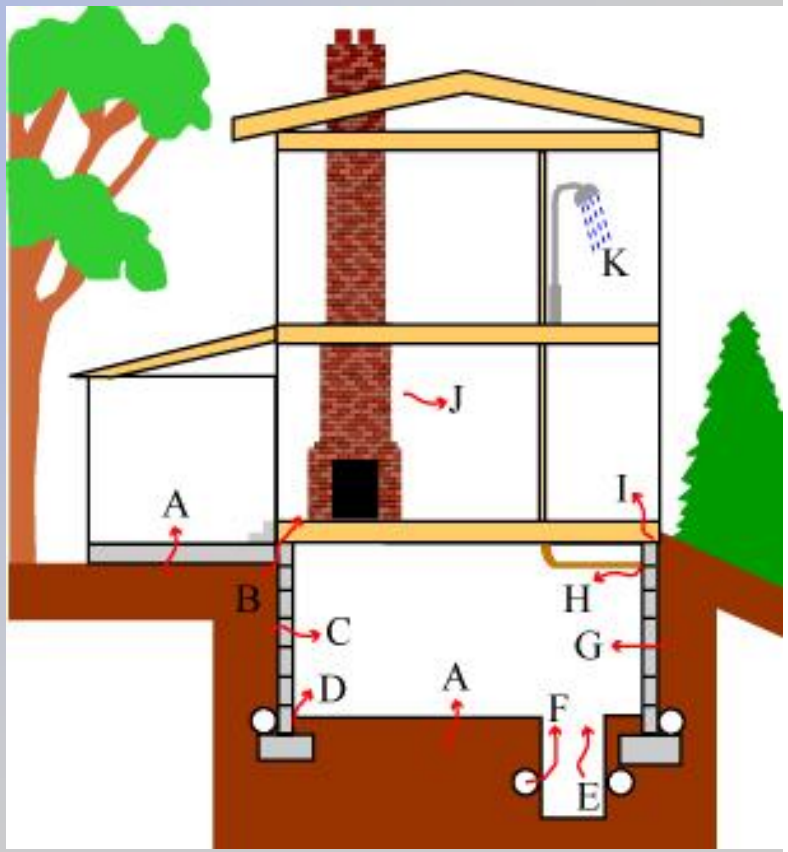
EPA/MPCA vs MDH Roles

Outside: EPA/MPCA



Inside: MDH



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MDH Recommended Screening Levels

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Protecting, maintaining and improving the health of all Minnesotans

December 18, 2007

Sonia R. Vega
U.S. Environmental Protection Agency
Emergency Response Branch
520 Lafayette Road N.
St. Paul, MN 55155

Dear Ms. Vega,

Per your recent request, below are the recommendations of the Minnesota Department of Health (MDH) for health-based values for the evaluation of sub-slab soil gas and indoor air samples collected for the Highway 7 – Wooddale Ave Soil Vapor Study in St. Louis Park, Minnesota. The health-based values are for a number of volatile organic compounds (VOCs) that have been identified as target compounds for the study. The target compounds include:

- cis-1,2-dichlorothene (cis-1,2-DCE)
- trans-1,2-dichloroethene (trans-1,2-DCE)
- 1,1-Dichloroethane (1,1-DCA)
- 1,2-Dichloroethene (1,1-DCE)
- 1,1,1-Trichloroethane (1,1,1-TCA)
- Tetrachloroethylene (PCE),
- Trichloroethylene (TCE)
- Vinyl chloride
- Benzene
- Napthalene
- 2-methylnapthalene
- 1,2,4-Trimethylbenzene
- 1,3,5-Trimethylbenzene

The Highway 7 – Wooddale Ave Soil Vapor Study is designed to evaluate the potential for soil vapor intrusion into residential and commercial structures in the study area. VOCs have been identified in shallow groundwater in the area, and soil vapor samples have indicated the presence of VOCs at elevated levels in some locations. Because of the size of the study area and the number of single family homes, the Minnesota Pollution Control Agency (MPCA) has referred the site to the EPA to implement the investigation.

The recommended health-based values are based on the understanding that if soil vapor intrusion is found to be occurring, exposures to the target chemicals could have occurred for some time, and removal of the VOCs from the contaminated aquifer will not occur in the near future. As a result, long-term (sub-chronic or chronic) screening values are generally more appropriate than short-term (acute) screening values and therefore are the values that have been applied. The values in Table 1 are designed primarily for residential scenarios, where exposure could be continuous and long-term. MDH also recommends that these screening values be used for schools, day care centers, or other commercial structures where children or other potentially sensitive subpopulations spend a large part of their day. These screening values are considered to be health protective by MDH and ATSDR.

Table 1: Recommended Values for Residential Structures/Schools

Residential	Short-Term Action Level: Indoor Air		Short Term Action Level: Sub-slab Vapor		Long-Term Screening Level: Indoor Air		Long-Term Screening Level: Sub-slab Vapor	
Chemical	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv	ug/m^3	ppbv
cis-1,2-DCE	800	200	8000	2,000	35	10	350	100
trans-1,2-DCE	800	200	8000	2,000	70	20	700	200
1,1-DCA					500	125	5,000	1,250
1,1-DCE	80	20	800	200				
1,1,1-TCA	4,000	700	40,000	7,000	1,000	200	10,000	2,000
PCE c	1,000	145	10,000	1,450	20	3	200	30
TCE c	700	100	7,000	1,250	3	0.5	30	5
Vinyl chloride c	80	30	800	300	1	0.4	10	4
Benzene c	20	6	200	60	3	1	30	10
Napthalene	200	35	2,000	350	9	2	90	20
2-methylnapthalene					70	12	700	120
1,2,4-TMB					6	1	60	10
1,3,5-TMB					6	1	60	10

c = long-term screening level based on cancer risk
ug/m^3 = micrograms per cubic meter of air
ppbv = parts per billion per volume of air

Short-term action levels for indoor air are derived from ATSDR intermediate Minimal Risk Levels[1] (MRLs), designed to evaluate exposures from >14 to 364 days (note that the PCE value is an acute MRL, while the naphthalene value is an acute MDH Health Based Value[2]). These are intended to be levels that would trigger quick action to reduce exposure, such as increased ventilation, rapid installation of a sub-slab depressurization system, or some other rapid response action. An exceedance of these values does not necessarily mean that the home or structure is unsafe for occupancy, only that response actions should be expedited. These screening values represent a conservative approach.

Long-term screening levels for indoor air are derived from a combination of sources, including EPA vapor intrusion criteria[3], MDH chronic Health Risk Values[4] and Health

MDH's Public Health Messages to the Community

- Focus on exposure pathways
- MDH screening values are very protective – even if exceeded the risk is still very low.
- If there is a problem, mitigation systems are inexpensive and easy to install and operate.
- Mitigation systems are effective at reducing or preventing vapor intrusion – and also prevent infiltration of naturally occurring radon gas – the second leading cause of lung cancer in the U.S.
- Individual interpretation of results

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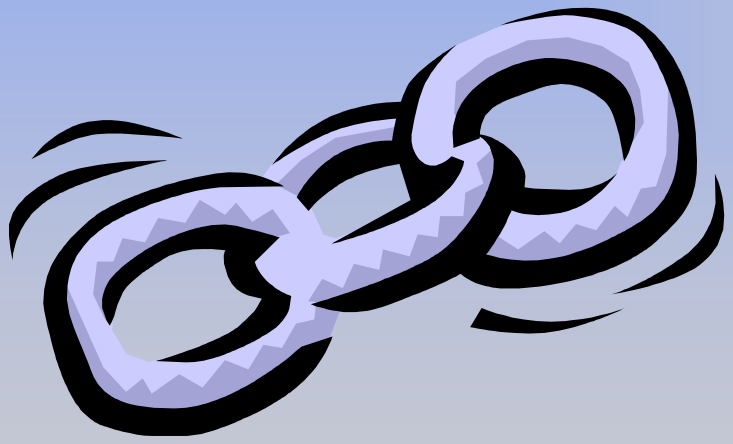
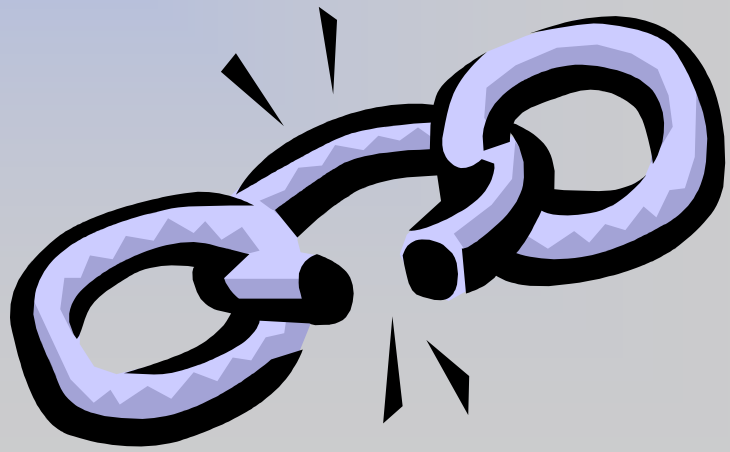
Exposure Pathway

Groundwater → Soil Vapor →

Sub-slab Vapor → Indoor Air





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Some Thoughts on Why this Project was a Success…

- Proactive in nature
- Close cooperation between federal, state, and local government
- Rapid action taken to identify and mitigate real and potential exposures
- Personal touch – one on one meetings in the home to discuss elevated results
- Exposures were relatively minor, and risks were relatively low

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In the Future…..

- Process should be easier now that MPCA has issued guidance
- Intrusion Screening Values (ISVs) are also very useful
- Consultants, lenders and attorneys becoming more familiar with the issue
- Radon-resistant construction practices becoming more common

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http://www.health.state.mn.us/divs/eh/hazardous/ index.html

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