

# OVERVIEW OF DEQ ENVIRONMENTAL INVESTIGATION

NORTH AND DOWNTOWN  
CASPER PCE PLUMES  
ORPHAN SITE

February 18, 2010

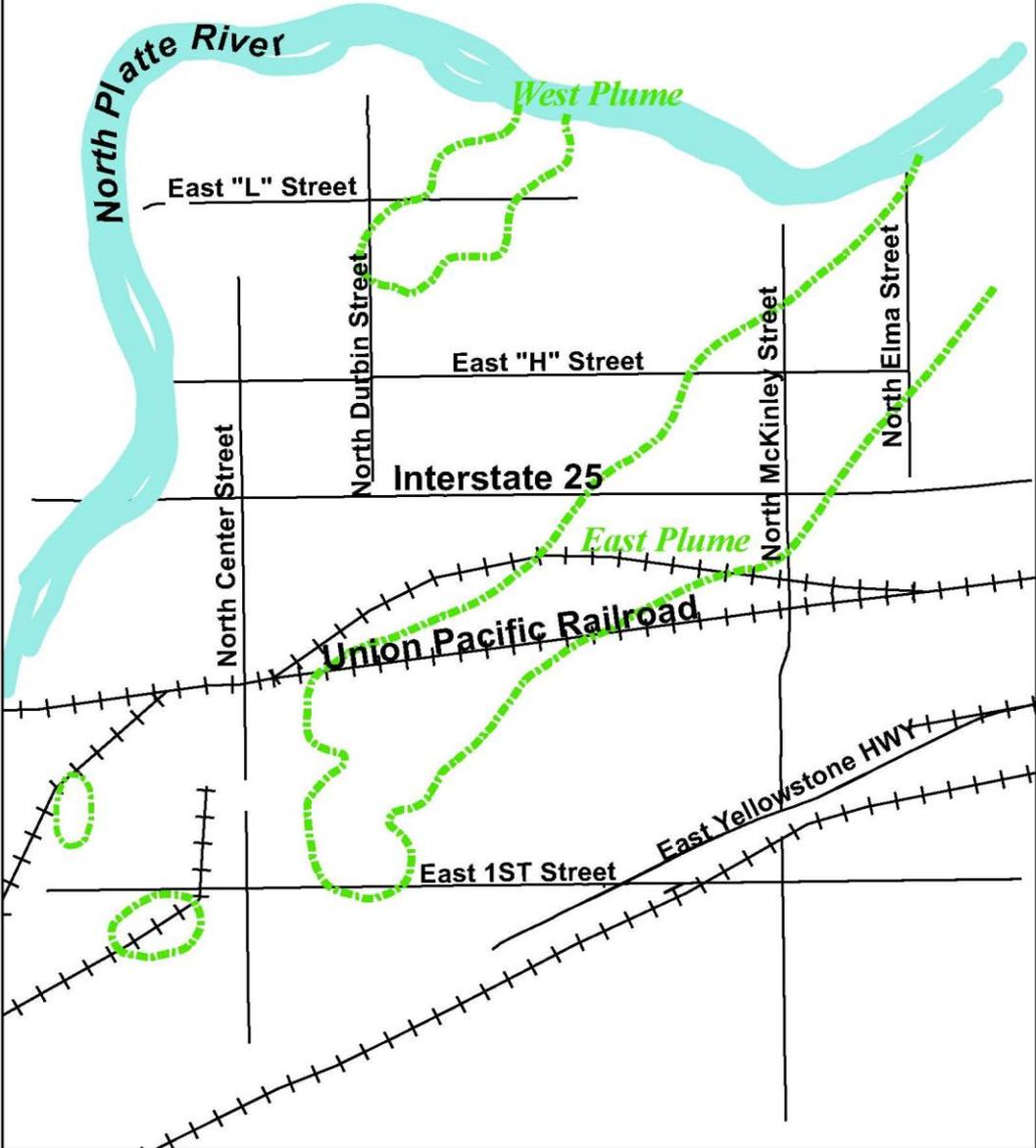
# DEQ Overview

- Orphan Site Remediation Law enacted in 2000 (Article 17 of the Environmental Quality Act)
- In 2005, DEQ developed *quantitative* ranking criteria and ranked the list of potential orphan sites
- In 2007, DEQ developed *qualitative* ranking criteria and ranked the list of potential orphan sites
- In 2009, a portion of the Abandoned Mine Lands funding was designated for orphan site remediation
- DEQ began investigation of top four priority sites

# Site History

- Numerous environmental investigations conducted in the 1980's & 1990's
- Agency for Toxic Substances and Disease Registry (ATSDR) conducted numerous health consultations in the 1990's
  - Classified the North Casper PCE Plume Site as **No Apparent Public Health Hazard**
- DEQ listed Casper PCE Plumes as Orphan Sites

Casper Investigation Areas



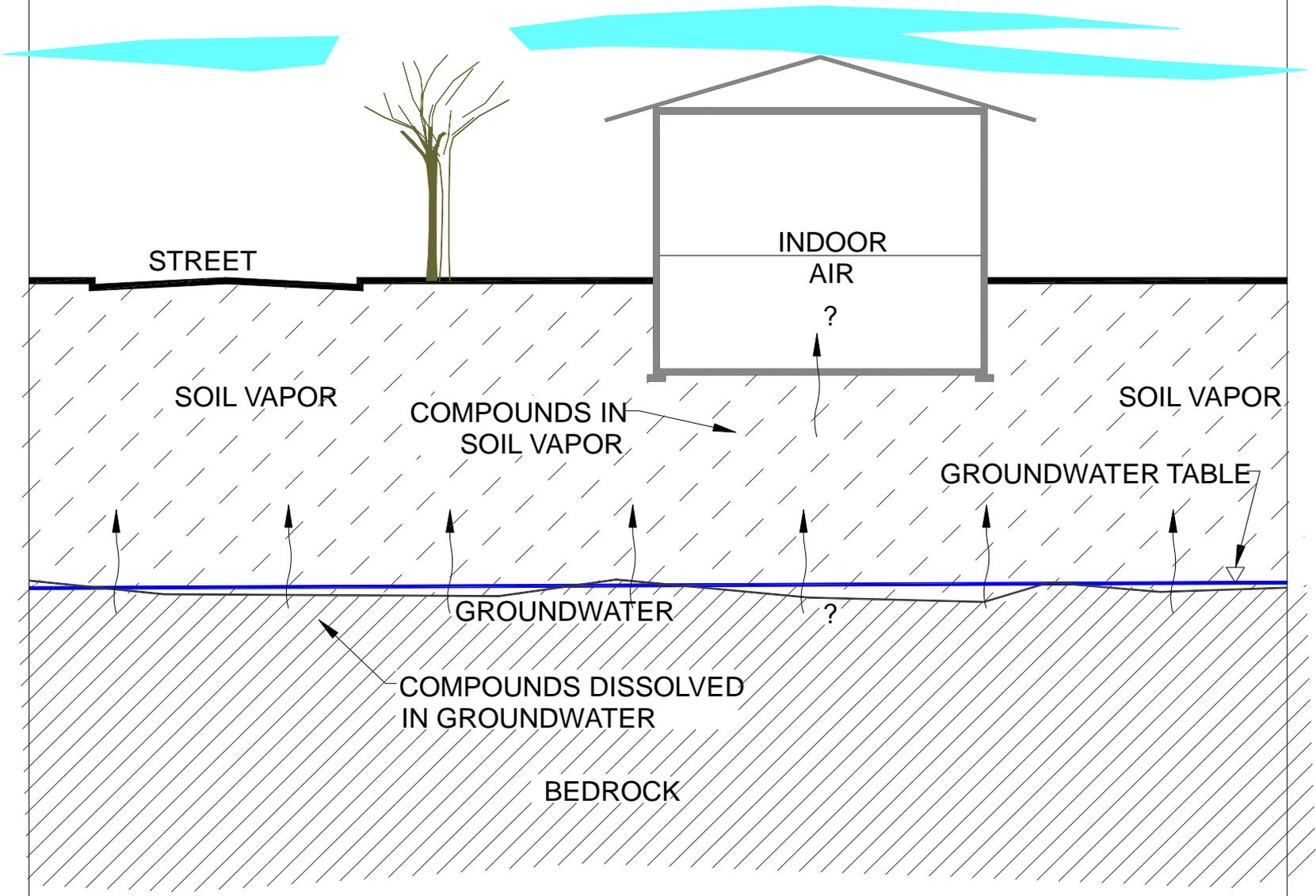
# Perchloroethylene (PCE)

- Numerous commercial and industrial uses including:
  - Historic metal degreasing operations
  - Historic dry cleaning operations
- Leaks and spills from tanks

# Investigation Objectives

- Is groundwater still impacted?
- What is the extent and concentration in groundwater and soil gas?
- What is the potential for indoor air impacts (vapor intrusion)?
- Is private well water impacted?

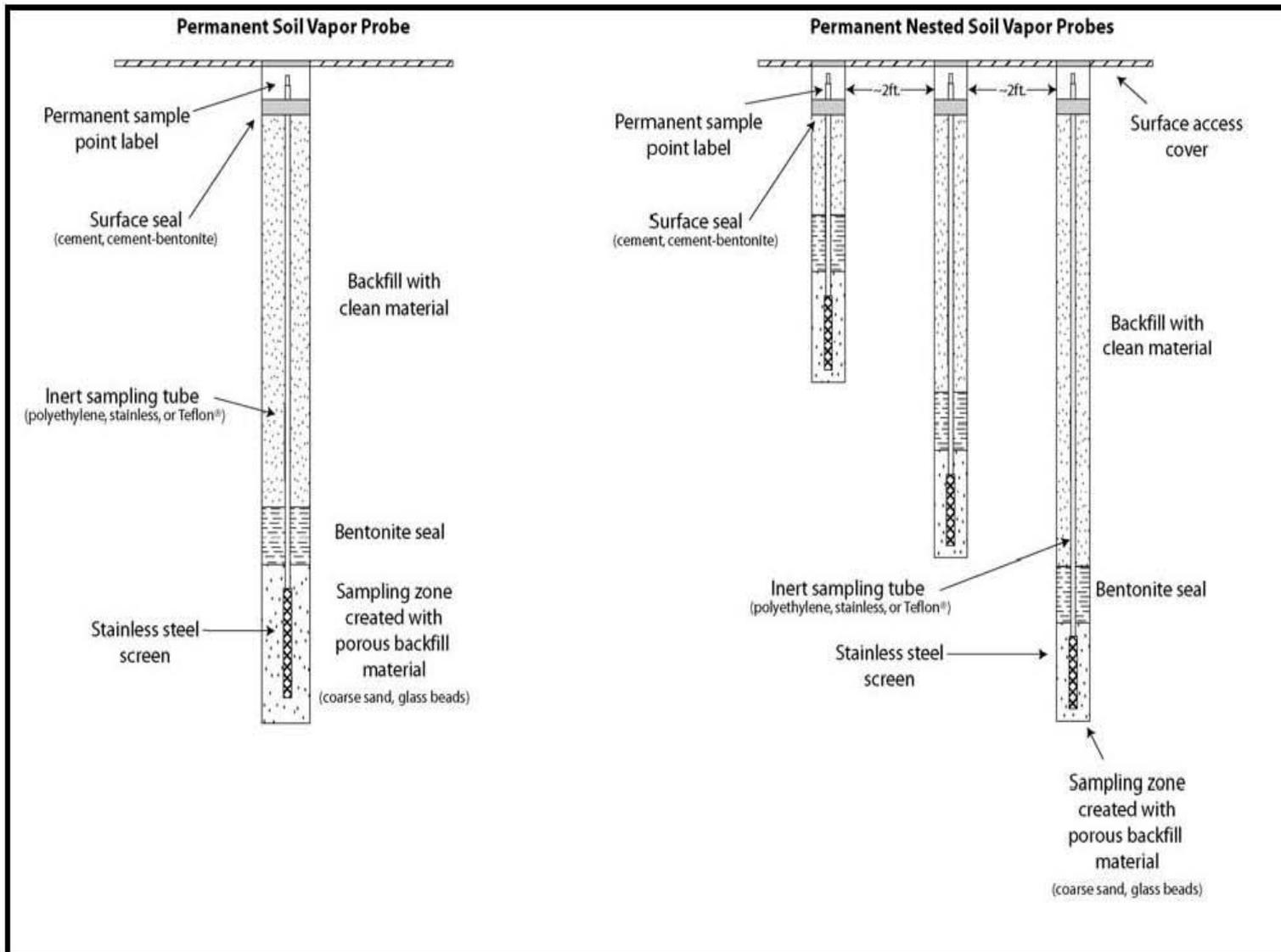
# MOVEMENT OF COMPOUNDS FROM GROUNDWATER INTO SOIL VAPOR



# 2009 Investigation

- Sampled 8 existing monitoring wells and 1 private well
- Installed and sampled 10 shallow and 3 deep monitoring wells
- Installed and sampled 40 shallow (5 ft) soil gas points (approximately every block)
- Analyzed soil gas for PCE & TCE with mobile laboratory

# Soil Vapor Probe



# Investigation Results for Groundwater

- Essentially all (12) of the groundwater samples from the main “East Plume” had PCE > Federal Drinking Water Standard
- 2 of the 4 samples from the North Casper “West Plume” were above the Drinking Water Standard for PCE
- Drinking Water is generally supplied by the City and is not derived from groundwater
- Groundwater samples from two small SW plumes had PCE below detection

# Investigation Results for Soil Gas

- Soil gas is derived from evaporation of PCE & TCE from the groundwater surface
- Soil gas represent vapor that can impact indoor air
- About half of the 26 soil gas samples in the main “East Plume” had PCE levels above the DEQ screening level
- More than half of the 8 soil gas samples in the North Casper “West Plume” had PCE levels above the DEQ screening level

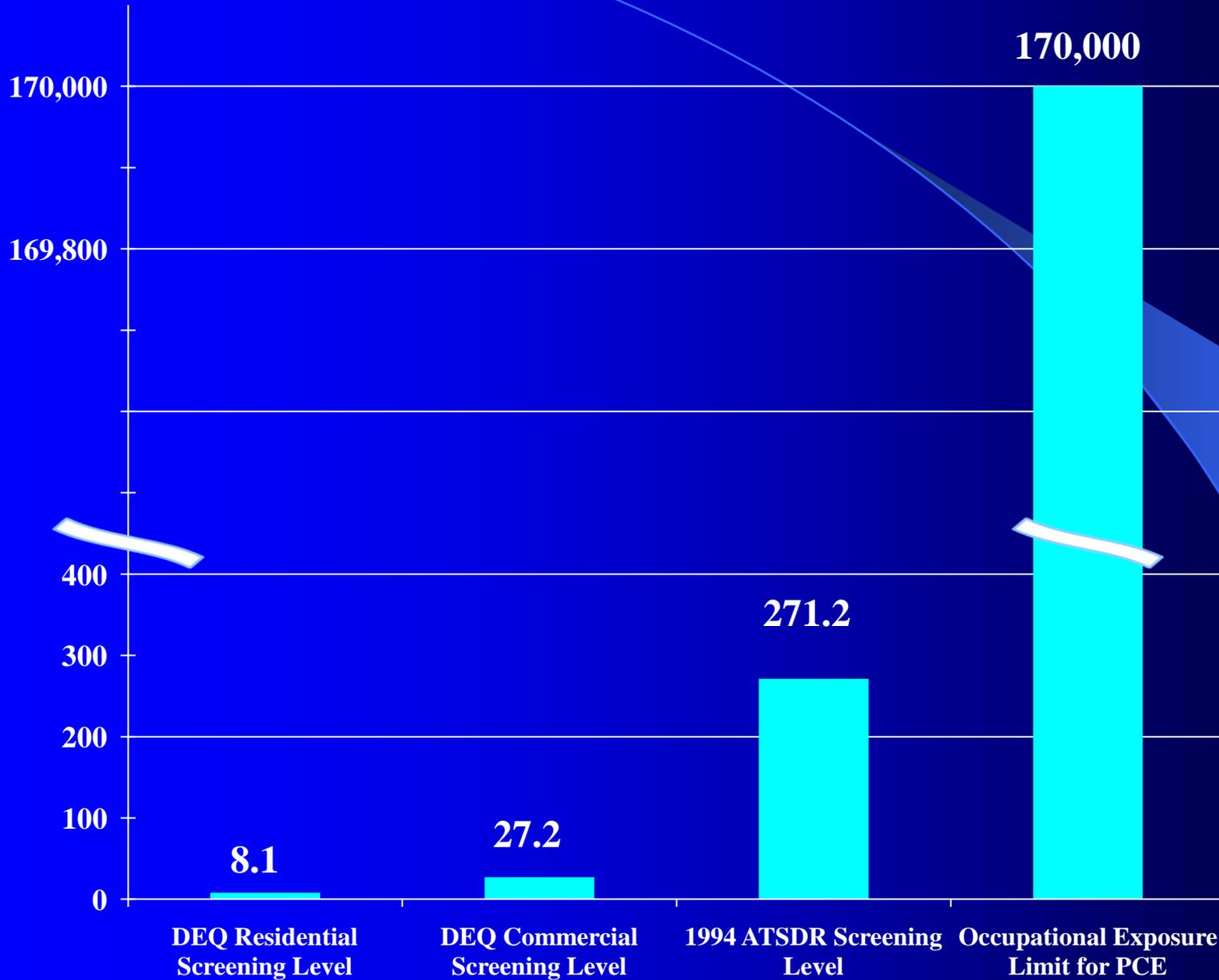
# DEQ Next Steps

- Offer to test and/or install ventilation systems in single family homes over impacted groundwater/soil vapor plume
- Indoor air and sub-slab vapor testing in businesses
- Indoor air testing in homes and businesses around the periphery of the high concentration portion of the soil gas plume
- No action required for buildings outside test area
- Test private wells

# PCE in Indoor Air

- Residential Screening Level =  $8.1 \text{ ug/m}^3$
- Commercial Screening Level =  $27.2 \text{ ug/m}^3$
- Ventilation Offered
- Laboratory Reporting Limit =  $0.68 \text{ ug/m}^3$   
(lowest level that can be measured)

# Important Levels for PCE in Indoor Air (ug/m<sup>3</sup>)



# Canister Tests



- Vacuum
- Lowest Living Space
- 24 Hour Residential Test
- 8 Hour Commercial Test

*Courtesy of Entech  
Instruments, Inc.*

# Indoor Air Testing Requirements

- No Dry Cleaned items brought into building for at least 2 weeks before testing
- Chemical inventory near sampling locations
- Resident questionnaire

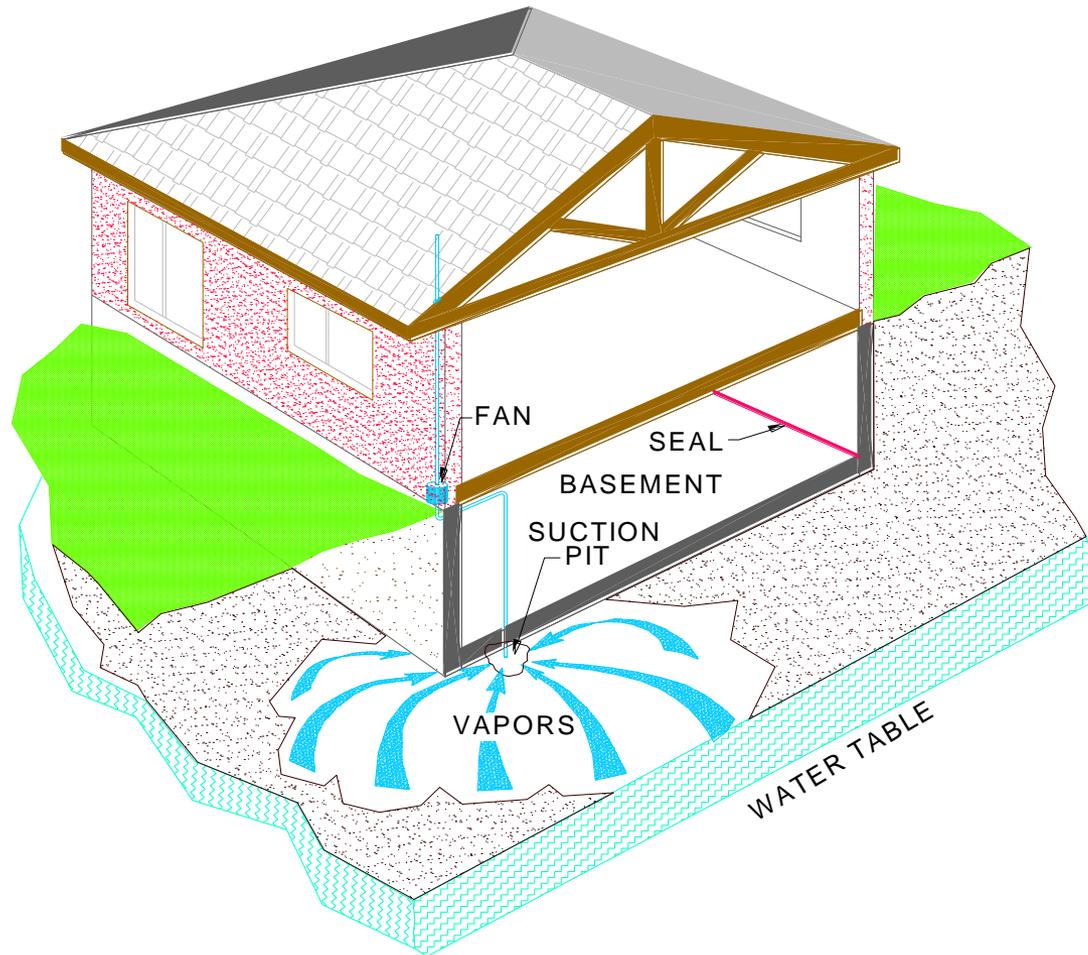
# Sub-slab Vapor Sampling

- Small diameter (1 inch) hole drilled through building slab
- Tubing installed to collect soil gas sample from just beneath the slab
- Canister sample similar to indoor air sample
- Measures vapors directly beneath the building; these vapors have a potential to enter indoor air
- Hole patched after completion of test

# Ventilation Systems

- Sub-slab depressurization (SSD) systems
- Sub-membrane depressurization (SMD) systems for crawl spaces
- Sump ventilation systems

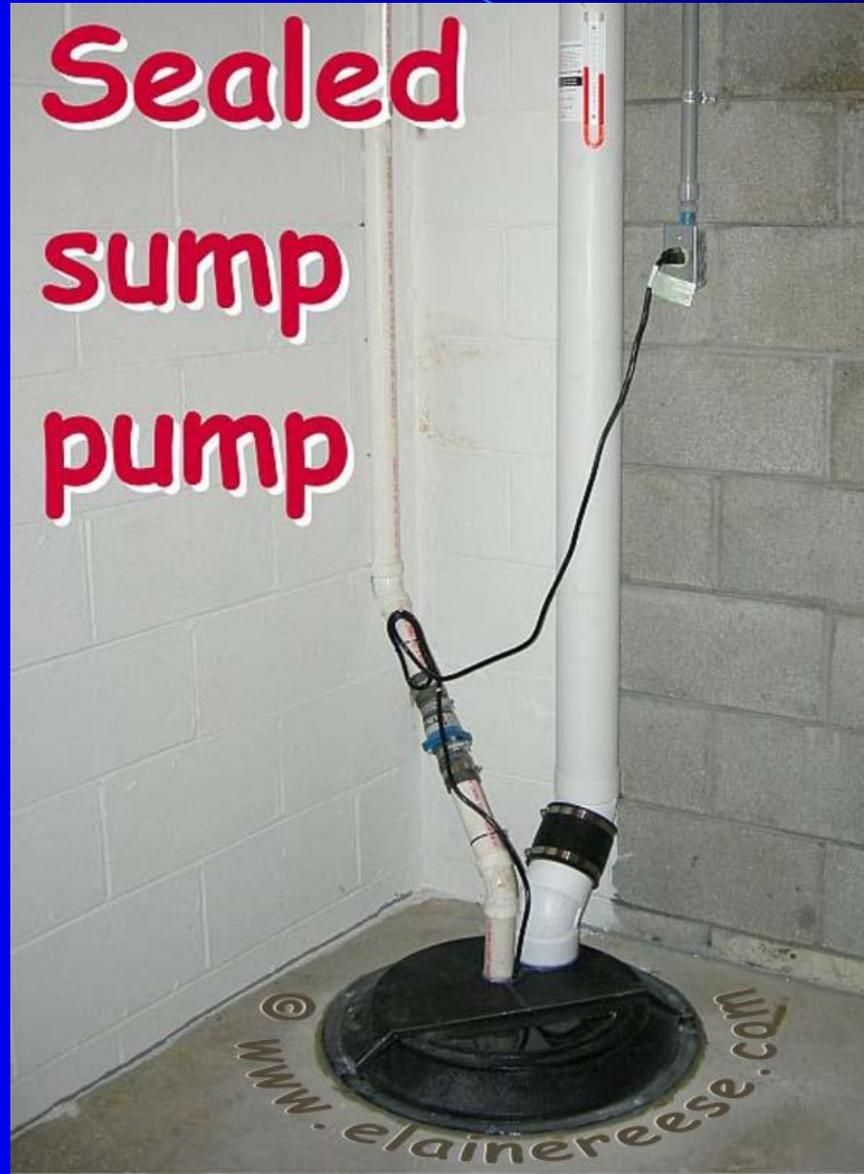
# SSD (BASEMENT) SYSTEM



# Sub-membrane System



# Sump Ventilation



# External Appearance



# Timing of Next Steps

- Obtain permission to do venting for select homes and testing for other homes and businesses
- **Access agreement/Easement must be signed/notarized**
- Indoor air testing this winter heating season
- Residential ventilation system installation within six weeks of homeowner request
- Inventory and test private wells

# DEQ Long-Term Goals

- To Protect Human Health and the Environment
  - Cleanup groundwater to levels that will not create unacceptable indoor air risks
  - Cleanup groundwater to meet drinking water standards
  - Remove Sources of Contamination

# More Information

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