NAVFAC MID-ATLANTIC

Restoration Advisory Board (RAB) Meeting

GM-75 Groundwater Investigation Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage

March 11, 2009

GM-75 PROGRAM PURPOSE

- **Purpose: The GM-75 Program is being conducted to delineate an area of groundwater contamination that has TCE at a concentration greater than 1000 ug/l and is beyond the capture zone of the On-Site Groundwater Containment System.**
- **Program is also being used to investigate lower concentrations in groundwater that may impact water supplies.**
- **Vertical profile borings are used to quickly screen areas for the presence, depth, and concentration of contamination.**

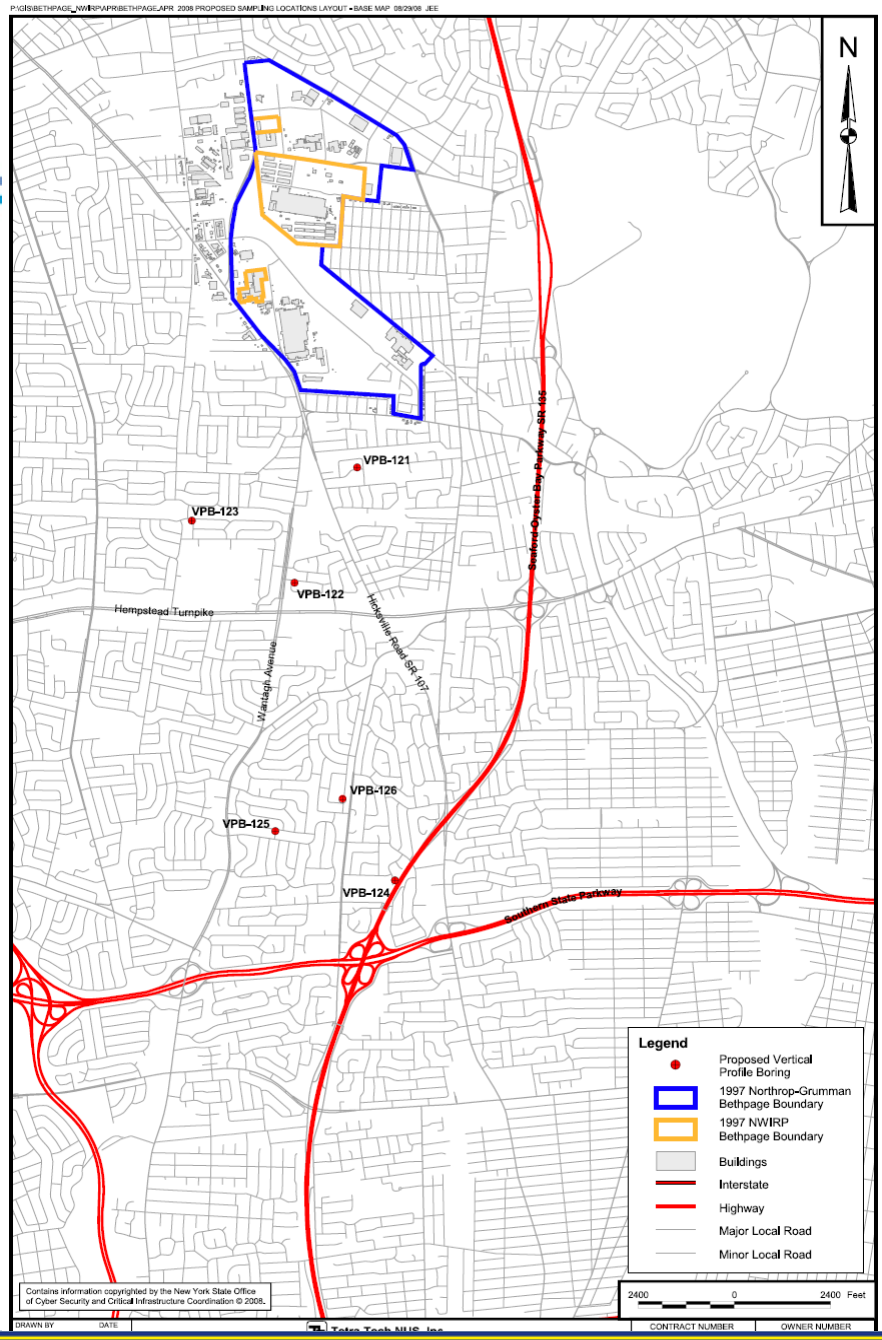
GM-75 VERTICAL PROFILE BORING PROGRAM

- A vertical profile boring is a 12-inch diameter hole drilled into the ground. At select depths, the drilling is stopped and a sampling device is lowered to the depth, and a sample of the water encountered is collected.
- The borings will extend to the Raritan Clay Layer at a depth up to 840 feet below ground surface.
- At 840 feet, the sampler is exposed to a pressure of 340 pounds per square inch (PSI).
- 36 groundwater samples will be collected per boring and analyzed for VOCs.

GM-75 VERTICAL PROFILE BORING PROGRAM (CONTINUED)

- Each boring requires 4 to 6 weeks to complete and costs $150,000 to $200,000.
- Based on results, permanent monitoring wells may be installed.
- Six locations have been selected, additional borings are planned.
- Work started in January 2009.
- VPB-125 was completed in February 2009.
- VPB-124 is in progress.

GM-75 VERTICAL PROFILE BORING PROGRAM (CONTINUED)



GM-75 VERTICAL PROFILE BORING PROGRAM (CONTINUED)

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GM-75 VERTICAL PROFILE BORING PROGRAM (CONTINUED)

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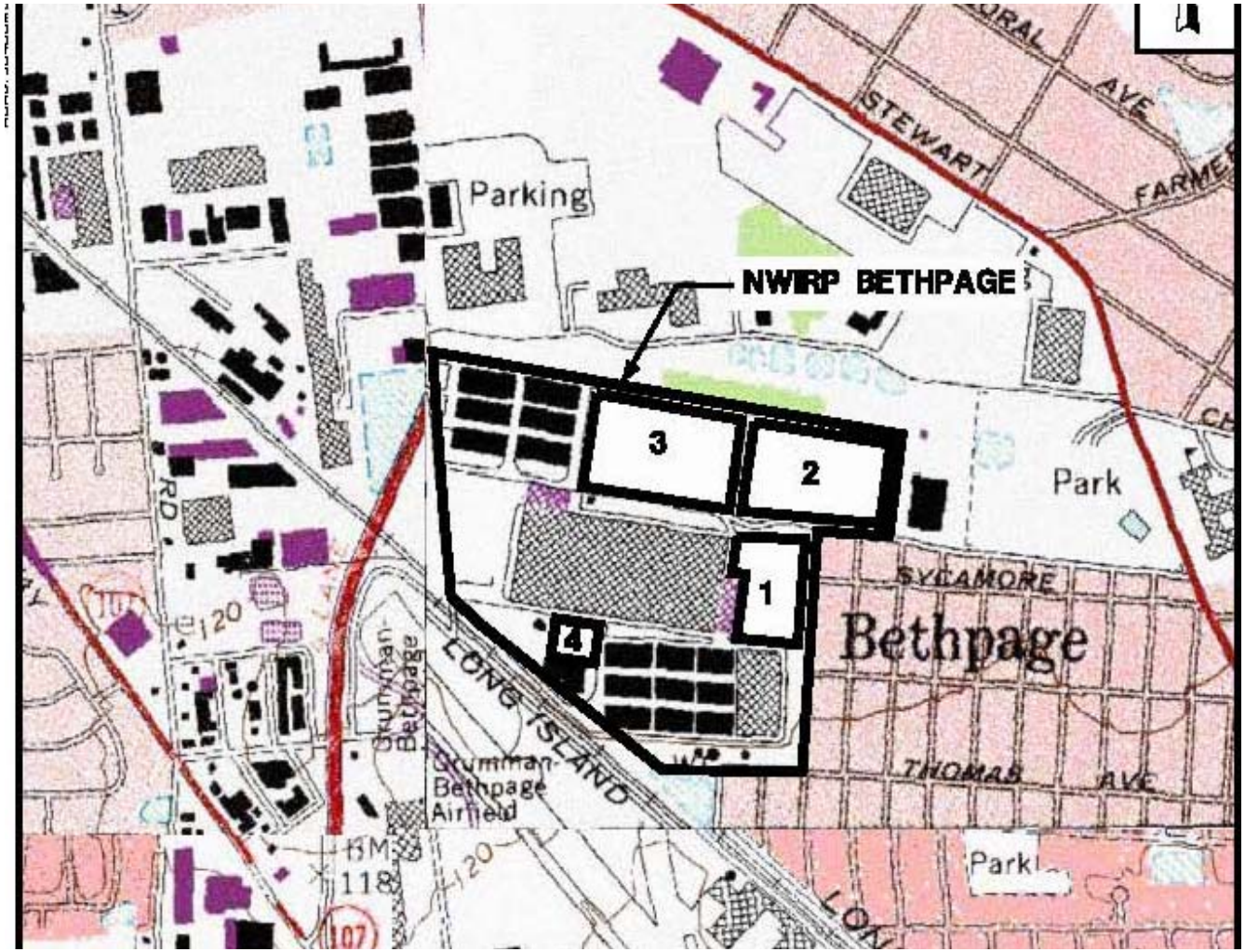
Site 1 – Soil Gas Testing and Indoor Air Sampling Update
Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage
March 11, 2009

SITE MAP


NWIRP BETHPAGE
Parking
STEWART
AVE
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LONG ISLAND
THOMAS
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Grumman-Bethpage Airfield
Grumman-Bethpage
BM 118
120
107

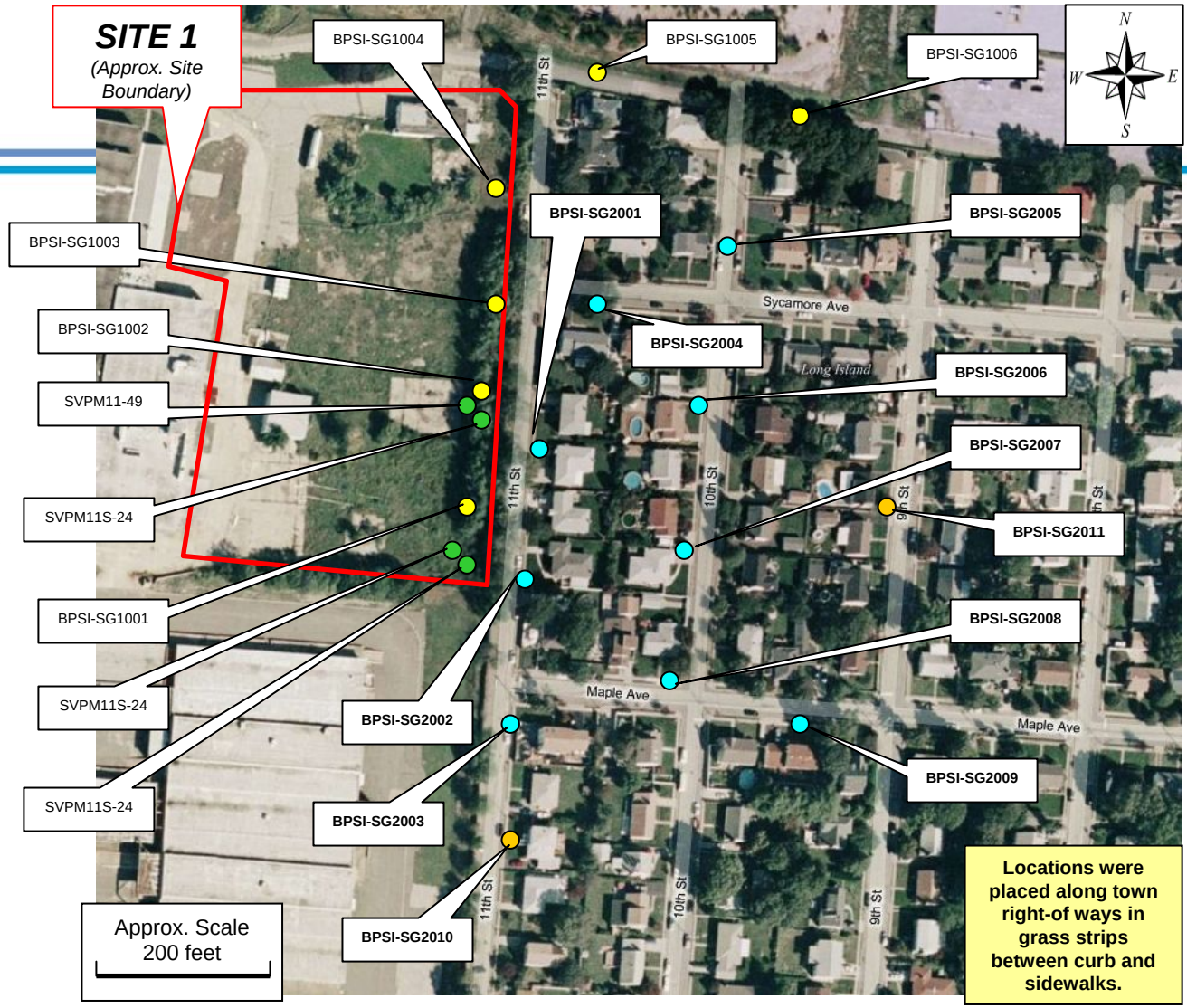
SITE 1 HISTORY – SOIL GAS

- October 2006 New York State Department of Health issued soil vapor intrusion guidelines – identifies soil vapor migration and potential intrusion into buildings as a potential concern.
- January 2008, Navy conducted a soil gas investigation at the eastern fence line of Site 1. Investigation was conducted to determine whether there was a potential for off site migration.
- Soil gas sampling results indicated elevated levels at the fence line.
- October 2008 soil gas testing conducted in the adjacent neighborhood along 10th and 11th Streets, and Sycamore/Maple Avenue.

SITE 1 HISTORY – SOIL GAS

- Additional soil gas sampling was conducted at two locations, on 9th Street and further south on 11th Street in early January 2009.
- Soil Vapor Extraction Pilot Test conducted in early January to obtain site specific data for full scale design.

SITE 1 SOIL GAS SAMPLING LOCATIONS

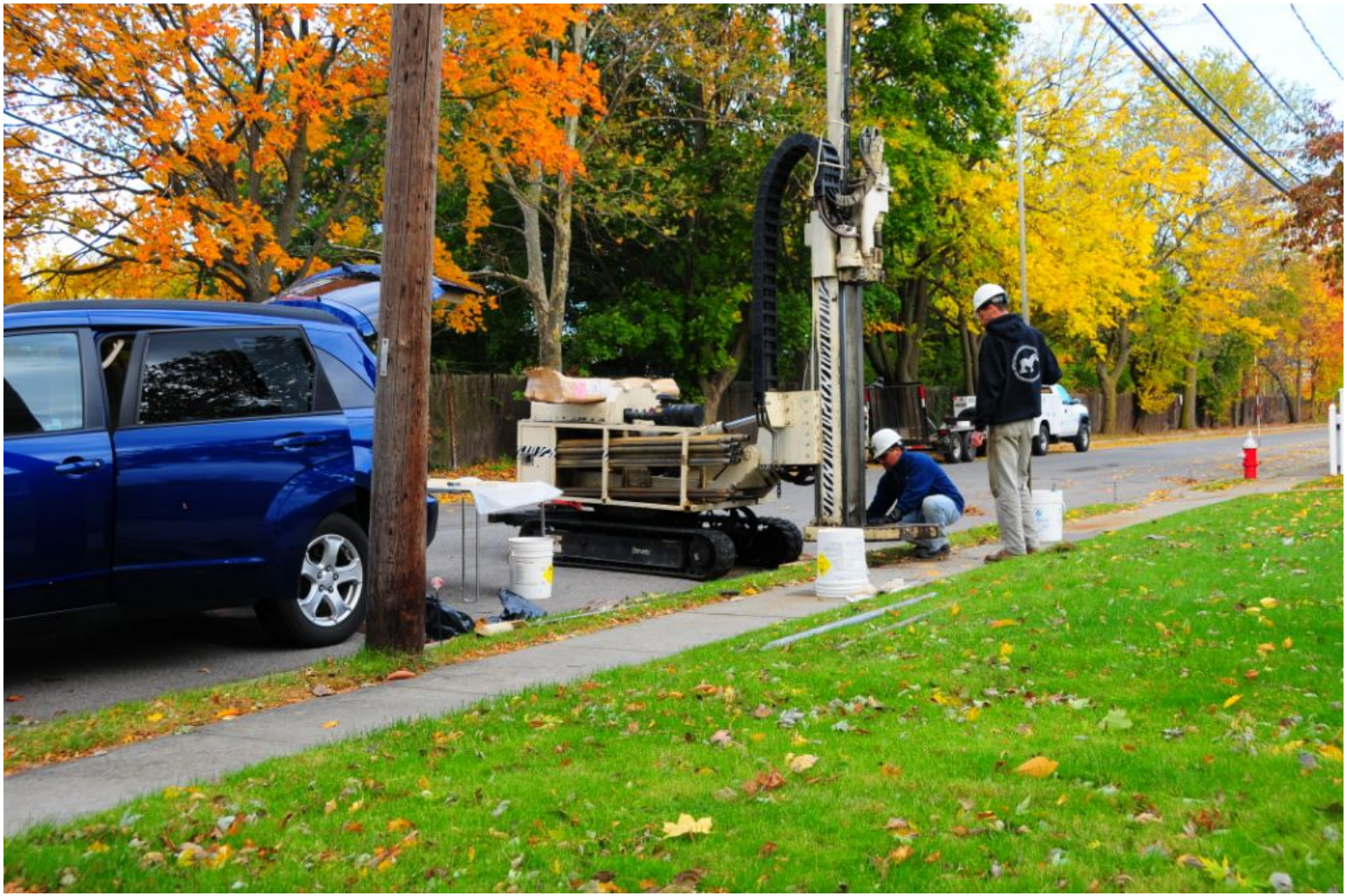


Legend:

- Former Soil Gas Sample Locations
- Former Soil Vapor Pressure Sample Locations
- Soil Gas Sample Locations
- Additional Soil Gas Sample Locations

Soil Gas Sampling Photos

Soil Gas Sampling Photos



Soil Gas Sampling Photos

SOIL VAPOR INTRUSION/INDOOR AIR SAMPLING

- January 2009, Navy conducted initial indoor air and sub-slab sampling in homes targeted along 11th Street.
- Sampling results indicated TCE levels above NYSDOH guidelines in some indoor air and sub-slab samples.
- February 2009 (and ongoing), indoor air and sub-slab sampling being conducted in additional homes.
- Portable carbon air filtration units installed as temporary mitigation measure and utility access sumps sealed (as needed) in basements.
- March 3, 2009 – Public Informational Meeting regarding the soil vapor investigation, indoor air sampling, future monitoring and mitigation measures.

SOIL GAS SAMPLE LOCATIONS AND NYSDOH SUB-SLAB GUIDELINES

Legend:

- Soil Vapor Sampling – Shallow TCE conc. greater than 250 ug/m^3.
- Soil Vapor Sampling – Shallow TCE conc. less than 250 ug/m^3.

Indoor Air Sampling Photos

Indoor Air Sampling Photos

FUTURE ACTIONS

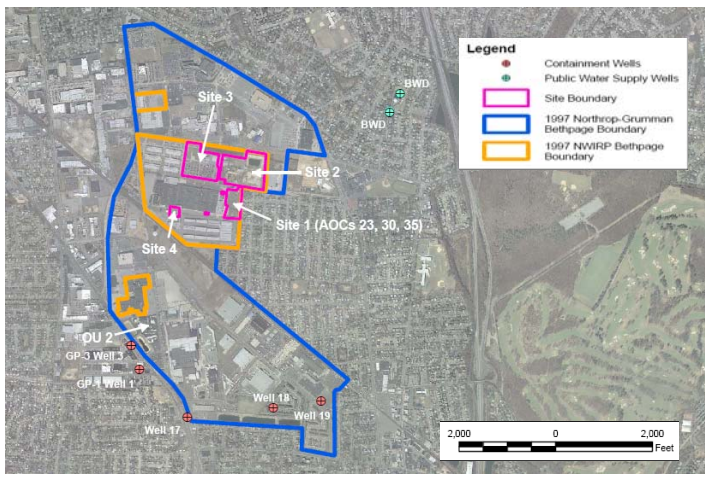
- Continue indoor air sampling in targeted homes. Additional homes will be selected based on sampling results.
- Continue air monitoring in homes to monitor vapor levels and effectiveness of portable carbon air filtration units.
- Sub-Slab Depressurization System – will be installed in homes where sub-slab vapor levels indicate the need for this type of mitigation (NYSDOH - Mitigation Matrix).
- Full scale SVE System design (construction anticipated in Sept. 2009).
- Future soil gas and indoor air sampling to monitor effectiveness of short-term and long-term mitigation measures.

QUESTIONS ?

SITE 1 SOIL VAPOR CONTAINMENT SYSTEM DESIGN

Facility Environmental Issues

Navy and Northrop Grumman Property Layout:



Site 1 – Former Drum Marshalling Area (Continued)

History (Continued)

- **Trichloroethene (TCE), Tetrachloroethene (PCE), and 1,1,1-Trichloroethane (TCA) were identified as primary solvents in soil and groundwater.**
- **In 1991, groundwater at the site contained:**
  - **TCE: 1,100 µg/L**
  - **PCE: 3,600 µg/L**
  - **TCA: 10,000 µg/L**

Site 1 – Former Drum Marshalling Area (Continued)

AS/SVE Remediation System:

- **Full Scale System started operated from 1998 to 2002.**
- **System removed 4,500 pounds of chlorinated solvents**
- **By 2002, groundwater concentrations in downgradient monitoring wells were 20 µg/L or less – achieved groundwater goal.**
- **No rebound observed in groundwater through 2008.**

Site 1 – Former Drum Marshalling Area (Continued)

Long-Term Soil Vapor Containment System

Design Goal:

- **Use an onsite soil vapor extraction system to prevent further offsite migration of contaminated soil gas, and**
- **To the extent practical, capture contaminated soil gas that has migrated offsite:**
  - **Primary goal is to capture soil gas with TCE at concentrations greater than 250 µg/m³; required soil gas capture zone is a maximum of:**
    - 270 feet to the east and southeast near groundwater, and
    - 170 feet to the east and southeast at an intermediate-depth
  - **Secondary goal is to capture soil gas with TCE at a concentration greater than 5 µg/m³, required soil gas capture zone is a maximum of 410 feet to the east and southeast.**

Long-Term Soil Vapor Containment System (Continued)

Design Goal (Continued):

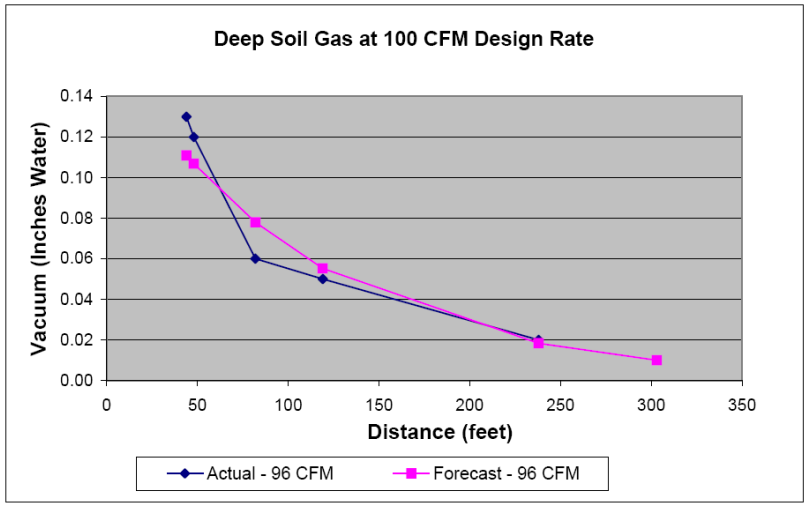
- **Design will incorporate other factors, including:**
  - **Precipitation infiltration – natural flushing of VOCs to groundwater**
  - **Winter operation to extend capture zones (frozen ground acts as a cap)**
  - **Effects of sub-slab depressurization units**
- **Long-term operation required to address residual TCE in soils/clay in southeast corner of site (below water table) and variable water table**

Long-Term Soil Vapor Containment System (Continued)

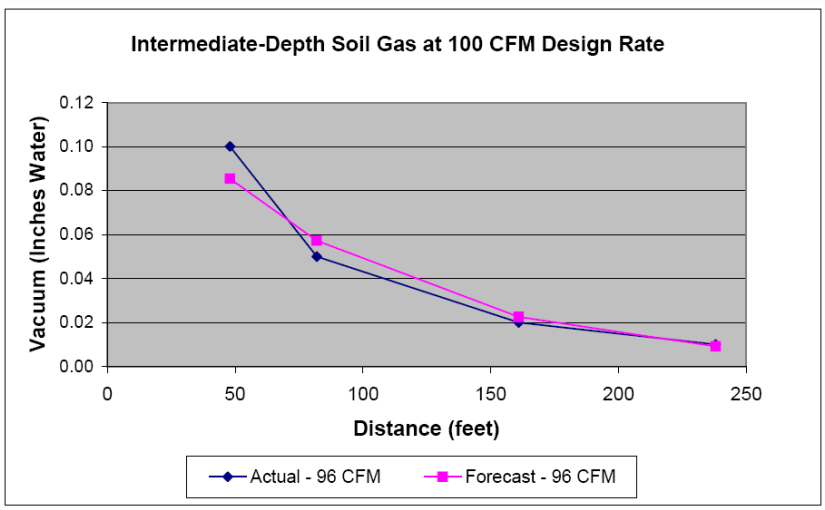
Pilot Scale Testing:

- **To support full scale design, conducted pilot-test in Jan 2009**
- **Achieved a measureable vacuum at 238 feet (offsite)**
- **A vacuum at 282 feet could not be confirmed – atmospheric fluctuations caused natural pressure swings**
- **Based on regression analysis, at 100 cfm (using both a deep and intermediate-depth SVE well), the design capture zone is:**
  - **Intermediate-depth soil gas: 230 feet.**
  - **Deep soil gas: 300 feet.**

Long-Term Soil Vapor Containment System (Continued)



Long-Term Soil Vapor Containment System (Continued)

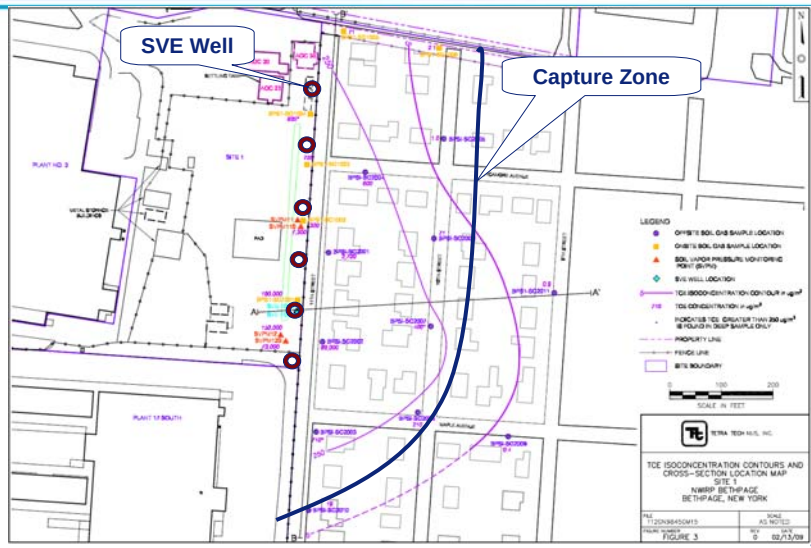


Long-Term Soil Vapor Containment System (Continued)

Full Scale Design (Preliminary):

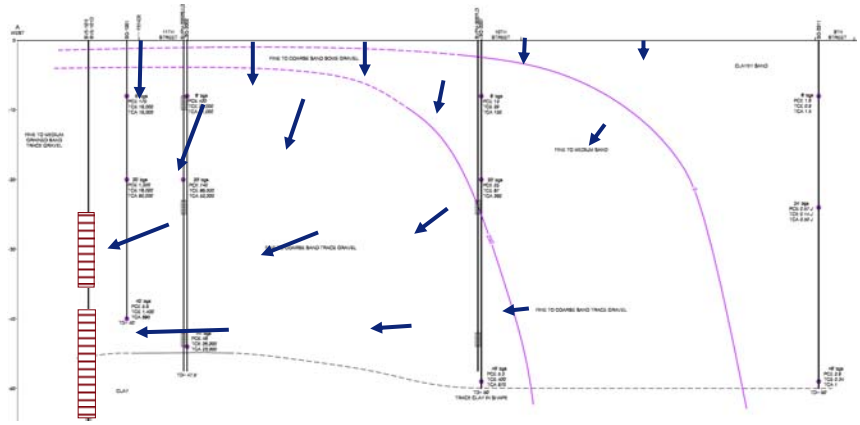
- **Six clusters of intermediate-depth and deep soil vapor extraction wells (12 wells total)**
- **Clusters will be approximately 100 feet apart along the fence line**
- **Design flow rate of 50 cfm per well, and a total system flow rate of 600 cfm**
- **Two 600 cfm blowers, at a rated vacuum of 40 inches water column**
- **Condensate tank – 600 gallons**
- **Vapor phase carbon units - 1800 pound units**
- **Buried piping and units housed in a building for year round operation**

Long-Term Soil Vapor Containment System (Continued)



Long-Term Soil Vapor Containment System (Continued)

Cross Section A – A'



Questions

- **Questions**