Management of Significant PHC Impacts in an Urban Community Setting – Case Study

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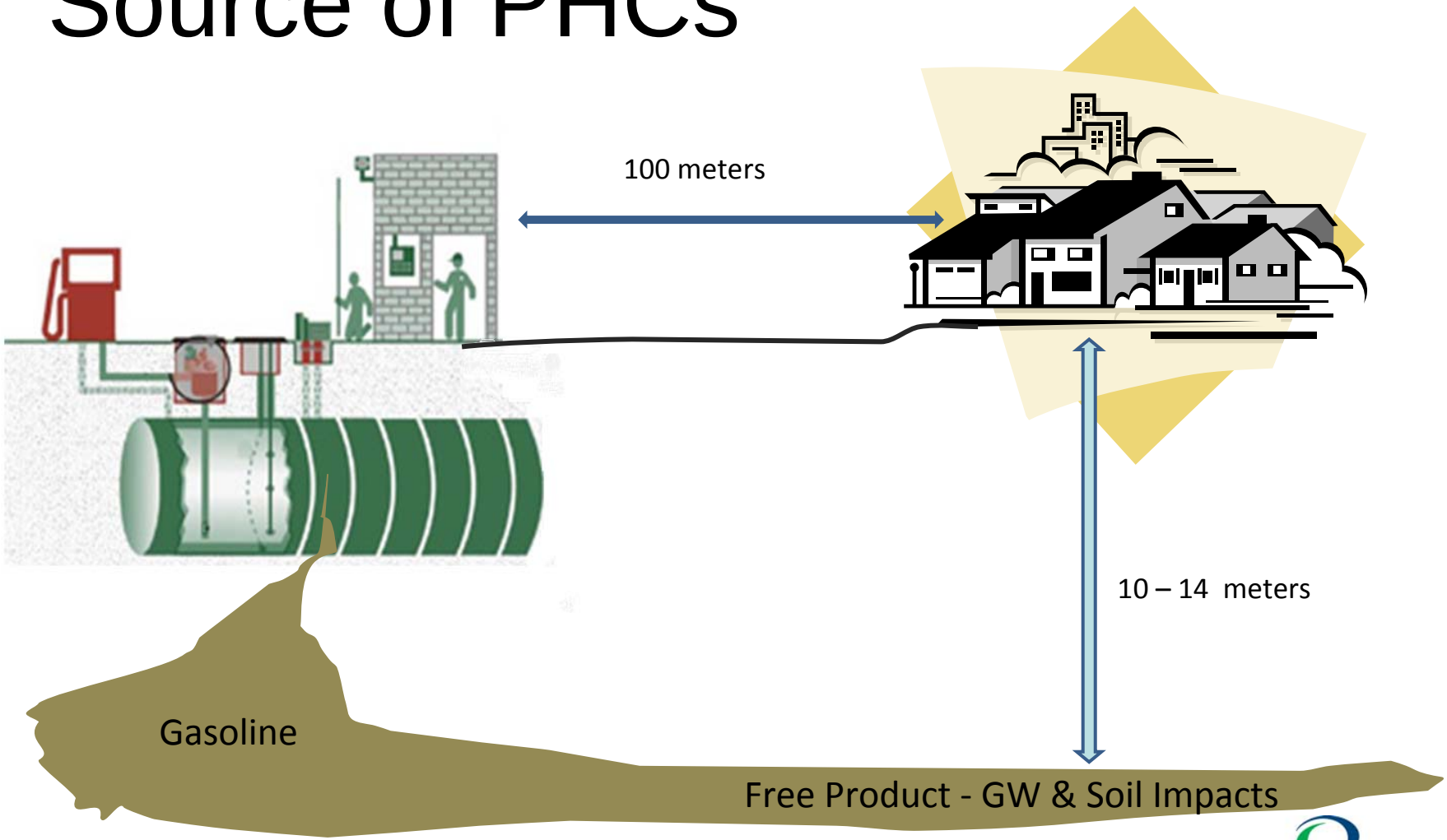
Summary

- Description of site and impacts
- Description of risk assessment approach:
  - Public consultation (regulators & residents)
  - Monitoring
  - Tier 3 assessment
- Development of site management plan

Source of PHCs



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Conceptual Model

Upper sand – 4 m

Clay – 4 m

Silty sand – 2 m

0-1 m

0-1 m

0-2 m

PHC impact

150 – 300 meters

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Approach

- Short-term:
  - Public consultation program implemented
  - Immediate risks to human health were assessed qualitatively
  - A monitoring plan and delineation program was developed
- Long-term
  - Public consultation
  - Site-specific risk assessment
  - Develop site management plan

Public Meeting

- Notified community of subsurface PHC contamination through public meeting and indicated that:
  - Immediate risks to human health are not expected based on conceptual site model;
  - Monitoring program was in place to assess short-term and long-term human health risks; and,
  - Risk assessment would be completed under guidance & approval of AENV.
- Public meeting helped address immediate health concerns & offered contacts for further communication
- Asked individuals in community to volunteer properties for shallow soil vapour sampling program
- Assured residents they would continue to be informed

Monitoring

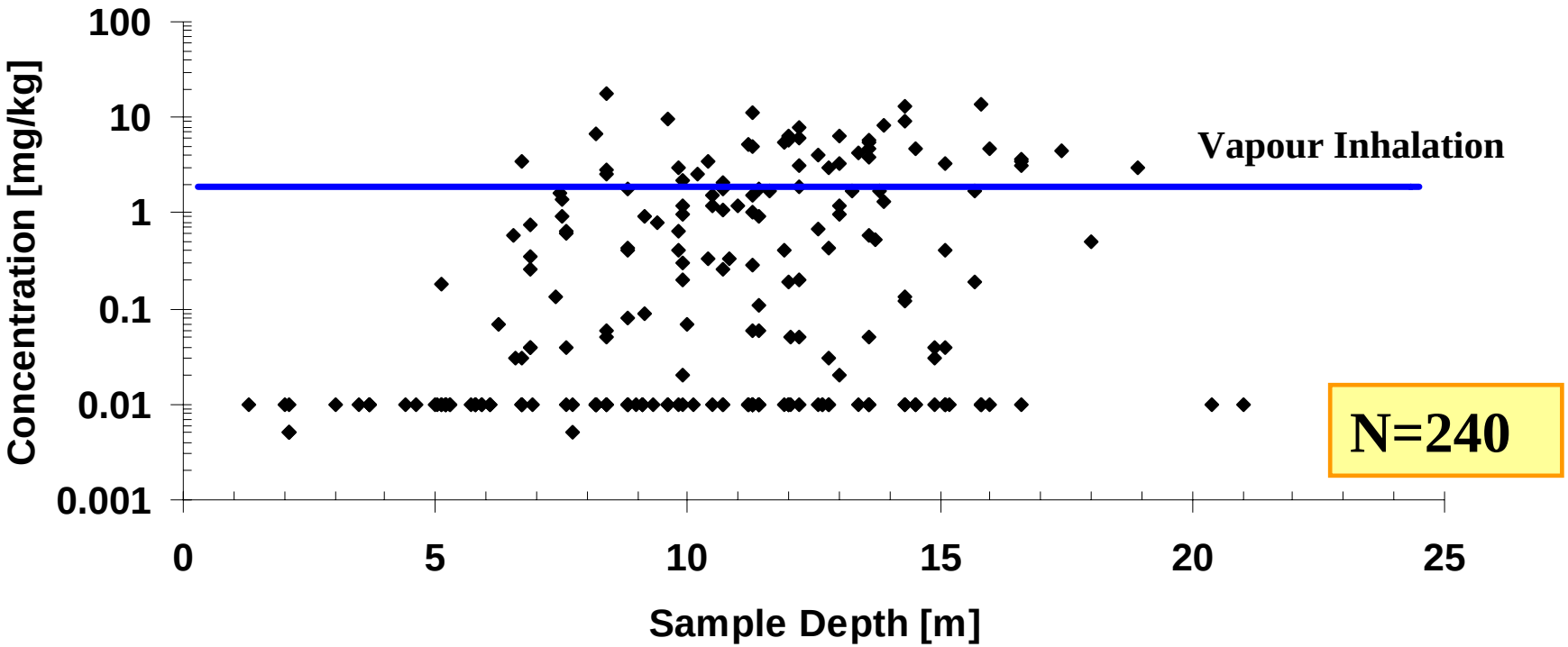
Public Property (Roads, Alleys, Public property)

- Soil data collected from bore holes (BTEX, F1 – F4)
- Boreholes completed as groundwater monitoring wells (BTEX, F1 – F2)

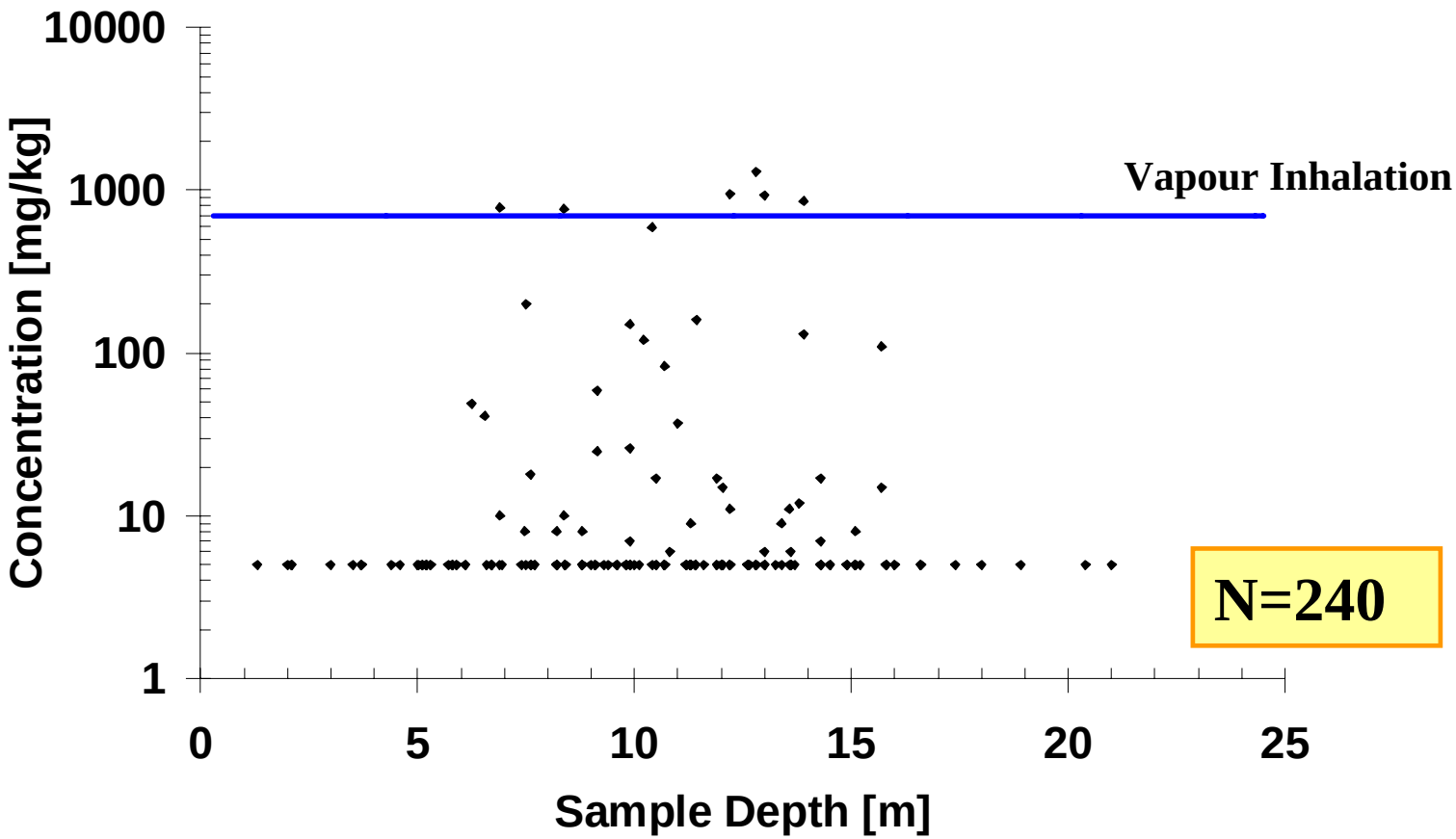
Private Property (Individual properties)

- Added shallow soil vapour testing to monitoring program (BTEX, F1 & F2)
- Investigations were completed for individual health concerns and development permits

Concentration – Soil Benzene



Concentration – Soil F1



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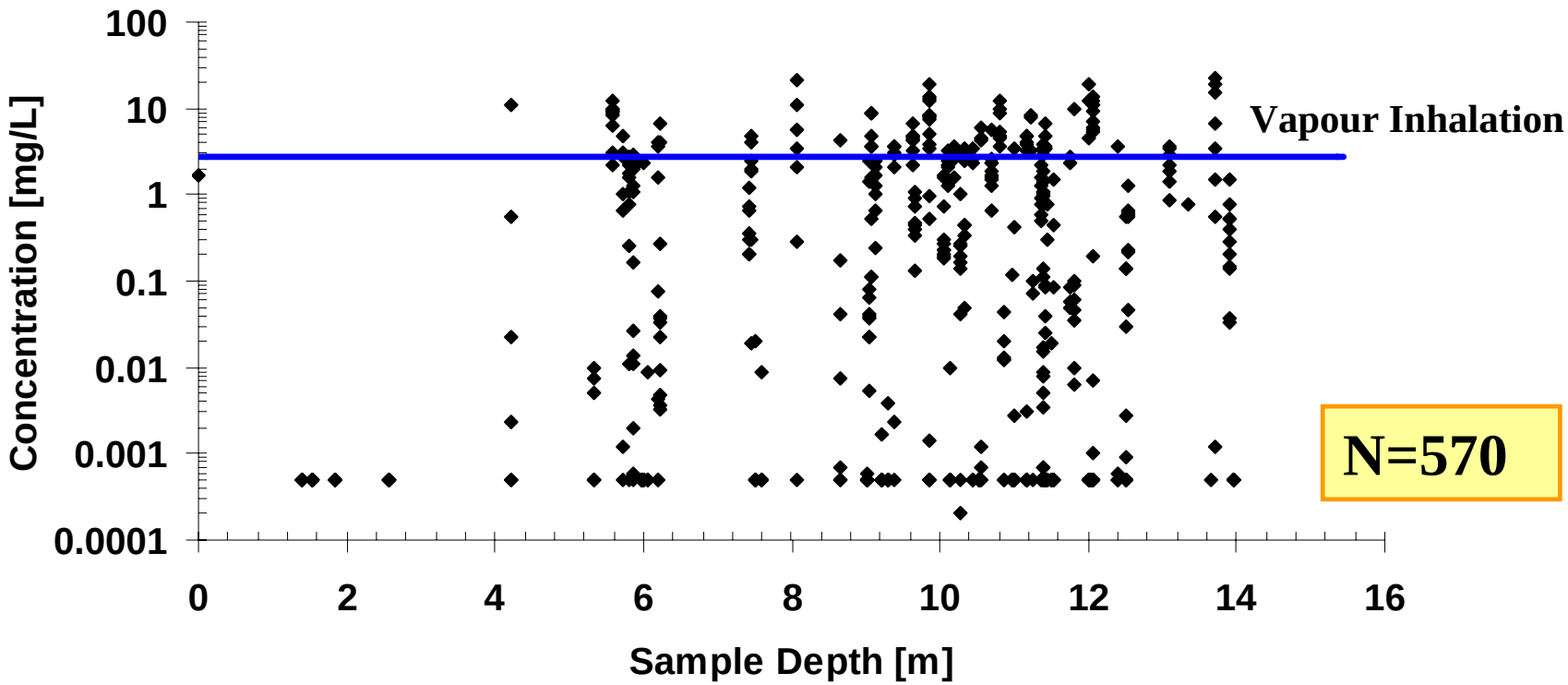
Concentration – GW Benzene



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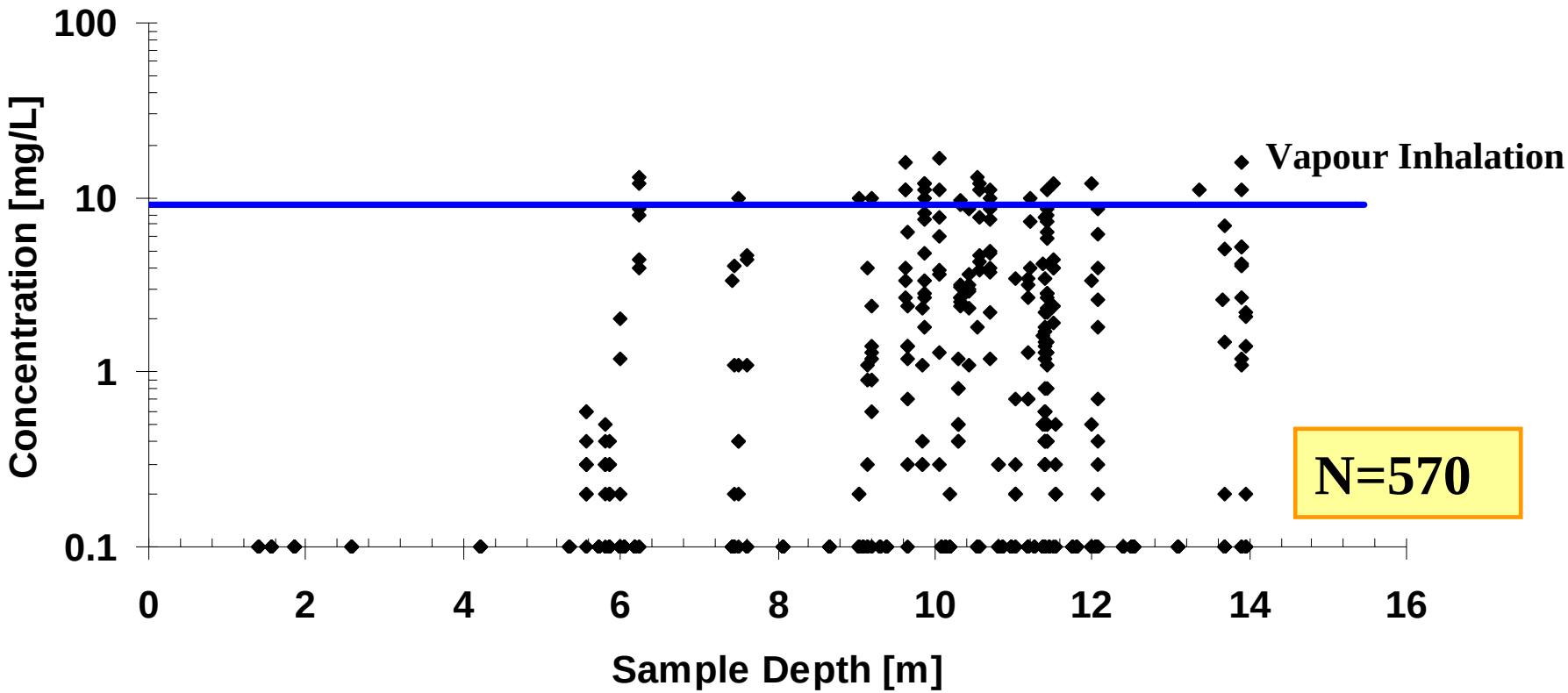
Concentration – GW F1



Concentration – Soil Vapour

- All non-detect (N=345)
- Benzene (<3 – <5 $\mu g/m^3$)
- Toluene, Ethylbenzene and Xylenes (<40 – <50 $\mu g/m^3$)
- F1 & F2 (<300 – <500 $\mu g/m^3$)

Risk Assessment – Results

- Tier 3 values calculated for each impacted property (39 in total)
- Measured concentrations below calculated Tier 3 remediation objectives (vapour inhalation only)
- Suggesting that active remediation not required; however, free product must be addressed
- Shallow soil vapour monitoring demonstrated the absence of detectable concentrations and validated Tier 3 remediation guidelines
- Essentially, area of potential concern reduced to where free product present (6 properties)

Public Consultation – Results

- Communicated with residents (community & personal level), public representatives, local and provincial regulators, & local health region
- Communication of soil vapour results alleviated immediate health concerns by public and regulators
- Status of risk assessment and site management plan communicated regularly
- Regular communication ensured that the risk assessment and site management plan met the needs of all stakeholders including the client

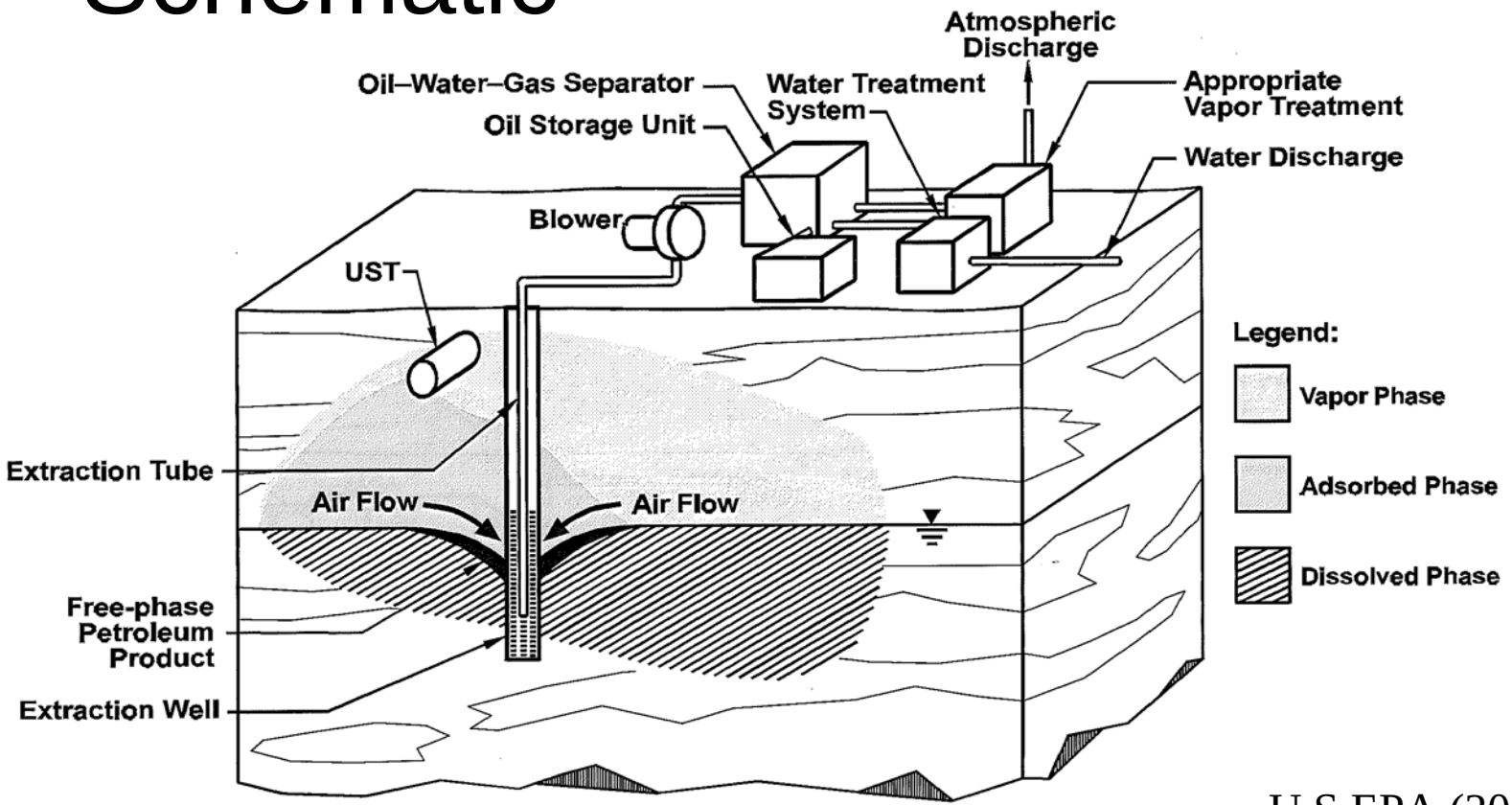
SMP - Components

1. Tier 3 Objectives
2. Free product
3. Monitoring
4. Decommissioning
5. Contingency planning

SMP – Free Product

- Existing concentrations below Tier 3 objectives
- Required to:
  - Remove the free product underlying the site to the degree practicable
- Proposed multi phase vacuum extraction (MPVE)
- Liquid and vapour recovery tests promising
- Continued monitoring of SV (including nested wells) and GW; plus monitoring moisture content of clay
- Monitoring natural attenuation

SMP – Vacuum Extraction Schematic



U.S EPA (2004)

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MPVE System

- **Small footprint and odourless**
- **Quiet and operate continuously in residential neighbourhood**
- **Incorporate high-performance oil coalescing media**
- **Vacuum oil/water separator**
- **Vacuum air stripper**
- **Thermal desorption unit**

Conclusion

- Risk assessment and detailed environmental investigations reduced area of concern dramatically
- SMP was developed and implemented where necessary
- Public consultation and active management alleviated public health concerns, promoted speedy solution and prevented financial losses to residential properties