New Soil Vapor Guidance in the SAM Manual

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Goals

- Formed in early 2000 to develop standards for collection of soil vapor samples.
- Needed to clarify proper methodologies for particular applications.
- Didn’t want a strict cookbook approach.

Soil Vapor Sampling

Soil vapor surveys can be used for a number of purposes, including the following:

Initial Site Screening
Site Assessment/Characterization
Risk Assessments
Remediation and Post-Remediation Monitoring
Ongoing Monitoring

Initial Site Screening

- The objective is to assess if volatile organic chemicals (VOCs) are present.

Site Assessment/Characterization

- The objective is to assess the source, extent, and magnitude of impacted soil, groundwater and/or vapor.

Risk Assessments

- The objective is to assess the risk to public health, safety and the environment.

Remediation and Post-Remediation Monitoring

- The objective is to assess remediation progress or completion.

Ongoing Monitoring

- For risk assessment, remediation monitoring, landfill gas monitoring and background methane monitoring.

These guidelines provide information on the following:

- Common methods of sample collection;
- Transient and other environmental factors that could affect the outcome of a vapor survey;
- Vapor survey design for a variety of sites including petroleum-related sites, dry cleaners and industrial facility sites, methane testing sites; and
- Documentation, including work plans, well permits, field notes and reporting.

Overview of Soil Vapor Survey Methods

- Three principle methods exist for collecting soil vapor data:

  - Active
  - Passive
  - Flux Chambers

Active

- The active approach consists of the withdrawal of soil vapor from the subsurface, typically with a sampling probe, followed by analysis of the withdrawn vapor.
- Analysis is often performed on-site.
- Samples can be stored in gas-tight containers and analyzed at an off-site laboratory.
- Method is quantitative.
- The most common soil vapor collection method.

Passive

- The passive approach consists of the emplacement of an adsorbent into the subsurface and subsequent removal and analysis of the adsorbent.
- Measured values cannot be reported as concentrations, only as total adsorbed mass.
- Passive surveys are useful for qualitative purposes only.
- The technique requires two visits to the field.
- Does not allow for the acquisition of real-time data.

Flux Chambers

- Flux chambers consist of an enclosed chamber that is placed on the surface for a specific time.
- Vapor concentrations are measured in the chamber.
- This method is also quantitative and yields both concentration data in the chamber and flux data (mass/area-time).
- Flux chambers are the least common soil vapor survey method.
- They are typically used only for risk-based applications when direct vapor fluxes out of the subsurface are desired.

Factors Which Influence Soil Vapor Data

- ***Sample Spacing***
- ***Collection Depth***
- ***Purge Volume***
- ***Excessive Vacuums Applied During Collection***
- ***Probe Seals***
- ***Probe Decontamination***
- ***Vacuum Pumps***
- ***Exposure Period***
- ***Number of Samples per Exposure Period***
- ***Method Blanks***

Transient and Other Environmental Effects

- Temperature
- Barometric Pressure
- Earth Tides
- Precipitation (Rainfall)

Documentation

- Work plans
- Well permits
- Accurate maps and cross-sections
- QA/QC procedures
- Assessment report with conclusions and recommendations
- Signature of licensee, as appropriate