

## **BPSS – 12B - Soil Vapor Extraction Pilot Test Guidance**

This document provides general guidelines for the development of soil vapor extraction (SVE) pilot test plans. SVE is a cleanup technology that is applicable to volatile and semi-volatile contaminants of concern (COCs) in the vadose zone (i.e., unsaturated soil). SVE may be utilized as a sole remedial technique or incorporated with other technologies (e.g., in-situ sparging or prior to bioventing or natural attenuation, etc.) to provide a cost-effective remedial approach.

Along with an investigation and evaluation of the lithologic profile, a pilot test is generally required for all SVE System designs to evaluate the feasibility of the technology and effectively design the treatment system. Proper technical justification must be provided at the time of the Pre-RAP meeting if a pilot test will not be performed. Prior to implementation of the pilot test, a pilot test plan must be submitted to the FDEP or local program for approval. The pilot test plan must include, at a minimum, the following information:

1. A site diagram (indicating the North direction, drawn to scale, and including a graphical representation of the scale) depicting the following:
  - a. The horizontal and vertical delineation of the plumes for each impacted medium and any other pertinent features (e.g., underground utilities, nearby surface water bodies, backfill areas, drainage systems, surface seal, aquifer heterogeneity, etc.); and
  - b. The location of the test well network, consisting of dedicated vacuum extraction wells (VEWs) and observation wells, and the location of the impervious surface seal.
2. Design information for the SVE pilot test. Dedicated VEWs are required to effectively implement the pilot test. Consider the following during the VEW design:
  - a. VEW(s) should be located within the most contaminated area of the plume (i.e., area of highest COC concentrations), or as close as physically practicable;
  - b. VEW(s) should be screened in accordance with the concentration profile of the COCs, considering the depth to groundwater and stratification of soil, as applicable; and
  - c. The pilot test VEW(s) should be utilized, if feasible, in the final design.
3. Observation wells are required to accurately monitor the observed vacuum readings throughout the test. Dedicated observation wells are recommended. Consider the following during the observation well design:

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- a. The number of observation wells must be sufficient to properly evaluate the operational conditions;
  - b. The screened interval of the observation wells should be equivalent to the screened interval of the VEWs;
  - c. Observation wells must be located in a radial pattern, to evaluate the influence of the SVE System in all directions, and must be located at appropriate distances (e.g., 5 ft., 10 ft., 20 ft., 30 ft., etc.) from the VEW(s); and
  - d. The observation wells must be appropriately located to evaluate the following: the effect of any anisotropic conditions (e.g., backfill, tank farms, drainage structures, etc.), and areas of potential preferential pathways (e.g., grassy areas, dispenser islands, etc.) resulting from varying surface seals.
4. The surface seal (e.g., concrete), if utilized, should be representative of the final design. Be advised that if a surface seal is not utilized in the final design, the pilot test results must demonstrate that the seal is unnecessary.
  5. Construction details of all the VEWs and observations wells.
  6. Off-gas discharge and, if necessary, treatment design. A minimum off-gas discharge stack of fifteen (15) feet is required. The discharge stack must not be located in close proximity to any potential receptors (e.g., workers, air intake systems, etc.). Off-gas treatment must be provided if any of the following conditions exist:
    - a. The system is operated for more than eight (8) hours (therefore, limiting the length of pilot test to no more than eight (8) hours is recommended);
    - b. The site of the pilot test is in close proximity to inhabited areas such that health nuisance conditions may result from the pilot study; or
    - c. Operation of the pilot system is likely to result in adverse health effects or nuisance conditions due to expected high concentrations of recovered vapors even though there are no inhabited areas in close proximity.
  7. A monitoring proposal, including parameters and frequency. A step increase application, performed using a minimum of four (4) step increases in the applied vacuum/flow, is required to fully evaluate the flow processes within the vadose zone. Equipment must be properly designed to adequately influence the vadose zone at the highest steps. The following should be measured at each step interval noting the time each measurement was taken:
    - a. Applied vacuum at the vacuum extraction wellhead;

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- b. Flow rate, including the flow stream temperature and pressure at the location of the flow rate measurement to accurately convert the rate to standard temperature and pressure;
  - c. Observed vacuum at each observation well; and
  - d. Volume of groundwater recovered during the pilot test.
8. A minimum of two (2) off-gas samples for total petroleum hydrocarbons or total hazardous air pollutants (HAPs) (see BPSS-2) must be obtained during the step that is considered to be most representative of the final design.