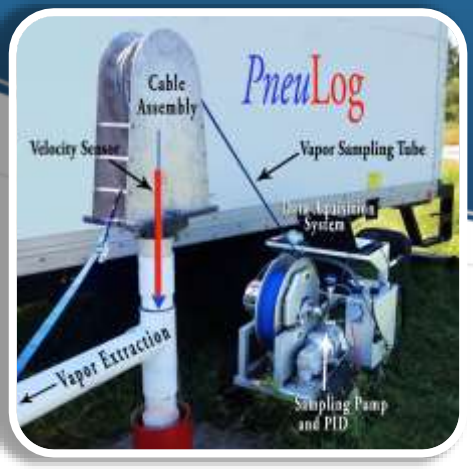
PNEULOG ®

PNEUMATIC WELL LOGGING

PneuLog® **is an established technique for vadose zone characterization, optimization of SVE systems, and support to site closure.** ***PneuLog***® **utilizes in-well instrumentation to continuously measure air permeability and contaminant production along a well screen during vapor extraction. Soil heterogeneities are clearly defined in individual wells identifying preferential flow paths and mass transfer constraints in the vadose zone.**



PNEULOG answers the question: *Is it time to shut off the SVE system?*

Logs from several wells across a site are synthesized into a comprehensive model of subsurface heterogeneities and contaminant distribution. The model yields an optimized remedial strategy and provides estimates for operation times to meet closure requirements. During an initial site investigation, ***PneuLog***® **provides real-time assessments of subsurface conditions. This method of expedited characterization enables the rapid deployment of an optimal, efficient SVE system. By targeting the contaminant-producing soil layers the wasteful collection and treatment of clean soil gas is minimized.**

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DYNAMIC CHARACTERIZATION

+

SVE PERFORMANCE EVALUATION

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REALISTIC TRANSPORT MODELING AND CLOSURE

PNEULOG ®

PNEUMATIC WELL LOGGING

IN-WELL MEASUREMENTS FOR VADOSE ZONE CHARACTERIZATION, OPTIMAL REMEDIATION, AND CLOSURE

PNEULOG® Results

Results from pneumatic logging performed in the Central Valley of California are presented below. The well screen extended from 40 to 74 feet below ground surface. A vacuum of 30 inches of water was applied to this well and the resulting total air extraction rate was 50 cubic feet per minute. Figures a and b plot the raw cumulative data collected during the test. Figures c and d show the corresponding air production and estimated contaminant concentrations in the soil. PneuLog data revealed that 70% of the extracted air was produced from the narrow 70 to 73-foot interval while the air production was significantly less above this zone (Figure a and c). The inverse is observed in the soil concentration profile. Pneulog detected the highest TCE concentrations at the top of the screen where air production was low (Figure d). Based on the existing design, the highest concentrations in the shallow soil are mass-transfer constrained. Additionally, the peak in vapor concentration at the top of the screen suggests more concentrated TCE vapors existed in the shallow soils.

PneuLog® generates vertical profiles of:

- Soil Permeability
- Contaminant Distribution

PneuLog® data are useful for:

- SVE Design & Optimization
- Bioventing Design & Optimization
- Risk Assessments & Site Closure
- Accelerated Site Characterization

PneuLog® optimizes & accelerates remediation by:

- Defining contaminant & air production
- Generating data to improve conceptual and predictive models
- Providing optimum well screen intervals
- Locating & defining mass transfer limitations
- Delineating the contaminant source

Based on the PneuLog data generated from all the wells, the following conclusions were made about the site:

- **The existing SVE system was not effectively remediating the shallow soils which contained the highest concentrations.**
- **Previous asymptotic data from monitoring points proved premature.**
- **A significant mass of TCE remained in the soil.**