

A.1 Technology Name

Beacon Passive Sampler

A.1.1 Source

Journal of Remediation. Application of Passive Soil Gas Technology to Determine the Source and Extent of a PCE Groundwater Plume in an Urban Environment, Deborah Goodwin with Arizona DEQ and Jim Clarke, R.G. with Mactec, Harry O'Neill with Beacon Environmental, Joseph E. Odencrantz

<https://beacon-usa.com/wp-content/uploads/2021/05/Regional-Groundwater-Investigation.pdf>

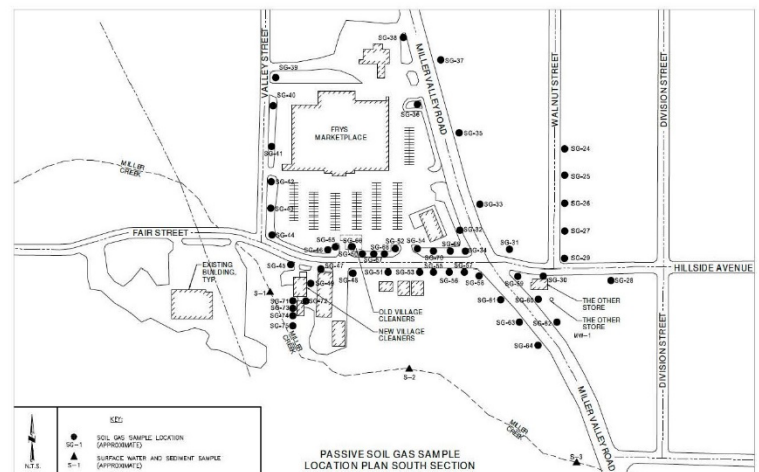
A.1.2 Summary

Media:	Soil Gas and Groundwater
Study Type:	Source Zone Investigation
Technology:	Beacon Passive Soil Gas Sampler
Peer Reviewed:	Yes
Publication Date:	July 2008

A.1.3 Site Description

- The Site is the Miller Valley Road and Hillside Avenue Water Quality Assurance Revolving Fund (WQARF) in Prescott, Arizona. The Site includes several commercial properties, including a former gas station at the southeast corner of Miller Valley Road and Hillside Avenue and a dry-cleaning facility. The active dry-cleaning facility was located on the south side of Hillside Avenue but had previously operated on the north side of the street.

Exhibit 2 – Site Plan



- Contaminants of concern: Tetrachloroethene (PCE)
- The investigation was completed in two phases. Phase 1 was a passive soil gas (PSG) survey that included the collection of soil gas samples from 50 points around the current and former dry-cleaning locations. The soil gas samplers were deployed at 8 inches below ground surface (bgs) and left to passively collect for two weeks (14 days). Based on the results of the PSG survey, Phase 2 consisted of a limited groundwater investigation to confirm impacts to groundwater. This phase included 11 soil borings to 5 feet bgs for the collection of grab groundwater samples and the sampling of two existing groundwater

monitoring wells. Both soil gas and groundwater samples were submitted for laboratory analysis of volatile organic compounds (VOCs).

- Beacon's passive soil gas samplers. Samples were analyzed by a laboratory using USEPA Test Method 8260B. Groundwater samples were collected using disposable bailers.

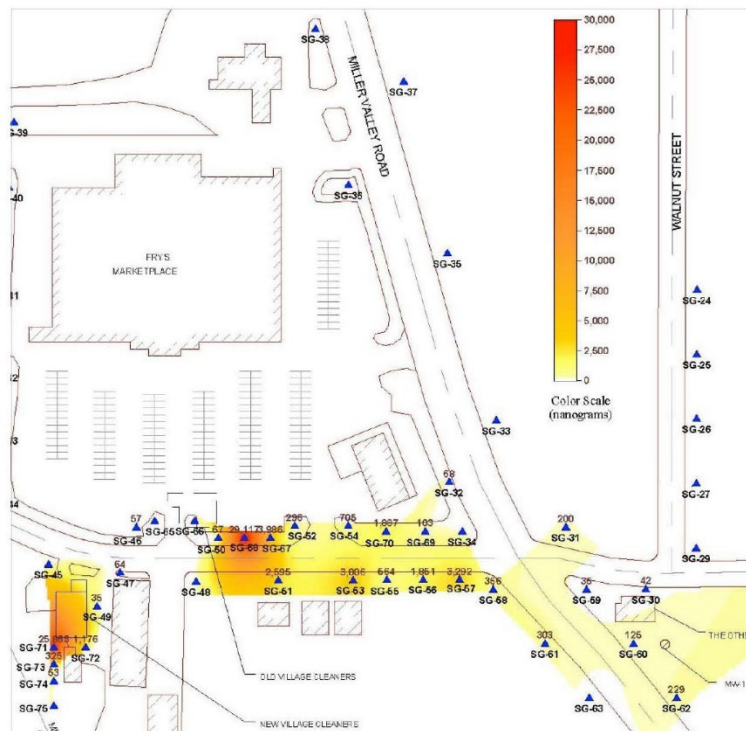
A.1.4 Remedial Phase

As part of routine groundwater monitoring at a former gas station at the southeast corner of Miller Valley Road and Hillside Avenue, tetrachloroethene (PCE) was detected above the groundwater cleanup level of 5.0 micrograms per liter (ug/L) in a monitoring well. In response, the Arizona Department of Environmental Quality (ADEQ) authorized a preliminary investigation (PI) to identify the source of the PCE. The initial suspected source was a dry-cleaning facility located on the south side of Hillside Avenue, approximately 0.25 miles west of the targeted monitoring well. After reviewing historical documents, the dry cleaner was identified as having previously operated at a property across the street to the north between the 1960s and 1988, when they moved to their current location. Other potential sources of PCE were also identified in the area. To efficiently identify the source(s) in a reduced number mobilizations, ADEQ approved the use of a PSG survey as part of the PI.

A.1.5 Outcome

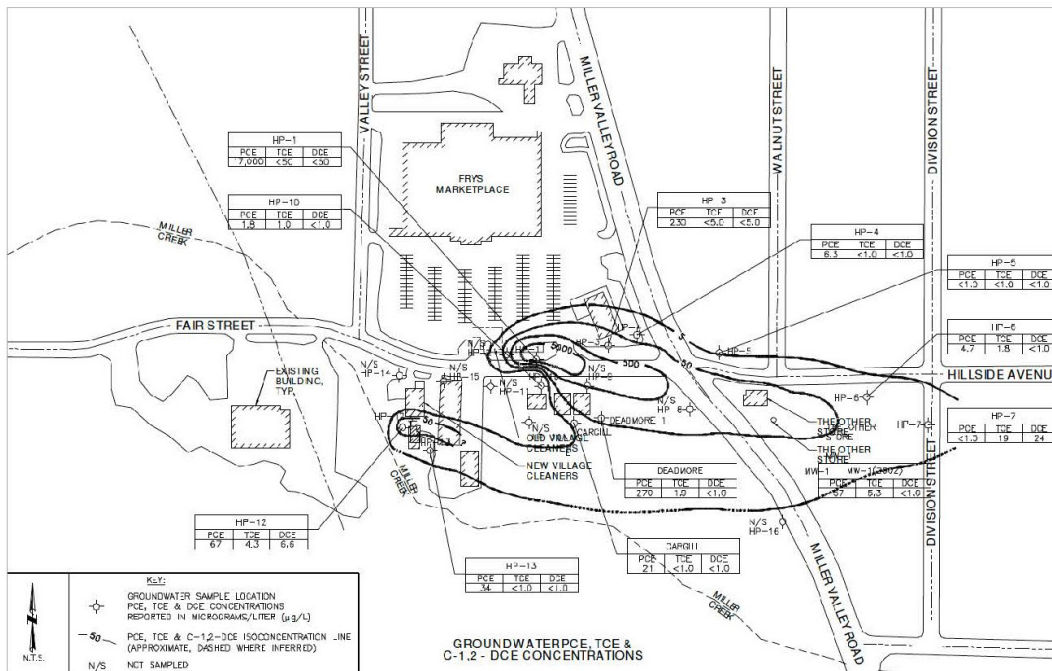
As shown in the figure to the right, the results of the PSG survey were able to identify two potential PCE source zones, from sample locations SG-68 and SG-71 east toward SG-60. With groundwater in the area being so shallow, it was concluded that the impacted soil gas was emanating from impacted groundwater. The PSG survey was also able to partially delineate the lateral extent of the PCE plume and the migration pathway.

Exhibit 4 - Results of Passive Soil Gas Survey



The results of the subsequent groundwater investigation confirmed the presence of two commingled PCE plumes that originate from two separate source areas.

Exhibit 5 - Groundwater Sample Locations and Results



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76 The PSG survey proved to be a cost-effective method to identify the source areas and the extent
 77 of the PCE plume. Using the PSG survey data, the subsequent groundwater investigation was
 78 able to be targeted, which minimized costs while successfully confirming the results.

79 A.1.6 References

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 82 Arizona DEQ and Jim Clarke, R.G. with Mactec, Harry O'Neill with Beacon Environmental,
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