A.1 Technology Name

Passive Diffusion Bag (PDB)

A.1.1 Source

FINAL Technical Report for the Evaluation of Groundwater Diffusion samplers - Former McClellan Air Force Base (AFB), California - Parson Engineering Science, Inc. for Air Force Center of environmental Excellence (AFCEE) Technology Transfer Division (ERT) - December 1999

A.1.2 Summary

Media:	Groundwater
Study Type:	Comparison study
Technology:	Diffusion Samplers & Micro purging & Conventional Sampling
Peer Reviewed:	Yes
Publication Date:	1999

A.1.3 Site Description

The study area for this report consisted of nine (9) monitoring wells within the Former McClellan Air Force Base (AFB) site during two groundwater sampling event mobilizations. The monitoring wells selected for the study were multi-level monitoring wells. The constituents of concerns (COCs) were chlorinated volatile organic compounds (CVOCs). These include Trichloroethene; 1,2-Dichloroethene (Trans and Cis); 1,1-Dichloroethane; 1,1-Dichloroethane; 1,1,2-trichloroethane and 1,2-dichloroethane.

The scope of this study was to compare groundwater analytical results collected via conventional well purging methods (Conventional), micro-purge /low flow sampling (Micropurge), USGGS passive diffusion bag sampler (USGS or PDB) and DMLS™ diffusion sampler (DMLS™).

A.1.4 Remedial Phase

Long Term Monitoring

A.1.5 Outcome

Concentration differences between the four sample methods were quantified by the Analysis of Variance (ANOVA) test. ANOVA is a statistical procedure used to compare the means of different groups of data to determine if there are significant differences among the groups. This test is designed to determine if the data sets are drawn from the same distribution. If a chemical passes the ANOVA test, it can be concluded that there are no significant differences among the various sampling techniques. The study concluded that the ANOVA results indicate that there are no statistically significant differences among analytical results obtained using the four groundwater sampling techniques.

The variability between the four sample methods collected samples was further evaluated by collecting duplicate samples and calculating the RPDs between the main samples and the duplicate samples for the four sampling methods. In no instance did the RPD between primary and duplicate samples exceed 20 percent, demonstrating acceptable accuracy.

Each of the four sampling methods was rated in each of the comparison categories (cost, accuracy, ease of use, generation of investigation derived waste, definition of contaminants and natural attenuation monitoring). The USGS PDB sampler was rated with the highest overall performance rate of the four methods.

The report noted several benefits of using USGS PDB sampler, quick and simple installation and sample collection, minimal decontamination, negligeable quantities of investigation derived waste. The disadvantages of the USGS PDB sampler that it is suitable only for VOC analysis and inappropriate for measurements of some charged inorganic natural attenuation parameters.

The report also mentioned that PDB may not be suitable for sites with significant variations of groundwater elevations during the sampling period that could expose the USGS/PDB sampler to air and provide negative bias data.

Report recommended using USGS/PDB for CVOC compliance quarterly monitoring, but micro-purge/low flow sampling for natural attenuation parameters at lower sampling frequency (e.g., annually).

A.1.6 References

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