

A.1 Technology Name

Min-Trap® Sampler

A.1.1 Source

Divine. 2022. *Demonstration of Mineral Traps to Passively Evaluate and Monitor In-Situ Reactive Minerals for Chlorinated Solvent Treatment*. Final Report. ESTCP Project ER19-5190. October.

Media:	Groundwater
Study Type:	Side-by-side comparison
Technology:	Accumulation
Peer Reviewed:	Yes
Publication Date:	October 2022

A.1.3 Site Description

- Field and laboratory tank demonstration of Min-Trap® Sampler at two sites associated with Vandenberg Space Force Base in Central California.
- Ongoing in-situ bioremediation remedy via enhanced reductive dechlorination (ERD) within clay, silt and silty sand aquifers and target treatment area within 1,000 µg/L Trichloroethene (TCE) plume and other areas with elevated TCE concentrations indicative of potential dense non-aqueous phase liquid (NAPL).
- Ambient iron and sulfate groundwater chemistry at the two sites were sufficient to drive iron sulfide mineral formation following ERD implementation and development of reducing geochemical conditions.

A.1.4 Remedial Phase

Remedial phase demonstration of the use of the Min-Trap® technology to collect mineralogical data to evaluate and manage the ERD remedy. Multiple performance objectives including, but not limited to, comparing data collected from Min-Trap® with corresponding geochemical conditions and traditional soil core collection methods, determining minimum deployment time to obtain measurable amounts of reactive minerals and whether abiotic reaction rates can be measured, evaluating spatial variability in results from multiple locations, and whether targeted microbial community characterization can be performed with sampler.

A.1.5 Outcome

Presence of reduced iron minerals in Min-Trap® samples in monitoring wells confirmed in areas with highly reducing geochemical conditions and were absent in areas did not exhibit reducing conditions. Significant biogenic iron sulfide minerals present in Min-Trap® samples were consistent with chemical and spectroscopic analyses of collected soil cores. Deployment periods of 1 to 2 months indicated Min-Trap® samples can detect iron sulfide minerals forming in the aquifer. Use of 14C assay was able to adequately measure abiotic reaction rates for TCE on Min-Trap® samples. Spatial variability of the presence or absence of reactive iron sulfide

minerals consistent with spatial variations in groundwater flux, geochemistry and/or remediation system operation. Microbial testing results indicate Min-Trap® and Bio-Trap® samples provide comparable microbiological data. Min-Trap® sampling costs are low compared to overall performance monitoring costs and can be used more frequently and reliably than conventional methods to allow for effective remedy implementation and optimization.

A.1.6 References

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