

A Comparison of Membrane Interface Probe (MIP) Relative Responses to Field-collected Screening Data (Color-Tec) and Laboratory Analytical Data, Pueblo Chemical Depot, Pueblo, Colorado

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Background/Objectives. Pueblo Chemical Depot (PCD), a 24,000-acre facility near Pueblo, Colorado, contains one of the largest remaining stockpiles of chemical warfare agents in the United States. Historically, PCD began operations in the early 1940s accompanied by large-scale war-time operations including maintenance and refurbishing of artillery, fire control, and optical material. Historical use of chlorinated solvents including trichloroethene (TCE) was widely reported at the site. Due to PCDs size and scope of historical operations, multiple areas of TCE-impacted groundwater have been noted throughout the facility. Historical remedies have included large scale injection of carbon substrates and bioaugmentation materials.

Approach/Activities. At multiple areas where in situ enhanced reductive dechlorination of groundwater has failed to fully treat source areas and groundwater plumes, a MIP, Color-Tec (colorimetric field analysis for chlorinated solvents [cVOCs]) and soil and groundwater sampling demonstration program was initiated to screen potential technologies for further characterizing potential source material and groundwater plumes. The approach utilized during this investigation allowed for multiple technologies to be used to evaluate the presence/absence of source material with real-time decision making with field screening the laboratory analytical tools. Initially, MIP and soil/groundwater sampling locations were installed primarily in known source treatment areas, but to broaden the study, also within non-source groundwater plumes. At the time of this abstract submittal, the pilot scale investigation has been completed and full scale investigation is planned for October 2016 including multiple step-outs and transects across plume boundaries.

Results/Lessons Learned. This poster or platform will include significant data interpretation of approximately one thousand feet of MIP data including relative response of four detectors, with corresponding high density soil and groundwater sampling using Color-Tec, and side-by-side traditional soil and groundwater sampling analyzed by a fixed based laboratory. The comparison will include ability/inability to consistently correlate MIP, Color-Tec and laboratory data such that select methodologies can be evaluated as being more appropriate for select parameters including lithology, cVOC concentrations, and soil vs. groundwater. Current data suggest variability between Color-Tec and laboratory data; although responses appear relatively consistent, the degree of correlation is insufficient to make this a reliable screening tool. For the full-scale investigation beginning in October 2016, MIP was selected as the primary tool for high resolution characterization of source areas with laboratory samples at select locations. Direct push drilling with laboratory groundwater analysis was selected to investigate non-source plume areas. For the MIP-laboratory correlation, the increase in sampling density and overall sampling will vet the statistical variability of a small sample size during the pilot phase and help provide a consistent data collection methodology for these types of sites.