

**Final Report
Six-Phase Heating Treatability Study
at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**

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The Effect of the SPH System on Adjacent Utilities and Facilities – Air samples were collected at four separate subsurface locations adjacent to the SPH treatability study site. Samples were collected to ensure and document that workers in adjacent facilities were not being exposed to VOC contaminants generated by SPH operations.

During the first 30 days of system operation, air samples were collected daily from the C-400 building basement and from three locations in a tunnel located just east of the SPH site. The samples were collected using gas indicator tubes designed to identify TCE and VC. Neither contaminant was detected during the initial 30-day time period. Therefore, the sampling frequency was reduced to weekly. Gas indicator tubes indicated no detections of TCE or VC for the duration of SPH operations. The detection limits were 2 parts per million (ppm) for TCE and 0.5 ppm for VC.

Additionally, for the first 10 weeks of SPH operations, air samples were collected weekly at the same four locations using summa canisters configured to collect a 24-hour integrated sample. Summa canisters were analyzed for VOCs with detection limits of 0.5 ppmv. During the week of March 17, 2003, TCE was detected at 2.8 ppmv in the summa canister sample collected from the C-400 basement. The positive TCE result was evaluated and determined to have originated from seep water in the sump surrounding an abandoned TCE storage tank located in the C-400 building. However, as a precaution, and for the remainder of the project, one of the summa canister sample locations was changed from the tunnel to the office area of the C-400 building. Additionally, sample collection was reduced from weekly to bi-weekly for the remainder of the project. All results from samples collected in the C-400 building office area were non-detect.

An additional TCE detection occurred during SPH operations. The C-400 basement sample collected during the week of May 12, 2003 had an estimated TCE detection of 0.5 ppm. The positive TCE result was again determined to have originated from the seep water in the sump surrounding the abandoned TCE tank in the C-400 building. There were no other detections of the contaminants of concern throughout SPH operations.

2.2 LESSONS LEARNED AND RECOMMENDATIONS

Topic

Heated groundwater may have migrated from the treatment area.

Description

Thermocouples located in the borings of monitoring wells MW405 and MW408 outside the treatment area indicated that heated groundwater may have migrated from the treatment area during the treatability study (Figures 4.3 and 4.4), particularly near the middle of the RGA at approximately 23 m (75 ft) bgs. However, the heated groundwater did not appear to carry significant TCE mass because the VOC concentrations in MW405 and MW408 decreased as the heated groundwater encroached upon them. The horizontal flow of groundwater is discussed further in Section 4.1.

Solution / Recommendation

A hydraulic control system could be incorporated into a full-scale design to prevent the spread of heated groundwater; however, the cost of such a system may not be justified because of the lack of detrimental effects shown during the treatability study. Edge effects, including hot groundwater spreading, become relatively less important as the treatment area increases.