

Implementation of a Passive DNAPL Recovery Program at a USEPA Region 5 CERCLA Site

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Background/Objectives. A former chlorinated solvent manufacturing facility used a series of unlined ponds for separation of process solids circa 1950-1972. In 1986, the site was designated as a CERCLA Site within USEPA Region 5. From 1992 to 2002, the facility completed the Remedial Investigation/Feasibility Study, Remedial Design, Remedial Action and Record of Decision (ROD) process. High vacuum, dual phase groundwater and DNAPL extraction was used for site remediation from 2002 to 2014. During a span of 12 years, approximately 6,000 gallons of DNAPL was recovered. Also, the site conceptual model (SCM) was updated using MIP investigations, pilot studies and continuously sampled soil borings. Based on recovery operations and the updated SCM, it was determined that high vacuum extraction was ineffective for DNAPL removal as it required extensive OMM and not cost effective.

Approach Activities. Considering operational issues and the updated SCM, a request was submitted for USEPA to consider an Explanation of Significant Difference (ESD) to modify the ROD and change the DNAPL recovery method. The ESD was issued in January 2014 and changed the DNAPL recovery method to passive recovery using drop tube vacuum extraction from recovery wells. The ESD program required that 180, 4-inch diameter, HDPE wells be installed at 45 ft. spacings in the source area. A Mobile DNAPL Recovery Unit (25 ft trailer, dual double diaphragm pumps, conical separation tank, activated carbon air treatment) was designed and built for DNAPL recovery. Monthly recovery was required for any well with greater than 1 ft of DNAPL. Installation of the passive recovery system was completed in 2014 and the MDRU program became fully operational in September 2014.

Results/Lessons Learned. In June 2017, USEPA Region 5 approved the ESD Construction Completion Report and indicated that all requirements were achieved. Recoverable DNAPL (>1 ft) has been identified in approximately 75 of the 180 recovery wells. During the past three years, more than 27,000 gallons of DNAPL have been recovered and treated offsite. Currently, approximately 208 gallons are recovered monthly. The former high vacuum operation recovered 8,000 gallons in 12 years and required extensive OMM, due to corrosion of materials and vapor phase treatment. Annual OMM costs ranged from \$300,000-\$325,000/yr. The current passive operation has minimal OMM (annual well cleanout, vacuum pump repair and drop tube adjustments). Annual OMM costs range from \$90,000-\$125,000/yr. including monitoring and reporting to USEPA. It is expected that the passive DNAPL recovery operation will continue for the next 30-50 years, if not longer. The use of an ESD has provided a cost effective, reliable, and sustainable method of DNAPL recovery.