

## **Groundwater Recovery System Replacement Using a Multiple Lines of Evidence MNA Demonstration**

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**Background/Objectives.** An existing groundwater recovery system, operating since the late 1990s, was shut down through the implementation of a multiple lines of evidence (LOEs) MNA demonstration and the associated data evaluation. The existing groundwater recovery system had begun to approach asymptotic mass removal rates and the associated treatment plant was in need of significant capital investment to replace aging components. Project objectives were to collect multiple LOEs and evaluate the potential implement MNA to prevent migration of the VOCs beyond the GMZ boundary; prevent exposure of human receptors; and reduce vinyl chloride to concentrations less than specified remediation objectives.

**Approach/Activities.** To collect additional data related to the multiple LOEs, a combination of historical data re-evaluation, a revised conceptual site model (CSM) and a series of supplemental groundwater / surface water / porewater sampling events were completed. More than 20 years of historical groundwater monitoring and groundwater recovery system data were re-evaluated using detailed plume analytics, existing geologic and hydrogeologic conditions were evaluated using sequence stratigraphy to revise the existing CSM, and supplemental sampling events were completed to collect microbiological, dissolved gases, inorganic, and other natural attenuation data.

The multiple lines of evidence were assembled over the course of a year and the data was subsequently compiled into a comprehensive site-wide presentation to the regulators. The objective of the regulator presentation was to secure/obtain a temporary one-year cessation of groundwater recovery operations during which time an enhanced groundwater monitoring program was implemented to document the continued natural attenuation mechanisms with the groundwater recovery system shutdown.

**Results/Lessons Learned.** The completion of the revised CSM, detailed plume analytics, and the evaluation of the supplemental groundwater data provided a comprehensive assessment and demonstration that natural attenuation is a viable alternative remedial approach to the groundwater recovery system. An overview of the data evaluation will be presented. The regulators granted permission for a temporary cessation of groundwater recovery along with enhanced groundwater monitoring from 2022-2023. The results from the enhanced groundwater monitoring program from 2022 and early 2023 will also be presented to demonstrate the efficacy of natural attenuation and the justification that the groundwater recovery system does not need to be re-started.