BURNS McDONNELL

CASE STUDY

Multifaceted Treatment Approach Speeds Site Cleanup for Community

Investigation and evaluation were already underway at the site of a former manufactured gas plant in central Illinois when the utility that owned the property learned of a school development on adjacent land. The project team pivoted to expand its work in support of the school development and deliver timely remedies for the client.

Challenge

Just a short way off an interstate highway in central Illinois, a property currently owned by a confidential electric utility had been the site of a manufactured gas plant (MGP) for 50 years. MGP operations ended in 1942, but utility operations at the site continued up to the present. Subsurface site investigation activities began in the 1990s.

The electric utility had been investigating the affected area, which was in a primarily commercial/industrial area, for a couple of decades. By the mid- to late-2010s, the utility was seeking a partner to perform a high-resolution comprehensive site characterization. Burns & McDonnell was selected to provide those services.

In 2020, the utility learned that an adjacent property south of the main site was being acquired for development of an elementary school. The project team

Project Stats

Client
Confidential electric utility

Location
Central Illinois

39
MAXIMUM DEPTH, IN FEET, OF EXCAVATION

28K
SQUARE FEET OF IN-SITU TREAMENT AREA

$4M+
ESTIMATED SAVINGS OVER ALTERNATIVE APPROACHES

hastened to expand its exploration for expedited analysis and remediation of the adjacent parcel on behalf of the community.

Solution

On the main site, we performed high-resolution site characterization, including usage of environmental sequence stratigraphy (ESS), TarGOST/electrical conductivity/hydraulic profiling tool probes, geochemical analysis, microbial population quantification and nested monitoring wells, combined with conventional soil and groundwater sampling. Most impacts were present in more permeable glacial outwash sands located approximately 20 to 35 feet below the ground surface.

The Illinois Environmental Protection Agency had approved conducting a pilot study to evaluate the effectiveness of in-situ remedies for implementation at the site shortly before the utility learned about the school development. The pilot study was designed as an alternative to remedy source material impacts that would be less disruptive to the community. The approach used a combination of surfactant-enhanced product recovery and in-situ chemical oxidation. Soil, groundwater and soil gas data were collected for several months after the pilot study to confirm the effectiveness of the combined approach.

While the pilot study activities were ongoing, the project team began rapid investigation of the adjacent school property to evaluate potential soil, groundwater and vapor intrusion risks. Following the results of that investigation, the utility was able to issue a request for proposal for the excavation and engineered barrier installation to meet residential remedial objectives.

Efforts to expedite the school property remedy included pre-excavation confirmation sampling, submission of expedited in-situ stabilization treatability samples prior to awarding the contract, and early and frequent involvement of the school development property stakeholders to align remediation design details with property development requirements. Burns & McDonnell prepared the design documents, assisted in bidder selection, conducted air monitoring and served as owner's engineer during the remedy implementation on that parcel.

Remediation on the main site was conducted using a combination of in-situ treatment technologies and excavation and off-site disposal. Despite early initiation of utility relocations, some elements such as existing sewers, utility poles and other subsurface utilities presented significant challenges for conventional excavation.

Full-scale remedy implementation began in December 2022 with installation of 34 injection/extraction wells. The surfactant enhanced product recovery (SEPR) phase operated from February-August 2023, and the in-situ chemical oxidation (ISCO) injection phase delivering iron-activated sodium persulfate via more than 200 direct-push injection locations operated from May-August 2023. Overlap between the SEPR and ISCO phases was required to meet the project deadline. The overlap was coordinated using a variety of factors, including property-specific schedule considerations and mass-flux recovery criteria updated using daily collected performance monitoring data.

Results

The advanced geoscience applied in the high-resolution comprehensive site characterization proved invaluable in achieving project success. While this approach required

more upfront investment, the trust between the utility and the consultant saved considerable time on the back end by providing clear understanding of subsurface behaviors. That enabled the team to mitigate issues from the start, rather than dealing with potential problems as they might have arisen later in the project.

The electric utility and the project team were able to enhance the community by adapting to expand the remediation project in support of the adjacent elementary school development. The trust-based relationship helped expedite completion of the site characterization and design for the remedy at the school property. The team successfully met the development timeline for the property, including the receipt of a No Further Remediation (NFR) letter.

The project team and contractor minimized field downtime by leveraging on-site earthwork capabilities. Simultaneous design and execution of separate remedial approaches targeted for different parcels also saved time. The pilot study provided actionable data for full-scale design refinement, including site-specific mobile porosity calculations, delivery methodologies and daylighting mitigation considerations.

The combined remedy is estimated to have delivered savings of at least $4 million for the utility, when compared with alternatives. Both the utility and external stakeholders were satisfied with the final outcome of the project.

About Burns & McDonnell

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