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## Site Closure with Multi-Level Treatment Approach at a Former MGP Site: Central Illinois

### PROJECT OVERVIEW

The Mattoon Former Manufactured Gas Plant (FMGP) Site is located in Mattoon, IL and is currently owned by Ameren Services Corporation (Ameren). This MGP site was historically operated using a method of extracting oil from coal for use in residential lighting and heating before natural gas was available. One of the waste products of this process is coal tar, which is a mixture of volatile organic compounds (VOC) and polycyclic aromatic hydrocarbons (PAH). Several former gas holders and tar wells were removed and backfilled with fill and concrete debris between 1985 and 1987 and environmental investigations were initiated in 2007.

A Remedial Objectives Report and Remedial Action Plan (ROR/RAP) completed in July 2009 specified excavation and removal of the on-site source material and in situ chemical

oxidation (ISCO) of the off-site impacts under an active city street adjacent to the FMGP Site.

The remedial goal for the off-site treatment was compliance with Illinois TACO subpart C, in this case:

- Reduce MGP impacts from measured values of 17,000+ milligrams per kilogram (mg/kg) of total petroleum hydrocarbon (TPH) to approximately 9,000 mg/kg, and
- Reduce dissolved benzene concentrations an order of magnitude from measured highs of 30,000 to 40,000 micrograms per liter ( $\mu\text{g/l}$ ); a reduction in the elevated groundwater benzene concentration by active treatment was sought to reduce the potential for migration and elevated downgradient concentrations.

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Above: ISCO System Set-Up at Mattoon MGP Site

### Project Name & Location

In Situ Chemical Oxidation at Former Manufactured Gas Plant (MGP) Site (Mattoon, IL)

### Nature of XDD's Responsibilities

- Previous Remedial Activities Review
- Data Gap Analysis
- Bench Scale Testing
- Remedial Design and Implementation of Full-Scale ISCO Application

### Contaminants of Concerns

- BTEX (Coal Tar)
- Polycyclic aromatic hydrocarbons (Coal tar)

### Project Owner/Client

Ameren Services Corporation  
St. Louis, MO  
*Individual client reference available upon request*

### Key XDD Personnel

Mike Marley, L.E.P. Principal  
Derek Ingram, P.E. Project Mgr.

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## ISCO DESIGN & IMPLEMENTATION

In 2009, XDD was contracted by Ameren to review available site data, identify data gaps, conduct a bench treatability study and implement an injection/extraction pilot study. Based on the data collected from the bench and pilot studies, XDD subsequently designed and implemented full-scale treatment using alkaline activated persulfate (AAP) of the off-site impacts under the road. The off-site treatment consisted of two treatment areas (West and East Area) separated by a natural hydraulic barrier.

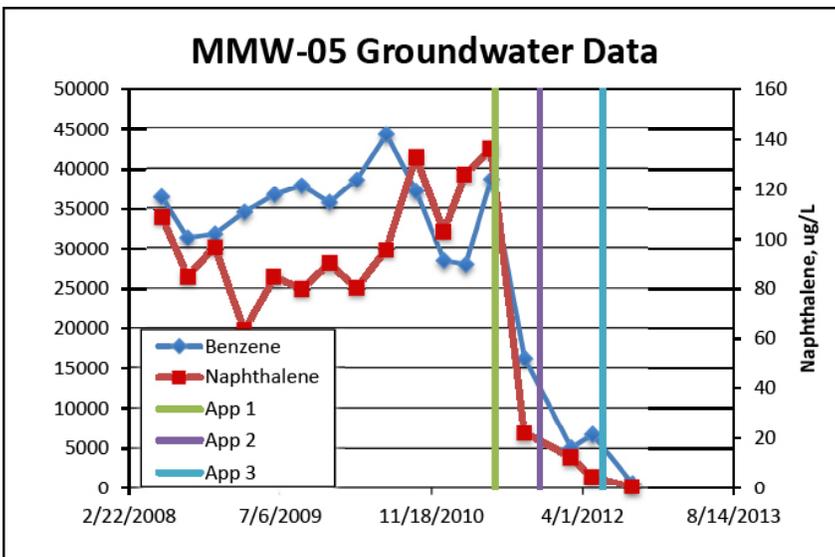
The off-site ISCO treatment occurred at the same time as the on-site

excavation (performed by others) between June 2011 and June 2012. XDD used a combination of permanent injection wells installed along grass areas and a parking lot adjacent to the road, along with temporary direct push injection wells installed within the active roadway to implement the ISCO treatment.

Multiple targeted injections of ISCO were applied in both the West and East areas. Approximately 46,200 pounds of persulfate were injected into the two areas over three injection applications.

Post-Injection monitoring confirmed that the remedial goals were achieved in both areas as summarized below:

- West Area: Confirmation soil samples in the west area met the criteria with TPH reductions to approximately 2,500 mg/kg.
- East Area: greater than a 98 percent reduction in dissolved benzene concentrations was achieved from a 30,000 µg/l to 40,000 µg/L baseline to approximately 600 µg/L post treatment (*see below chart*).



**XDD's ISCO applications exceeded the remedial goal of 90% reduction in benzene concentrations by achieving a 98% reduction from baseline concentrations.**

## RESULTS

Site closure was obtained by receipt of a **No Further Action (NFA) letter** from the State of Illinois in May 2013. The off-site ISCO treatment was approximately 5% of the total project costs. This cost would have been significantly higher if excavation of the impacts were conducted instead of ISCO.