



A Case Study: Manufactured Gas Plant Site, Troy, NY

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Abstract

The site of the former MGP Site in Troy, NY, which is situated on the Hudson River less than five miles north of the Albany, NY, has an impressive industrial history. The site was home to iron and steel manufacturing as early as 1847 and was the location of the first American steel manufacturing plant (established in 1864) that employed the Bessemer process, which allowed for mass-production of steel which in turn further fueled the Industrial Revolution. MGP operations evolved on a portion of the site to support the steel manufacturing by producing coke and from there evolved into a commercial coke plant and gas works. At its height the MGP was one of the largest in the state and provided gas from its 2,000,000 cubic foot gasholder to communities all over the capital area (west to Amsterdam, north to Glens Falls). In addition to the coke and gas manufacturing, the site also had a by-products recovery and processing operation (and testing laboratory) to capitalize on by-products derived from coal tar (e.g., phenol, naphthalene, creosote, pitch), ammonia (e.g., ammonium sulfate fertilizer), and light oils (e.g., benzene, xylenes, toluene) generated during the process. In 1956, the MGP was retired and since then the site has been home to a bulk petroleum terminal and distribution center and other small-scale industrial operations.

The past industrial operations have left the site impacted with MGP residuals (coal tar, purifier waste) and petroleum. Initial investigation activities began in 1994, followed by several interim remedial actions, and further investigations. In 2003, the NYSDEC selected a remedy for the site, which consisted of large-scale excavation and in-situ chemical oxidation. However, following additional pre-design investigation and treatability testing (conducted in the shadow of the former Water Gas Building), it became clear that the selected remedy would not be able to achieve the remedial objectives for the site. In addition, through these additional investigations, the conceptual model became more refined as more information was developed on the nature and extent of the MGP impacts and the effect the site geology was having on contaminant distribution and mobility.

A revised remedy was developed for the site based on the increased understanding of the hydrogeology and nature and extent of MGP impacts. The revised remedy maintains a substantial excavation component, but now includes an in situ solidification (ISS) component that works in concert with the site geology to provide long-term containment of MGP residuals on-site and permit future site redevelopment. Remedial design is currently ongoing and is being coordinated with the current owner, the City of Troy. Although it would be a tall order to surpass the past grandeur of this site, the future of the site is bright. As part of its overall riverfront revitalization plans, the City of Troy has targeted the site for redevelopment as Troy Energy Park.

Hudson Valley Coke & Products Corp. (1924-29)

- Large consolidated coke plant and gas works.
- Sent gas to Troy, Albany, Schenectady, Amsterdam, Johnstown, Gloversville, Saratoga Springs, Hudson Falls, Glens Falls, and intermediate points
- Replaced 7 local gas works.

1935 Postcard (looking NW)

1936 Plant Stats:

- Produced 10-20 million CF gas sold per day
- 1500 - 1650 tons coal used per day
- 1000 - 1120 tons coke produced per day
- 475 employees
- \$8,000 per day operation costs

“Old gas plants are now as much out-classed by the Troy Coke Plant as the Model T is outclassed by the V-8.”
— excerpt from October 1936 Brochure “The Coke Plant”

1953 Postcard (looking NE)

3 years before the MGP was officially retired

Main Areas of Impacts

Stratigraphy (West-East Cross-Section)

Stratigraphy (North-South Cross-Section)

ISCO Pilot Test (2004-2005)

- ISCO was a primary component of the initial remedy.
- Tested Fenton's Reagent.
- Demonstrated that ISCO would not be effective in achieving goals in NAPL-impacted areas.

Selected Remedy

Structure Cleanout and Purifier Waste Removal

Summary

Introduction:

- Former MGP Site in Troy, NY
- 16-acre property located on Hudson River
- Long history of industrial operations (dating back to mid-1800's) - steel, coke, MGP, MGP by-products recovery, petroleum terminal - which have left the Site impacted with MGP residuals (coal tar, purifier waste) and petroleum.
- To date remediation activities have included investigations, pilot testing, remedy selection, and beginning phases of remedial action.
- Future plans include completion of remedial action followed by redevelopment by the Site owner (City of Troy).

Methodologies:

- Site Investigations (1994 to 1998)
- Remedy Evaluations (1998 to 2002)
- ROD (2003)
- Pre-Design Investigations (2003 to 2008) and ISCO Pilot Testing (2004 to 2005)
- Remedy Evaluations (2004 to 2010)
- Amended ROD (2011)
- Remedial Design (2011 - ongoing)
- Remedial Action:
 - Selected structure cleanout and purifier waste removal (2008-2009)
 - Full-scale remediation (planned 2012 to 2014)

Results:

- Stratigraphy: fill, alluvial deposits, lower sand and gravel, discontinuous glacial deposits, shale bedrock.
- Impacts:
 - NAPL (coal tar and petroleum), purifier waste, PAHs, BTEX.
 - 3 Main Areas of Impacts: (1) former Water Gas Building area; (2) former By-Products Building area; and (3) former Wynantskill Channel alignment.
 - Low mobility coal tar (resulting from the intense by-products recovery).
 - Alluvial deposits impede movement of groundwater and NAPL.
 - Groundwater impacts coincident with NAPL (decrease quickly outside NAPL areas).
- 2003 ROD Remedy: Excavation and ISCO (with eng. and inst. controls)
- Pre-Design Investigations identified substantial area and volume increases and infeasibility of ISCO.
- Barrier Wall approaches were considered (partial and full walls), but eliminated due to concerns about the alluvial layer as a suitable key-in unit.
- Selected Remedy (2010 Amended ROD): Excavation (27,000 CY) and ISS (69,000 CY) (with other minor components including eng. and inst. controls)

Conclusions:

- Selected Remedy is the result of extensive site investigation and remedy evaluations. A thorough understanding of the Site Conceptual Model was developed and the remedy targets the most heavily impacted area that pose the greatest potential for future risks of constituent migration or exposure.
- Planned Remedial Action Activities:
 - Southern Area Remedial Action (Excavation and Cover): 2012-13
 - Northern Area Remedial Action (Excavation, ISS, and Cover): 2013-14
- Main Challenges/Considerations for Remediation:
 - Subsurface obstacles (foundations, structures, pipes, debris, slag, utilities).
 - Excavation and ISS adjacent to buildings, structures, railroad
 - Integration with site redevelopment
- Site Redevelopment:
 - City of Troy owns the Site and plans redevelopment of the Site into “Troy Energy Park”
 - The City is in discussions with several companies, including one that uses membrane technology to purify liquid chemical and industrial waste for reuse, one that converts municipal solid waste to ethanol biofuel, and another that serves as a U.S. defense contractor.
 - One of the redevelopment alternatives was estimated to result in a \$70 million investment into the city along with over 100 new jobs.



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