Sediment Delineation and Remediation within the New York State Barge Canal at a Former Manufactured Gas Plant Site

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Background/Objectives. Non-aqueous phase liquid (NAPL, i.e., coal tar) has migrated approximately 200 feet from a former Manufactured Gas Plant Site (former MGP Site) through shallow fractured bedrock and has seeped into sediment within the New York State Barge Canal (the Canal) near Lock E35 in Lockport, NY. At this location, the Canal is cut approximately 45 feet into bedrock and has vertical walls and a relatively flat exposed bedrock floor. The New York State Department of Environmental Conservation (NYSDEC)-issued Record of Decision (ROD) for the Site includes a requirement for delineation of MGP-impacted sediment and remediation of these sediments. The delineation of impacted sediments is complicated by stormwater discharges to the Canal from heavily industrial zoned properties located within the vicinity of the Canal and historical commercial and recreational boating traffic. The ROD further specifies that sediment excavation will not begin until onsite remediation is complete and subsequent observations indicate cessation of NAPL seeps. Work completed within the Canal is complicated due to safety concerns related to the location of the impacted sediment at the base of the vertical exposed bedrock Canal walls, large amount of anthropogenic debris and significant talus found within the Canal, and potential safety hazards from rock or debris falling from the vertical Canal walls. Remediation work will be performed during the non-navigation season during which the Canal is drained to base flow conditions; logistical setup, remediation, and restoration must occur between December 1 when the Canal is drained and March 30 when the Canal is charged to navigable conditions.

Approach/Activities. The ROD required a Pre-Design Investigation be performed because the Feasibility Study did not fully delineate the area of MGP-impacted sediment for remediation; i.e., concentrations of polycyclic aromatic hydrocarbons (PAHs, potentially indicative of MGP-impacts) in the sediments were above NYSDEC screening values upstream of historic seep areas. In the interest of safety, historic seep cessation was demonstrated through visual observation of the Canal wall during sequential non-navigation seasons. Delineation sampling was then conducted manually during the non-navigation season without the use of mechanical equipment, providing greater visual/olfactory assessment of physical conditions (odor, sheen, etc.) at each sampling point along multiple transects. To differentiate MGP related PAHs from other anthropogenic contamination, forensic PAH information was obtained during the delineation investigation. Preliminary delineation samples were analyzed for extended PAH and alkylated PAH profiles analysis (i.e., potential site-related compounds). Based on the results of these analyses, a select sub-set of samples were submitted for forensic analysis, including wide range hydrocarbon fingerprint analysis, total petroleum hydrocarbons, alkanes, and isoprenoid biocompounds. The forensic data, in conjunction with data collected during the Remedial Investigation, were used to refine the footprint of PAHs that were or were not MGP-related.

Results/Lessons Learned. The forensic data collected during the delineation program were successfully used to refine the ROD-defined limits of sediment excavation and reduce the removal volume from 1,200 to 800 cubic yards. The NYSDEC-approved Remedial Design requires the construction contractor to develop an approach to conducting remediation work safely and to complete of work while the Canal is drained. Currently, procurement of a construction contractor is underway.