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Title: ART Pilot Study for a CVOC contaminated site in South Brunswick, New Jersey

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Key Topic: Innovative Remediation Technologies

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Client Name: Sealy, Inc.

Project Name: Tempur Sealy

Project Location: South Brunswick, New Jersey

Primary Ramboll Project Staff (Office): Princeton, New Jersey

ABSTRACT

Background/Objectives:

In 2017, Ramboll was retained by Sealy, Inc. to complete a remedial investigation and implement a final remedial plan for impacted soils and groundwater at a site located in South Brunswick, NJ. Ramboll took over the O&M of two interim remedial systems, namely, a vapor mitigation and a groundwater P&T system. Historical discharges have impacted soil and groundwater media across different hydraulic units with VOCs, primarily PCE and its daughter products. Site investigations identified a 'hot-spot' source area within a 110,000 square foot commercial warehouse. PCE concentrations have been detected as high as 48,000 ug/L in groundwater under the warehouse. The existing SSD and P&T Systems were controlling the vapor intrusion pathway to buildings and minimizing off-site migration of groundwater, respectively; however, additional remedial actions were necessary to address the impacted media beneath the warehouse. Ramboll performed a remedial alternatives analysis and selected Accelerated Remediation Technologies, Inc. (ART), In-Well Integrated technologies, for controlling and reducing the source area within the warehouse. The ART In-Well technologies combine several proven remedial processes, specifically in-situ air stripping, air sparging, soil vapor extraction, and enhanced bioremediation/oxidation in addition to subsurface groundwater circulation, in one well. This technology addresses both saturated soil and groundwater and is easily adaptable to field conditions, with minor disruption to site operations.

Approach/Activities:

In 2018, Ramboll installed an ART well system for an initial six-month pilot study. The pilot ART system includes a 4-inch monitoring well, five monitoring wells/piezometers, an in-well water extraction and recirculation line, vapor extraction line, electrical lines, and connection to a treatment shed outside the warehouse, which includes an SVE blower, vapor/liquid knockout tank, air compressor, connection to two 200lb GAC vessels, and an air discharge stack. The pilot study was designed to evaluate the removal of volatile organic compounds (VOCs) within the shallow groundwater beneath the warehouse. A baseline groundwater sampling event was performed July 10-11, 2018, prior to system start-up on July 12, 2018. Initial groundwater concentrations of PCE ranged between 250 µg/L to 48,000 µg/L. After the system start-up, monitoring wells and piezometers were sampled and analyzed for VOCs every six weeks until January 2019. Weekly operation and maintenance monitoring, including vacuum, temperature, flow, and PID measurements, was performed during this period as well.

Results/Lessons Learned:

Results of the six-month pilot study showed a decrease in total VOC concentrations between July 2018 and January 2019. An approximately 40% mass reduction was observed over the 6-month period. No increase of contaminant mass was noted outside the source area within the same hydraulic units, a condition that indicates that the ART system was effectively removing and treating contaminants within the source area. Based on the results of the pilot study, two additional ART wells were installed and are expected to start up in September 2022. It is anticipated that the addition of these ART wells

will significantly reduce the mass of VOC contaminants in the source area, ultimately minimizing any additional impact to the existing groundwater units.

Aspect of Work that Relates to Sustainability:

Due to the nature of this in-situ remediation technology, (a) there is minimal waste generated over the lifetime of the system, (b) landfilling and the use of fossil fuels for truck transport is avoided, which is typically seen in dig and haul practices, (c) energy required to run the system is small, and (d) maintenance frequency tends to be lower, when compared to other technologies.