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Ms. Pamela Tames
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Via Electronic Transmission

RE: **DRAFT SEPTEMBER 2016**
SEMI-ANNUAL/ANNUAL
GROUNDWATER QUALITY UPDATE
Rowe Industries Superfund Site
Groundwater Recovery and Treatment System
Sag Harbor, New York

Dear Ms. Tames:

LBG Engineering Services, P.C. (LBGES) has completed the 2016 September groundwater quality monitoring event for select monitor and recovery wells at the Former Rowe Industries Superfund Site (the Site) in Sag Harbor, New York (Figures 1 and 2). The purpose of the groundwater sampling is the long-term monitoring of groundwater quality at the Site. The following sections summarize a brief site history, groundwater sampling procedures, groundwater quality results, findings, conclusions and recommendations.

SITE BACKGROUND

The site was historically used to manufacture various electrical components such as copper coils for toy slot cars. Degreasers used in the manufacturing process were disposed of in several drywells and were also stored in drums in the Former Drum Storage Area (FDSA) that eventually leaked to the ground surface. The contamination was detected in nearby drinking water wells during the mid-1980s, and the Suffolk County Department of Health investigation identified the source as the property occupied by Sag Harbor Industries (SHI). The subsequent remedial investigation identified the compounds of concern (COCs) as tetrachloroethylene (PCE), trichloroethylene (TCE) and 1,1,1-trichloroethane (TCA). A groundwater contaminant plume extended northwesterly from the FDSA for over ½-mile toward a brackish estuary named Ligonee Creek and Sag Harbor Cove.

In 2000, a focused groundwater pump and treat system (FP&T) was installed to address the most impacted groundwater located on top of a shallow clay lens in the FDSA. The FP&T system includes four focus recovery wells, FRW-1 through 4; each capable of producing water at an approximate pumping rate of 1 to 6 gpm (gallons per minute). Between 2000 and 2002, a full-scale pump and treat (FSP&T) system was constructed with nine downgradient recovery wells (RW-1 thru 9), and piped to a two-story remediation building located on the SHI property. Operation of the FSP&T system commenced in December 2002. Computer modeling indicated that with continuous full operation, 99% of the plume would be removed in 11 years.

On July 13, 2005, the operation of RW-1 was discontinued with permission from the EPA after observing water-quality results below the laboratory reporting limits of 1 ug/l (micrograms per liter) for over two years. Subsequently, the RWs, with the exception of RW-2 which continues to operate today, were shut down after achieving water-quality results below Applicable or Relevant and Appropriate Requirements (ARAR) for over three years:

- RW-3 was shut down on May 21, 2012;
- RW-4 was shut down on January 1, 2014;
- RW-5 was shut down on May 23, 2012;
- RW-6 was shut down on January 1, 2014;
- RW-7 was shut down on January 1, 2014;
- RW-8 was shut down on April 30, 2012; and
- RW-9 was shut down on April 23, 2012.

Even though the groundwater quality at RW-2 has been below the ARAR for over seven years, RW-2 will remain in operation as a protective measure in the event there is a lapse in containment by the FRWs in the FDSA. In accordance with the approved Limited Shutdown Plan of May 29, 2012 (RW-3, 5, 8 and 9) and October 18, 2013 (RW-4, 6 and 7), each of the RWs that were shut down were monitored monthly for six months followed by quarterly monitoring for one year, and then followed by semi-annual monitoring for the remainder of the operation of the FSP&T system. Rebound of COC concentrations has not been observed at RW-1, RW-2, RW-3 or downgradient from these wells since the shutdown of the RWs.

The groundwater quality in the downgradient monitor and recovery wells, and many of the monitor and recovery wells on the Sag Harbor Industries (SHI) property, has either been below laboratory reporting limits or below ARARs for at least three years or longer. Therefore, on July 15, 2016, LBGES submitted a letter proposing modifications to the existing groundwater and FSP&T/FP&T system monitoring program, as defined in the Sampling, Analysis and Monitoring Plan (SAMP), to the United States Environmental Protection Agency (EPA) for approval. The proposed modification to the sampling program included: a) decreased sampling of the FSP&T system water and air samples (both frequency and/or number of locations sampled); b) the discontinuation of groundwater elevation measurements and groundwater quality sampling at all monitor and recovery wells down gradient of the SHI; and, c) sampling select monitor wells on the SHI property and in the FDSA.

On September 2, 2016, the EPA approved the discontinuation of groundwater elevation measurements and groundwater quality sampling for piezometers and select monitor and recovery wells, while reducing the monitoring frequency of other monitor and recovery wells from semi-annual to annual. Table 1 summarizes the requested and approved changes to the groundwater monitoring program. The new groundwater monitoring frequency was implemented in September 2016.

Semi-annual groundwater quality samples will continue to be collected during March and September and the additional annual groundwater quality samples will be collected during September of each year. The FRWs and operating RW will continue to be monitored monthly for groundwater quality.

SEMI-ANNUAL AND ANNUAL GROUNDWATER MONITORING ACTIVITIES

LBGES completed semi-annual and annual groundwater sampling between September 13 and 15, 2016, which included the measurement of groundwater levels in select monitor and recovery wells and the collection of groundwater samples from select wells for laboratory analysis. The plan is designed to allow for an assessment of recovery system effectiveness, rebound of contaminant concentrations, natural degradation of the COCs, and monitoring the groundwater quality in the footprint of the former downgradient plume.

The September 2016 groundwater quality monitoring event included the collection of samples from 29 monitor wells, 4 RWs and 4 FRWs for a total of 37 wells.

Groundwater Level Measurements

The depth-to-water (DTW) levels were measured with an electronic water-level indicator (e-tape); the measurements at each location being referenced to the top of casing (TOC). The groundwater elevations were calculated by subtracting the DTW measurements from the TOC elevations. The e-tape was decontaminated between use at each well using Alconox (a detergent) and deionized water (DI).

On September 26, as part of the groundwater sampling event, DTW levels were measured in select monitor and recovery wells during static conditions (with the recovery wells turned off). The recovery wells were shut down on September 21, 2016, to allow ample time for groundwater levels to recover to static conditions. The data were used to calculate the groundwater elevations (Table 2 and Figure 3).

A round of DTW levels were measured in select monitor and recovery wells during pumping conditions on September 13, 2016. These data were used to calculate groundwater elevations with RW-2 and FRW-1 thru 4 operating and to estimate the capture zones (Table 2 and Figure 4).

Groundwater Sampling

Water samples were collected from the four FRWs and RW-2 via sample ports, which is the standard procedure during monthly groundwater quality sampling for these wells. All other groundwater samples, including three RWs (RW-3, 4 and 6), were collected in accordance with the EPA low-flow sampling technique guidelines. For the non-operating RWs, the tubing intake is set at the approximate depth of the former pump intake in order to collect groundwater samples comparable to samples collected while the RWs were operating.

Field parameters were monitored with a calibrated Horiba U52 meter and flow-thru cell for pH, conductivity, turbidity, dissolved oxygen (DO), temperature and oxidation reduction potential (ORP). Copies of the field sampling sheets are included in Appendix I. New tubing was used to collect the sample at each well and, due to the historical contaminants at the Site, spent tubing and personal protective equipment (PPE) was treated as hazardous waste, drummed, labeled and stored for disposal at a later time. Groundwater samples were collected in laboratory-supplied vials, preserved with hydrochloric acid (HCl), stored in dedicated coolers with ice and then delivered to a NYS-certified laboratory using proper chain-of-custody (COC) procedures. The groundwater samples were analyzed for Volatile Organic Compounds (VOCs) using EPA Method 8260.

Quality Assurance/Quality Control

For Quality Assurance/Quality Control (QA/QC) purposes, two trip blanks (TB) and two field blanks (FB), one each per sampling technician, were also analyzed. TBs are preserved vials prepared by the laboratory with de-ionized (DI) water and shipped with the sample vials. A set of TBs were carried by each sampling technician with their vials, and then returned to the laboratory for analysis in order to rule out inadvertent exposure of the vials or samples to VOCs. FBs were collected in the field by each sampling technician following the same procedures as the collection of groundwater samples with clean, single-use tubing, and then submitted to the laboratory for analysis in order to rule out any cross contamination from the tubing or equipment. Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples were collected from MW98-04 and MW-58A; these wells being chosen for the MS/MSD samples because of either historic detections of COCs in the groundwater samples from the well or because it was a newly constructed well. MS/MSD samples involve collecting a groundwater sample from a well in triplicate, and submitting all three samples to the laboratory for analysis. Two blind duplicate samples, MW-A and MW-B, were collected from MW98-04B and MW-59B, respectively, and submitted to the laboratory for analysis. A blind sample is a separate sample submitted for analysis with the source location and identity known to the sampling technician but unknown to the laboratory. The blind sample is used to ensure the laboratory's proficiency in the execution of the analysis. Based on the evaluation of the results of the QA/QC analyses, the laboratory data are usable for their intended purpose.

Groundwater Level Measurement Discussion

The water-table elevation data from the sampling event collected during static and pumping conditions were reviewed and used to construct water-table elevation contour maps (Figures 3 and 4, respectively). As depicted by the contour map, the interpreted groundwater flow direction at the Site is to the northwest towards Sag Harbor Cove. When compared to the September 2015 static groundwater elevations, the September 2016 groundwater elevations are comparable. When compared to the March 2016 static groundwater elevations, the September 2016 groundwater elevations are lower; likely the result of the dry summer conditions.

The groundwater contours were evaluated to assess the capture zone (Figure 4). The capture zone lines for the recovery wells are shown as dashed red lines. The capture zone map indicates that the operation of the FP&T system continues to minimize the migration of COCs away from the FDSA and the operation of RW-2 continues to be an effective protective measure to prevent COCs from migrating beyond its location.

Semi-Annual Groundwater Quality Results and Discussion

PCE, TCA, TCE and 1,2 cis-dichloroethylene (DCE) concentrations are summarized on Tables 3, 4, 5 and 6 respectively. Laboratory analytical data are provided in Appendix II. PCE, TCE, TCA and DCE concentrations detected in the wells located downgradient of the FDSA are below ARARs and, in most cases, below laboratory reporting limits. Furthermore, the COCs downgradient of the FDSA are within normal seasonal and temporal variability for the Site. Rebound of contaminant concentrations has not been detected above ARARs in the water samples from wells located downgradient of the FDSA following the shutdown of eight of the nine FSP&T recovery wells.

PCE concentrations in the groundwater at the FDSA continue to be above ARARs in most wells. The PCE concentrations in the FDSA observed in September 2016, when compared to March 2016, were comparable with the exception of the concentrations in the groundwater samples from the four FRW wells, which have decreased but remain within normal seasonal/temporal variability in the FDSA. Figure 5 shows the approximate size of the PCE plume in September 2016.

TCE and DCE, which are daughter products of PCE, continue to be detected in the FDSA wells. In the latest September sampling event, the TCE and cis-DCE concentrations were below ARARs in all FDSA wells sampled. The continued detection of these compounds suggests that limited biodegradation of PCE is continuing in the FDSA. However, the biodegradation of the PCE has not been sufficient to reduce the concentrations below the ARARs. Furthermore, the limited biodegradation that is occurring is not proceeding through to the end of the complete reductive dechlorination process.

TCA concentrations in the groundwater beneath the FDSA were within historical ranges and have been below ARARs in the FDSA for three and a half years.

While the FP&T wells provide sufficient hydraulic containment to prevent contaminants from migrating beyond the FDSA, PCE concentrations in the FDSA continue to persist above ARARs.

CONCLUSIONS

The following conclusions are based on the results of the September 2016 groundwater quality sampling event.

- The concentrations for the COCs in the groundwater downgradient from the FDSA continue to be below ARARs and have not rebounded in areas that are outside of the influence of the FP&T system.

- The operation of the FP&T system provides adequate hydraulic control of the COCs to prevent their migration beyond the FDSA. However, COC concentrations continue to persist above ARARs in the FDSA.

- The continued detection of TCE and DCE suggests limited biodegradation of PCE is occurring in the FDSA. However, the biodegradation of the PCE has not been sufficient to reduce the concentrations below the ARARs. Additionally, the limited biodegradation is not proceeding through to the end of the complete reductive dechlorination process.

If you have any questions or require additional information, please do not hesitate to contact Ms. Sandor or Mr. Goldberg directly at (475) 882-1711 or (475) 882-1708, respectively.

Very truly yours,

LBG ENGINEERING SERVICES, P.C.

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TKS:cmm
Enclosures
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