

March 20, 2023

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Mr. Jeffrey E. Mendenhall
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Bureau of Land and Waste Management
2600 Bull Street
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**Subject: Second 2022 Semiannual Monitoring Report
Products (SE) Pipe Line Corporation (PPL)
Lewis Drive Remediation Site
Belton, South Carolina
Site ID #18693, "Kinder Morgan Belton Pipeline Release"**

Dear Mr. Mendenhall,

On behalf of Products (SE) Pipe Line Corporation (PPL), this Second 2022 Semiannual Monitoring Report presents a summary of the work performed at the Lewis Drive Remediation Site in Belton, South Carolina, between July 1, 2022, and December 31, 2022. The activities conducted during this reporting period included select gauging, collection of surface water and groundwater samples for laboratory analysis, and air sparging (AS) system operation/maintenance. These activities were conducted in accordance with the *Request to Modify Groundwater Monitoring and Reporting Schedule in 2022* submitted on October 26, 2021 (Jacobs, 2021a) and agreed upon by the South Carolina Department of Health and Environmental Control (DHEC) on November 12, 2021 (DHEC, 2021a). A revision to the reporting schedule proposing semiannual reports in place of an annual and biannual report was submitted on May 5, 2022, and approved on May 27, 2022, via email correspondence with DHEC. Figure 1 presents a map of the site and sampling locations, including monitoring wells, recovery sumps, recovery wells, and surface water monitoring locations.

1. Summary of Gauging and Product Recovery

Select gauging including product recovery features (recovery sumps and wells) was conducted during the September 2022 semiannual event. Select monitoring wells were gauged during the quarterly event in December 2022. Surface water locations were gauged and sampled monthly during this reporting period from July 2022 through December 2022. During the September 2022 event, the majority of residuum monitoring wells and all recovery features (with the exception of RW-09) had water levels well within their screened intervals to allow the detection of free-phase product, if present, at the site. Groundwater elevations in the residuum aquifer, along with stream elevations, are presented on Figure 2A. Groundwater elevations in the bedrock aquifer are presented on Figure 2B. Field observations made during this reporting period are summarized in Table 1 with stream and groundwater elevations tabulated in Table 2.

Water levels from the September 2022 gauging event were used to develop potentiometric surface maps for the site (Figures 2A and 2B). Groundwater potentiometric levels in both the residuum (Figure 2A) and bedrock (Figure 2B) aquifers mimic the topography of the site and generally flow from higher to lower topography. Cupboard Creek flows intermittently, indicating the primary direction of groundwater flow is northeast toward Browns Creek. The September 2022 water table configurations and potentiometric levels are consistent with previous findings.

All remaining continuous product recovery canisters were removed during the March 2022 annual event due to lack of product detected at the site and replaced with absorbent socks. The modification of the product recovery activities are in agreement with the *Request for Modification of Product Recovery Activities* submitted on October 24, 2021 (Jacobs, 2021b) and agreed to by DHEC on November 12, 2021 (DHEC, 2021b). Product gauging and recovery will continue semiannually, with the next event scheduled for March 2023.

No measurable product was detected at any of the monitoring well locations, and only detected at three recovery features during this reporting period, ranging from 0.01 foot in RW-05 to 0.13 foot in RW-04. Well gauging data are presented in Table 2. Hydrographs for select monitoring wells and recovery features that are representative of approximate product thickness trends are provided in Attachment A.

2. Summary of Surface Water Results

Inspections of surface water features were performed monthly at the site during this reporting period. No signs of distressed vegetation or hydrocarbon sheens were observed during the surface water inspections for this reporting period. The inspection route of surface water features is presented on Figures 1, 2A, and 2B. Field observations documented during this reporting period are summarized in Table 1.

The stream aerators at Browns Creek were being turned off for a 24-hour period prior to conducting site surface water sampling. Due to low water levels from the removal of two beaver dams in February 2022, the stream aerators were turned off on April 22, 2022, and may resume operation when conditions allow. Monthly surface water samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), naphthalene, and methyl tertiary butyl ether (MTBE) using U.S. Environmental Protection Agency (EPA) Method 8260D.

During this reporting period, dissolved hydrocarbons were detected in surface water at 3 of the 13 locations sampled: SW-02, SW-04, and SW-13 (Table 3A). Benzene was the only constituent that exceeded the surface water standard for protection of human health for consumption of water and organisms (2.2 micrograms per liter [$\mu\text{g/L}$]; DHEC, 2014) and was isolated to SW-02. Surface water sample results are summarized in Table 3A; historical data for surface water samples are summarized in Table 3B. BTEX trends for surface water sampling locations SW-01, SW-02, SW-04, SW-08, SW-09, SW-12, and SW-13 are presented in Attachment B. The trend graphs for locations SW-01, SW-12, and SW-13 show a data gap during this reporting period due to lack of flow in Browns Creek that did not allow for sample collection. Flow in the creek was impacted by the removal of the beaver dam in the culvert under the Lewis Drive and a beaver dam north of Lewis Drive by the county in February 2022, causing the creek waters to diminish and in some areas disappear. Laboratory analytical reports for surface water samples and chain-of-custody (COC) records are included in Attachment D.

3. Summary of Groundwater Results

Two groundwater sampling events were performed between July 1, 2022, and December 31, 2022. Gauging was performed at select wells during both the September and December 2022 events. During these two sampling events, wells were gauged using an oil-water interface probe to measure the depth to water and test for the presence and thickness (if detected) of product. The oil-water interface probe was decontaminated before each use and after the final measurement. Monitoring wells without free product were sampled during this reporting period using either a HydraSleeve or low-flow peristaltic pump in accordance with the Quality Assurance Project Plan (QAPP), Revision 4 (CH2M-Jacobs, 2018). Samples were analyzed for BTEX, 1,2-dichloroethane, MTBE, and naphthalene using EPA Method 8260D. Groundwater sample results are summarized in Table 4A; historical data for groundwater samples are summarized in Table 4B.

Groundwater monitoring results during the second half of 2022 demonstrate continued decreases in dissolved concentrations of hydrocarbons at MW-14B and MW-50B (Hayfield Zone), at MW-23, MW-57, and MW-58 (Cupboard Creek Protection Zone [CCPZ]) and at MW-38, MW-38B, and MW-39 (Browns Creek Protection Zone [BCPZ]). Areas showing increased concentrations during this reporting period event are localized to the Hayfield Zone (MW-09, MW-13B, MW-16, and MW-18). These increases in the Hayfield Zone wells are likely associated with the horizontal air sparge (HAS) shutdown for the product rebound test conducted during this reporting period. Expansion of the HAS system was completed between August and October 2021 and started up in June 2022 as described by Jacobs in the *Corrective Action Plan Addendum #2* submitted on May 24, 2021 (Jacobs, 2021c) and approved by DHEC in correspondence dated June 29, 2021 (DHEC, 2021c) to address the increased hydrocarbon concentrations in the BCPZ and CCPZ areas. The HAS expansion wells became operational on June 20, 2022. Most bedrock wells, including those in the Shallow Bedrock Zone (SBZ), are outside the influence of vertical air sparge (VAS) wells and HAS wells and yet have stable dissolved concentrations.

Although site-specific groundwater cleanup targets have not been established, groundwater analytical results are screened against the risk-based screening levels listed in the South Carolina *Quality Assurance Program Plan for the Underground Storage Tank Management Division*, Table D1 (DHEC UST Management Division, 2016), referred to as Target Screening Levels (TSLs). The results for this reporting period are provided in Table 4A, shown on Figures 3A and 3B, and summarized in the following sections. Historical groundwater analytical results are provided in Table 4B.

Trend plots for select groundwater monitoring wells are included in Attachment C. Note that the gray shaded area on the trend plots indicates the operational period of the AS system for wells estimated to be within the area of influence of the AS system, and monitoring wells that have been nondetect or below TSLs since well installation are not presented. Additionally, in preparation for the startup of the system expansion wells HAS-4 through HAS-6, the VAS wells were shut down on May 19, 2022, to monitor baseline conditions in wells within 80 feet of HAS-4 through HAS-6. Cupboard Creek VAS wells resumed operations on June 29, 2022, while Browns Creek VAS wells remain off to monitor effectiveness of HAS-4 and HAS-5. Laboratory analytical reports and COC records for this reporting period are provided in Attachment D.

3.1 Browns Creek Protection Zone

Remediation in the BCPZ during the second half of 2022 shows dissolved concentrations below TSLs or nondetect in 11 of the 21 monitoring wells sampled in September 2022. MW-15 was dry in September 2022, while four locations (MW-34, MW-43, MW-43B, and MW-49) were not sampled, in accordance with DHEC approved sampling schedule (DHEC, 2021a). The remaining five wells showed exceedances of benzene, MTBE, or both (MW-12, MW-15B, MW-25B, MW-38, and MW-38B).

- Dissolved concentrations in residuum and bedrock wells side-gradient of and within the influence of the AS system have decreased or remained stable since the last quarterly event with the exception of MW-12, with a benzene exceedance of 18.4 µg/L. MW-15B continues to have exceedances of benzene and MTBE since the last reporting period, showing an overall decreasing trend since November 2021, but with a slight increase in December 2022.
- The installation of downgradient monitoring well MW-38B was completed on April 14, 2020, and concentrations remained stable since July 2020. However, since June of 2022, benzene concentrations have decreased by 2 orders of magnitude, with benzene below detection limits for the first time since the well was installed. MTBE continues to exceed its TSL but with a concentration decrease of 47 percent.
- Downgradient monitoring well MW-38 concentrations showed a decreasing trend since the last reporting period in June 2022 with benzene decreasing by 97.1 percent.
- Downgradient monitoring well MW-25B concentrations showed slight increases during this reporting period, with benzene slightly above its TSL at 9.55 µg/L.
- Downgradient monitoring well MW-39 concentrations continued to decrease in 2022 and were nondetect for all analyzed compounds for the first time since it was initially sampled in December 2016.

3.2 Cupboard Creek Protection Zone

Dissolved concentrations in the CCPZ during this reporting period have decreased or stabilized in all residuum and bedrock wells. The only locations with TSL exceedances are MW-20 and MW-56. MW-19 was not sampled due to insufficient water.

- MW-20 is within the influence of the vertical AS curtain and has shown stable BTEX concentrations since the March 2022 event with exceedances of benzene, ethylbenzene, and toluene.
- MW-23 is downgradient and outside of the vertical AS curtain's area of influence and concentrations have shown a decreasing trend since the last reporting period, with constituents being nondetect for the first time since December 2018.
- During this second semiannual reporting period, BTEX concentrations at MW-46 have remained nondetect with MTBE falling below its TSL for the first time since well installation in December 2017. MW-57 concentrations also showed a decreasing trend during this reporting period with all constituents being nondetect or below TSL for the first time since November 2020.

- Benzene concentrations at MW-56 have fluctuated during 2022 but show an overall stable trend, while MTBE concentrations have decreased throughout 2022. Both benzene and MTBE concentrations continue to exceed their respective TSLs.
- The installation of downgradient monitoring well MW-60 was completed on April 7, 2020. The dissolved hydrocarbon concentrations have remained nondetect or below TSLs since November 2020.
- As part of the additional delineation of dissolved hydrocarbon concentrations in the Cupboard Creek area, installation of residuum wells MW-58, MW-59, MW-62, and MW-63 and bedrock well MW-61B were conducted during the summer of 2021. Since installation, dissolved hydrocarbon concentrations at MW-59, MW-61B, MW-62, and MW-63 have remained nondetect or below TSLs with the exception of MW-58. Concentrations at MW-58 have fluctuated since November 2021 but have shown a decreasing trend during this reporting period. Concentrations are currently nondetect or below TSLs for the first time since well installation in May 2021.
- Constituents were nondetect in monitoring wells MW-23B, MW-26, MW-26B, and MW-29.

Expansion of the AS system at Cupboard Creek to address dissolved hydrocarbon concentrations in the CCPZ in areas not directly influenced by the current AS system was conducted in the fall of 2021. Connection of HAS-6 to the system compound was completed in May 2022 but is not yet operational due to surfacing of air along the well screen. A mitigation plan was developed, and on December 7, 2022, a slipline was installed within HAS-6 as discussed in the Additional Activities section; however, additional mitigation will be necessary before HAS-6 is fully operational.

3.3 Hayfield Zone

In September 2022, 11 of the 15 residuum monitoring wells sampled were nondetect or below TSLs. MW-07, MW-13, MW-17, MW-45, and MW-54 were not sampled due to insufficient water. During the quarterly event in December 2022, six residuum monitoring wells were sampled in the Hayfield Zone with concentrations in MW-02, MW-16, and MW-18 exceeding TSLs. In October 2020, the HAS system was shut down to conduct a product rebound study in accordance with the request letter submitted to DHEC on August 24, 2020 (Jacobs, 2020), and approved by DHEC in letter correspondence dated September 28, 2020 (DHEC, 2020c). During this reporting period, the following locations showed increased dissolved hydrocarbon concentrations – MW-16 and MW-18, both of which are within the AS system area of influence. MW-02, also within the AS system influence area, has shown stable concentrations. No free product was detected at any of the monitoring wells.

- MW-02 is within the AS system area of influence. BTEX concentrations at MW-02 have remained stable in 2022 with a benzene detection slightly above the TSL at 5.25 µg/L.
- MW-09 is within the AS system area of influence and has shown increases in dissolved hydrocarbon concentrations since the March 2022 sampling event, with benzene and naphthalene exceeding their respective TSLs in September 2022 but nondetect in December 2022.
- BTEX concentrations in MW-14 have continued to remain nondetect since the November 2021 sampling event.

- MW-16 and MW-18 are within the AS system area of influence. Both have shown an increase in dissolved hydrocarbon concentrations in 2022 with benzene, toluene, MTBE and naphthalene exceeding their respective TSLs.
- Of the 9 bedrock wells sampled during the September 2022 event, dissolved concentrations were above TSLs in four of the wells which are outside the AS system area of influence. Benzene concentrations range from 7.3 µg/L (MW-14B) to 4,470 µg/L (MW-17B). All other bedrock wells in the Hayfield Zone were nondetect or below TSLs during the September 2022 event. During the December 2022 quarterly event, dissolved concentrations were only detected in MW-17B.
 - MW-17B, which is upgradient of the Cupboard Creek AS curtain, has shown stable BTEX concentrations during the second semiannual event with benzene, toluene, naphthalene, and MTBE exceeding their respective TSLs.
 - Benzene and MTBE both exceed their respective TSLs in MW-13B with benzene concentrations doubling since the March 2022 annual event. Ethylbenzene, toluene, and total xylenes remain below their respective TSLs. The expansion of the HAS system, downgradient of MW-13/MW-13B, was conducted in the fall of 2021 with the intention of addressing these concentrations and serve as a treatment barrier for downgradient waterbodies such as Browns Creek. The expanded HAS system became operational on June 20, 2022.
 - Dissolved concentrations of hydrocarbons in MW-14B showed a slight increase during the first half of 2022 but have since decreased, with concentrations below TSL or nondetect in December 2022. The expansion of the HAS system, downgradient of MW-14/MW-14B, was conducted in the fall of 2021 with the intention of addressing these concentrations and serve as a treatment barrier for downgradient waterbodies such as Browns Creek. The expanded HAS system became operational on June 20, 2022.
 - Benzene concentrations in MW-50B have decreased by 96.5 percent since the last event in March 2022 with benzene and MTBE above their respective TSLs. The expansion of the HAS system, downgradient of MW-50B, was conducted in the fall of 2021 with the intention of addressing these concentrations and serve as a treatment barrier for downgradient waterbodies such as Browns Creek. The expanded HAS system became operational on June 20, 2022.

3.4 Shallow Bedrock Zone

The residuum and bedrock wells in the SBZ have been nondetect or below TSLs during the second semiannual reporting period with the exception of MW-11. The BTEX concentrations at this location have remained stable since the last reporting period in June 2022. Benzene, toluene, and ethylbenzene remain above their respective TSLs. MW-11 is in the expanded AS system area of influence. The AS system is expected to influence BTEX groundwater concentrations within the MW-11 area and downgradient of MW-11 (Figure 3A).

4. Summary of Air Sparging System Operation/Maintenance and Efficiency

The average runtime for the AS system that was intended to be operational during the second semiannual event was 98.1 percent. Air compressor downtime during this reporting period was associated with routine maintenance visits and sampling.

The surface aerators in Browns Creek have not operated since April 22, 2022, due to very low water levels from the removal of two beaver dams in February 2022. Since the system expansion was completed on June 23, 2022, HAS-4 and HAS-5 have been brought up to design flow capacity during this reporting period. HAS-6 remains off due to air surfacing along the well screen interval. VAS wells in the CCPZ resumed operation on June 29, 2022, while a plan to mitigate HAS-6 is being developed.

In accordance with DHEC approval, in a letter dated September 28, 2020 (DHEC, 2020c), HAS-1 through HAS-3 were shut down for rebound analysis on October 1, 2020. With HAS-1 through HAS-3 not operating, only one compressor has been operating since October 1, 2020. With only one compressor needed to operate the system, the compressors were rotated so that only one compressor was operating at a time. With reduced runtime hours, scheduled maintenance services could be reduced from quarterly to semiannually.

Activities associated with operation and maintenance of the AS system are summarized by remediation area as follows:

- BCPZ: VAS wells did not operate during this reporting period to allow continued collection of operation and performance data for HAS-4 and HAS-5. Air was not injected into two surface water submersible diffusion aerators installed in Browns Creek during this reporting period due to low water levels attributed to the removal of two beaver dams in February 2022. The stream aerators were turned off on April 22, 2022 and may resume operation when conditions allow.
- CCPZ: AS was performed using a curtain of 24 VAS wells screened between 9.5 and 31.2 feet below ground service (bgs) at an average flow rate of 6.72 standard cubic feet per minute (scfm) per sparging well during this reporting period. In preparation for the startup of the system expansion wells HAS-4 through HAS-6, the VAS wells were shut down on May 19, 2022, and resumed operation on June 29, 2022, when HAS-4 and HAS-5 reached full operating capacity. VAS wells in the CCPZ will remain in operation while a plan to mitigate HAS-6 is being developed. Two weeks prior to the restart of HAS-6, VAS wells in the CCPZ will be turned off, and will resume operations when HAS-6 reaches full operating capacity or potentially a lesser but functional capacity.
- Hayfield Zone: AS was not performed during this reporting period.

5. Additional Activities

The following additional activities were performed from July 2022 through December 2022:

- Two weeks prior to startup of HAS-4 and HAS-5 in BCPZ, and HAS-6 in CCPZ, vertical sparge wells were deactivated and baseline headspace soil volatile organic compound concentrations, groundwater elevations, and dissolved oxygen concentrations were measured in monitoring wells within 80 feet of the horizontal wells. HAS-4, HAS-5, and HAS-6 were started on June 20,

2022, at flow rates of 30 to 40 scfm. Surfacing of air was noticed along HAS-6 (Cupboard Creek) upon startup and the three horizontal wells were shut down. HAS-4 and HAS-5 were then started up slowly over a period of 6 weeks and progressed from 10 scfm to 50 scfm. As of December 31, 2022, HAS-4 and HAS-5 (Browns Creek) are operating at 150 and 220 scfm, respectively. A plan is currently being developed to remedy the surfacing at HAS-6 before it is restarted as discussed in the Path Forward section below.

- Performance monitoring of wells within the area of influence of HAS-4 and HAS-5 was conducted between July and December 2022. Water levels, dissolved oxygen, and photo-ionization detector readings were collected during routine site walks to monitor the effectiveness of HAS-4 and HAS-5.
- On December 7, 2022, a 1.5-inch diameter Schedule 40 PVC pipe (slipline) was installed within HAS-6 in an attempt to push air 50 feet past the aperture of the surfacing location. HAS-6 was tested on December 8, 2022 and was shown to be unsuccessful with minor surfacing at the original surfacing location. HAS-6 will remain deactivated until a Nationwide Permit 18 can be acquired for activities associated with grouting the aperture(s).
- An update to the Conceptual Site Model (CSM) is in draft as of September 2022. The CSM update is expected to be complete by second quarter 2023.
- The initial Lewis Drive wetland delineation was conducted in December 2014 and January 2015. An update to the delineation along Browns Creek was completed on June 6, 2019. The most recent update to the wetland delineation occurred between October 4 – 5, 2022. The jurisdictional boundaries of aquatic resources and protected species habitats were collected and documented electronically with a tablet and an external high accuracy global navigation satellite system (GNSS) receiver; aquatic resources were not physically flagged in the field.
- *Request to Abandon Vertical Bedrock Sparging and Temporary Piezometer Wells* was submitted to DHEC on October 3, 2022 (Jacobs, 2022a) and approved by DHEC on October 12, 2022 (DHEC, 2022a). Well abandonments are scheduled to occur in January 2023.
- *Request to Modify Groundwater Monitoring and Reporting Schedule in 2023* was submitted to DHEC on November 28, 2022 (Jacobs, 2022b) and accepted by DHEC via email on December 21, 2022 (DHEC, 2022b).
- A revision to the site-specific quality assurance plan is scheduled to be completed during the second quarter of 2023.

6. Summary of Findings

The following conclusions are based on site work performed during the reporting period between July 1, 2022 and December 31, 2022:

- Product thickness values have declined to negligible levels in both recovery and nonrecovery features across the site. During both gauging events this reporting period, only RW-03, RW-04, and RW-05 had measurable product during the September 2022 event ranging from 0.01 foot in RW-05 to 0.13 foot in RW-04.

- Remedial efforts continue to be effective at reducing dissolved concentrations of hydrocarbons in groundwater across the site with limited impacts remaining outside the AS system area of influence, upgradient of Browns Creek and Cupboard Creek. Of the 60 residuum and bedrock well groundwater samples analyzed during the September 2022 event and 25 groundwater samples analyzed during the December 2022 event, 47.5 percent and 64 percent of the wells respectively were nondetect or below TSLs for constituents analyzed. Benzene concentrations in MW-38, and MW38B (BCPZ) showed significant decreases this reporting period with benzene decreasing by 97.1 percent in MW-38 and decreasing by 2 orders of magnitude in MW38B. Dissolved hydrocarbon concentrations in MW-39 (BCPZ) are nondetect for the first time since it was initially sampled in December 2016. Additionally, benzene concentrations in MW-23 and MW-58 (CCPZ) have decreased significantly this reporting period with benzene being nondetect for the first time since December 2018 for MW-23 and since well installation for MW-58. In the Hayfield Zone, only MW-16, MW-18, and MW-13B have shown an increase in dissolved hydrocarbon concentrations. MW-50B, which is outside the AS area of influence, has shown a decrease in benzene concentration by 96.5 percent since March 2022.

Oxidant injections were conducted in the BCPZ and CCPZ areas in August 2019 to address dissolved concentrations outside the AS area of influence at monitoring wells MW-46, MW-56, and MW-57 in the CCPZ and MW-38 in the BCPZ. None of these monitoring wells have shown increases in benzene concentrations during this reporting period. Additionally, each of the CCPZ downgradient monitoring wells installed in the summer of 2021 (MW-58, MW-59, MW-61B, MW-62, and MW-63) are nondetect or below TSLs for constituents analyzed for the first time since installation. An expansion of the HAS system was approved by DHEC in correspondence dated June 29, 2021 (DHEC, 2021c) to address hydrocarbon concentrations in these two areas. The system was installed during the fall of 2021 and HAS-4 and HAS-5 became operational on June 20, 2022. HAS-6 was started on June 20, 2022, but was turned off due to air surfacing along the screened interval. A mitigation plan was developed for HAS-6 and a slipline was installed within HAS-6 on December 7, 2022. Further mitigation is required prior to operation of HAS-6, and additional mitigation plans have been developed. Concentrations within the intended new areas of influence will be monitored at BBPZ and at CCPZ upon the successful startup of HAS-6.

- In the Hayfield Zone the TSL exceedances are located outside the AS system area of influence and are found in bedrock monitoring wells (MW13B, MW17B, and MW-50B) showing exceedances for benzene and MTBE as well as toluene and naphthalene in MW-17B. Exceedances within the AS system area of influence are found in residuum wells (MW-02, MW-16, and MW-18) with exceedances of benzene, toluene, MTBE, and naphthalene at MW-16 and MW-18 and benzene and naphthalene only at MW-02. Rebound monitoring is ongoing for this area of the site. The increases in the Hayfield Zone wells may be associated with the HAS shutdown in October 2020 for the product rebound test. Groundwater sample results from this reporting period will be reviewed with DHEC to determine the future status of the Hayfield Zone treatment as agreed upon in the April 21, 2022 meeting with DHEC (Jacobs, 2022c).
- Cupboard Creek and Browns Creek both have upgradient AS treatment zones, and although there has been fluctuation in concentrations, benzene was nondetect or below TSL at each surface water sampling location with the exception of SW-02 this reporting period.

- The AS system was operating at 98.1 percent for the reporting period. Operating flows in the CCPZ VAS wells and HAS-04 and HAS-05 were maintained at approximately 45 percent and 29 percent of design flow capacity, respectively.

7. Path Forward

Future activities planned for the Lewis Drive site include the following:

- Ongoing monitoring and reporting will be conducted according to a revised groundwater and surface water monitoring and reporting plan, covering the time period from January 1, 2023, to December 31, 2023. Groundwater concentration trends in the monitoring well network will continue to be assessed to improve the monitoring well network, optimize the AS system, identify areas for potential additional remediation, or any combination of the three.
- The Conceptual Site Model (CH2M, 2015) will be updated to include data from the subsequent site assessment and remediation activities. Activities included bedrock sparging testing, and the installation of monitoring wells, soil borings, and biosparging wells.
- The Quality Assurance Project Plan (Revision 5) (CH2M-Jacobs, 2018) will be reviewed and updated, if necessary, in the second quarter of 2023.
- A plan to mitigate surfacing of air along HAS-6 is being developed. The plan will also address procedures that will be implemented to potentially allow HAS-6 to be restarted and operate at its designed capacity or potentially a lesser but functional capacity.
- In October 2020, HAS-1 through HAS-3 were deactivated to assess rebound in the Hayfield Zone. A meeting with DHEC is scheduled for March 2023 and discussions on how to address the Hayfield Zone will take place during the meeting.

8. References

CH2M HILL Engineers, Inc. (CH2M). 2015. *Site Assessment Report*. September.

CH2M HILL Engineers, Inc. (CH2M-Jacobs). 2018. *Quality Assurance Project Plan, Revision 4. Addendum to the DHEC UST Programmatic Quality Assurance Program Plan for Plantation Pipe Line Company/Site ID No. 18693*. February 9.

Jacobs Engineering Group Inc. (Jacobs). 2020. *Notification of Planned Horizontal Well Sparging Shutdown to Monitor Rebound*. August 24.

Jacobs Engineering Group Inc. (Jacobs). 2021a. *Request to Modify Groundwater Monitoring and Reporting Schedule in 2022*. October 26.

Jacobs Engineering Group Inc. (Jacobs). 2021b. *Request for Modification of Product Recovery Activities*. October 24.

Jacobs Engineering Group Inc. (Jacobs). 2021c. *Corrective Action Plan Addendum #2*. May 24.

Jacobs Engineering Group Inc. (Jacobs). 2022a. *Request to Abandon Vertical Bedrock Sparging and Temporary Piezometer Wells*. October 3.



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Jacobs Engineering Group Inc. (Jacobs). 2022b. *Request to Modify Groundwater Monitoring and Reporting Schedule in 2023*. November 28.

Jacobs Engineering Group Inc. (Jacobs). 2022c. Lewis Drive Status Update Meeting with DHEC– Action Items list. April 21.

South Carolina Department of Health and Environmental Control (DHEC). 2014. *R. 61-68, Water Classifications & Standards*. June 27.

South Carolina Department of Health and Environmental Control (DHEC). 2020a. Monitoring Well Approval Form, Approval #: MW-12274. January 23.

South Carolina Department of Health and Environmental Control (DHEC). 2020b. Monitoring Well Approval Form, Approval #: MW-12377. April 27.

South Carolina Department of Health and Environmental Control (DHEC). 2020c. Review of *Request to Conduct Shallow Bedrock Zone Air Sparge Test and Notification of Planned Horizontal Well Sparging Shutdown to Monitor Rebound. Lewis Drive Remediation Site, Plantation Pipe Line Company, Belton, South Carolina. Site ID Number 18693, "Kinder Morgan Belton Pipeline Release."* September 28.

South Carolina Department of Health and Environmental Control (DHEC). 2021a. Approval of *Request to Modify Groundwater Monitoring and Reporting Schedule in 2022*. November 12.

South Carolina Department of Health and Environmental Control (DHEC). 2021b. Approval of *Request for Modification of Product Recovery Activities*. November 12.

South Carolina Department of Health and Environmental Control (DHEC). 2021c. Approval of *Corrective Action Plan Addendum #2*. June 29.

South Carolina Department of Health and Environmental Control (DHEC). 2022a. Approval of *Request to Abandon Vertical Bedrock Sparging and Temporary Piezometer Wells*. October 12.

South Carolina Department of Health and Environmental Control (DHEC). 2022b. Approval of *Request to Modify Groundwater Monitoring and Reporting Schedule in 2023*. December 21.

South Carolina Department of Health and Environmental Control, Underground Storage Tank Management Division (DHEC UST Management Division). 2016. *Quality Assurance Program Plan for the Underground Storage Tank Management Division*. Title: Programmatic QAPP. Revision Number: 3.1. Revision Date: February 2016. 215 pp.

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If you have any questions regarding this report or the project in general, please call me at (919) 859-5789 or Greg Dempsey/PPL at (770) 751-4143.

Regards



William M. Waldron, P.E.
Program Manager

The material and data presented in this report were prepared consistent with current and generally accepted consulting principles and practices. This work was supervised by the following Jacobs licensed professional.



Tom Wiley, P.G.

South Carolina Registered Professional Geologist No. 2787



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Date

Copies to: Greg Dempsey, PPL (Digital, Greg_Dempsey@kindermorgan.com)
Mary Clair Lyons, Esq., PPL (Digital, mary_lyons@kindermorgan.com)

Attachments:

Table 1 – Field Observation Log

Table 2 – Groundwater Elevation and Product Thickness Data

Table 3A – Analytical Results for Surface Water, Second Semiannual 2022

Table 3B – Analytical Results for Surface Water, Historical

Table 4A – Analytical Results for Groundwater, Second Semiannual 2022

Table 4B – Analytical Results for Groundwater, Historical

Figure 1 – Site Overview

Figure 2A – Residuum Groundwater and Surface Water Elevation Map

Figure 2B – Bedrock Groundwater Elevation Map

Figure 3A – Groundwater Analytical Results in Residuum Aquifer, September and December 2022

Figure 3B – Groundwater Analytical Results in Bedrock Aquifer, September and December 2022

Attachment A – Product Thickness Trends

Attachment B – Surface Water Analytical Trends

Attachment C – Groundwater Analytical Trends

Attachment D – Laboratory Analytical Reports

Tables

Figures

Attachment A
Product Thickness Trends

Attachment B
Surface Water Analytical Trends

Attachment C
Groundwater Analytical Trends

Attachment D
Laboratory Analytical Reports