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February 9, 2018

*Delivered via FedEx Overnight Delivery*



Ms. Bobbi Coleman  
South Carolina Department of Health and Environmental Control  
Assessment Section, UST Management Division  
Bureau of Land and Waste Management  
2600 Bull Street  
Columbia, SC 29201

**Subject: Response to Comments in SCDHEC Letter titled "QAPP Revision, Monitoring Well Installation and Well Log Information, Receptor Survey, Plume Definition Plan, and Bedrock Plan Request" dated December 14, 2017**  
Plantation Pipe Line Company  
Lewis Drive Remediation Site  
Belton, South Carolina  
Site ID #18693, "Kinder Morgan Belton Pipeline Release"

Dear Ms. Coleman,

On behalf of Plantation Pipe Line Company (Plantation), CH2M HILL Engineers, Inc. (CH2M) has prepared this response to comments received from the South Carolina Department of Health and Environmental Control (SCDHEC) in their letter date-stamped December 14, 2017.

Each SCDHEC comment is presented below and followed by Plantation's response.

## Corrective Action Plan Addendum

**Comment 1: Section 2.1 (Corrective Action Objectives).** *The proposal to transition from free phase LNAPL recovery to in-situ destruction of LNAPL by the end of September 2017 (approximately 6 months after starting the sparging system) cannot be approved. As discussed and agreed upon during the August 23, 2017 conference call, free phase product recovery will need to continue on a weekly basis in the Browns Creek Protection Zone (BCPZ) and the Cupboard Creek Protection Zone (CCPZ).*

**Response:** As discussed at a meeting with SCDHEC on January 22, 2018, Plantation will continue free product recovery going forward through the use of product skimmers and petroleum-absorbent socks. These will allow us to quantify the volume of product recovered by well. The details of this plan are provided in the *Free-Product Recovery Plan – Revision 4*, submitted to SCDHEC on February 6, 2018.

It should be noted, however, that data already demonstrate that product recovery has reached a point of diminishing returns. Additionally, all remaining free product at the site is surrounded

by air sparging systems to prevent its migration to surface waters. As such, the need for the aggressive free product recovery currently being conducted is not warranted.

As shown in Table 1, wells inside the area of influence of the air sparging system show product thickness reductions of 92% to 100%, whereas product recovery features outside the influence of the sparging system show minor decreases and even increases in product thickness.

**Table 1. Gauging Results in Recovery Wells**  
*Lewis Drive Remediation Site*

<b>Recovery Feature</b>	<b>Free product thickness at air sparging startup on March 6, 2017 (ft)</b>	<b>Free Product Thickness 9 months post startup on December 27, 2017 (ft)</b>	<b>Percent Decrease in Free Product Thickness</b>	<b>Distance from nearest sparging point (ft)</b>
<b>Wells inside the radius of the air sparging system</b>				
RW-06	0.10	No measurable product	100%	21
RW-07	2.10	0.02 ft	99.0%	21
RW-08	1.43	0.01 ft	99.3%	18
RW-09	1.72	No measurable product	100%	25
RW-10	3.82	No measurable product	100%	20
RW-11	1.28	0.10	92.2%	20
RW-12	0.02	No measurable product	100%	9
RW-13	2.08	No measurable product	100%	23
RW-14	0.06	No measurable product	100%	18
<b>Wells outside the radius of influence of the air sparging system</b>				
RW-01	No measurable product	No measurable product	No change	410
RW-02	No measurable product	0.59	-∞	434
RW-03	0.01	0.05	-500%	440
RW-04	1.06	0.58	45.3%	202
RW-05	0.30	1.17	-290%	113
RW-15	1.01	0.68	32.7%	69

Plantation therefore contends that 9 months of air sparging have been more effective at reducing free product thickness than over 2 years of free product recovery by evacuation.

**Comment 2:** *Section 3.5 (Surface Water Monitoring). The proposal to transition to monthly surface water sampling for the first 6 months of operations and quarterly the following year cannot be approved. The April 26, 2017 correspondence (Coleman to Aycock) states that evaluation of monitoring frequency must be discussed in the Annual Report and any changes to monitoring frequency will need to be evaluated and approved by the Department.*

**Response:** So noted.

**Comment 3:** *Section 3.9 (Reporting). The proposal to provide quarterly reports in place of monthly reports starting in April 2018 cannot be approved at this time. As discussed and agreed upon during the August 23, 2017 conference call, monthly and quarterly reports will need to continue. Changes to reporting frequency can be proposed and discussed in the Annual Report which will be evaluated and approved by the Department.*

**Response:** So noted.

**Comment 4:** *Table 2 Revised Groundwater Monitoring Plan. Table 2 will need to be revised to include all newly installed groundwater monitoring wells.*

**Response:** Table 2, as submitted with the *Corrective Action Plan (CAP) Addendum Revision 2* on October 12, 2017, already includes all newly-installed wells at the site (in blue text). We have attached the table again here for your convenience.

## Quality Assurance Project Plan (QAPP)

**Comment 5:** *Section A5.1 (Purpose and Scope). The Department concurs with Plantation Pipe Line's proposal to conduct sampling following EPA Guidance detailed in Low Flow (Minimal Drawdown) Groundwater Sampling Procedures (EPA 1996) and Region 4 Science and Eco System Support Division (SESD) Operating Procedure (OP) for Groundwater Sampling. However, Section A5.1 cites SESDPROC-301-R3 (EPA, 2013) whereas the most recent EPA OP for Groundwater Sampling is dated April 26, 2017. The Department suggests that Section A5.1 cite that the most recent EPA OP for Groundwater Sampling will be followed so that revisions are not required when documents are revised.*

*Please provide a frequency for which low flow sampling will be conducted for wells that are not sampled monthly. The EPA OP for Groundwater states that no-purge methods are predicated on the assumption that aquifer flow through the well maintains the water in the screened interval in a state equivalent to that in the aquifer. If site specific data has been collected to evaluate flow through the screened intervals, this information should be provided to determine the interval for which hydra sleeves (the proposed no purge method) will be conducted rather than low-flow sampling (the proposed method where purging is conducted). Further, Section A8 provides procedures for purging and sampling with bailers and pumps, which had not previously been discussed. A section that defines which purging and sampling method will be used and the circumstance for each should be provided to ensure that ground water samples collected are reflective of the groundwater transported through the subsurface under ambient flow conditions with minimal alterations from sampling procedures, minimizing variability.*

**Response:** This section of the QAPP has been revised (see attached QAPP Revision 4) to cite the most recent version of the EPA guidance document.

The sampling frequency for wells not sampled monthly is quarterly (see CAP Addendum, Revision 2). Slug testing was performed at the site in 2015 and 2016 and the results were used to calculate groundwater seepage velocities presented in the Site Assessment Report (CH2M, 2015) and Comprehensive Site Assessment Report (CH2M, 2016). Estimated velocities are less than 5 ft/day in the residuum and less than 0.2 ft/day in the fractured bedrock

(CH2M, 2016). Monthly and quarterly sampling intervals are adequate to ensure that water in well screens is representative of water in the aquifer.

The text of Section B2 has been revised to include sampling with bailers and submersible pumps.

**Comment 6:** *Section A5.3.1 (Low-Flow Groundwater Sampling from Monitoring Wells SOP). This section states "if water level is drawn down by more than 1 foot, or 5% of the static water column, purging should be conducted in accordance with SOP Groundwater Sampling from Monitoring Wells." This statement is contradictory to a previous statement that when conducting low-flow purging and sampling draw down should not exceed 0.3 feet. Additionally, considering that most of the wells are screened with a 10 feet to 15 feet screen, 1 foot is not equivalent to 5%. The Department suggests that drawdown during purging and sampling is limited to 0.3 feet to minimize volatilization. Also, please clarify which SOP is being referenced.*

**Response:** The only specific drawdown limit guidance in the *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (EPA, 1996)* and *Region 4 Science and Ecosystem Support Division (SESD) Operating Procedure (OP) for Groundwater Sampling, SESDPROC-301-R4 (EPA, 2017)* is the minimal drawdown goal of less than 4 inches. The text of this section has been revised to be more consistent with these documents.

**Comment 7:** *Section A5.3.1 (Low-Flow Groundwater Sampling from Monitoring Wells SOP). A Decontamination of Personnel and Equipment SOP document is cited however, it could not be located in the document. Please provide decontamination procedures. Also, listing documents provided in Appendix A in the Table of Contents would be helpful.*

**Response:** The attached QAPP Revision 4 now includes SOP A13 Decontamination of Equipment. The table of contents has been revised to include a list of SOPs provided in Appendix A.

**Comment 8:** *Section A5.3.2 (Low-Flow Groundwater Sampling from Monitoring Wells SOP). This section states inorganics, including metals, may be collected and preserved in filtered form as well as the unfiltered form. This section should state that unfiltered samples will be collected prior to filtered samples and should filtered samples be collected, an unfiltered sample will be collected and reports will clearly note if a sample is filtered or unfiltered. Groundwater samples should not be filtered as a standard practice, as discussed in the Region 4 EPA SOP for Groundwater which is cited in Section A5.1 (Purpose and Scope).*

**Response:** The text of this section has been revised as suggested. Filtered samples have not been collected during the monitoring program.

**Comment 9:** *Section A5.5 (Low-Flow Groundwater Sampling from Monitoring Wells SOP). This section states that drawdown in the well should be minimized as much as possible (preferably no more than 0.5-foot to 1 foot). Please see comment #6.*

**Response:** See response to Comment 6.

**Comment 10:** *Section A8.1 (Groundwater Sampling SOP). Please specify under what circumstances purging and sampling with bailers or pumps, not using low flow techniques, will be conducted, as further discussed in item #6. As stated in the EPA SOP for Groundwater Sampling, due to difficulties and limitations inherent in the use of bailers and pumps (volatilization regarding the contaminants at the referenced site), other sampling or purging means should be given preference.*

**Response:** See response to comment 6 and the attached QAPP Revision 4. The order of preference of sampling methods is 1) HydraSleeves, 2) low flow sampling, and 3) multi-volume purging with bailer or pump.

**Comment 11:** *Section A8.3.1 (Groundwater Sampling SOP). Wells should be sampled as soon as possible upon recovery of adequate volume for sampling, as stated in the EPA OP. This section states that sampling may be conducted up to 6 hours after purging and should recharge be an issue, greater than 10 hours. This statement leads the reader to understand that documentation will be provided in the field log if the time lapse between purging and sampling is 10 hours or greater. Sample collection times should always be recorded on field data sheets. If sampling is not conducted immediately after purging, an explanation should be provided.*

**Response:** Sampling collection details and times are recorded in the field logbooks and field sampling sheets during the sampling events.

**Comment 12:** *Section A8.3.1 (Groundwater Sampling SOP). The EPA OP for Groundwater Sampling states that if bailers are used, a new nylon haul rope should be used. The Department suggests bailers not be left in any well.*

**Response:** Bailers are rarely used during the Lewis Drive sampling events and are not left in wells. When utilized, they are for one-time use, and are fitted with new rope and are disposed of after the sampling event.

**Comment 13:** *Section A8.3.1 (Groundwater Sampling SOP). If following the EPA OP for Groundwater, as stated, adequate purging is achieved when specific conductance varies no more than five percent.*

**Response:** The text of this section has been revised to be consistent with *Region 4 Science and Ecosystem Support Division (SES) Operating Procedure (OP) for Groundwater Sampling, SESDPROC-301-R4 (EPA, 2017)*.

**Comment 14:** *A list of all existing wells, sumps, trench points, and surface water sampling locations will need to be included. This list appears to be omitted in error, as it is referenced in the response.*

**Response:** A list of these features has been included in the revised text.

## Surface Water Sampling

**Comment 15:** *Surface water should be sampled for MTBE as MTBE is confirmed in groundwater.*

**Response:** MTBE will be added to the analyte list for surface water samples starting with the February 2018 monthly sampling event.

## August and September Monthly Status Reports

**Comment 16:** *The September monthly status report states that groundwater monitoring wells MW-46, MW-47, and MW-49 were installed. Table 4, Well Construction Information will need to be updated in the next monthly status report to include all wells that have been installed.*

**Response:** Well construction information for all newly installed wells was provided in the October 2017 monthly status report and is included in subsequent monthly reports.

**Comment 17:** *As agreed to during the August 23, 2017 conference call and the September 12, 2017 correspondence (Coleman to Aycock), recovery of free phase petroleum (FPP) is to continue on a weekly basis in the BCPZ and the CCPZ. The September monthly status report documents that FPP was not recovered from RW-7 or RW-9 on September 15 or 21, 2017 when FPP levels were measured to be 0.93 feet (ft.) and 1.05 ft. respectively in RW-7 and 0.35 ft. and 0.42 ft. respectively in MW-9. Recovery of measurable FPP in the BCPZ and CCPZ will need to be conducted.*

**Response:** These features were scheduled to be evacuated on September 18, 2017, but during that week, a vegetation contractor was removing snags in the vicinity of these recovery wells

that prevented access to those wells. Free product was recovered from these features the week before and the week after on September 11, 2017 and September 28, 2017.

**Comment 18:** *The September monthly status report notes an increase in one or more contaminant concentrations above the Risk Based Screening Levels (RBSLs) in groundwater monitoring wells MW-15B, and MW-17B that monitor the bedrock aquifer in the areas of the BCPZ and the CCPZ. A strategy to address bedrock contamination in these areas will need to be provided within 60 days of this correspondence.*

**Response:** As stated in Plantation's October 12, 2017, response to SCDHEC's comments date-stamped September 12, 2017, Plantation's original plan to address bedrock impacts at the site was through the implementation of air sparging in the shallow bedrock zone. SCDHEC has had numerous concerns with the proposed pilot test in the shallow bedrock zone requiring a testing plan be submitted which was submitted on May 8, 2017. Regarding the bedrock impacts in question, Plantation will continue to monitor these wells and evaluate adjustments to our current remedial operations and the need to expand those operating systems.

**Comment 19:** *It was agreed during the July 21, 2017 meeting and stated in the September 12, 2017 correspondence (Coleman to Aycock) that MW-33T would be sampled quarterly. However, data collected from MW-33T has not been provided since May 10, 2017 data was collected. Please ensure MW-33T is monitored and reported, as agreed, going forward.*

**Response:** MW-33T was not sampled during the September 2017 quarterly event due to an oversight in communicating the additional well to the field team. MW-33T was sampled during the December 2017 quarterly monitoring event and results will be included in the December 2017 quarterly report.

**Comment 20:** *The Department understands that all wells approved to date have been installed. As discussed during the December 1, 2017, conference call with Scott Powell (CH2M), all geologic well logs and 1903 forms must be provided with the next monthly status report.*

**Response:** The geologic logs and 1903 forms for the all the recently installed wells were included in the November 2017 monthly status report.

## Second Quarter 2017 Monitoring Report

**Comment 21:** *Based upon the data provided, the horizontal extent of the plume will need to be defined north and north-west of MW-30 as contaminant concentrations have been increasing since May 2017. A plan to define the extent of contamination will need to be provided within 60 days of the date of this correspondence.*

**Response:** Plantation proposes to install an additional well north of MW-30 to define the northern extent of the dissolved-phase plume. This well will be designated as MW-51, and its proposed location is shown on the attached Figure 1. Plantation also proposes to install two additional monitoring wells upgradient of MW-38 to better define impacts in that area. These wells will be designated as MW-52 and MW-53 and are also shown on Figure 1. The monitoring wells will be constructed in accordance with South Carolina Well Standards R.61-71 and the Project QAPP, Revision 4 (attached). These wells will be scheduled to be installed with other subsurface features in 2018.

**Comment 22:** *The Department does not agree with the statement that "recovery features within the radius of influence of the BCPZ and CCPZ sparging curtains will not be evacuated unless data indicate that air sparging system is not adequately reducing product thickness". As agreed upon during the August 23, 2017 Conference Call and the September 12, 2017 correspondence (Coleman to Aycock)*

*recovery of free phase petroleum is to continue on a weekly basis in the BCPZ and the CCPZ. Measurable free phase petroleum product must be evacuated per the June 16, 2017 correspondence (Coleman to Aycock).*

**Response:** See response to Comment 1 and the *Free-Product Recovery Plan – Revision 4*, submitted to SCDHEC on February 6, 2018.

**Comment 23:** *The Department understands that Plantation Pipe Line's "interim goal for the project is to transition from free-phase LNAPL recovery to in situ destruction of LNAPL by the end of December 2017". However, as stated in the June 16, 2017 correspondence (Coleman to Aycock), measurable free phase petroleum product must be evacuated. After further discussion during the August 23, 2017 conference call, documented in the September 12, 2017 correspondence (Coleman to Aycock) recovery of free phase petroleum is to continue on a weekly basis in the BCPZ and the CCPZ.*

**Response:** See response to Comment 1 and the *Free-Product Recovery Plan – Revision 4*, submitted to SCDHEC on February 6, 2018.

## Groundwater Sampling Analytical Results (CHANDLER-AG-W)

**Comment 24:** *The well located on the south side of Lewis Drive will need to be included in an updated receptor survey and included in routine sampling. An updated receptor survey must be submitted within 60 days of the date on this correspondence.*

**Response:** Because this private well is inside the Lewis Property, it is therefore subject to the terms of the settlement agreement between Scott Lewis and Plantation. As such, Plantation does not consider this to be a potential a receptor well. Additionally, no other development in the area has been observed, as such, there is no need to conduct an updated receptor survey. Users of that well are bound by the terms of the settlement agreement and can use that well at their own risk.

Furthermore, an environmental forensic review was performed of the laboratory data from the groundwater sample from the Chandler-AG well compared to a sample from MW-40 and summarized in a letter from Mr. David Thal of Environmental Standards, Inc. to Mr. Jerry Aycock on December 4, 2017. This letter was subsequently forwarded to Ms. Bobbi Coleman of SCDHEC on December 26, 2017. According to the review, "the source of contamination to the Chandler AG was not a gasoline release, and was different from the contamination in the MW-40 well." Impacts to this well are likely the result of activities conducted in association with the installation of and maintenance of a well and surrounding structures.

Lastly, Plantation already maintains monitoring wells between the subject well and the impacts from the release. Those wells to the east of Brown's Creek do not show impacts and thus there is no driver to add the subject well to our monitoring program.

**Comment 25:** *The Chandler-AG-W well will need to be added to routine quarterly monitoring for all parameters. Table 2 in the CAPA will need to be revised to include this well.*

**Response:** See response to Comment 24. As discussed in our meeting with SCDHEC on January 22, 2018, Plantation does not plan to add this well to future sampling.

## Shallow Bedrock Zone Biosparging Pilot Study Plan

**Comment 26:** *During the August 23, 2017 conference call Plantation Pipe Line clarified that the intended purpose of the Shallow Bedrock Zone-Biosparging Pilot Study is meant to remediate the shallow aquifer rather than the bedrock aquifer while discussing the location of bedrock monitoring wells in the*

*pilot study area. As this plan is intended to study the effects of sparging on the shallow contamination and sparging is already being conducted in the area, the pilot study can commence provided a comprehensive pilot study report is provided rather than a brief technical memorandum, as proposed.*

**Response:** The Biosparging Pilot Study will be conducted as part of Plantation's 2018 plan. We will prepare a report in a brief, but comprehensive technical memorandum. Please note that while the bedrock sparging is intended to primarily affect the shallow residuum, it is expected to also have some treatment effect within the bedrock.

If you have any further questions or concerns, please call me at (919) 760-1777, Mr. Scott Powell/CH2M at (678) 530-4457, or Mr. Jerry Aycock/Plantation at (770) 751-4165.

Regards,  
CH2M HILL Engineers, Inc.



William M. Waldron, P.E.  
Program Manager

**Attachments:**

CAP Addendum Table 2 (revised)  
Figure 1 – Proposed Additional Monitoring Wells  
QAPP Revision 4

c: Jerry Aycock, Plantation (Digital, Jerry\_Aycock@kindermorgan.com)  
Mary Clair Lyons, Esq., Plantation (Digital, Mary\_Lyons@kindermorgan.com)  
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**Table 2. Revised Groundwater Monitoring Plan**  
**Corrective Action Plan Addendum Revision 2**  
**Lewis Drive Remediation Site, Belton, South Carolina**  
**Site ID #18693 "Kinder Morgan Belton Pipeline Release"**

Frequency: <sup>a</sup>	Contaminant Reduction Evaluation			Biodegradation Evaluation		Zone of Influence <sup>b</sup>	Notes
	Baseline	Monthly (Year 1)	Quarterly (Year 1)	Baseline	Quarterly	Monthly (Year 1)	
Analytes:	BTEX, Naphthalene, MTBE, and 1,2-DCA <sup>c</sup>			Nitrate, Sulfate, Ferrous Iron, Carbon Dioxide, Methane, and Alkalinity <sup>d</sup>		Dissolved Oxygen	
Well ID							
<i>Brown's Creek Protection Zone</i>							
MW-12	Y		Y	Y	Y	Y	Typically contains product
MW-12B	Y		Y			Y	
MW-15	Y		Y	Y	Y	Y	
MW-15B	Y		Y			Y	
MW-24	Y		Y				
MW-24B	Y		Y				
MW-25	Y	Y	Y	Y	Y	Y	
MW-25B	Y		Y			Y	
MW-28	Y	Y	Y	Y	Y	Y	
MW-34		Y	Y				
MW-35	Y	Y	Y	Y	Y		
MW-37	Y		Y				
MW-38	Y	Y	Y				
MW-39	Y	Y	Y				
MW-40	Y	Y	Y	Y	Y		
MW-41	Y	Y	Y				
MW-42	Y		Y	Y	Y		
MW-43		Y	Y				
MW-43B			Y				
MW-49			Y				
<b>Brown's Creek Subtotal:</b>	<b>16</b>	<b>9</b>	<b>20</b>	<b>7</b>	<b>7</b>	<b>7</b>	
<i>Cupboard Creek Protection Zone</i>							
MW-19	Y		Y	Y	Y	Y	Typically contains product
MW-20	Y	Y	Y	Y	Y	Y	
MW-23	Y	Y	Y				
MW-23B	Y		Y				
MW-26	Y	Y	Y				
MW-26B	Y		Y				
MW-29	Y	Y	Y			Y	
MW-46			Y				
<b>Cupboard Creek Subtotal:</b>	<b>7</b>	<b>4</b>	<b>8</b>	<b>2</b>	<b>2</b>	<b>3</b>	

**Table 2. Revised Groundwater Monitoring Plan**  
 Corrective Action Plan Addendum Revision 2  
 Lewis Drive Remediation Site, Belton, South Carolina  
 Site ID #18693 "Kinder Morgan Belton Pipeline Release"

Frequency: <sup>a</sup>	Contaminant Reduction Evaluation			Biodegradation Evaluation		Zone of Influence <sup>b</sup>	Notes
	Baseline	Monthly (Year 1)	Quarterly (Year 1)	Baseline	Quarterly	Monthly (Year 1)	
<b>Analytes:</b>	BTEX, Naphthalene, MTBE, and 1,2-DCA <sup>c</sup>			Nitrate, Sulfate, Ferrous Iron, Carbon Dioxide, Methane, and Alkalinity <sup>d</sup>		Dissolved Oxygen	
<b>Well ID</b>							
<i>Hayfield Zone</i>							
MW-02	Y	Y		Y	Y	Y	Typically contains product
MW-02B	Y		Y			Y	
MW-03	Y	Y		Y	Y	Y	
MW-04	Y		Y	Y	Y	Y	
MW-05	Y	Y	Y				
MW-06	Y		Y				
MW-06B			Y				
MW-07	Y	Y					
MW-08	Y		Y	Y	Y	Y	
MW-09	Y		Y	Y	Y	Y	Typically contains product
MW-09B			Y				
MW-10	Y	Y	Y	Y	Y	Y	
MW-13	Y		Y				
MW-13B	Y		Y				
MW-14	Y		Y				
MW-14B	Y		Y				
MW-16	Y		Y	Y	Y	Y	Typically contains product
MW-17	Y		Y				
MW-17B	Y		Y				
MW-18	Y		Y	Y	Y	Y	Typically contains product
MW-21	Y		Y				
MW-30	Y	Y	Y			Y	
MW-31	Y	Y	Y				
MW-31B							
MW-32	Y		Y	Y	Y		
MW-33							
MW-33T			Y				
MW-36	Y		Y				
MW-36B	Y		Y				
MW-45	Y	Y	Y				
MW-45B	Y		Y				
MW-47			Y				
MW-48B			Y				
MW-50B			Y				
TW-55						Y	
TW-59						Y	
TW-60						Y	
TW-64						Y	
TW-66						Y	
TW-67						Y	
TW-73						Y	
TW-96						Y	
<b>Hayfield Subtotal:</b>	<b>26</b>	<b>8</b>	<b>29</b>	<b>9</b>	<b>9</b>	<b>18</b>	

**Table 2. Revised Groundwater Monitoring Plan**  
 Corrective Action Plan Addendum Revision 2  
 Lewis Drive Remediation Site, Belton, South Carolina  
 Site ID #18693 "Kinder Morgan Belton Pipeline Release"

Frequency: <sup>a</sup>	Contaminant Reduction Evaluation			Biodegradation Evaluation		Zone of Influence <sup>b</sup>	Notes
	Baseline	Monthly (Year 1)	Quarterly (Year 1)	Baseline	Quarterly	Monthly (Year 1)	
<b>Analytes:</b>	<b>BTEX, Naphthalene, MTBE, and 1,2-DCA<sup>c</sup></b>			<b>Nitrate, Sulfate, Ferrous Iron, Carbon Dioxide, Methane, and Alkalinity<sup>d</sup></b>		<b>Dissolved Oxygen</b>	
<b>Well ID</b>							
<i>Shallow Bedrock Zone</i>							
MW-01	Y		Y	Y	Y	Y	Typically contains product
MW-01B	Y		Y			Y	
MW-11	Y		Y	Y	Y	Y	
MW-22	Y	Y	Y	Y	Y	Y	
MW-27	Y		Y				
MW-27B	Y		Y				
MW-44	Y		Y				
MW-44B	Y		Y				
<b>Shallow Bedrock Subtotal:</b>	<b>8</b>	<b>1</b>	<b>8</b>	<b>3</b>	<b>3</b>	<b>4</b>	
<b>Grand Totals:</b>	<b>57</b>	<b>22</b>	<b>65</b>	<b>21</b>	<b>21</b>	<b>32</b>	

Notes:

<sup>a</sup> Any alterations to the monitoring frequency after the first year will be proposed to the South Carolina Department of Health and Environmental Control as needed and will be summarized in the Annual Report.

<sup>b</sup> Zone of influence monitoring for dissolved oxygen will be performed monthly for Year 1 and as-needed thereafter as air sparge flow rates are adjusted.

<sup>c</sup> Contaminant Reduction Evaluation: BTEX, naphthalene, MTBE, and 1,2-DCA by EPA Method 8260B

<sup>d</sup> Biodegradation Evaluation: Nitrate by EPA Method SM2320B, sulfate by EPA Method D516-9002, ferrous iron by EPA Method SM3500 FE D, carbon dioxide and methane by EPA Method RSK-175, and alkalinity by Method SM2320B

1,2-DCA = 1,2-dichloroethane

BTEX = benzene, toluene, ethylbenzene, and xylenes

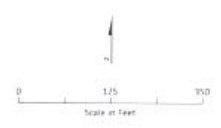
EPA = U.S. Environmental Protection Agency

MTBE = methyl tertiary butyl ether



- LEGEND**
- ★ Release Point
  - ⊙ Monitoring Well
  - ⊙ Bedrock Monitoring Well
  - ⊙ Sleep Location
  - ⊙ Recovery Sump
  - ⊙ Proposed Monitoring Well
  - ⊙ Piezometer ("R" indicates Replacement)
  - ⊙ Recovery Well (4-inch diameter)
  - ⊙ Vertical Bedrock Sparging Well
  - ⊙ Vertical Saprotite Sparging Well
  - ⊙ Surface Water Sampling Location
  - ⊙ Septic Tank
  - ⊙ Recovery Trench Extraction Point
  - Recovery Trench
  - Surface Water Flow Direction
  - Horizontal Sparging Well Riser
  - Horizontal Sparging Well Screen
  - Pipeline
  - National Hydrography Dataset: Stream
  - Delineated Wetland
  - Beaver Dam
  - Detail Area
- 0.43 Product thickness in feet as of 12/21/2013 and 12/21/2017
- NP No product detected  
NM Not measured

Base Map Sources  
 \*USDA, Farm Service Agency (FSA) National Agriculture Imagery Program (NAIP), Published 8/15/2015  
 \*United States Geological Survey (USGS) National Hydrography Dataset (NHD)



**Figure 1. Proposed Additional Monitoring Wells**  
 Lewis Drive Remediation Site  
 Belton, South Carolina  
 Site ID #18693 "Kinder Morgan Belton Pipeline Release"

