

*Delivered via FedEx Overnight*

Bruce Crawford  
Underground Injection Control Program  
2600 Bull Street  
Columbia, SC 29201

June 3, 2019

**Subject: Submittal of UIC Permit Application for Direct-Push Injections  
Lewis Drive Site, Plantation Pipe Line Company, Belton, Anderson County, South Carolina  
Site ID #18693, "Kinder Morgan Belton Pipeline Release"**

Dear Mr. Crawford,

On behalf of Plantation Pipe Line Company, Jacobs Engineering Group Inc. (Jacobs) is submitting the enclosed materials to apply for an underground injection control (UIC) permit to conduct direct-push injections of Oxygen Biochem (OBC) at the Plantation site located at 112 Lewis Drive, Belton, Anderson County, South Carolina. The proposed injection event includes 64 direct-push technology injection locations in two areas of the site: 40 injection locations upgradient of Cupboard Creek and 24 injection locations upgradient of Brown's Creek. The enclosed materials (Attachments A through K) provide the necessary details related to implementing the proposed direct-push injection event.

If you have any questions or concerns regarding this application submittal, please contact me at (678) 530-4388.

Regards,


Tom Wiley  
Site Manager

William M. Waldron  
Program Manager

Enclosures:

- UIC Permit Application for Proposed Direct-Push Injection Event
- Attachments A-K for Proposed Direct-Push Injection Event

cc: Bobbi Coleman/South Carolina Department of Health and Environmental Control  
Jerry Aycock/Plantation Pipe Line Company (via email at Jerry\_Aycock@kindermorgan.com)

Form  I  UIC	 <b>Underground Injection Control Permit Application Ground-Water Protection Division</b> (Collected under the Authority of Title 48 Chapter I of the 1976 South Carolina Code of Laws)	I. EPA ID NUMBER		
			T/A	C
		U		

**Read attached instructions before starting.  
For Official Use Only**

Application Approved month day year	Date Received month day year	Permit Well Number

Comments

II. Facility Name and Address			III. Owner/Operator and Address		
Facility Name Lewis Drive Release Site (Site ID #18693)			Owner/Operator Name Plantation Pipe Line Company		
Street Address 112 Lewis Drive			Street Address 1000 Windward Concourse, Suite 450		
City	State	Zip Code	City	State	Zip Code
Belton	South Carolina	29627	Alpharetta	Georgia	30005-5440

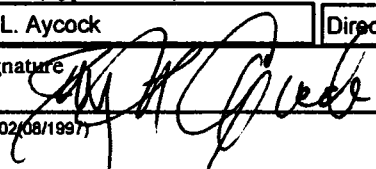
IV. Ownership Status (Select One)	V. SIC Codes
<input type="checkbox"/> A. Federal <input type="checkbox"/> B. State <input checked="" type="checkbox"/> C. Private <input type="checkbox"/> D. Public <input type="checkbox"/> E. Other (Explain)	4613

VI. Well Status (Select A, B or C)		
<input type="checkbox"/> A. Operating	Date Started (MM/DD/YYYY)	<input type="checkbox"/> B. Modification/Conversion <input checked="" type="checkbox"/> C. Proposed

VII. Type of Permit Requested - Class and Type of Well (see reverse)			
A. Class(es) enter code(s) V.A	B. Type(s) enter code(s) I	C. If class is "other" or type is code 'Y', explain	D. Number of Wells per type 64 DPT Injection locations

VIII. Location of Wells or Approximate Center of field or Project									
C	A. Latitude					B. Longitude			
1	Deg 34	Min 32	Sec 41.3 N			Deg 82	Min 30	Sec 24.9 W	

**IX. Attachments**  
Complete the following questions on a separate sheet(s) and number accordingly; see instructions for Classes 11, 111, and V, complete and submit on a separate sheet(s) attachments A-U as appropriate. Attach maps where required. List attachments by letter which are applicable and include with your application.

<b>X. Certification</b>			
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.			
A. Name (Type or Print) Jerry L. Aycock		Title Director-EHS	B. Phone No. (770) 751-4165
C. Signature 		D. Date Signed (MM/DD/YYYY) 05/31/2019	

## Well Class and Type Codes

Class I Industrial, municipal, and other injection wells for the subsurface disposal of fluids. (Prohibited)

Class II Oil and gas production and storage related injection wells.

Type "D" Produced fluid disposal well  
"R" Enhanced recovery well  
"R" Hydrocarbon storage well (excluding natural gas)  
"X" Other Class II wells

Class III Special process injection wells.

Type "G" Solution mining well  
"S" Sulfur mining well by frasc process  
"U" Uranium mining well (excluding solution mining of conventional mines)  
"X" Other Class III wells

Class IV Hazardous or radioactive waste disposal injection wells. (Prohibited)

Class V.A Injection wells not included in Class I, II, III, IV or V.B

Type "A" Storm runoff drainage wells  
"B" Aquifer recharge wells  
"C" Salt-water intrusion barrier wells  
"D" Subsidence control wells  
"E" Backfill wells associated with subsurface mining  
"F" Geothermal energy recovery wells  
"G" Experimental technology well  
"H" Natural gas storage wells  
"I" Corrective action wells

Class V.B Non-contact return flow system wells

Type "A" Heat pump return flow wells  
Type "B" Cooling water return flow wells

**Instructions for Attachments to Form 1**  
**Underground Injection Control**  
**for Corrective Action Wells**  
(effective 01/91)

The following ATTACHMENTS should be submitted with an underground injection control (UIC) permit application for Class V.A. corrective action wells associated with aquifer remediation that are to be used to inject fluid whose chemical constituents are below all drinking water standards, as established under R.61-58.5.

**Attachment A: Activity for Review**

Submit a brief description of the activities to be conducted that require a UIC permit.

**Attachment B: Well Construction Details**

Submit schematic or other appropriate drawings of the surface and subsurface construction details of the recovery and injection wells.

**Attachment C: Operating Data**

Submit the following proposed operating data for each injection well:

- 1) Average and maximum daily rate and volume of fluid to be injected. In addition, indicate the average and maximum daily rate and volume of fluid to be withdrawn from each recovery well. Verification of the aquifer's hydraulic ability to produce and accept the quantities proposed should be presented.
- 2) Average and maximum injection pressure.
- 3) Pumping schedule (i.e. continuous, alternating cycles, etc.).
- 4) Proposed ranges in the concentration of all contaminant constituents within the injection fluid. Include comprehensive ground-water quality data from a "worst case" well sample.
- 5) Length of time the project is expected to require injection to complete remediation (to ensure the effective dates of the permit will allow sufficient time to complete the project).

**Attachment D: Monitoring Program**

Discuss the planned monitoring program in detail:

- 1) Include a discussion of monitoring devices, sampling frequency (sufficient to verify treatment system efficiency), sampling protocol, sampling location, parameters to be analyzed, and proposed method(s) of analysis.
- 2) This plan should indicate how, through monitoring, the proposed contaminant levels in the injectate will be verified.
- 3) This plan should also clearly illustrate exactly how hydraulic control of the contaminant plume (and injectate, where relevant) will be verified through monitoring (i.e., piezometers, quality analyses, etc.).

**Attachment E: Existing or Pending State/Federal Permits**

List the program and permit number of any existing State or Federal permits for the facility (i.e., NPDES, RCRA, UST, etc.).

**Attachment F: Description of Business**

Give a brief description of the nature of the business of the facility and any immediately adjacent facilities.

**Attachment G: Area of Review**

- 1) The area of review should be a fixed radius of 1/4 mile from the injection well, the outermost injection wells (if a wellfield).

- 2) If a fixed radius is not selected, the methods and the calculations used to determine the size of the area of review should be submitted.

#### Attachment H: Maps of Wells and Area of Review

- 1) Submit a topographic map of the area, extending one mile beyond the project property boundaries. This map should show all hazardous waste treatment, storage, or disposal facilities, and all intake and discharge structures associated with the project facility. Any known areas of soil and/or ground-water contamination within a one mile radius should be indicated. Also indicate all surface bodies of water, springs, mines (surface and subsurface), quarries, and other pertinent surface features such as residences, roads, and geologic faults (known or suspected).
- 2) A scaled map(s) should be included which shows the name and/or number and the location of **ALL** production, injection, monitoring, abandoned and dry wells within the area of review. This should be accomplished by file **and** field surveys. Information regarding the construction (i.e., total depth, diameter, casing/screened intervals, grouting, etc.) and the current status (i.e., actively used, temporarily abandoned, permanently abandoned) of **ALL** wells within the area of review should be submitted. If any wells have been abandoned, details on the method the wells were abandoned (i.e., cemented/grouted, filled with sand, etc.) should be included.
- 3) A potentiometric map of the project site should be submitted which accurately locates all monitoring wells and proposed recovery and injection wells and outlines the horizontal extent of both the free-phase contaminant (where applicable) and dissolved contaminant plumes. Include all water level and product thickness data. The date and time that water levels and product thicknesses were measured should be indicated.

#### Attachment I: Cross Sections/Diagrams

- 1) Geologic cross sections indicating the lithology and stratigraphy of the site and the horizontal and vertical extent of the contaminant plume, should be submitted. At least two stratigraphic cross sections, one parallel and one perpendicular to the horizontal ground-water flow direction, should be submitted. In areas where the site stratigraphy is complex, additional cross sections should be submitted to clearly illustrate the local conditions.
- 2) A schematic diagram, in the form of a cross section, showing the proposed remediation system with the components of flow (above and below ground) and all associated appurtenances (i.e., stripping tower, piping, wells, etc.).

#### Attachment J: Name and Depth of Underground Sources of Drinking Water (USDW's)

Identify and describe all aquifers which may be affected by the injection.

#### Attachment K: Hydraulic Control

- 1) Sufficient supporting data (i.e. time/drawdown data, Theis curves and methods, calculations, etc.), used to determine aquifer characteristics to verify **complete** hydraulic control over the contaminant plume (and injectate, if proposed injectate quality does not conform to classified ground-water standards) during injection should be submitted. At a minimum, values should be given for transmissivity, hydraulic conductivity, effective porosity and specific yield.
- 2) Demonstrate the presence and magnitude of, or the absence of, any vertical hydraulic gradient at the site. If a vertical hydraulic gradient exists, show how its direction and magnitude are incorporated in the calculations demonstrating hydraulic control.
- 3) Ground-water flow computer models (especially 2-D map view with potentiometric and flow lines) may be utilized and submitted. All calculations should be in English units. All model-derived data and maps should be properly labeled and keyed so as to be clearly understood.

#### Subsequent Action

After receipt of a complete Underground Injection Control Permit Application, the Department will make a determination to deny or issue a **Permit to Construct** the injection well(s). After the well(s) is/are constructed, the Department should be notified in writing of the well(s) completion and sent a copy of the completed well record form(s) signed by a South Carolina certified well driller which illustrates the "as built" well construction. If the system is in compliance with the approved application, the Department may then issue an **Approval to Operate**. This Approval to Operate is the final permission necessary prior to injection.

This underground injection control (UIC) permit is being submitted in regard to a proposed direct-push injection event at the Lewis Drive Release Site in Belton, South Carolina, referenced in South Carolina Department of Health and Environmental Control (DHEC) correspondence dated December 11, 2018 and January 22, 2019 which are included in this attachment. This injection event consists of injection locations near Brown's Creek and Cupboard Creek. During this injection event, Oxygen Biochem (OBC) will be delivered to the subsurface to prevent the migration of groundwater impacted by the Plantation Pipe Line release toward Brown's Creek and Cupboard Creek. The release occurred approximately 450 feet east of the intersection of Lewis Drive and West Calhoun Road, approximately 1- mile northwest of Belton, South Carolina.

The selected amendment is OBC™ supplied by Redox Tech, LLC. OBC is a mixture of sodium persulfate and calcium peroxide that supports a two-fold mechanism for treating petroleum hydrocarbons. OBC delivers a strong oxidant (sodium persulfate) in situ chemical oxidation in the short term as well as electron acceptors (oxygen and sulfate) for biological oxidation in the long term. The Safety Data Sheet for OBC is included within this attachment.

The proposed injection event includes a total of 64 direct-push technology (DPT) injection locations in two areas of the site. 40 injection locations upgradient of Cupboard Creek and 24 injection locations upgradient of Brown's Creek. Injection points will be spaced approximately 15 feet apart, perpendicular to groundwater flow. A Geoprobe direct-push drill rig will be used to deliver OBC solution from the top of bedrock (approximately 20 feet below ground surface [ft bgs]) to 5 ft bgs. Injection of OBC™ solution will be performed using a track-mounted Geoprobe direct-push drill rig. Proposed injection locations are included in **Figure A-1**.

At each injection location, approximately 600 pounds of OBC will be mixed with 360 gallons of potable water and delivered to the subsurface in 1- to 2-foot increments to ensure proper vertical distribution. Throughout the event, a total of 38,400 pound of OBC and 23,000 gallons of potable water will be delivered to the subsurface. Additional injection locations may be required to deliver the total quantity of OBC and water to the subsurface due to refusal or daylighting.

The nearest residence is currently about 1,300 feet southeast from the release point. The former residence at 112 Lewis Drive was 300 feet from the release point, but this property has been acquired by Plantation and is no longer occupied. No other facilities exist nearby, and, aside from the paved roads, the surrounding area is comprised of a mixture of pasture, forest, and wetlands. Baseline and performance monitoring will be performed with routine groundwater sampling events to evaluate the effectiveness of the system at reducing concentrations of the dissolved-phase hydrocarbons present in groundwater at the site.

