

APPENDIX V – OTHER TREATMENT AND DISPOSAL OPTIONS

Permit application requirements for other treatment and disposal options as defined in Section 547, if applicable (Section 525)

In addition to the information requested in §519.C, the following information required in this Section must be provided in duplicate in each application for approval of a commercial Facilities incorporating the use of treatment and/or disposal options other than land treatment and as defined in §547.

1.0 A detailed description of the site with relation to the following:

1. Past and present land use;
2. Geology/soil properties/hydrogeology;
3. Drainage and flood control;
4. Hydrologic balance; and
5. Highest seasonal groundwater level.

1.1 The site is an approximate 7.873-acre site consisting of a portion of the N 1/2 of the NE ¼ of Section 20, Township 13 North, Range 9 West Red River Parish, Louisiana. The Permitted Facility Boundary encompasses 5 acres of this tract and includes the aboveground storage tanks, office/lab buildings, and injection well. The past land use is primarily Timberland. The present land use is Timberland.

1.2 The proposed Facility is located in Uplands. The underlying soil on these uplands is identified as the Falkner Series – Falkner-Boswell Association (FBB) according to the U. S. Department of Agriculture Natural Resources Conservation Service website (<http://websoilsurvey.nrcs.usda.gov/>), access date 11/14/2018.

The Falkner Series consists of somewhat poorly drained, slowly permeable soils that have a subsoil that is loamy in the upper part and clayey in the lower part. These soils formed in clayey sediment of Tertiary age. These soils are on gently sloping uplands. Slope ranges from 1 to 5 percent. Mean annual air temperature is about 12 degrees C to 24 degrees C (55-75 degrees F), and mean annual precipitation is about 1041 mm to 1549 mm (41 in to 61 in).

Falkner-Boswell Association, Gently Sloping (FBB) – This is a nearly level, somewhat poorly to moderately well drained, loamy/clayey soil. It is in areas of 200-800 acres on Uplands in Red River Parish. The soils are on broad ridges and drainage divides. It has the profile described as a representative of the Association. Slopes are mostly 1-5 percent.

TAXONOMIC CLASS:

Falkner - Fine-silty, siliceous, thermic, Aquic Paleudalfs, Alfisols.

Boswell - Fine, mixed, thermic, Vertic Paleudalfs, Alfisols.

According to the U. S. Department of Agriculture Natural Resources Conservation Service website (<http://websoilsurvey.nrcs.usda.gov/>, access date 11/14/2018, The underlying soil is identified as the Falkner-Boswell Association (FBB) which have slopes of 1-5 percent.

Faulkner-Boswell Association, Gently Sloping (FBB) - silty/sandy loam, 1-5 percent slope. The Faulkner-Boswell Association, Gently Sloping (FBB) component makes up 100 percent of Defiance Energy Services, LLC (Defiance) property and well pad boundary. This component is found on broad ridges and drainage divides with slopes of 1 to 5 percent. Depth to a root restrictive layer is greater than 80 inches. The natural drainage class is somewhat poorly drained with moderately low to moderately high water movement in the most restrictive layers. Available water storage in profile is high, about 11.4 inches. This soil is not flooded nor is it ponded. This soil does not meet hydric criteria.

- 1.3 Natural drainage is generally to the west and south. Local groundwater flow likely follows the predominant surface topography in the area, to the south-southwest.

According to the U. S. Geological Survey (USGS), Red River Parish is located in the Mississippi Embayment aquifer system. Groundwater in the area of the Property is produced from the Carrizo-Wilcox Aquifer. Wells completed in the Carrizo-Wilcox Aquifer in this area vary in depth from approximately 122 to 300 feet.

The Site is located on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Red River Parish, Louisiana and Incorporated Areas, FIRM Panel No. 220152B, Effective Date May 15, 1985. The entirety of the Site is designated as Zone C. Zone C would be described as an area of minimal flood hazard, usually depicted on FIRMs as outside the 500-year flood plain.

- 1.4 The development of the proposed commercial SWD facility will not adversely impact the hydrologic balance of the area. Best Management practices will be implemented for drainage of storm water or rainwater to prevent contact with hydrocarbon or produced E and P waste impacted surfaces. During construction activities, best management practices will be implemented to limit the run-off of silts and maintain the hydrologic balance of surrounding streams and tributaries. The main offloading area for E and P waste liquids has 6-inch concrete containment berms to prevent run-on or run-off of storm water. More significant spills are contained on the bermed unloading area that is equipped with a sump and fluid actuated sump pump to prevent any accumulation of fluid on the unloading pad and send fluids through the treatment process. The loading area for oil or condensate is equipped with a 6.5 gallon poly loading valve containment with cover and lock. Minor spills of oil are immediately contained within the poly loading

valve containment and can be transferred to the oil tanks. A 5 gallon bucket is available at the loading site to contain the minimal amount of oil between valves when unhooking from the truck. Absorbent materials to contain a spill are kept on site and will be utilized to control and minimize any spills that might occur while loading oil. The tank containment area has a capacity of approximately 15,654-barrels. Erosion control measures are implemented around the site to prevent excess erosion before and after construction. The perimeter of the site will be seeded after construction and grass maintained to prevent erosion. Best Management Practices will be developed and maintained before and after construction. Storm water or rainwater will drain to unnamed tributaries to the west and south/southwest into Grand Bayou, thence into Grand Bayou Reservoir, thence into Black Lake Bayou, thence into Black Lake, thence into Bourbeaux Bayou, thence into Saline Bayou, thence into the Red River.

- 1.5 These soils have an apparent seasonal high water table at a depth of 1.5 to 3 feet from December to April (USDA, Soil Survey of Red River Parish, pg 14, Falkner Series Soils).

2.0 A detailed description of the Facility design including maps and drawings and a discussion of the following:

1. Site layout (Labeled as Attachment 3, facility diagram and maps)
 2. proposed waste application technique;
 3. Drainage control;
 4. Proposed waste treatment rates; and
 5. Expected Facility life.
- 2.1 Vacuum trucks transporting approved Exploration & Production Waste (E&P wastes) for disposal enter the Defiance facility (The Facility) from US Highway 371. The surface storage facility comprises approximately 5 acres. The facility will be surrounded by a 6-foot chain linked fence. The saltwater will have solids removed prior to being pumped to the permitted injection well. The trucks transporting liquid E&P wastes will enter The Facility during operating hours. E&P waste fluids collected sent via centrifugal pumps through filter pots to the initial treatment tanks. A sample of the fluid being offloading will be collected and analyzed for certain parameters prior to the truck offloading. Trucks will continue through the U-shaped driveway to the exit gate and return to US Highway 371. The laboratory will be located adjacent to the off-loading area to direct incoming trucks to the offloading area and streamline completion of manifests and tickets upon off-load completion. The employee parking area will be located outside of the southern portion of the permitted facility boundary. The one (1) proposed injection well will be located in the northwestern portion of the facility boundary and will be surrounded with post and chain closures. Any access roads to the well will be restricted with locked gates and will remain locked at all times. The detailed Facility Diagram is attached (Attachment 3).
- 2.2 This application includes an application for a permit to drill one (1) commercial SWD well and to construct the Facility that will be used to

separate oil and solids from incoming E and P waste and dispose of E and P waste liquids, primarily produced saltwater, in the proposed commercial disposal well. The E and P waste liquids will be pumped through a closed loop system from the truck through a strainer basket and centrifugal pump into the inlet manifold where it is directed through two (2) 700-barrel fiberglass settling tanks. The fluids will then be sent through two (2) series of four (4) 1,000-barrel fiberglass tanks (8 Total) for solids separation and some minimal hydrocarbon separation. The fluids will then be transferred via centrifuge pumps to the two (2) fiberglass 1,000 gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from the tops of the 1000-barrel tanks and siphoned from the gun barrels and transferred to two (2) 400-barrel steel oil tanks. Fluid from the gun barrels is directed to two (2) 750-barrel fiberglass suction tanks prior to being disposed of in the approved injection well. Fluid from the two (2) 750-barrel suction tanks are then transferred by one of three (3) triplex pumps to the one (1) approved SWD well. All tanks will be closed top tanks. The oil will be transferred from the two (2) steel 400-barrel oil tanks via the load out pipe on the north side of The Facility. Solids accumulate in the gun barrels and settling tanks from the gravity settling process and require periodic cleanouts. These solids will be cleaned out of the tanks and placed in a covered steel roll-off that is sealed to prevent leaks until the waste profile is approved for disposal at a nearby Facility approved by the State of Louisiana to accept such waste. The roll-off container will only be located at the Facility during temporary routine maintenance, such as cleaning tank bottoms from aboveground storage tanks. The solids contained in the sealed roll-off will be transported by a permitted transporter to an LDEQ or LDNR approved Facilities. The clean produced E and P waste fluid will be injected into the permitted well at less than the Maximum Authorized Surface Injection Pressure (MASIP). E and P waste fluid disposal by deep well injection is a common practice and is the primary technique employed for disposal of this type of waste.

- 2.3 The Defiance Commercial SWD Facility will have a Stormwater Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasures (SPCC) Plan, developed by a Professional Engineer to incorporate stormwater management for the containment areas of the proposed SWD facility. The main offloading area for E and P waste liquids has 6-inch concrete containment rollover berms to prevent run-on or run-off of storm water. Minor spills of oil are immediately addressed if a spill occurs while loading oil. The loading valve is fully contained by the 6.5 gallon poly containment at the unloading valve. Erosion control measures are implemented around the site to prevent excess erosion before and after construction. The perimeter of the site will be seeded after construction and grass maintained to prevent erosion. In non-containment areas, such as wellheads and flowlines, any detected small leakage from valves, glands, etc. will be repaired by Facility personnel. If a larger, more significant leak is found, the source will be shut off and mobilization for repair and cleanup will commence immediately. Containment of any spills in the tank battery area is

protected by 49-in. steel sealed/lined containment wall around the tank battery that provides for greater than 100% capacity of all the tanks. The tank containment wall is integrated into the sealed/lined floor and the floor is slightly sloped towards the west end of the tank containment area, towards automated collection sumps actuated by a fluid level switch to prevent accumulation of any fluids within the tank containment area. Any fluids picked up by the sump pumps are sent back through the flow process.

Loading and off-loading operations will occur only during operational hours. Drivers are required to comply with warning signs and to remain on the off-loading area while operations are underway. Drivers will be assisted by trained Defiance employees and will inspect truck and tank connections before, during and after loading operations. Warning signs are posted at the location and absorbent materials are located near the unloading pad for immediate use in the event a small leak or spill would occur. All non-compliant events will be reported to The Office of Conservation within 24 hours and will be followed by a written corrective action plan within 5 days, in accordance with LAC43;XIX.535.E.

- 2.4 The anticipated average volume of waste that will enter The Facility is 15,000 bbls per day at approximately 10.4 bbls per minute. The anticipated maximum daily rate of waste disposal is 25,000 bbls per day at approximately 17.4 bbls per minute.
- 2.5 It is Defiance's expectation that the new injection well will last 15 to 20 years.

3.0 An explanation of the proposed E and P Waste management and operations plan with reference to the following topics:

1. Sampling and testing of incoming waste (waste acceptance procedures);
2. Method of receiving waste;
3. Waste segregation;
4. Proposed waste treatment monitoring plan;
5. Reuse stockpile management plan (see §565.G); and
6. Air emissions (odor) reduction and monitoring plan that addresses such sources as:
 - a. The volatilization of organic materials and/or hydrogen sulfide in the E and P Waste;
 - b. Particulate matter (dust) carried by the wind;
 - c. Periodic removal and subsequent handling of free oil; and
 - d. Chemical reactions (e.g., production of hydrogen sulfide from sulfur-bearing E and P Wastes).

- 3.1 *Sampling and testing of incoming waste:* Before offloading at this commercial Facility, each shipment of E and P waste will have a sample collected, measured for percent solids, and analyzed by facility personnel for pH, conductivity, and chloride content. Records of these tests will be kept on file

at The Facility for a period of three (3) years and will be available for review by an inspector employed by the Office of Conservation.

A minimum of one (1) eight-ounce sample will be collected from each load and will be labeled with the date, operator, and manifest number. These samples will be retained at The Facility location for a minimum of thirty (30) days.

Exploration and Production (E and P) Waste Shipping Control Tickets (Form UIC-28) will be stored on-site for at least three (3) years for review by the Louisiana Department of Natural Resources.

Procedures for accepting the E and P Waste include: 1) The manifest must be completed with the correct information before accepting E and P Waste in accordance with LAC43:XIX.545.A and L, 2) The field analytical tests conducted including pH, conductivity and chlorides, must be recorded on the UIC-28 to ensure completeness of the form, 3) If the E and P Waste is from a non-Louisiana operator, then an approved UIC-23 must accompany the UIC-28 and E and P Waste shipment and 4) A company representative or employee of Defiance must meet the transporter at the offloading area for all acceptance of E and P Waste shipments.

- 3.2 *Method of receiving waste:* A concrete off-loading area will be constructed to prevent the release of E and P waste into the environment. The concrete off-loading area will have 6-inch concrete rollover berms on four sides to prevent run-off of E and P waste and run-on of rainwater. Any fluid spilled, or rainwater falling onto the unloading pad is directed towards a catch sump by the slight slope built into the unloading pad towards the catch sump. The catch sump is equipped with an automated fluid level switch to pump any accumulated fluid from the catch sump back through the process flow.

The storage tanks at The Facility will be surrounded by a 49-in steel sealed/lined containment wall that is integrated into the sealed/lined floor, which has a total spill containment capacity of approximately 15,654-barrels. The sealed/lined floor of the tank containment area is sloped slightly towards the integrated sealed/lined sumps at the west end of the tank containment area which collects any fluid spilled in the containment area and/or rainwater. The sumps are equipped with a fluid level actuated switch that automatically pumps any fluid from the catch sumps back through the process flow to prevent any accumulation of fluid in the tank containment.

The E and P waste, or primarily produced saltwater, will be pumped through a closed loop system from the truck off-loading area, through a strainer basket, to the inlet of manifold where it is directed through two (2) 700-barrel fiberglass settling tanks. The fluids will then be sent through two (2) series of four (4) 1,000-barrel fiberglass tanks (8 Total) for solids separation and some minimal hydrocarbon separation. The fluids will then be transferred via centrifuge pumps to the two (2) fiberglass 1,000 gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from

the tops of the 1000-barrel tanks and siphoned from the gun barrels and transferred to two (2) 400-barrel steel oil tanks. Fluid from the gun barrels is directed to two (2) 750-barrel fiberglass suction tanks prior to being disposed of in the approved injection well. Fluid from the two (2) 750-barrel suction tanks are then transferred by one of three (3) triplex pumps to the one (1) permitted disposal well via the injection pumps.

- 3.3 *Waste segregation:* After taking a sample of the tank truck's contents, a 4-inch flexible hose is connected to the tail end of the tank truck to allow the contents to be pumped from the truck off-loading area, through a strainer basket, manifold where it is directed through two (2) 700-barrel fiberglass settling tanks. The fluids will then be sent through two (2) series of four (4) 1,000-barrel fiberglass tanks (8 Total) for solids separation and some minimal hydrocarbon separation. The fluids will then be transferred via centrifuge pumps to the two (2) fiberglass 1,000 gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from the tops of the 1000-barrel tanks and siphoned from the gun barrels and transferred to two (2) 400-barrel steel oil tanks. Fluid from the gun barrels is directed to two (2) 750-barrel fiberglass suction tanks prior to being disposed of in the approved injection well. Fluid from the two (2) 750-barrel suction tanks are then transferred by one of three (3) triplex pumps to the one (1) approved SWD well. Periodically, any of the storage tanks may need to be cleaned to remove solids from the bottom of the tank. The tank bottoms may be pumped off and transported to a permitted Facility, or the tank may be taken out of service, the liquids transferred to another tank within the permitted system, and the tank bottoms cleaned from the tank and placed in a lined covered seal-tight roll-off for profiling and disposal. The roll-off container will only be located at The Facility during temporary routine maintenance, such as cleaning tank bottoms from aboveground storage tanks. The solids will be transported by a licensed transporter to a permitted Facility that can accept E and P Waste.

The storage area will have a spill containment capacity of approximately 15,654-barrels. A SPCC Plan will be developed by a Professional Engineer upon completion of The Facility and maintained on-site. The included Facility Diagram (Attachment 3) shows the layout of The Facility and the storage tanks.

Only approved E and P waste, such as produced saltwater, rain water from containment water and other E and P Waste previously defined in this application will be injected in the permitted injection well. Injection pressures and the casing/tubing annulus pressure will be monitored according to the permit.

Solids that are generated from the E and P waste handled at The Facility will be periodically cleaned from the tanks and placed in a lined steel container. These solids will be sampled, analyzed, and profiled for disposal at an approved facility. An authorized transporter will transport these solids to a permitted facility for proper disposal. There will be no storage of these solids onsite for any longer than is necessary to complete tank cleaning operations.

- 3.4 *Proposed waste treatment monitoring plan:* Monitoring for The Facility and reporting frequency are listed below:

Services	Frequency
Annulus Pressure	Recorded Daily, Reported Monthly
Report of Waste Receipts	Recorded Daily, Reported Monthly
Daily Monitoring Log	Recorded Daily, Reported Monthly
Waste Volume	Recorded Daily, Reported Monthly
Facilities Inspection	Performed Daily, Reported to DNR Upon Incident
Waste Refusal Notification	Immediately Upon Occurrence
Complete Water Analysis	Upon Request

- 3.5 *Reuse stockpile management plan:* This Facility will not accept solids. There will be no reuse stockpile.

- 3.6 *Air emissions (odor) reduction and monitoring plan*

1. *The volatilization of organic materials and/or hydrogen sulfide in the E and P Waste:* Emissions calculations based on the anticipated throughput of this facility indicate that emissions would reach the threshold that requires an air permit; therefore, Defiance obtained a minor source air permit. Defiance will employ a third party contractor to perform optical gas imaging twice a year to ensure compliance with the National Ambient Air Quality Standard (NAAQS). There may be situations where minor or insignificant amounts of chemicals may be required to treat skim oil or condensate for emulsions and/or to treat steel piping for prevention of corrosion. Any chemical evaluated for use will be tested for compatibility with the current operations at the site, and, if utilized, will be properly stored and labeled at the site according to State and Federal regulations. These chemicals, if used, will be brought to the site on an as needed basis and typically stored in a one (1) barrel drum within the tank containment. The drums will remain closed until product is required and will be of small enough quantities and for short, limited time periods so as to only negligible air emissions. The estimated amount of chemicals that might be required on a daily basis would be approximately 12 gallons of Scale Inhibitor/Surfactant, 7 gallons of Oxygen Scavenger, and/or 6 gallons of Iron Sulfide Chelator. This amounts to less than one percent of the daily throughput at The Facility and will be added in a closed loop system. There are no compressors, line heaters, separators, dehydrators, or any other equipment that has the potential to emit. Facility personnel will be monitored for possible Hydrogen Sulfide (H₂S) exposure, through H₂S personnel monitors.

2. *Particulate matter (dust) carried by the wind:* The main access road to The Facility will be from U. S. Highway 371. U. S. Highway 371 is a paved road, and will not require a water truck or other measures to reduce dust emissions related to truck traffic. To help control dust carried by the wind, the entrance and exit drives to this facility will be asphalted from U.S. Highway 371 to half the distance of the unloading pad.
3. *Periodic removal and subsequent handling of free oil:* The periodic removal and subsequent handling of free oil occurs through a closed loop system. The hose from the oil tank load out to the truck is attached prior to opening valves from the tanks. The vacuum from the tanker is kept on vacuum after the load out valve is closed and the hose removed at the end of the unloading process to suck remaining oil in the hose into the truck. The loading area is equipped with a 6.5 gallon poly loading valve containment with cover and lock. Minor spills of oil are immediately contained within the poly loading valve containment and can be transferred to the oil tanks. A 5 gallon bucket is available at the loading site to contain the minimal amount of oil between valves or left in the hose when unhooking from the truck. Absorbent materials to contain a spill are kept on site and will be utilized to control and minimize any spills that might occur while loading oil.
4. *Chemical reactions:* Facility personnel will be monitored for possible Hydrogen Sulfide (H₂S) exposure, through H₂S/hazardous gas personnel monitors.

4.0 The site will be closed according to LAC43:XIX.567. The Department of Natural Resources – Environmental Division will certify that the site is properly closed. Closure of the site will be performed under the DNR’s supervision. Detailed information concerning closure and post-closure activities and monitoring as follows:

1. Proposed Closure Procedures;
2. Post-closure maintenance; and
3. Closure and post-closure monitoring.

4.1 The proposed closure procedures for The Facility are as follows:

1. Defiance personnel will take soil samples within The Facility boundary and one (1) background sample from outside The Facility boundary for a full LAC 29-B analysis. Analytical results will determine if any remediation activities are required.
2. Dispose of all E and P waste in tanks in order to drain tanks of their contents.

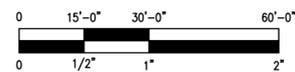
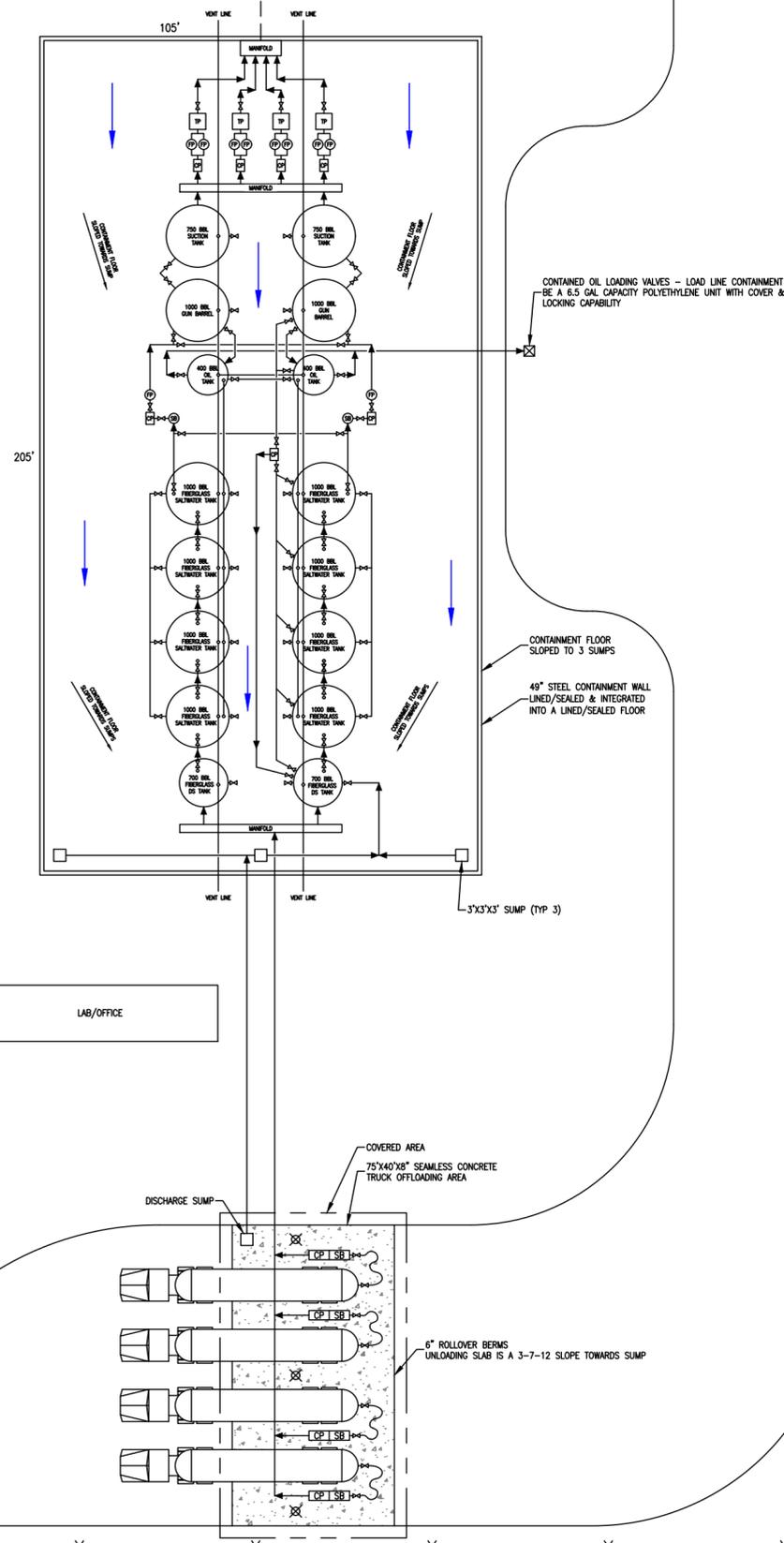
3. Take a background reading on location for Naturally Occurring Radioactive Material (NORM).
4. Clean tanks using freshwater vacuum trucks.
5. Sub-contract the removal of tank bottom contents to a certified NORM transport/disposal contractor if NORM readings are above background. Use same contractor to clean tanks inside and out.
6. Once clean, properly re-use, sell, and/or dispose of tanks.
7. Sub-contract the dismantling of tank battery, including all piping, tanks, vents, pumps, etc. All items are to be disposed of properly.
8. The sealed/lined tank battery and steel sealed/lined retaining walls will be demolished; all concrete will be removed from The Facility and built back to grade.
9. Plug and abandon the disposal well according to the procedures approved by DNR – Injection and Mining Division.
10. Once the site is to grade, it will be seeded. The site will be returned as close to possible to its original state per LAC 43:XIX.519.14a.
11. Re-sample at original locations to determine compliance with LAC 29-B parameters.

All Facility closure activities will be supervised by Defiance personnel. A Defiance supervisor will be on site at all times. The Environmental Health and Safety coordinator will meet with all sub-contracting parties to review safety concerns.

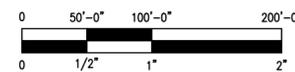
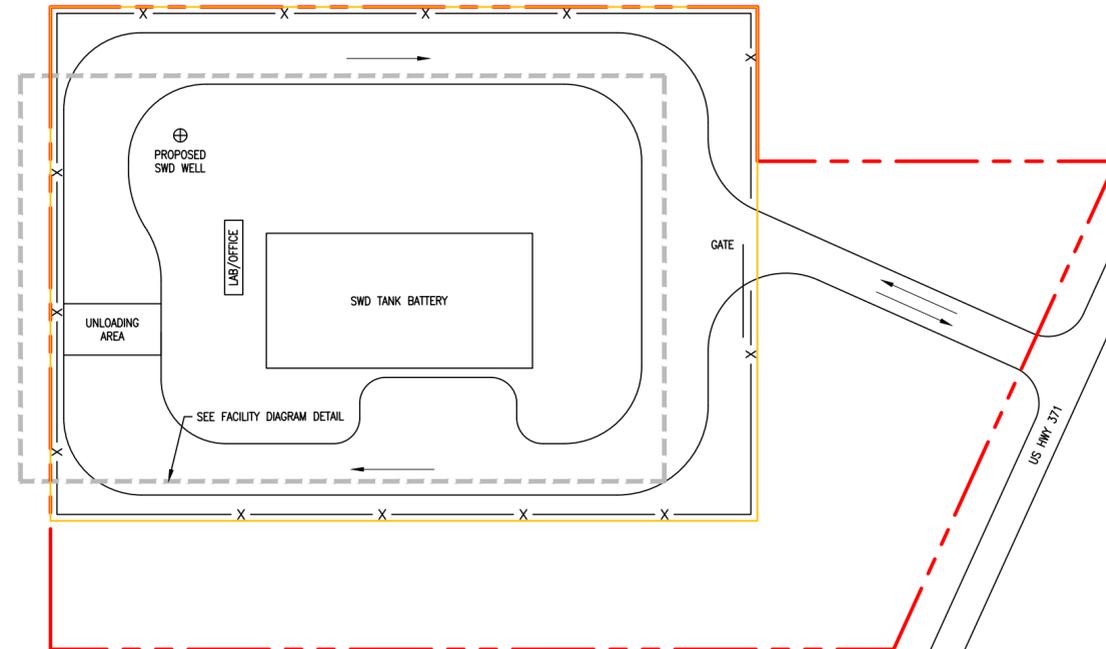
- 4.2 No post-closure maintenance is necessary.
- 4.3 No post-closure monitoring is necessary.



FACILITY DIAGRAM DETAIL



FACILITY DIAGRAM



LEGEND	
	PROPERTY BOUNDARY
	PERMITTED BOUNDARY
	6' CHAIN LINK FENCE
	UNDERGROUND FLOWLINE
	DRAINAGE DIRECTION
	CENTRIFUGAL PUMP
	TRIPLEX PUMP
	CONCRETE
	LEL MONITOR

TITLE	
ATTACHMENT 3 FACILITY DIAGRAM	

PROJECT NO.	SCALE	LOCATION
SA03994	AS SHOWN	
PAGE	DRAWN BY	
1	JKW	
SHEET	REVISED DATE	
C - 17" X 22"	07/08/20	

DEFIANCE ENERGY SERVICES, LLC. PROPOSED COMMERCIAL SWD FACILITY SECTION 20 T13N R5W RED RIVER PARISH, LOUISIANA	