APPENDIX A – CONSTRUCTION, OPERATION, AND DECOMMISSIONING PROCEDURES

VOLUME II – ENVIRONMENTAL EVALUATION

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LIST OF ACRONYMS AND ABBREVIATIONS

ABS	American Bureau of Shipping
ANSI	American National Standards Institute
A&R	abandon and recovery
API	American Petroleum Institute
ATBA	area to be avoided
ATWS	additional temporary workspace
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing Methods
AWS	American Welding Society
bbl.	barrel
BMP	best management practices
BOEM	Bureau of Ocean Energy Management
bph	barrels per hour
BSEE	Bureau of Environmental Enforcement
CALM	Catenary Anchor Leg Mooring
CO_2	carbon dioxide
CFR	Code of Federal Regulation
DHA	down hole assembly
DP	dynamic positioning
DWP	deepwater port
DWT	deadweight tonnage
e.g.	for example
FAA	fairway anchoring area
ft.	feet
GIWW	Gulf Intracoastal Waterway
GOM	Gulf of Mexico
GPS	global positioning system
HAZID	hazard identification
HAZOP	hazard and operability study
HDD	horizontal direction drill
MBC	marine breakaway coupling
MEG4	Mooring Equipment Guidelines
MHT	mean high tide
NAA	no anchorage area
NDT	non-destructive testing
NOAA	National Oceanic and Atmospheric Administration
OCIMF	Oil Companies International Marine Forum
PLEM	pipeline end manifold
Project	Bluewater SPM Project
psi	pounds per square inch
ROV	remotely operated vehicle
ROW	right of way
SMYS	specified minimum yield strength
SPM	single point mooring
U.S.	United States
USCG	United States Coast Guard

VLCC	Very Large Crude Carrier
WCD	worst case discharge
WOUS	Waters of the United States

1.0 Introduction

This document serves to describe the construction, operation, and decommissioning details, especially those considered potential consequence producing factors for the proposed Bluewater SPM Project (Project). Consequence producing factors are those aspects of the Project that have the potential to produce environmental consequences or impacts, and can be dependent on variables such as dimensions, methods, techniques, etc. Such consequence producing factors are discussed in detail in the following sections to provide supporting information for the environmental evaluation of the proposed Project. Consequence producing factors are discussed as occurring in three distinct phases of the Project, including: Construction, Operation, or Decommissioning. Additionally, construction, operation and decommissioning procedures are outlined for the project alternative in order to present a comparison of the consequence producing factors.

2.0 Proposed Project Construction Procedures

The execution of the construction of the proposed Project is divided into five (5) basic phases:

- Phase 1 – Engineering and Management
- Phase 2 – Solicitation and Procurement
- Phase 3 – Fabrication and Pre-Assemblies
- Phase 4 – Installations
- Phase 5 – Testing and Commissioning

The following sections describe in detail the five phases of construction.

2.1 Phase 1 – Engineering & Management

The engineering aspect of the Project will involve participation from the Applicant while utilizing qualified resources. The deliverables for this portion of the Project will include at a minimum the following: front end engineering and design, detail design, various analyses, construction drawings, material specifications, definition of applicable codes and standards, and other normal and customary documents and procedures relevant to this type of work.

A management team will be organized consisting of highly qualified individuals who are experts in their relative field. These individuals will consist of internal and/or external resources. Executive oversight of the Project team will be implemented using the Applicant's existing policies and procedures utilized on prior successful projects. The management team during the entire project life cycle will be responsible for vendor management, schedule, costs, health, safety, security, environmental and overall successful completion of the Project consistent with normal management functions.

2.2 Phase 2 – Solicitation and Procurement

The procurement process will commence upon completion of sufficient engineering data to allow for the process of sourcing materials to begin. The first major task for the procurement group will be the identification of long lead time items. The long lead time items can be identified as any item in which the time to manufacture or deliver could affect the overall planned completion date of the Project. The procurement group will be responsible for implementing existing standards (or developing new standards) as required to facilitate the successful procurement of the required products for the Project. Vendor selection will be performed by utilizing project approved vendor list, past procurement experiences, vendor capacities, vendor quality evaluations, track records, economic evaluations and any other industry mandated norms that may be required. The procurement group will have oversight of vendor management to ensure timely delivery and expediting of all materials. The materials will be manufactured, transported and stored in accordance with internationally recognized standards and deemed appropriate by the Applicant.

Major procurement long lead equipment include for example, 30-inch-diameter pipeline pipe, Single Point Mooring (SPM) buoy systems, pumps, tanks, and their associated appurtenances.

2.3 Phase 3 – Fabrication and Pre-Assemblies

One of the major fabrication and pre-assembly items defined at this time consist of the two (2) SPM buoy systems which will serve as the principle floating component to allow for the loading of crude oil to vessels moored at the deepwater port (DWP). Each of the proposed SPM buoy systems consist of a catenary anchor leg mooring (CALM) system, pipeline end manifold (PLEM) system, mooring hawsers, floating hoses, sub-marine hoses, and navigational aids.

The proposed SPM buoy systems will be of the CALM type. Each proposed SPM buoy system will be permanently moored with a symmetrically arranged six-leg anchor chain configuration extending to 72-inch-diameter pile anchors installed on the seafloor. The hull of the SPM buoy will be of all welded steel construction and divided into watertight compartments. The hull of the SPM buoy will be entirely coated in a high-quality marine paint system and the submerged portion will be further protected with the use of sacrificial zinc anodes to prevent electrolysis depletion of the hull. Handrails and ladders will be installed as required to provide safety and mobility to any personnel. The topsides of the SPM buoy will have navigation lights and radar reflector, as required. The SPM buoy will be equipped with a telemetry unit for communication. The floating hoses will be the interface between the ship's manifold and the SPM buoy. The floating hoses will remain floating on the surface and will be retrieved by the vessel and connected to the vessel's manifold.

The proposed SPM buoy systems will utilize PLEM systems which will serve as the primary manifold and connection point between offshore pipelines and the SPM buoys. Each of the proposed SPM buoy systems consist of a specialized PLEM to allow for either single or dual vessel loading operations at the DWP. The proposed PLEMs will connect offshore pipelines to the SPM buoy systems through a series of 24-inch-diameter sub-marine hoses. The PLEM systems consist of a steel frame structure positioned directly beneath each of the proposed SPM buoys. Each PLEM would consist of series of valves to control the flow of crude oil between the offshore pipelines and the SPM buoy systems. The proposed PLEMs have been designed with specific valve configurations to allow for multiple vessel loading scenarios including the loading of a single vessel at either SPM buoy, or the simultaneous loading two vessels (one vessel at SPM Buoy 1 and one vessel at SPM Buoy 2). The PLEM associated with SPM Buoy System 1 (PLEM 1) would be anchored directly to the seafloor via six (6) 18-inch-diameter pneumatically installed foundation piles. The PLEM associated with SPM Buoy System 2 (PLEM 2) would be anchored directly to the seafloor via six (4) 18-inch-diameter pneumatically installed foundation piles.

All components associated with the proposed SPM buoy system will be fabricated and constructed offsite in a controlled setting to minimize impacts and durations of onsite construction activities. The SPM buoy systems will be transported to the installation site via ocean transport vessels specifically designed for such purposes. The transportation method will be determined when the assembly or fabrication location is determined as the Project develops.

2.4 Phase 4 – Installations

The following sections for the installation of the proposed Project have been divided by project component to include the following:

- Harbor Island Booster Station Installation
- Pipeline Installation
    - Onshore Pipeline
    - Horizontal Directional Drill (HDD) Pipeline
    - Inshore Pipeline
    - Offshore Pipeline

- SPM Buoy System Installation

2.4.1 Harbor Island Booster Station Installation

Construction of the Harbor Island Booster Station would start with site preparation to establish the conditions necessary for the construction and installation of the proposed infrastructure. Once completed, security fences will be installed. The design and installation of the tank foundations, tanks, pumps, piping, and miscellaneous components will be in accordance with the applicable standards and design codes required by law and established industry standards. Construction materials will be delivered to the construction site via existing access roads. The construction and installation of the Harbor Island Booster Station will be completed using current industry standard practices. The Harbor Island Booster Station will be constructed within an approximate 19-acre site located on Harbor Island in Nueces County, Texas.

2.4.2 Onshore and Inshore Pipeline Infrastructure Installation

This section describes the main activities and processes involved in constructing and installing both onshore and inshore elements of the proposed Project. The onshore pipeline will include approximately 22 miles of two (2) new 30-inch-diameter crude oil pipelines extending from a planned multi-use terminal located near Taft, Texas to the landward side of the mean high tide (MHT) line of Redfish Bay. The proposed onshore pipeline infrastructure will use established pipeline and utility corridors and previously disturbed areas to the greatest extent practicable. The proposed inshore pipelines include the construction and operation of approximately 7.15 miles of two (2) new 30-inch-diameter pipelines and the Harbor Island Booster Station. The proposed inshore Project components serve to connect the onshore Project components to offshore Project components for the transport of crude oil and operation of the proposed DWP. The approximate 7.15 miles of the proposed inshore pipeline infrastructure extends from the western Redfish Bay MHT line to the MHT line located at the interface of San Jose Island and the Gulf of Mexico (GOM). The proposed inshore pipeline infrastructure crosses three navigable waterways including the Gulf Intracoastal Waterway (GIWW), the Aransas Pass Channel, and the Lydia Ann Channel. The inshore pipelines would intersect portions Texas State submerged lease tract 306 near the Lydia Ann Channel. The alignment of the inshore pipeline generally parallels Highway 361 from Aransas Pass to Harbor Island. The proposed Harbor Island Booster Station would occupy an approximate 19-acre area on Harbor Island in Nueces County, Texas. The proposed Harbor Island Booster Station would consist of and would consists of the necessary operating and pumping infrastructure to support the transport of crude oil and operations of the DWP.

The installation of the proposed onshore and inshore pipeline infrastructure will involve numerous construction techniques such as HDD, bores, and open cut conventional excavation in uplands, consolidated wetland soils, and unconsolidated soil areas. The two (2) 30-inch-diameter pipelines will be constructed using industry standards.

The Applicant proposes to install the onshore pipeline infrastructure within an approximate 125-foot-wide construction corridor, which will consist of a 75-foot-wide permanent Right of Way (ROW). During construction activities, additional temporary workspaces (ATWS) will be required beyond the width of the 125-foot-wide construction corridor at certain designated locations to provide the space necessary for safe and efficient installations of the proposed pipelines. The ATWS would be utilized where required for the storage of spoil, pipe, welding, pull strings, HDD entry and exit locations, and equipment access roads.

The Applicant proposes to install the inshore pipeline infrastructure within an approximate 100-foot-wide construction corridor. During construction activities, ATWS will be required beyond the width of the 100-foot-wide construction corridor at certain designated locations to provide the space necessary for safe and efficient installations of the proposed pipelines. The ATWS would be utilized where required for the temporary storage of spoil, pipe, welding, pull strings, HDD entry and exit locations, and equipment access roads. Refer to Attachment 1 for a depiction of the proposed onshore and inshore pipeline alignments and the associated construction workspaces.

The proposed onshore and inshore pipeline infrastructure will consist of mainline valves on each of the proposed 30-inch-diameter inshore pipelines for compliance with existing pipeline design codes and industry standard practices.

A review of the proposed construction footprint was made to determine if wetlands or waterbodies are present and their impact as a result of the construction and installation of the proposed onshore and inshore Project components. Based on this review, the proposed inshore and onshore Project components will temporarily impact approximately 27.9 acres of wetlands and 1.4 acres of streams and other waters of the United States (WOUS).

Best management practices will be utilized for pipeline installation within documented wetland areas to minimize temporary impacts to the maximum extent practicable. If the wetlands have unstable soil conditions at the time of mobilization and/or construction, the method of installation might involve using wood mats. Where possible, access to the construction site will utilize existing roads traversing the construction corridor. To minimize construction impacts to surface elevation in trenched areas, backfilling of the trenches following construction activities will occur as quickly as possible.

2.4.2.1 Site Survey and Centerline Marking

The site survey and centerline marking personnel are the first group from the construction contractor's workforce to enter the site to commence the main construction activities. The site survey and centerline marking of the works will be scheduled to start prior to the commencement of the other construction activities to allow for proper planning. This work will be carried out with a small crew using a global positioning system (GPS) and surveying instruments. Setting-out pegs will be placed at all boundaries, changes in direction and intermediate sightings on the proposed center line and the extremities of the working easement. Duties of the site survey and centerline marking personnel will include confirming that all crossings, utilities or other hinderances have been properly identified and addressed.

2.4.2.2 Rights of Way/Easement Demarcation

ROW marking will commence after the site survey and centerline marking. A crew of personnel and equipment comprising of mainly large, heavy tracked equipment will form the ROW access onto the land. The operations will include the removal of all hedging for disposal off site, bridge or flume pipe access across field ditches, protection of existing services by protection mattresses, re-grading of existing ground contours to assist access, the erection of goalpost and safety signs at overhead electric power lines and telecommunication cables. Operations will also include the placement of hard standings as required for vehicle parking and the re-grading of areas to provide a level and a safe excavation line/running track along the entire pipeline route. Additional crews will be provided to install offsite ROW accesses along the pipeline route to enable the ROW crew to gain access to the working areas, where access from the public road is not available or would cause a safety risk, or because of locked out locations or environmental concerns. Where temporary ROW fencing is required, crews will be required to erect this fencing to delineate the working area.

2.4.2.3 Procedures/Testing of Welders

Prior to the start of any mechanical work the contractor will issue for approval a full set of mechanical procedures for bending, welding, x-ray and coating. These contractor procedures will address work methods in accordance with the Project specifications detailing equipment and specific mandatory requirements. The procedures, particularly regarding welding and x-ray, will sufficiently address the full ranges of the various parameters which are characteristic of the Project in terms of diameter, wall thickness and technique. Once the documented procedures are approved then full trials for each element of the work will be carried out, fully inspected, and witnessed. The welding will include non-and full destructive testing to ensure the procedure welds are undertaken in strict compliance with the current industry standards and codes.

2.4.2.4 Clearing and Brush Disposal

The following are standard procedures to follow during the clearing phase of construction:

- ROW boundaries and other areas to be disturbed (e.g., workspace limits, valve station sites, etc.) will be clearly delineated followed by an inspection to ensure that no clearing occurs beyond these boundaries.
- Trees to be saved shall be marked with flagging before clearing begins.
- Stemmed vegetation such as brush, shrubs and trees shall be removed at or near the ground level, leaving the root systems intact.
- All existing fences needing to be temporarily removed for access shall be maintained with the use of a temporary fence section (gap). Prior to being cut, the fence will be properly braced, and similar material used to construct the gap. At no time will an unattended gap be left open. The gap will be replaced after cleanup with a permanent fence of the same or similar material and condition.
- Trees located outside of the ROW or workspace will not be cut to obtain timber for use along the ROW or workspace.

Trees and brush shall be disposed of in one or more of the following ways depending on local restrictions, applicable permit stipulations, and/or as designated by the designated inspector.

- Cleared materials may be removed from the ROW and/or facilities locations, chipped and spread on the ROW or buried within the construction ROW or workspace as approved by the Company inspector. However, cleared materials will not be buried in wetlands or other WOUS, agricultural lands, or in residential areas.
- Off Site Disposal
    a. Shall be done when brush piles, chipping, burning or burying are not permitted or appropriate.
    b. Disposal shall be at an approved landfill or other site which is traditionally used for disposal of construction debris. Off-site disposal can be subject to compliance with all applicable survey and mitigation requirements.
    c. Trees or other cleared materials will not be placed in wetlands or other WOUS.

2.4.2.5 Grading and Temporary Erosion Control Barriers

When existing topography and/or terrain does not permit crews and equipment to operate safely and does not provide access or an efficient work area, grading may be required. The following general construction methods will be employed during grading:

Hay/straw bales and silt fences are interchangeable, except where noted below. Temporary erosion control barriers are required immediately after the initial disturbance of the soil, as described below.

- At the outlet of a water bar/terrace when vegetation is not adequate to control erosion.
- Along banks of waterbodies between the graded construction ROW or workspace and waterbody after clearing.
- Downslope of any stockpiled soil in the vicinity of waterbodies and wetlands.
- At the base of slopes adjacent to road crossings until disturbed vegetation has been reestablished.

- At sideslope and downslope boundaries of the construction area where run-off is not otherwise directed by a water bar/terrace, sediment control barriers will be installed.
- Sediment control barriers/Best Management Practices (BMP) will be maintained throughout construction and remain in place until sufficient revegetation has been achieved, after which temporary sediment control barriers/BMPs will be removed.
- Within the construction ROW or workspace at boundaries between wetlands and adjacent disturbed upland areas, sediment control barriers may be placed.
- Sediment controls will be placed as necessary to prevent siltation of ponds, wetlands, or other waterbodies adjacent to or down slope of the ROW or workspace.
- Sediment controls may be placed at the edge of the construction ROW or workspace as needed to contain spoil and sediment.
- The site will be inspected in areas of active construction or equipment operation, on an as needed basis in areas with no construction or equipment operation, and within 24 hours of the end of a storm event that is has 0.5 inches or greater of rainfall.

2.4.2.6 Ditching

- Topsoil segregation will be in place within wetland areas and/or other areas deemed necessary in accordance with permit requirements and/or landowner requests.
- In areas where topsoil segregation is required, topsoil and subsoil will be segregated during ditching and stockpiled separately.
- Topsoil is removed to its actual depth or to a maximum depth of 12 inches, as determined by the designated inspector.
- Topsoil shall not be used for padding, backfill or trench breakers, under any circumstances.
- Appropriate authorities (such as the One Call/Dig Safe systems) will be notified.

2.4.2.7 Layout of Pipe and Above Ground Welding

<u>Pipe Stringing</u>

The pipes and pre-formed bends will be delivered to the proposed ROW. The pipe supply should ensure the various grades, wall thicknesses and coatings are supplied in sufficient and correct quantities to meet the requirements of the Project. Pipe stringing involves laying the pipe lengths along the easement length using pipe trailers. A typical crew will consist of two cranes, one loading the pipe trailers and the other on the ROW off-loading the pipe trailers. If ground conditions do not permit travel down the easement with standard or special heavy-duty pipe trailers, the pipes will be loaded on tracked pipe carriers at a point where the change in ground conditions occurs and permits the turning of the wheeled pipe trailers.

<u>Bends – Hot Pre-Formed and Cold Field Bending</u>

Once the pipe has been strung, engineers will follow to determine the location of all bends required to ensure the pipeline can follow the contours of the land and the required line and level as detailed on the drawings. There are two types of bends normally used. Hot pre-formed or forged bends which are manufactured offsite in a factory to a radius of 5 or 3 times the pipe diameter and secondly, cold bends which are manufactured to a radius of 40 times the pipe diameter and are formed in the field.

Welding of the Line pipe

The welding crew will weld the pipeline in continuous lengths between features such as roads, services, and other underground obstacles that prevent the line pipe being continuously installed in the trench. There are primarily two methods of welding, manual welding or automatic welding. As the names imply, manual welding involves the welding of the pipe by welders and automatic involves a semi-automatic system.

Nondestructive Testing (NDT) Inspection

All welds on the pipeline are generally subjected to inspection by radiography. This will be achieved on the main pipeline by an x-ray (source) placed in the internals of the pipe, film on the outside, exposed, developed and evaluated. Welds, which do not meet the required acceptance criteria, are either repaired or cut out and re-welded. Experienced and qualified x-ray specialists undertake the radiography under controlled conditions. Before the operation is started, the section of pipeline is cordoned off by marker tape to stop entry by non-x-ray personnel. The x-ray personnel are to be on constant surveillance to ensure that the workforce and members of the public are aware of the x-ray activities and only authorized access is permitted. In some instances, phased array ultrasonic testing is sometimes acceptable as an alternative to conventional x-ray.

Weld Rectification

Rectification will commence immediately after the NDT inspection activities to make repairs to any defective weld. On completion of any repair, another NDT inspection is performed on the weld to ensure that the finished weld conforms to the standard required.

Field joint coating

The coating of the pipeline field joints intended to prevent corrosion will commence after acceptable results are obtained from the NDT inspections.

2.4.2.8 Lowering-In/Backfilling

The following standard techniques will be used during lowering-in and backfilling:

Trench Dewatering

- Hose intakes will be elevated off the ditch bottom.
- Dewater locations will be approved by the designated inspector.
- Discharges:
    - If greater than 100 feet from a wetland or stream bank, the discharge will be directed into a well vegetated area; or
    - If no well vegetated area is available or the discharge point is less than 100 feet from a wetland or stream bank, the discharge will be directed through a filter system and/or into areas contained by erosion control barriers.

Under no circumstances will trench water or other forms of turbid water be directly discharged onto exposed soil or into any wetland or waterbody.

Backfilling

- Backfill material and methods will be approved by a designed inspector or other assigned inspector.

- Heavy equipment may be used to compact the backfilled ditch to minimize settling, or a crown of soil will be put over the pipeline to compensate for future soil settling. Openings shall be left in the crown to allow for lateral surface drainage.
- Excess or unsuitable material shall be disposed of in accordance with applicable regulations.

NDT Inspection

NDT testing will be employed on the construction of the two 30-inch pipelines as per Applicant specifications. All welds are to be 100% radiographically (X-ray) inspected and the X-ray film is to be reviewed and approved by a certified welding inspector. The pipeline's weld maps and the X-ray film is to be retained to be a permanent record. Any weld that is found to be unsuitable will be cut out and welded again.

2.4.2.9 Installation of Cathodic Protection

Cathodic Protection equipment will be installed as per required specifications on the two 30-inch-diameter pipelines that will include appropriately spaced rectifiers, test stations, ILI markers and other CP measures and equipment as required. Mile Post markers will be installed along the pipelines' route and pipeline identification signs are to be installed at pipeline, road and property line crossings and where it is deemed necessary by the operations staff.

2.4.2.10 Hydrostatic Testing

Hydrostatic testing verifies the integrity of pipeline segments. Hydrostatic testing is performed by capping pipeline segments with test manifolds and filling the capped segments with water. The water is then pressurized and held for 8 hours. Any significant loss of pressure indicates that a leak may have occurred. The source of the water used for testing is typically local streams, rivers, or potable water supply systems. Hydrostatic testing of the piping will be performed in one or more sections, depending upon the length of piping and / or elevation of the local terrain. All hydrostatic testing activities will be performed in compliance with appropriate permit requirements.

Environmental impacts associated with the withdrawal and discharge of test water shall be minimized by:

- Notifying appropriate agencies of intent to use specific sources at least 48 hours before testing activities, if required or unless they waive this requirement.
- Locating hydrostatic test manifolds outside of wetlands and riparian areas as practical.
- Withdrawing from and discharging to water sources shall comply with appropriate agency requirements which consider the protection of fisheries resources on a case-by-case basis.
- Complying with all appropriate permit requirements.
- Screening the intake to avoid entrainment of fish.
- Maintaining adequate stream flow rates to protect aquatic life, provide for all waterbody uses, and downstream withdrawals of water by existing users.
- Discharging test water to a suitable receiving body of water, across a well-vegetated area or filtered through a filter bag or erosion control barriers.
- Discharging test water against a splash plate or other energy dissipating device approved by a Company inspector in order to aerate, slow down, and disperse the flow.
- Controlling the rate of discharge at a level that appropriately prevents flooding or erosion.
- Coordinating hydrostatic test water withdrawal and discharge activities with the Company inspector.

2.4.2.11 Restoration and Revegetation

Restoration and revegetation of the ROW, associated valve station sites, or other disturbed areas will be managed using permanent erosion and sediment control measures. However, in the event that final restoration cannot occur in a timely manner due to weather or soil conditions, temporary erosion and sediment control measures will be maintained until the weather is suitable for final cleanup and revegetation. In no case shall final cleanup be delayed beyond the end of the next recommended seeding season.

<u>Permanent Restoration Measures</u>

- Construction debris shall be removed from the ROW, valve station sites, or other disturbed areas and the ROW or workspace shall be graded so that the soil is left in the proper condition for planting.
- Where trench compaction has not been done, the ROW, valve station site, or other disturbed areas shall be graded to pre-construction contours, as practical, with a small crown of soil left over the ditch to compensate for settling, but not to interfere with natural drainage.
- Where topsoil has been segregated, the topsoil shall be spread back along the ROW or workspace in an even layer.
- All fences which were cut and replaced by gaps during construction shall be repaired to at least the equivalent preconstruction conditions.

<u>Revegetation and Seeding</u>

- The Company inspector, in conjunction with the landowner, will determine the specific revegetation requirements. The ROW or workspace may be fertilized, seeded, and may be mulched in accordance with these specific requirements. If seeding cannot be done within the recommended seeding dates, temporary erosion and sediment controls shall be used and seeding of permanent cover shall be done at the beginning of the next seeding season.
- Where broadcast or hydro-seeding is to be done, the seedbed will be scarified to ensure sites for seeds to lodge and germinate.
- Where hand broadcast seeding is used, the seed shall be applied at one-half the rate in each of two separate passes. The passes will be made perpendicular to each other to ensure complete and uniform coverage.
- The seedbed will be prepared to depth of 3 to 4-inch using appropriate equipment to provide a firm, smooth seedbed, free of debris.
- Slopes steeper than 3:1 shall be seeded immediately after final grading in accordance with recommended seeding dates, weather permitting.
- The seed shall be applied and covered uniformly per local soil conservation authority's recommendations, depending on seed size.
- Other alternative seed mixes specifically requested by the landowner or land-managing agency may be used.
- Areas seeded after the recommended seeding date may be mulched if permitted.
- A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed, inspected and maintained as specified. When access is no longer required, the travel lane must be removed, and the ROW or workspace restored.

Monitoring

- Onshore pipeline personnel will conduct follow-up inspections after the first and second growing season after seeding to determine the success of revegetation. Revegetation will be considered successful if non-nuisance vegetation is similar in density to adjacent undisturbed lands, based on representative random sampling in the field (e.g., visual survey). If vegetative cover is not successful or if there is a need for noxious weed control measures, appropriate steps will be taken to assure that additional restoration measures are successfully implemented.
- Signs, gates, and marker posts shall be maintained as necessary.

2.4.2.12 Specialized Construction Methods

At some locations throughout the Project, specialized construction methods will be necessary in order to accommodate construction restriction due to congestion and other obstacles preventing safe construction activities. In other circumstances, specialized construction methods may have been selected to comply with resource/regulatory agencies requirements to avoid and minimize impacts to the greatest extent practicable. For the proposed Project, these construction methods will include the use of HDD and Push/Pull methods of installation which are described in the following section.

2.4.2.13 Pipeline Construction Workspaces

Both the inshore and onshore construction workspaces

Onshore Construction Workspaces

The construction workspace for the onshore pipelines is a 125-foot-wide area located strategically to maximize the use of existing easements and ROWs, where possible. Impacts to traffic will be avoided to the maximum extent possible and a traffic control plan will be implemented prior to construction in areas of high vehicular activity or other residential roads and driveways where necessary.

Inshore Construction Workspaces

The construction workspace for the inshore pipelines is a 100-foot-wide area, with the exception of the proposed pipeline construction workspace corridor on Harbor Island, which is a 75-foot-wide area due to easement restrictions. The inshore pipeline parallels Highway 361 for much of the terrestrial installation area. Impacts to traffic will be avoided to the maximum extent possible and a traffic control plan will be implemented prior to construction in areas of Hwy 361 or other residential roads and driveways where necessary. The terrestrial portion of the inshore pipeline located on San Jose island will be accessed from the western side of the island, near the Lydia Ann Channel. Equipment will be transferred via barges and unloaded onto a 150-foot-long matted temporary landing area located above the MHT line. Pipeline installation equipment and materials will be transported to the designated construction workspaces via a 30-foot-wide matted temporary access road strategically positioned along a previously disturbed vehicle path.

As part of the inshore construction, workspaces is approximately 57.2 acres of temporary workspace located on Harbor Island, Texas. The workspace area on Harbor Island has been strategically designed to avoid impacts to identified wetland areas. The proposed 57.2 acres of temporary workspace on Harbor Island will be utilized for multiple components including the temporary storage of pipe, HDD pullback workspace, and the necessary workspaces to install the necessary components associated with the Harbor Island Booster Station.

2.4.2.14 Wetland Impacts

Depending on the condition of the wetlands at the time of construction, best management practices for pipeline installation will be utilized to minimize impacts. If the wetlands have unstable soil conditions at the time of mobilization and/or construction, the method of installation might involve using wood mats. Where possible, access to the construction site will utilize existing roads traversing the construction corridor. To minimize construction impacts to surface elevation in trenched areas, backfilling of the trenches following construction activities will occur as quickly as possible.

2.4.3 Horizontal Directional Drill Pipeline Installation

Installation of the proposed pipeline via HDD crossing techniques will use the trenchless installation method selected at ten (10) designated crossings. This section provides an overview of the steps that will be involved in the execution of the described HDD crossings. This section also outlines the mitigation measures that will be implemented to ensure the effective installation of the proposed HDD crossing. These measures will be in conjunction with the measures required by any permit conditions associated with the construction of the proposed Project.

Prior to access or construction activities associated with HDD crossings, all necessary approvals, permits, and/or notifications will be received, or issued, respectively. All conditions specified in approvals or permits will be discussed, understood, and adhered to during the HDD installation process. Any notification requirements detailed in the permits/approvals will be provided within the timing specified. All notifications will be completed, documented and maintained.

2.4.3.1 HDD Pipeline Locations

There are ten proposed HDD pipeline installation sections for the proposed Project; Four of the proposed HDDs are located in the onshore pipelines segment and six of the proposed HDDs located in the inshore/offshore pipeline segments. Below are details of the proposed HDD segments, followed by a detailed discussion of HDD installation methods and construction techniques.

- HDD 1: HDD 1 is an approximately 1,068 ft. long segment of onshore pipeline located at the Gum Hollow Canal crossing in San Patricio County.
- HDD 2: HDD 2 is an approximately 1,072 ft. long segment of onshore pipeline located at the Highway 181 roadway and roadside ditch crossings in San Patricio County.
- HDD 3: HDD 3 is an approximately 1,059 ft. long segment of onshore pipeline located at the McCoullogh Slough crossing in San Patricio County.
- HDD 4: HDD 4 is an approximately 1,492 ft. long segment of onshore pipeline located at the Levy and Canal crossing near Huff St. in San Patricio County.
- HDD 5: HDD 5 is an approximately 3,773 ft. long segment of inshore pipeline located at the Gulf Intracoastal Waterway channel crossing near Aransas Pass in San Patricio County.
- HDD 6: HDD 6 is an approximately 965 ft. long segment of inshore pipeline located adjacent to Highway 361 (Port Aransas Causeway) at the eastern end of Stedman Island in Nueces County.
- HDD 7: HDD7 is an approximately 4,771 ft. long segment of inshore pipeline located adjacent to Highway 361 and the Aransas Pass Channel, at the Redfish Bay crossing in Nueces County.
- HDD 8: HDD 8 is an approximately 1,851 ft. long segment of inshore pipeline located at a channel crossing near Aransas Channel, adjacent to Highway 361 near Harbor Island in Nueces County.
- HDD 9: HDD 9 is an approximately 5,805 ft. long segment of inshore pipeline located at the Aransas Channel and Lydia Ann Channel crossing from Harbor Island to San Jose Island in Nueces County.
- HDD 10: HDD 10 (Shore Approach) is an approximately 5,000 ft. long segment of pipeline located at the shoreline crossing of San Jose Island and the Gulf of Mexico in Aransas County.

2.4.3.2 Overview of Horizontal Directional Drilling Technology

HDD is a trenchless technology utilized to install pipelines in lieu of open trenching. In some cases, HDD may be used where it is not feasible to open trench, and in other cases it may be used as a method of installation to avoid or minimize impacts to ecological and/or cultural resources.

HDD's require the drilling of a small diameter hole, or pilot hole, along a predetermined design path. The pilot hole is then enlarged sufficiently to accommodate the installation of the pipeline. The pipeline may or may not be installed concurrently with the hole enlargement depending upon the final diameter of the enlarged hole and the soil conditions encountered.

At the drill entry and exit locations, it will be necessary to contain drilling fluids using a containment pit or frac-tanks during all phases of the installation. These fluids and cuttings must be disposed of in an approved manner periodically or at the completion of the crossing installation. HDD fluids are typically composed of bentonite (an inert clay mineral) and water.

The crossing length and cross section geometry is dependent upon the pipeline design parameters, the obstacle to be crossed and the subsurface conditions. At points along the pipeline, additional temporary workspace, including pipe staging areas and storage areas for drilling mud and borehole cuttings, will be in upland areas outside of wetlands and riparian zone whenever practicable. This method requires additional temporary workspace for entry/exit sites and is only used in areas where boring and conventional open-cut methods are not suitable.

Some HDD locations are designed to "walk" the equipment around the feature to be drilled. In these instances, construction equipment will be loaded onto proper conveyances and moved to the other side of the feature utilizing various means of public and/or private access to the construction ROW, thereby avoiding all impacts to the feature.

At other HDD locations, the contractor may elect to maintain a traffic lane across the feature. These traffic lanes will allow the passage of construction equipment from one side of the feature to the other and will be maintained at a width sufficient for a single line of traffic. In addition, these lanes will be placed in previously cleared/maintained areas whenever possible and will utilize measures, including but not limited to, wooden mats and/or temporary bridges/culverts so that any resulting impacts would be temporary in nature. The selection of the appropriate measure will be made depending upon the conditions of the feature at the time of construction and in coordination and consultation with the applicant.

<u>Inadvertent Return Contingency Plan</u>

The most likely occurrence of inadvertent mud releases developing during drilling operations is from Inadvertent Returns. An Inadvertent Return is a condition in which the drilling mud is released through fractures in the soil and migrates toward the surface. Inadvertent Returns usually occur when the downhole pressures are too high and overcome the restraining forces of the surrounding formation. This most often occurs during the pilot hole drilling operations when the pressures are the highest. Escape of drilling mud from an Inadvertent Return is most common near the drill entry and exit locations but can occur at any location along the drill path. An Inadvertent Return Contingency Plan has been prepared for the proposed Project which identifies operational procedures and responsibilities for the prevention, containment, and clean-up for the unplanned release of drilling fluids associated with HDD operations for the Project.

<u>Layout and Design for the HDD Crossing</u>

The HDD entry and exit locations will be sited to provide a minimum setback from sensitive resources and a maximum design depth clearance to provide the greatest buffer between the sensitive resource and the drilling activity/installed pipe.

<u>Monitoring of HDD Operations</u>

Company inspector(s) will continuously monitor operations during HDD activities. Monitoring activities during horizontal directional drilling operations will include:

- Visual inspection along the drill path, fluid return pit(s) and waterbody surface for evidence of a release.

- Observation and documentation of drilling fluid pressures using HDD instrumentation.
- Observation and documentation of drilling fluid recirculation volumes.
- Documentation of all drilling fluid products used.

The Contractor will have readily available and strategically placed containment equipment to contain inadvertent releases of drilling fluid to waterbodies, including earth-moving equipment, portable pumps, containment booms, hand tools, hay bales, silt fence and sandbags. The Company inspector(s) will ensure that adequate quantities of spill containment equipment and supplies are at the drilling location prior to allowing the contractor to begin drilling. Further, the Company inspector(s) will ensure that everyone involved in drilling operations is familiar with the locations of all spill containment equipment and the specific procedures for handling potential drilling fluid releases.

Potential Loss of Circulation

Typically, loss of circulation has the highest probability of occurring during drilling of the pilot hole, due to the smaller bore-hole annulus and the relatively large volume of solids being displaced and carried out in the drilling fluid. In the course of drilling the pilot hole, circulation will often be temporarily lost as the pilot bit is advanced through more permeable or less competent sections of the ground formation when fluid pressures are at a maximum. As the pilot bit advances beyond these sections of the bore-hole, fluid pressure will fall and circulation within the bore-hole will naturally be re-established. Much of the fluid lost to the formation under the greater pressures will return to the bore-hole as the pressures fall, in which case the drilling fluid is not likely to migrate to the ground surface or the river. Drill cuttings generated as a result of the drilling process often will naturally bridge and subsequently seal fractures or voids as drilling progresses, thus providing another means of reestablishing circulation. Most fractures can be sealed, if detected early, by pumping special materials to prevent loss of circulation down hole. If a significant reduction of drilling fluid circulation is detected without total loss of circulation, the Contractor will reduce drilling fluid volumes and subsequent pressures, and will increase the yield point of drilling fluid. Then, depending upon the progress of the drilling, the drill pipe may be tripped out until return flow is restored.

Procedures for Release of Drilling Fluid

Upon detection of an inadvertent release of drilling fluid (bentonite) occur, all drilling activities will cease, containment and subsequent clean-up will begin immediately. Field measures to contain inadvertent releases of drilling fluid will vary according to site-specific conditions (e.g. volume of fluid, topography, and environmental setting). The most commonly utilized system for containment of surface releases of bentonite would involve a perimeter earthen berm, hay bales, or silt fence. Where this system of containment cannot be employed, containment procedures will be directed by the Company inspector(s) to minimize environmental impact. After containment, clean-up and restoration will generally be accomplished utilizing one of the following: hand labor, hand tools and buckets; portable pumps and hand tools; rubber-tired equipment and hand tools; and/or vacuum trucks and hand tools. In the unlikely event that a drilling fluid release occurs within an area that cannot be isolated or contained, such as along the bed of the waterbody or into the water, drilling operations will be stopped immediately. Upon evaluation by appropriate personnel, a decision will be made on how best to continue the crossing construction to minimize impacts. Project team will ensure that all reasonable measures within the limitations of the technology have been taken to re-establish drilling fluid circulation; continue drilling with the minimum amount of drilling fluid required to penetrate the formation and successfully install the pipeline. In the event of an inadvertent release of drilling fluid within a waterway, Applicant will immediately notify the appropriate agencies detailing the location and nature of the release, the corrective actions being taken, and whether the release poses a threat to public health and safety.

Identification of Buffer Zones

All buffer zones or restricted areas will be identified and flagged prior to mobilization and site preparation. In addition, any restricted areas identified by permits/approvals will be flagged. Access to these restricted areas will be prohibited unless authorized by the appropriate regulatory authority in the case of permits/approvals. All other safety buffer zones during installation will be flagged and reported to alert local vessels of the construction activities.

Pre-Construction Survey

A pre-construction survey will be conducted to confirm the HDD entry and exit points (within HDD Boxes) for the pilot bore as shown on the construction drawings. All HDD entry and exit points will be clearly staked or marked in the field. A survey examination of entry and exit points will be done prior to casing and equipment installation to verify distances, field stations, and elevations along the proposed pipeline centerlines. Points will be plotted for the monitoring and recording of the three-dimensional coordinates generated by the magnetic guidance tracking software. This exercise ensures the pre-alignment and radius restrictions are maintainable during the execution of the HDD. Following receipt of the survey results a comparison against the engineering design profile will be conducted and verified prior to starting drilling operations.

Equipment Summary

It is anticipated that the HDD rig to be used would be capable of 1,000,000 pounds of pullback; however, this will be confirmed during final HDD design of the proposed Project. The equipment will include at a minimum: drilling unit, mud tanks, mud lab, water storage tanks, mixing tanks, storage areas, and control room. The work platform for the drilling operations will be further defined by the selected contractor and based on the equipment proposed for use by the contractor.

Entry/Exit Points

The HDD rig layout and site setup may vary based on the provided work space. During site preparations the size, slope grade, berm walls, and ingress and egress will be defined. The HDD equipment preferred footprint is of a level grade to ensure safe and efficient drilling operation. HDD rig matting will be placed on entry to ensure a safe and effective working environment. All matting used during HDD installation would be removed upon completion.

Staging areas will be used to string, weld, coat, and pre-test pipeline sections prior to pullback operations. The primary staging area will be located near the exit side of the crossing and will be contained within the existing ROW limits and/or designated temporary construction workspaces.

Surface and Guide Casing

An experienced contractor will be used to install entry or exit casings in the event it is required at an HDD crossing. Casing will be installed according to the geo-technical information and profile design. Casing will be cleaned by the casing contractor prior to use. Casing final design will be based on actual geo-technical information.

Tracking System

A magnetic guidance system, Tru-tracker or Paratrack, will be used to track and to monitor the drill path during the HDD pilot bore (determination of tracking system will be based on availability at time of drill execution and as specified in the specifications of the contract document). This system is important to insure the proper installation in accordance with the HDD design. This system allows the drilling assembly to control the path the drill takes and calculate the horizontal and vertical coordinates relative to the initial entry point on the surface. A coil grid will be laid out accordingly on exit/entry points using surveyed stations to ensure the accuracy of the drill path. This system will be used to generate an as-built profile of the drilled bore.

In the event of a deviation of the drill path, the drilling assembly will be pulled back to an appropriate location in the bore path and a steering correction initiated. An annular pressure tool will be run in conjunction with the downhole assembly directly behind the mud motor to ensure the proper monitoring of annular and downhole pressures. An annular pressure graph will be available for reference.

Pilot Hole

To initiate the pilot bore, the HDD is set-up in alignment with the inclination & azimuth according to the engineered design. The down hole assembly (DHA) is assembled and consists of the steering tool and drill tooling. The steering tool is then calibrated, and a 4-point roll check completed. Measurements will be taken of the DHA and from the bit to the steering probe. The distance from the HDD vices to the entry point will be recorded and each additional drill pipe measured and recorded in successive order. A nonmagnetic collar will be placed behind the downhole assembly to create a non-magnetic buffer between the steering tool and possible magnetized drill string. The path of the pilot bore will be recorded by taking periodic readings of the inclination and azimuth using the tracking system to calculate the vertical and horizontal coordinates relative to the initial entry point. These readings will be taken in intervals not to exceed 10 meters to ensure deviation and design parameters are maintained.

A jetting assembly along with an annular pressure tool will be used on this pilot bore. Real time pressures will be recorded by the drilling instrumentation system.

Reaming and Hole Opening

Once the pilot bore is exited per the specified tolerances, the bore is enlarged using hole openers in a series of sizing. The anticipated phases for the bore are anticipated, but not limited to, the following:

- Casing Installation
- 12” pilot
- 18” - 24” fly cutter
- 24” - 36” fly cutter
- 36” - 42” fly cutter
- 42” - 48” fly cutter and packer

Reaming swabbing, and cleaning passes will be performed as required to ensure the bore is free of obstructions for the next required opening. At least one reaming pass will be performed after the final opening to ensure a clean bore for the pull section.

Pullback Procedure

After the swabbing ream is completed, the pull section is then attached to the hole opener using a swivel minimizing torsion forces transmitted to the pull section. Product pipe handling equipment will be required to assist and align the pull section in such a manner as to reduce axial tension loads imposed on the pull section. It is recommended not to exceed a 14-degree exit angle to prevent excessive tensional forces. Pullback forces will be recorded during and after the pullback is complete. If required, buoyancy control could be used during pullback operations. As the pull section is advanced to the lowest elevation of the bore, water will be inserted into the pipeline to achieve neutral buoyancy, reducing the tensional force required to advance the pull section. Water used for buoyancy control will be disposed of according to the guidelines established for proper disposal.

Cleanup & Restoration

Following the completion of the HDD, the pipeline ROW and associated temporary workspaces will be cleaned up and restored to original contours and vegetated conditions.

2.4.4 Offshore Pipeline and PLEM Installation

Offshore components associated with the proposed Project are defined as those components located seaward of the MHT line located at the interface of San Jose Island and the GOM. The offshore Project components include approximately 27.13 miles of two (2) new 30-inch-diameter crude oil pipelines extending to two (2) SPM buoy systems. The proposed 27.13 miles of offshore pipeline infrastructure includes approximately 1.68 miles of two (2) 30-inch-diameter pipelines connecting the PLEMs associated with SPM Buoy System 1 and 2.

2.4.4.1 HDD 10 Installation (Shore Approach)

HDD 10 begins on San Jose Island and extends approximately 5,000 ft. to a designated ending point within the GOM beyond the surf zone. The installation methods for HDD 10 are unique due to its exit location within Gulf of Mexico, rather than on land such as in the other HDD segments. Individual pipeline sections will be assembled on San Jose Island and pulled back through the HDD bore hole to the offshore exit location. This will be repeated for each of the proposed 30-inch-diameter pipelines. From the offshore HDD exit location, the offshore pipeline assembly will begin.

2.4.4.2 Pipeline Assembly

The offshore pipeline will be installed with a jetting technique in a 75-ft wide construction workspace on the sea floor. To begin offshore pipeline installation, a pipelay barge will begin at the eastern end of HDD 10, in the Gulf of Mexico. The pipelay barge will then set four anchors along the pipeline ROW, two of which anchors will be from the stern (port stern and starboard stern) and two from the bow (port bow and starboard bow). The anchors set from the bow will be set and tensioned in front of the pipelay barge. When the anchors are set, a material transport barge loaded with line pipe will be towed from the nearby port and brought alongside the pipelay barge. The material transport barge will be secured with ropes to either the port or starboard side of the pipelay barge. Once positioning is confirmed, the pipelay barge will use the abandon and recovery (A&R) winch to retrieve the tail sections of HDD 10 from the sea floor and will then guide the pipeline through the pipe alley and onboard the vessel. The pipelay barge bow will be facing eastward. A stinger will not be required for this portion of pipelaying due to the shallow water and proximity to shore. The laydown head that was installed on the HDD 10 tail section will be removed, and the pipelay barge will commence to assemble the offshore pipeline.

During the assembly of each new joint of pipe, the pipelay barge will move forward by tightening the bow anchor cables and slacking the stern anchor cables. Given that the pipe is connected to the end of HDD 10, the pipeline will begin to leave the stern of the pipelay barge and settle on the ocean floor. This process will repeat until the total length of pipeline has been installed on the seafloor. When the last joint of pipe has been welded and inspected, it will be lowered to the seafloor using the A&R winch on the pipelay barge. This process will be performed once for each of the proposed offshore pipelines.

Pipelay Stress Limitations

Procedures will be thoroughly developed that describe all aspects of the laying operation as barge and stinger configurations (barge trim, stinger length and radius, roller positions, and tension range) for each phase of the installation. Calculations shall be performed for required pipe holdback tension and stinger or support ramp configurations for each combination of pipe material grade, wall thickness and coating, and for the range of water depths at which each combination is to be installed on the seabed. Total combined stresses induced in the pipe shall not exceed 85% of specified minimal yield strength (SMYS) in the overbend region or 70% of SMYS in the sag bend region.

Pipelaying Equipment

The pipelines may be installed by any suitable and industry accepted means of laying/lowering the pipe to the seabed that can support/demonstrate the adequacy of the proposed methods/equipment with appropriate pipelay stress analysis. Wherever possible, redundant tensioning devices shall be used so that failure of a single tensioner will not affect laying operations. Stinger cameras are required on the aft end of the stinger. These cameras shall be positioned so the pipe and the aft most roller on the stinger are clearly in the field of view. Control tower personnel shall monitor pipe, position of vessel and all systems throughout the pipelaying process. There shall always be a qualified A&R winch operator on board, who is designated to operate the A&R winch and is thoroughly trained on the operation of the winch.

Pipeline Routing

The permitted offshore pipeline ROW will be shown in the final engineering pipeline routing drawing. The pipeline shall be placed on the seabed entirely within the bounds of the authorized ROW. If any portion of the installed pipeline is outside of these boundaries, it shall be relocated until it rests entirely within the bounds of the authorized ROW. The designated construction workspace for laying of the offshore pipelines is a 75-ft corridor centered on the centerline of the pipeline alignment.

In some cases, expendable buoys are set at 500-ft. intervals along the routes of foreign pipelines and foreign cables. Crossing of existing pipeline infrastructure will be crossed as defined by the final engineering drawings.

Survey

All necessary charts, nautical aids, navigational warnings, and signs required to properly conduct the installation of the pipelines will be identified and made available prior to the commencement of construction activities. There shall be onboard, the required survey personnel and remotely operated vehicle (ROV), for continuous 24-hour per day positioning of each installation vessel. The positioning system shall utilize a satellite-based system that maintains a plus-or-minus five (5) meter accuracy.

Pipeline Start up and Laydown Target Positions

Where pipeline location is critical, ancillary survey/positioning capability will be used to ensure accurate installation positioning. Additionally, as-built location surveying is required. The pipeline start-up and lay down target positions shall be in accordance with the permitted offshore pipeline route. The installation contractor will insure the pipeline ends are positioned on the seabed within a dedicated target box of 10 feet wide and 15 feet long and placed on the designated pipeline heading to an accuracy of +/- two (2) degrees.

Allowable Anchor Line and Anchor Placement

The installation contractor shall endeavor to maintain a 50-foot vertical clearance between all anchor cables and any existing pipelines or facilities. No anchors shall be placed within 500-feet of the near side of any existing pipeline. If any anchor cable is run across a pipeline, its location shall be no closer than 1,000-feet from the existing pipeline. Anchors shall be recovered vertically to prevent potential damage to existing pipelines and/or the seabed.

Dynamic Positioning Operations

The selected installation offshore pipeline installation contractor may utilize a vessel that has dynamic positioning (DP) capability and an anchoring system during installation. In this case, the installation contractor shall be prepared to make available records from his most recent DP audit and a list of DP operators and their qualifications. Further, the DP system utilized by the pipelay vessel for the offshore pipeline installation shall be an American Bureau of Shipping (ABS) Class DSP 2 or equivalent. Prior to mobilization the installation contractor will conduct a minimum three (3) hour long DP trial, or provide equivalent supporting documentation.

Anode Bracelet Installation

If anodes are not pre-installed ontothe pipe, then the anode bracelets shall be installed during offshore pipelay operations. Anode bracelet assemblies shall be inspected prior to installation. Any sharp burrs or defects that could damage the pipeline coating shall be removed or repaired. The pipe area for anode installation shall be double wrap with heat shrinkable wrap or another approved fire-retardant wrap. The line pipe corrosion coating shall be inspected immediately prior to the installation of the anode assembly using an electronic holiday detector set at the proper voltage for the pipe coating material and thickness. The anode halves shall be matched, placed over the pipe, and drawn together using a non-metallic strap system or attached by means of a mechanical bolt-on style clamp assembly. Rubber mallets may be used to assist in fitting the anodes. Care shall be taken not to damage the corrosion coating. When welding the anode bracelet segments to attach the anode to the coated line pipe, a fire-retardant heat shield shall be placed between the coating and the bracelet straps to protect the coating from any damage that may occur during the welding process. After the weld has sufficiently cooled, the shield must be removed.

The spacing of the anode bracelets will be determined during the engineering phase. The installation contractor will be responsible to confirm the exact location in which the anodes are installed.

Production Welding

All welding shall comply with the requirements of industry standards. Production welding shall not commence until qualified procedures and welders have been approved. Welding procedures used must be separately qualified for each grade of pipe, each mainline pipe wall thickness, and each diameter group.

Foreign Pipeline Crossings

Existing pipelines have been identified in the current ROW as requiring a crossing and steps must be taken to protect the existing pipeline. Prior to laying the pipeline across any pre-existing pipeline, the installation contractor will locate and mark the pre-existing line with a minimum of three buoys. No jetting or other excavation to lower a pre-existing pipeline will be permitted without prior approval. There must be placement of protective materials to ensure the new pipeline is adequately supported prior to flooding the pipeline. At locations where crossing of foreign pipeline will not allow the pipe to be buried to the designated minimum depth of cover, utilization of a concrete mat or other methods may be used to protect the pipeline in these areas.

2.4.4.3 Jet Sled Trenching of Pipeline

Trenching of offshore pipeline infrastructure is required in water depths of 200 feet or less. The top of the pipeline shall be lowered to a minimum of three (3) feet below the sea bed for the entire length of the offshore pipeline. If additional depth is required, it will be indicated on the final engineering drawings. The trenching equipment shall be configured in such a manner as not to cause damage to the pipeline, anodes, and pipeline coating. Trenching operations shall be conducted prior to any hydrostatic testing of the pipeline.

Upon completion of the assembly of the offshore pipelines, the pipelay vessel will attach a jet sled (or similar pipe burial sled) to an A-Frame located at the stern of the vessel. The vessel will position the sled over one of the pipelines on the seafloor and begin the process of moving along the pipeline. The jet sled will utilize high pressure water jets to remove and discharge the earthen materials underneath the pipeline until the desired depth is reached. The hardness (or softness) of the soils will determine and influence the rate of travel along the route. Based on preliminary estimations, three passes of the jet sled may be required to achieve required pipe depth and depth of cover. This process will be repeated for the second pipeline. The pipelines will be covered by earthen subsea materials by natural currents and movements at the sea floor in addition to the jetted materials settling on top of the pipeline until a minimum depth of 3-feet below the seabed is reached.

2.4.4.4 PLEM Installation

Once the offshore pipelines are installed, the pipelay barge will be positioned over the designated termination point of the pipelines and PLEM installation area. The PLEM will be transported on a material transport barge and brought alongside the vessel. PLEM 1 will be lifted and lowered to the sea floor and fixed at the designated location on the sea floor via six (6) 18-inch-diameter foundation piles. Once PLEM 1 has been placed and is leveled, the offshore pipelay vessel will mobilize the diving crew to take dimensions for the required spool pieces needed to connect the incoming and outgoing pipeline ends to PLEM 1. Once the dimensions have been confirmed, the two spool pieces will be fabricated, tested, coated and prepped for installation. Flanged connections with swivel flanges will be used for installation, as required to facilitate the connection of the offshore pipelines to the fixed orientation of the PLEM. PLEM 1 consist of connections to two 30-inch-diamter offshore pipelines extending to PLEM 2. PLEM 2 will be installed with four (4) 18-inch-diameter foundation piles. All offshore pipeline infrastructure terminates at PLEM 2.

2.4.5 Single Point Mooring Buoy System Installation

This section addresses the general process for installing the proposed SPM buoy systems. The SPM buoy systems utilize the CALM technology that has been successfully utilized for decades throughout the world. The SPM buoys are a predesigned system that is fabricated entirely offsite within a controlled environment. It consists of the buoy hull, rotating table, swivels, hoses, chains, anchoring, navigation aids, solar panels and other ancillary equipment as required for the specific use and size of the vessels that will be utilizing the SPM buoy systems. The onsite SPM buoy installation process begins with the arrival of its associated components to the designated location.

2.4.5.1 Survey

The initial task for the installation process to commence, requires the analysis of the meta ocean data that will be collected during the design process. This data will be analyzed to determine whether the use of conventional anchors or driven piles will be required to secure the buoy in position. The current assessment for this Project indicates that six anchor piles will be utilized, and that method is described below. The exact position of the anchors will be determined in the engineering and design portion of the Project. The installation vessel will launch an ROV with video capability to perform a visual sweep (or check) of the installation site. Any obstructions will be removed prior to commencement.

2.4.5.2 Positioning

The installation contractor will utilize a vessel that has DP capability. The use of anchoring systems during the installation of the SPM buoy systems is not proposed.

2.4.5.3 Anchor and Chain Installations

The installation vessel will begin by installing the CALM anchor pilings. The anchor piles will be prefabricated and have the connections preinstalled on the upper portion of the anchor piles. It is anticipated that twelve anchor piles will be required per SPM buoy CALM system. The piles will be pneumatically driven in the locations as specified in the final construction drawings. The pile driving and refusal limits (if achieved) will be based on industry accepted standards. Each pile shall be orientated so that the anchor chain connection point is facing the correct direction. The piles will all be driven, and the chains will be connected and placed in a “Lazy S” on the seafloor. Please note that the anchor chains may consist of a combination of chain and synthetic rope and are referred to as “anchor chains” in this description.

2.4.5.4 SPM Buoy Installation

The installation of the two SPM buoy systems begin with the arrival of the SPM buoy installation vessel and initial survey of the sea bottom at the designated location which the SPM buoy is to be installed. Once surveys are complete, the proposed twelve 72-inch-diameter CALM pile anchors will be installed at their designated coordinates, followed by the connection of the anchor chains to the pile anchors. Once the pile anchors and anchor chains are installed and inspected, the SPM buoy will be towed into the designated location and followed by the attachment of the anchor chains. Once the mooring of the SPM buoy is inspected and complete, the subsea and floating hoses will be transported to the installation site and installed. Once the SPM buoy installation is complete, including the installation of the subsea hoses to the PLEM, the SPM buoy system will be fully inspected.

The SPM buoys will be towed from the nearest port or facility in which it was stored while awaiting installation. During installation offshore, the SPM buoy will be positioned and held in place by the installation vessel and the first of the anchor chains will be retrieved from the ocean floor using a 30-ton winch fixed on the SPM buoy. The first anchor chain leg will be attached to the SPM buoy. The process will repeat for the anchor leg chain on the opposite side of the SPM buoy. This will continue until all proposed anchor leg chains are connected to the SPM buoy. Once all the anchor leg chains are secured then the process of tensioning and/or attaining the proper anchor chain leg angle of inclination may begin.

2.4.5.5 Hoses and Connections

The subsea hoses will be removed from the installation vessel and be lowered into the ocean. This usually requires a special overboard chute that keeps the hoses from being kinked or over bent and allows for better control of the lowering process. The subsea hoses will be lowered to the correct depth and positioned over the connection point of the PLEM. The installation vessel will dispatch divers to make the connection between the subsea hoses and the PLEM. When the PLEM connection is complete the 30-ton winch located on the SPM buoy will be utilized to connect the upper end of the subsea hoses to the swivel connection on the bottom side of the SPM buoy.

The floating hoses will be removed from the transport vessel or from a material transport barge and placed in the water. The floating hoses will be connected to the SPM buoy on the topsides at the hose connection flange. The floating hoses will simply float on the surface of the water and will weather vane along with the SPM buoy dependent on the offshore conditions

2.4.5.6 Commissioning and Testing

The commissioning will consist of confirming all signals, relays, and all other functions of the mechanical and electrical systems are functioning properly. The testing will consist of a basic leak test since the products and components have been completely tested at the original manufacturing point. The leak test parameters will be further defined in the engineering process.

2.5 Phase 5 – Testing and Commissioning

Phase 5 consist of the testing and commissioning of all installed pipeline segments and the SPM buoy system. Once all pipeline segments and the SPM buoy system are installed and inspected, contractors will mobilize to commence testing of each component.

For the pipeline segments, a gauging pig (caliper plate) run will be performed. This will be performed in conjunction with a cleaning pig run to remove any debris and clean the internals of the installed pipelines. Specific procedures will be developed for each segment of the pipelines, including specific procedures for each of the tie-in points. The cleaning and gauging pig runs will be followed by flooding, hydrotesting, and dewatering. The flooding process includes filling the pipeline with hydrotest water. The pipeline pressure will be raised to the predetermined testing pressure, the pressure will be held as required for the time specified in the testing documents (testing procedures will be developed during the engineering phase of the Project). Adjustments for pressure changes will be realized based on monitoring the ambient temperatures throughout the process. Upon acceptance of the pressure testing by all parties, the pipeline will be dewatered in accordance with existing regulations.

For the SPM buoy system, the testing and pre-commissioning activities will be performed following the completion of the installation. The individual suppliers for each of the SPM buoy system component are responsible for the development, testing, and pre-commissioning procedures. These procedures will be reviewed prior to implementation to confirm compliance with industry standards and meet or exceed the requirement of the owner/operator of the facility.

The mechanical completion consists of validating and recording the proper assembly of all mechanical equipment including:

- Tensioning/torqueing records
- Leak test of the piping elements and flange connections
- Rotation test of the weather-vaning equipment
- Load tests of the lifting and rigging equipment
- Electrical continuity checks of the cathodic protection
- Visual inspection records
- Trimming & ballasting

Several items regarding the SPM buoy system are covered during the pre-commissioning activities during fabrication. This includes the start-up and functional testing of specific equipment to demonstrate proper integration and performance into the overall system. For these specific functions, some specific pre-commissioning and testing procedures will be required during fabrication and pre-assembly.

3.0 Operation Procedures

Operation of the proposed Project is described in more detail in the Draft Operations Manual (Volume III [Confidential]). For the purposes of defining operations that may lead to environmental consequences, the following items were considered in the Environmental Evaluation:

3.1 Harbor Island Booster Station Operation

The proposed Harbor Island Booster Station booster station consists of an approximate 19-acre area located on Harbor Island in Nueces County, Texas. The proposed Harbor Island Booster Station would consist of the necessary operating and pumping infrastructure to support the transport of crude oil and operations of the DWP. The proposed Harbor Island Booster Station will consist of two pumping systems to service the two 30-inch-diameter pipelines. The booster station will consist of four electrically powered motors (approximately 5,500 horse power each) in a series electronically locked into operation as two booster pumping systems delivering approximately 11,000 horse power to each pipeline. The booster station pumping systems would be located within noise abatement housings to minimize noise during operations to the maximum extent practicable.

The Harbor Island Booster Station would also consist of two (2) 181,000 bbl crude oil storage tanks, two (2) 181,000 bbl water tanks, for the clearing of offshore pipeline infrastructure during emergencies or maintenance operations. Additionally, there will be a fire water tank, fire water pumps, communications tower, emergency generators, stormwater treatment plant, and leakage metering.

3.2 SPM Buoy Operation

The SPM buoys shall have adequate buoyancy to support all loads from hoses, chains and equipment and maintain a minimum of 6 feet of freeboard with all equipment, anchor chains and hoses in place. The SPM buoy hulls will be of cylindrical shape with watertight compartments and fendering protection from work boats, tugs or collision with vessels.

The SPM buoys will consist of inner and outer cylindrical shells with a bottom and top deck forming a welded toroid shaped plate structure divided into 12 equal sized radial watertight compartments. The proposed SPM buoys would remain operational with up to two (2) adjacent compartments flooded. The SPM buoy hull plate will consist of stiffeners and brackets, designed to hold all mooring loads and will be capable of being submerged in 21.5 feet of water above the top deck. The bottom of the proposed SPM buoy would be fitted with a skirt to attach the mooring chains through chain stoppers accessible from above for adjustment. The side and bottom skirt will be protected by heavy steel fendering.

The top deck of the SPM buoys will carry the main slewing bearing for the mooring system. Cleats and mooring bollards will be mounted on the deck of the SPM buoys for mooring launches, workboats, and tugs. The watertight compartments will be accessible through sealed manholes in the deck. The inner shell of the SPM buoy would house and allow for access to sub-marine hoses, valves, and the SPM buoy swivel which serves as the connection between sub-marine hoses to the above deck piping and floating hoses extending to moored vessels for loading. The inner shell of the SPM buoy is also equipped with an access ladder for maintenance and repairs. Sub-marine hoses will extend from the SPM buoy to its respective PLEM, the non-floating part of the SPM buoy system.

Both proposed SPM buoy systems will be of the CALM type consisting of a specifically arranged anchor chain system extending to 72-inch-diameter pile anchor piles installed on the seafloor. Each CALM mooring line consist of the top chain extending from the SPM buoy to a synthetic line segment, and bottom chain connected to an anchor pile. The proposed 72-inch-diameter pile anchor piles are positioned in a circular pattern with a horizontal radius of approximately 300 feet from the center of the proposed SPM buoy. The CALM mooring system is designed to be capable of holding the position of the SPM buoy with a moored vessel under design operating conditions with any single line broken. The configuration of the CALM mooring system arrangement is designed to provide flexibility for the location of the PLEM and reduce potential interference with sub-marine hoses. The preliminary CALM mooring system is designed to achieve all relevant ABS requirements.

The SPM buoy rotating table is mounted above the deck on a protected grease lubricated roller bearing designed to withstand offshore weather and water conditions. The rotating table turns around the SPM buoy hull as the vessel weather vanes during loading operations. The vessel is moored to the rotating table via two (2) nylon hawsers consisting of chaffing chains fixed on both ends. The hawser length is specifically designed to ensure vessels moored at the SPM buoys are clear of the CALM mooring system. Mooring hawsers will be connected to mooring winches located on the bow deck of vessel and to the SPM buoy via a tie plate mechanism. The tie plate mechanism would contain load cells that continuously monitor loads on the mooring system. The rotating table also carries the launch platform allowing personnel to board the SPM buoy from a launch or workboat and an access ladder positioned 180 degrees away to the diving platform.

The floating hoses extending from the SPM buoy to the vessel are connected to a launch platform and are offset 90 degrees from the mooring hawsers to avoid entanglement and interference during operations. All navigation warning equipment is mounted to the launch platform. As a safety measure, the rotating table would have the ability to be "locked" to the SPM buoy hull during maintenance work.

The SPM buoy swivel is mounted over the central well of the SPM buoy and houses the connections between sub-marine hoses extending to the PLEM to the above deck piping. Such connections would be achieved via 24-inch-diameter piping extending from the lower fixed portion of the swivel to topside of the SPM buoy swivel which rotates along with the SPM rotating table. This connection allows for the transfer of crude oil from sub-marine hoses extending from the PLEM, to the SPM buoy, and to the floating hoses extending from the SPM buoy to for the loading of moored vessels. A leakage detection and control system would be mounted to the SPM buoy swivel for monitoring purposes during operations.

Each of the proposed SPM buoy systems would be equipped with navigation and location identifiers including a radar reflector mounted above the rotating table, an omnidirectional 1-mile fog horn, and a white 360-degree obstruction light. The radar reflector would be a stainless-steel octahedral reflector consisting of a diameter of 0.50 meters protected from entanglement by a steel rope.

Each of the proposed SPM buoy systems would be equipped with an omnidirectional fog horn and use a sound signal to provide the required audible warning to vessels during periods of reduced visibility in accordance with 33 Code of Federal Regulation (CFR) 149.585. The omnidirectional fog horn would have a sound intensity of 112 decibel sounding pressure at 1 mile, an acoustic range of 0.5 nautical miles (0.9 kilometers), and blast Morse code "U" in normal operation at 30 second intervals. The omnidirectional sound single will be capable of being actuated manually or at the onshore control room.

Each of the SPM buoy systems would display the required obstruction lights in accordance with 33 CFR 149.540 and as further described by the obstruction light requirements at 33 CFR 67. The proposed obstruction lights fixed on the SPM buoy would be a white 360-degree obstruction light with an effective intensity of a 5 nautical mile range located a minimum of 10 feet above mean high water elevations. The omnidirectional light would flash the Morse code letter "U" at 15 second intervals.

Additionally, the floating hoses connected to the proposed SPM buoys will be equipped with strobe lights (Winkler Lights) at 15-foot intervals for detection at night and low-light conditions. The proposed SPM buoys would clearly display the name of the DWP and an identifying number for the structure, which would be visible from all angles of approach in accordance with 33 CFR 149.570.

Machinery and electrical equipment mounted on each of the proposed SPM buoy rotating tables may include:

- Solar panels and associated electrical equipment
- Winch and jib crane for tensioning anchor chains and lifting heavy parts on board
- Audible alarm sound signal
- Radar reflector
- Navigation and obstruction lighting

Machinery and equipment mounted on each of the proposed SPM buoy hull compartment may include:

- Hydraulic pump, accumulators, reservoirs, and controls for remotely operating the PLEM valves
- Telemetering and communications equipment

The proposed SPM buoy systems each utilize a PLEM system which serves as the primary manifold and connection point between offshore pipelines and the SPM buoys. Each of the proposed SPM buoy systems consist of a specialized PLEM to allow for either single or dual vessel loading operations at the DWP. The proposed PLEMs will connect offshore pipelines to the SPM buoy systems through a series of 24-inch-diameter sub-marine hoses. The PLEM systems consist of a steel frame structure positioned directly beneath each of the proposed SPM buoys. Each PLEM would consist of a series of ANSI 600 series hydraulically operated ball valves and flanges to control the flow of crude oil between the offshore pipelines and the SPM buoy systems. The proposed PLEMs have been designed with specific valve configurations to allow for multiple vessel loading scenarios including the loading of a single vessel at either SPM buoy, or the simultaneous loading two vessels (one vessel at SPM Buoy 1 and one vessel at SPM Buoy 2).

The PLEM associated with SPM Buoy System 1 (PLEM 1) would be a 65-foot by 33-foot steel frame structure positioned directly below SPM Buoy 1. PLEM 1 would be anchored directly to the seafloor via six (6) 18-inch-diameter pneumatically installed foundation piles. The PLEM associated with SPM Buoy System 2 (PLEM 2) would be a 40-foot by 30-foot steel frame structure positioned directly below SPM Buoy 2. PLEM 2 would be anchored directly to the seafloor via four (4) 18-inch-diameter pneumatically installed foundation piles.

The two (2) incoming 30-inch-diameter offshore pipelines would directly connect to PLEM 1 which consist of specific valve configurations to allow for the direct transfer of crude oil to PLEM 2 through 1.68 miles of two (2) 30-inch-diameter pipelines. The dual offshore pipeline configuration in combination with the PLEM valve arrangements allows for simulations vessel loading operations at both proposed SPM buoys. The proposed PLEMs will connect subsea pipelines to the 24-inch-diameter sub-marine hoses which will extend to the SPM buoy. The sub-marine hoses extending from the PLEM to the SPM buoy would be of the API 17K specification.

The proposed SPM buoys and their associated PLEMs are designed to allow for moored vessels to clear crude oil from the floating hoses back into a designated tank located on the vessel prior to vessel disconnection and departure from the DWP.

3.3 Navigation and Vessel Operations

The general range of vessel sizes utilizing the DWP will be from 155,000 deadweight tonnage (DWT) to 320,000 DWT. These vessels will be in the generally described class of VLCC and Suezmax carriers. The current configuration of floating hoses at the SPM buoy systems indicates that vessels equipped with a 20-metric ton (Mt) ship crane would be acceptable to hoist the SPM buoy system floating hoses to the vessel manifold. Vessels equipped with a 15 Mt ship crane would be reviewed by the Applicant during their vessel vetting procedure to determine the vessel equipment suitability for mooring to the proposed DWP. As such, some acceptable carriers may be less than 155,000 DWT. However, all vessels must meet the recommendations in the latest edition of Oil Companies International Marine Forum (OCIMF) Mooring Equipment Guidelines (MEG4) for equipment employed in the bow mooring of bow mooring of conventional tankers at SPMs. The MEG4 was recently updated in 2018 and supersedes previous published recommendations. Although the Applicant may not have title to the crude oil, the Applicant will be held responsible for safe transfer of the product at the boundary between the DWP and the vessel, which occurs at the vessel's manifold.

Vessels would likely approach the proposed DWP from the west or southwest via already established safety fairways or anchorage areas as shown on National Oceanic and Atmospheric Administration (NOAA) Navigation Chart 11313 and 1117A. The Applicant does not intend to establish specific ship-routing measures or dedicated approach and departure lands for vessels. Each vessel approach and departure would be planned by the Applicant and follow the operational procedures of the DWP. Vessels approaching and departing the DWP would be under the direction of an approved mooring/cargo master. Mooring/cargo masters will be terminal personnel trained to assist the vessel master specifically for the marine operations at the SPM buoy system. Two mooring/cargo masters will board each vessel at either the existing Fairway Anchoring Area (FAA) located west of the proposed DWP or the Port Aransas sea buoy. The vessel will make all required notifications to the United States Coast Guard (USCG) and the DWP before entering the safety zone. The mooring/cargo masters will oversee vessel approach maneuvers and coordinate support vessel operations. The mooring/cargo masters will remain on board during all mooring, hose connection, cargo transfer, hose disconnection, un-mooring operations, and vessel departure. The mooring/cargo masters will act as the person in charge and will be in direct communication with onshore booster station and terminal personnel throughout all operations within the safety zone.

At this early stage in the Project for operations planning purposes, a minimum of two ocean-going tugs of a minimum of 80,000 to 90,000 horse power range and one smaller hose/line handling boat are assumed to be on location at the DWP during berthing and unberthing operations. If VLCC's are mooring or departing simultaneously, then two additional ocean-going tugs would be on location (two ocean-going tugs per SPM buoy system). The support vessels will bring the mooring masters to the DWP prior to tanker arrival to conduct pre-arrival inspections of the moorings, hoses, and all essential equipment to ensure proper functionality. The operator of the proposed DWP support vessels is unknown at this time. The Applicant will contract with an existing third-party company to operate the support vessels on long-term charter. The onshore facilities for the support vessels would likely be at or near the Port of Corpus Christi.

Two (2) synthetic hawsers will be used for mooring the vessel to the SPM buoy. Vessel cargo cranes are used to connect the floating hoses to the ships manifold. Two double carcass floating crude oil hoses are used for transferring product from the SPM buoy system to the vessel's manifold. The floating hoses are equipped with marine breakaway couplings (MBC) which are quick acting valves that snap shut to prevent marine spillage from the floating hoses. Each hose string is equipped with winker lights which incorporate a sun switch and an adjustment means of the flash repetition rate.

The Applicant is proposing a 3,609-foot (1,100-meter) radius for the safety zone from the center of each SPM buoy system. The proposed safety zone consists of a circle with a radius equal to the SPM buoy swing radius, hawser length, vessel length, plus 500 meters from the stern of the vessel. Additionally, the Applicant proposes an 820-foot (250-meter) area to be avoided (ATBA) and no anchorage area (NAA) surrounding the safety zone.

3.4 Emergency Operations

Emergency procedures will be in place to prevent petroleum releases because of unplanned disconnects, emergency preparation, or other events in which the system needs to cease normal operation procedures. In the case of an unplanned disconnect during loading, such as a station keeping issue where the vessel drifts off station, or the hawsers fail, the hose MBC will act as the weak link, limiting the amount of spilled product into the environment. The valves in the SPM buoy systems will close to shut-in contents of the under-buoy flexible hoses. The PLEM valves will close to shut-in contents of the subsea hose. In case of a planned disconnect during loading, such as impending weather or a nearby emergency, the floating hoses will be flushed with water. Otherwise, floating hoses will be flushed with water following loading operations from each vessel. The valves in the SPM buoys will close to shut-in contents of the under-buoy flexible hoses. The PLEM valves will close to shut-in contents of the subsea hose. In case of series weather event, the subsea pipeline, PLEMs, under buoy hoses and the floating hoses will be flushed with water.

3.5 Petroleum Release

In the event of a petroleum release, either from vessel or from pipeline, an Emergency Response Plan and Spill Response Plan will be in place to respond to the incident in a timely and effective manner.

A Trajectory Model has been prepared for the proposed Project. The intent of the trajectory model is to assess the potential consequence of an oil spill, the worst-case discharge (WCD), and associated spill trajectories for different seasonal weather conditions. A WCD Calculation is provided which was developed per applicable regulations. A hazard identification/hazard and operability study (HAZID/HAZOP) will be completed once the design concept is finalized and detail design begins. At this time, the worst-case discharge is used to identify the high consequence and associated tactical response requirements. Comprehensive Emergency Response, Safety, Security, and Fire Plans will be developed during the detail design.

All regulatory requirements for safety, security and oil spill response plans will be developed and submitted to the USCG and/or the Bureau of Safety and Environmental Enforcement (BSEE), as applicable.

4.0 Decommissioning Procedures

The proposed Project is expected to have a 50-year life before decommissioning of the Project components is anticipated to occur. Decommissioning of the Project will consist of removal of both SPM buoy systems, removal of offshore pipelines, plugging and abandonment of inshore and onshore pipelines and deconstruction and removal of onshore facilities.

The proposed decommissioning schedule is based on estimated number of days to complete decommissioning and removal of each component as follows:

- SPM buoy removals- 10 days
- Anchor Piles – 25 days
- Anchor Chains – 3 days
- Bottom Surveys – 2 days
- Subsea Hoses – 3 days
- Floating Hoses – 2 days
- PLEMs – 30 days
- Pipelines (offshore) – 50 days

Decommissioning activities have the potential to cause some environmental consequences and are evaluated in the Environmental Evaluation assuming the activities consist of the details and methods described in the following sections.

4.1 Removal of SPM Buoy Systems

Utilizing a diving spread and divers, the floating hoses, subsea hoses and umbilical will be disconnected from the SPM buoys and their respective PLEMs and placed on a material barge or on the back deck of a utility service boat. The floating hoses, subsea hoses, and umbilical will be transported to shore and properly disposed. The SPM buoy is secured in position by anchor cables that are attached to subsea piles installed in the seafloor. To remove the SPM buoy, the anchor cables will be disconnected, and lowered to the seafloor. A tug boat will tow the SPM buoy to a scrap facility for disposal.

Utilizing a dive spread vessel and medium duty offshore crane, divers will disconnect the anchor cables from the anchor piles. The anchor cables will be lifted to the surface and placed on a transport vessel or material transport barge for transit to a scrapping facility for disposal. The PLEM will be disconnected from the pipeline at the flange locations and disconnected from the anchor piles. Using a crane on a marine vessel, the PLEM will be lifted to the surface and placed on a material transport barge. The PLEM will be transported to a scrap facility for proper disposal.

The CALM anchor piles will either be removed by vibration or removed by a cut off at -15’ below mudline. The removal by vibration involves utilizing a vibrating hammer and instead of hammering the pile into the seafloor, a crane will be attached to the top of the pile and apply tension to retrieve the piling to the surface. The cut off at -15’ below the mudline involves the jetting and removal of the seafloor materials around each pile to facilitate an external cut on the pile. Utilizing the cut off method, a section of the piling remains in the seafloor (well below the mudline); however, this is a typical standard practice in the GOM.

4.2 Removal of Offshore Pipelines

Decommissioning of the offshore pipelines will consist of utilizing a heavy lift vessel to retrieve pipeline segments from the sea floor and then transport the segments to a scrap facility. There will be no offshore pipeline component decommissioned and abandoned in place for this project.

The removal of the pipelines will be accomplished by utilizing a heavy lift crane vessel and diving spread. The removal will commence at the end of the pipeline where the PLEM was connected. The heavy lift crane will lift the pipeline end towards the surface and expose the pipeline on the seafloor. The diving spread will dispatch divers to the seafloor to cut the pipeline into segments to be safely retrieved to the surface. It may be required in some areas to perform hand jetting to loosen the material covering the pipeline. The segments will be placed on a material barge and transported to a scrapping facility for disposal. This process will continue until the entire pipeline has been removed up to the exit point of HDD 10. The pipeline will be removed and cut at the HDD 10 exit point to a depth that follows GOM requirements. The remaining section of HDD 10 will remain in the ground well below the natural bottom of the seafloor.

The entire pipeline corridor and the location of both SPM Buoy 1 and 2 will be surveyed and inspected. Any observed debris or other items that are related to the SPM buoy systems or pipelines will be retrieved to the surface and disposed of properly.

4.3 Abandonment of Inshore and Onshore Pipelines

Onshore pipelines within terrestrial trenches will be cleaned and abandoned in place. HDD pipelines will be capped and abandoned. All existing contours, grade and vegetation will remain undisturbed or be restored where necessary.

4.4 Removal of Harbor Island Booster Station

The removal of onshore facilities such as the Harbor Island Booster Station, will commence simultaneously with the decommissioning of other project components. All material will be removed from the site according to local, state, and federal standards for reuse, recycle, or disposal. The site will be surveyed after decommissioning and removal to reestablish natural grade and tested for materials following the removal of the Project.

5.0 Alternative Project

The Alternative Project involves the design, engineering, and construction of a DWP, 48.58 miles of pipeline infrastructure, and a booster station. For the purposes of this DWPL application, the Alternative Project is described in three distinguishable segments by locality including “offshore”, “inshore”, and “onshore”.

Offshore components associated with the Alternative Project are defined as those components located seaward of the MHT line located at the interface of Mustang Island and the GOM. The Offshore Project components include approximately 17.07 miles of two (2) new 30-inch-diameter crude oil pipelines extending to two (2) SPM buoy systems.

The Alternative offshore pipelines would extend from the MHT line located at the interface of Mustang Island and the GOM to the Alternative SPM buoy systems. The Alternative DWP consist of two (2) SPM buoy systems which would be installed offshore, within the GOM, outside of U.S. territorial seas, within the Bureau of Ocean Energy Management (BOEM) block number 769 and 768. The Alternative SPM Buoy System 1 is positioned at Latitude 27.6800556 and Longitude -96.8914861 within BOEM block number 769 approximately 13.38 nautical miles (15.4 statute miles) off the coast of Mustang Island in Nueces County, Texas. The Alternative SPM Buoy System 2 is positioned at Latitude 27.6941444 and Longitude -96.8685306, within BOEM block number 768 approximately 1.74 miles northeast of Alternative SPM Buoy System 1. The Alternative 17.07 miles of offshore pipeline infrastructure includes approximately 1.74 miles of two (2) 30-inch-diameter pipelines connecting SPM Buoy System 1 and 2. Of the 17.07 miles of offshore crude oil pipeline, approximately 6.19 miles crosses an existing fairway beginning at Latitude 27.6922472 and Longitude -96.9625611 and ending at Latitude 27.6834944 and Longitude -96.9130417.

Inshore components associated with the Alternative Project are defined as those components located between the western Corpus Christi Bay MHT line and the MHT line located at the interface of Mustang Island and the GOM. Inshore Project components includes approximately 8.44 miles of two (2) new 30-inch-diameter crude oil pipelines, and an approximate 19-acre booster station and valve station located on Mustang Island, in Nueces County Texas.

Onshore components associated with the Alternative Project are defined as those components landward side of the western Corpus Christi Bay MHT line, located in San Patricio and Nueces Counties, Texas. Onshore Project components includes approximately 23.08 miles of two (2) new 30-inch-diameter crude oil pipelines extending from a planned multi-use terminal located south of Taft in San Patricio County, Texas to the landward side of the MHT line of Corpus Christi Bay.

The sections below outline the construction, operation and decommissioning procedure for the project Alternative.

5.1 Alternative Project Construction Procedures

Similar to the proposed Project, the Alternative Project construction is divided in to 5 phases. Phase 1 – Engineering and Management, Phase 2 – Solicitation and Procurement, Phase 3 – Fabrication and Pre-Assemblies, and Phase 5- Testing and Commissioning are assumed to be the same as the Proposed Project are therefore not duplicated in this section. The discussion of Alternative consequence producing factors focuses on the differing installation procedures, specifically HDD locations and trenching in Corpus Christi Bay. The construction procedures for the Project Alternative are described in the following section.

Phase 4 – Installations, of the Project Alternative construction procedures includes some key differences than the proposed Project discussed previously in Section 2.4. The following sections for the installation of the Alternative Project have been divided by project component to include the following:

- Mustang Island Booster Station Installation
- Onshore Pipeline Infrastructure Installation
- Inshore Pipeline Infrastructure Installation
- HDD Pipeline Installation
- Offshore Pipeline, PLEM, and SPM Buoy System Installation

5.1.1 Mustang Island Booster Station Installation

The Alternative Project components include an approximately 19-acre booster station located on Mustang Island, approximate coordinates of Longitude -97.1446, Latitude 27.7258, in Nueces County, Texas. Construction of the Mustang Island Booster Station would start with sit preparation to establish the conditions necessary for the construction and installation of the proposed infrastructure. Once completed, security fences will be installed. The design and installation of the tank foundations, tanks, pumps, piping, and miscellaneous components will be in accordance with the applicable standards and design codes required by law and established industry standards. Construction materials will be delivered to the construction site via existing access roads. The construction and installation of the Mustang Island Booster Station will be completed using current industry standard practices.

5.1.2 Onshore Pipeline Infrastructure Installation

The installation of the proposed onshore pipeline infrastructure will involve numerous construction techniques such as HDD, bores, and open cut conventional excavation in uplands, consolidated wetland soils, and unconsolidated soil areas. Onshore Alternative Project components includes approximately 23.08 miles of two (2) new 30-inch-diameter crude oil pipelines extending from a planned multi-use terminal located south of Taft in San Patricio County, Texas to the landward side of the MHT line of Corpus Christi Bay. The installation of the onshore pipeline for the Project alternative follows the same procedures as the Proposed Project. The Alternative Project methods include the installation of the onshore pipeline infrastructure within an approximate 125-foot to 125-foot-wide construction corridor, which will consist of a 75-foot-wide permanent ROW. During construction activities, ATWS will be required beyond the width of the 125-foot-wide construction corridor at certain designated locations to provide the space necessary for safe and efficient installations of the proposed pipelines. The ATWS would be utilized where required for the storage of spoil, pipe, welding, pull strings, HDD entry and exit locations, and equipment access roads.

A review of the Alternative construction footprint was made to determine if wetlands or waterbodies are present and their impact as a result of the construction and installation of the Alternative onshore and inshore Project components. Based on this review, the onshore and inshore Alternative Project components would impact approximately 77 acres of wetlands and approximately 2,794 linear feet of other WOUS.

Like that of the proposed Project, best management practices would be utilized for pipeline installation within documented wetland areas to minimize temporary impacts to the maximum extent practicable. If the wetlands are of unstable soil conditions at the time of mobilization and/or construction, the method of installation may involve using wood mats. Where possible, access to the construction site will utilize existing roads traversing the construction corridor. To minimize construction impacts to surface elevation in trenched areas, backfilling of the trenches following construction activities will occur as quickly as possible.

The two (2) 30-inch-diameter pipelines will be constructed using industry standards and welding requirements as stated in API 1104, Welding Pipelines and Related Facilities, Latest Edition. Included in API 1104 are list of welding specification as well as weld testing requirements and procedures.

The detailed construction methods and best management practices that would be implemented for the Alternative Project are consistent with those described in Section 2.4.2.

5.1.3 Inshore Pipeline Infrastructure Installation

Inshore components associated with the Alternative Project are defined as those components located between the western Corpus Christi Bay MHT line and the MHT line located at the interface of Mustang Island and the GOM. Inshore Project components includes approximately 8.44 miles of two (2) new 30-inch-diameter crude oil pipelines. The installation methods for the inshore pipeline include both terrestrial installation methods of the pipeline and aquatic trenching of pipelines within Corpus Christi Bay. The details of the terrestrial installation of the inshore pipelines are consistent with the onshore pipeline methods described for the Proposed Project. The details of the inshore aquatic installation methods are described below.

Approximately 5.78 miles of inshore pipeline will be installed in Corpus Christ Bay using pipeline trenching methods in a 75-foot-wide construction corridor. The pipeline trench in Corpus Christi Bay will be excavated to a depth of approximately 8 feet to allow for 60 inches (5 feet) of cover over top of the pipeline. The spoils from trench excavation will be temporarily placed in hopper barges or other type of similar vessel to avoid the side cast of material within open water. The hopper barges will be floated into position within the 75-foot-wide construction workspace. Hopper barges would be anchored in place with spuds or anchor types, or rest on the sea bed in shallow water areas following the loading of sediment.

A pipelay barge will run the length of the pipeline section in series. The pipelay barge would assemble and weld the pipe sections followed by pulling the assembled pipeline sections into an excavated trench via a winch system. A messenger cable will be run from the barge to a land-based winch located onshore. The messenger cable will be utilized to connect the main cable from the winch to the pulling head that will be installed on the first joint of each pipeline section that will be assembled in this phase. The land-based winch will serve to pull the pipe from the pipelay barge as the pipe joints are assembled. Excavated material will then be placed in the pipeline trench, completing the burial of the inshore pipeline in Corpus Christi Bay.

5.1.4 Horizontal Directions Drill Pipeline Installation

There are nine proposed HDD pipeline installation sections for the Alternative Project; six of the alternative Project HDDs are located in the onshore pipelines segment and 3 of the HDDs are located in the inshore/offshore pipeline segments. Below are details of the Alternative Project HDD segments.

- HDD 1: HDD 1 is an approximately 1,068 ft. long segment of onshore pipeline located at the Gum Hollow Canal crossing in San Patricio County.

- HDD 2: HDD 2 is an approximately 1,072 ft. long segment of onshore pipeline located at the Highway 181 roadway and roadside ditch crossings in San Patricio County.
- HDD 3: HDD 3 is an approximately 700 ft. long segment of onshore pipeline located at the Highway 35 crossing in San Patricio County.
- HDD 4: HDD 4 is an approximately 950 ft. long segment of onshore pipeline located at the Union Pacific Railroad and Highway 361 crossing near W Main St. in San Patricio County.
- HDD 5: HDD 5 is an approximately 650 ft. long segment of onshore pipeline located at a ditch crossing west of Ingleside in San Patricio County.
- HDD 6: HDD 6 is an approximately 600 ft. long segment of onshore pipeline located at the Kinney Bayou and Highway 1069 crossing in San Patricio County.
- HDD 7: HDD 7 is an approximately 3,292 ft. long segment of inshore pipeline located at the Corpus Christi Ship Channel crossing in Nueces County
- HDD 8: HDD 8 is an approximately 5,250 ft. long segment of inshore pipeline located at a wetland crossing south of Wilson's Cut on Mustang Island in Nueces County
- HDD 9: HDD 9 (Shore Approach) is an approximately 5,000 ft. long segment of pipeline located at the shoreline crossing of Mustang Island and the Gulf of Mexico in Nueces County.

Methodology and installation details of the HDD installation method are consistent with what is described in Section 2.4.3 of the proposed Project procedures.

5.1.5 Offshore Pipeline, PLEM, and SPM Buoy Installation

Offshore pipeline and PLEM installation methods for the Alternative Project are consistent with those described in Section 2.4.4 of the proposed Project installation methods. The Alternative offshore pipelines would extend from the MHT line located at the interface of Mustang Island and the GOM to the Alternative DWP. The Alternative DWP consist of two (2) SPM buoy systems which would be installed offshore, within the GOM, outside of U.S. territorial seas, within BOEM block number 769 and 768. The Alternative SPM Buoy System 1 is positioned at Latitude 27.6800556 and Longitude -96.8914861 within BOEM block number 769 approximately 13.38 nautical miles (15.4 statute miles) off the coast of Mustang Island in Nueces County, Texas. The Alternative SPM Buoy System 2 is positioned at Latitude 27.6941444 and Longitude -96.8685306, within BOEM block number 768 approximately 1.74 miles northeast of SPM Buoy System 1. The Alternative 17.07 miles of offshore pipeline infrastructure includes approximately 1.74 miles of two (2) 30-inch-diameter pipelines connecting Alternative SPM Buoy System 1 and 2. Of the 17.07 miles of offshore pipeline infrastructure, approximately 3.1 miles crosses the fairway beginning at Latitude 27.6922472 and Longitude -96.9625611 and ending at Latitude 27.6834944 and Longitude -96.9130417.

The offshore pipeline workspace is proposed to be a 75-foot-wide temporary construction workspace corridor for the jetting installation of the offshore pipelines to a minimum of 3-foot of cover. Where the Alternative offshore pipeline infrastructure crosses 6.19 miles of existing vessel safety fairway, the workspace remains at 75-foot-wide, however, the pipeline is required to be covered by a minimum of 10 ft of cover followed by the placement of rip-rap over the installed pipeline infrastructure located within the limits of the fairway. The additional depth of pipeline required in this section would require additional jet sled passes. The rip-rap will be transported in via barges and lowered to the trench using clamshells and winches. This requirement will increase the amount and frequency of vessels in the construction area and existing vessel fairways compared to the pipeline installation of the rest of the offshore areas.

The installation of the two SPM buoys at the Alternative Project location follow the same general practices and methods as described in Section 2.4.5. Additionally, general items applicable to all installations (Section 2.4.6) are applicable to the Alternative Project components.

5.2 Operation

For the purposes of defining operations that may lead to environmental consequences, the operation procedures for the Alternative Project are assumed to be consistent with those previously described in Section 3.0.

5.3 Decommissioning

For the purposes of defining procedures that may lead to environmental consequences, the decommissioning procedures for the Alternative Project are assumed to be consistent with those previously described in Section 4.0.