2.0 DESCRIPTION OF THE PROPOSED ACTION

The FERC is the federal agency responsible for authorizing applications to construct and operate onshore LNG import and interstate natural gas transmission facilities. The Coast Guard is the federal agency responsible for determining the suitability of the waterway for LNG marine traffic. The Coast Guard is also the federal agency responsible issuing a LOR regarding the suitability of the waterway for LNG marine traffic.

The proposed action before the FERC is to consider issuing to Creole Trail a section 3 authorization for the LNG import facilities and a section 7 Certificate for new natural gas pipelines. The proposed action before the Coast Guard is to consider issuing Creole Trail a LOR finding the waterway suitable for LNG marine traffic, with certain conditions. These conditions are delineated, in part, in the Coast Guard's February 27, 2006 letter to FERC (attached as Appendix L-1). Specifically, these conditions require that all agencies that would be involved in navigation safety and maritime security aspects of LNG vessels transiting to and operating at the Creole Trail LNG terminal be adequately staffed, equipped, and funded to fully implement the safety and security measures. These measures include, but are not limited to, safety zones around the LNG carriers, escorts by armed law enforcement vessels, a variety of waterway and shoreline surveillance measures, and multi-agency cooperation and communication. Specific details of these measures are further delineated in the Coast Guard's February 28, 2006 letter to FERC which has been designated Sensitive Security Information as defined in Title 49 CFR Part 1520. Because any unauthorized disclosure of these details could be employed to circumvent the proposed security measures, they are not releasable to the public.

2.1 PROPOSED FACILITIES

Creole Trail proposes to construct and operate a new LNG import, storage, and vaporization terminal in Cameron Parish, Louisiana. In addition, Creole Trail proposes to construct and operate a new natural gas pipeline system to interconnect the proposed Creole Trail LNG terminal with intrastate and interstate pipeline infrastructure in southwest Louisiana. The proposed pipeline system would consist of two 42-inch-diameter dual pipeline segments, referred to as Segments 2 and 3.[1] Figure 2.1-1 illustrates the general location of the Creole Trail Project. This section describes the proposed Creole Trail LNG terminal, LNG ships, the proposed pipeline facilities, land requirements, construction procedures and schedule, environmental compliance and inspection monitoring, operation and maintenance procedures, and safety controls. The proposed LNG terminal and pipeline facilities were designed to comply with current federal standards and were filed prior to the occurrences of Hurricanes Katrina and Rita, which affected southern Louisiana in August and September 2005, respectively. In information filed after the hurricanes, Creole Trail indicated that it does not currently anticipate modifications to the proposed LNG terminal design, or to the proposed pipeline design, routing, or construction methods, as a result of the hurricanes. See section 4.1.3.5 for additional information about flooding and storm surge at the LNG terminal site.

2.1.1 LNG Terminal

The LNG terminal would include a new marine basin with 2 ship berths and unloading facilities, berthing facilities for 3 tugboats and 2 line-handling boats, 4 LNG storage tanks, vapor handling equipment, 21 LNG vaporizers and related regasification systems, utilities, and support facilities such as

[1] As noted in section 1.0 of this EIS, Creole Trail initially proposed three dual 42-inch-diameter pipeline segments and a 20-inch-diameter lateral pipeline. Creole Trail subsequently withdrew the segment that was referred to as Segment 1 and the lateral pipeline, which was referred to as the Hackberry Lateral.

buildings and other infrastructure. The LNG terminal would be located within a 771.6-acre tract of land west of the Calcasieu Ship Channel and northwest of Monkey Island, about 3.0 miles inland from the Gulf of Mexico. Creole Trail has acquired the land, which is part of a larger private property tract, through a long-term lease, and has an option to acquire the remainder of the larger tract if it so chooses. Of the 771.6-acre tract, approximately 367.3 acres would be affected during construction of the terminal. Following construction, an approximate 123.7-acre area would be required for operation of the proposed facilities. A layout of the proposed LNG terminal is provided on figure 2.1.1-1. The proposed LNG terminal would import, store, and vaporize an average of approximately 3.3 Bcfd.

An area in the northern portion of the proposed LNG terminal site is currently used by the COE as a dredged material placement area (DMPA), referred to as DMPA "O." The Lake Charles Harbor and Terminal District (Port of Lakes Charles), a political subdivision of the State of Louisiana, is the Local Sponsor pursuant to the Water Resources Development Act (33 USC sections 2201-2330) and is responsible for supplying DMPAs for the COE's dredging activities. Creole Trail is currently working with the COE, the Port of Lake Charles, and affected landowners in an effort to have DMPA "O" released for the proposed project. As part of this effort, Creole Trail is evaluating options for replacing DMPA "O" at another location. Alternative DMPA locations are addressed in sections 3.5 and 4.4.3.

In comments on the draft EIS, the Port of Lake Charles acknowledged Creole Trail's efforts to address the need for replacing DMPA "O," but expressed concern that this issue has not yet been resolved. Although DMPA "O" has not been used recently for disposal of dredged material from the Calcasieu Ship Channel, the Port of Lake Charles stated that it will be needed in the future. The Port of Lake Charles explained in its comments that the Energy and Water Development Appropriations Act, Public Law 109-103, section 133, enacted in November 2005, provides for a land exchange in which property tracts within DMPA "O" are to be replaced by another property referred to as "Area M." The Port of Lake Charles stated that it does not necessarily object to the replacement of DMPA "O" with Area M, but is concerned about how incremental costs associated with this exchange would be covered.

Creole Trail filed a response to the Port of Lake Charles' comments on March 22, 2006. Creole Trail stated that both Creole Trail and the Port of Lake Charles collaborated in the formulation of section 133, which is intended to resolve the DMPA "O" issue in a fair manner and to provide a solution for difficulties arising from an irrevocable easement the COE holds for part of DMPA "O." Creole Trail challenged the Port of Lake Charles' assertion that Creole Trail has taken the position that Creole Trail should not be responsible for any of the incremental costs associated with the use of Area M. Creole Trail also indicated that the Port of Lake Charles should describe the methodology it used to estimate those incremental costs.

The Port of Lake Charles requested in its comments that the Commission condition any authorization of the Creole Trail Project on Creole Trail taking full responsibility to secure a replacement DMPA with a disposal capacity equivalent to that of DMPA "O" that is acceptable to the COE and the Port of Lake Charles. Creole Trail stated that the Port of Lake Charles' position should be rejected because it does not recognize that the COE's easement for part of DMPA "O" has been revoked.

Non-Internet Public

ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED
CREOLE TRAIL LNG TERMINAL
AND PIPELINE PROJECT
Docket Nos. CP05-360-000, CP05-357-000,
CP05-358,000, CP05-359-000

Figure 2.1-1 General Project Location

Public access for the above information is available only through the Public Reference Room, or by e-mail at public.referenceroom@ferc.gov.

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Figure 2.1.1-1 Proposed LNG Terminal Site Plan

Public access for the above information is available only through the Public Reference Room, or by e-mail at public.referenceroom@ferc.gov.

The legal issues related to the COE's easements covering DMPA "O" and the manner in which incremental costs associated with the use of Area M would be covered are beyond the scope of this EIS. However, we recognize that an acceptable replacement for portions of DMPA "O" that would no longer be available to the COE as a result of the construction and operation of the proposed LNG terminal must be secured in order for the project to be implemented as proposed, and incremental costs are certain to be included in the negotiations for determining an acceptable replacement. In addition, Area M was not identified as one of the alternative DMPA locations being evaluated by Creole Trail. We have not had an opportunity to consider potential environmental impacts associated with the use of Area M; however, Area M is a currently approved DMPA for the COE, and all COE DMPAs undergo NEPA review as part of the approval process. As discussed in section 4.4.3, Creole Trail is coordinating with the COE, NOAA Fisheries, FWS, LADWF, the Port of Lake Charles, and other stakeholders to develop a comprehensive Aquatic Resources Mitigation Plan (ARMP) that would address several aquatic resource mitigation issues, including but not limited to the replacement of DMPA "O." It is our understanding that the COE will not approve an ARMP without having a final agreement on a replacement for DMPA "O." We recommend in section 4.4.3 that Creole Trail file a copy of its finalized ARMP with the Secretary for review and written approval of the Director of OEP prior to construction. We have revised this recommendation to explicitly include the Port of Lake Charles as one of the agencies to be involved in this process.

2.1.1.1 Marine and Unloading Facilities

A new marine basin, approximately 1,250 feet by 1,500 feet at its width mid-point, would be developed in the northeast portion of the LNG terminal site, connected to but set back from ship traffic in the Calcasieu Ship Channel. The marine basin would contain two protected ship berths as well as a maneuvering basin to allow the LNG ships to turn and move into their berths. The terminal would have the capacity to unload approximately 300 to 400 LNG ships per year, although the actual number of ships may be fewer depending on the ship sizes and terminal user agreement conditions. A Vessel Traffic Congestion Study conducted by Lanier & Associates (2005) concluded that the additional LNG ship traffic could be accommodated in the Calcasieu Ship Channel based in part on the understanding that some of the planned or proposed LNG facilities would provide their own fleets of tugs. Creole Trail would provide three dedicated tugs to support inbound and outbound LNG ships serving the proposed Creole Trail LNG terminal. A tug dock would be constructed south of the marine basin for berthing the tugs as well as line handler and supply boats.

The ship berths and maneuvering basin would be dredged to a depth of 45 feet below Mean Low Gulf (MLG)[2] to accommodate LNG ships with capacities of up to 250,000 m^3 and drafts up to 41 feet. The side slopes of the newly construction ship berths and maneuvering basin would range from 3:1 to 5:1, portions of which would be armored with articulated block mats or other means of slope stabilization. The tug dock area would be dredged to a depth of 25 feet below MLG and would have 3:1 side slopes. Construction of the combined marine facilities would require dredging approximately 4.1 million cubic yards (yd^3) of material. Creole Trail would remove the dredge material using a hydraulic dredge and would use the dredged material in a beneficial manner in accordance with Louisiana coastal use regulations as discussed in sections 3.5 and 4.4.3.

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2 Unit recognized by the U.S. Coast Guard for activities in the Calcasieu Ship Channel. Creole Trail has identified benchmarks that are referenced to National Geodetic Vertical Datum of 1929 (NGVD29), North American Vertical Datum of 1988 (NAVD88) (94 releveling), and MLG in order for a conversion between the datums to be available for assistance in elevation determinations. National Geodetic Survey (NGS) uses NAVD88 as its current datum and the Federal Emergency Management Agency (FEMA) uses NGVD29 for its current datum. The conversion from MLG to NAVD88 or NGVD29 is to add 0.83 foot. The conversion from NAVD88 or NGVD29 to MLG is to subtract 0.83 foot.

The maneuvering area and berth layout would be designed to provide enough room to safely turn inbound LNG ships and back them into the berth, and also to maneuver away from the berth and turn for the outbound transit. Mooring the LNG ship with bow headed seaward would allow the ship to leave the berth as quickly as possible in the event of an emergency. Two ships would be able to occupy the berths simultaneously, but only one ship could enter or depart at any given time and Creole Trail would not allow simultaneous movement of two LNG ships within the basin.

Each berth would be equipped with four breasting structures and six mooring structures. Both types of structures would consist of steel pipe piles with concrete caps. The breasting structures would be equipped with energy absorbing fenders suitable to safely berth and moor the full range of vessel sizes being considered and quick-release mooring hooks for spring lines to provide flexibility in mooring various types of vessels. Access catwalks would connect the breasting structures to the jetty platform and the mooring structures. Mooring structures would be equipped with quick-release mooring hooks, access stairs, and interconnecting walkways with protective hand railings except on the mooring line faces.

The jetty platform at each berth would be a single-level, reinforced concrete beam structure, approximately 90 feet wide by 116 feet long. The jetty platform would be curbed and its surface sloped to confine LNG spillage and direct it to a collection point. Drainage from the collection point would be through the LNG spill-collection trough to an onshore spill impoundment basin.

LNG would be transferred from the LNG carriers to the onshore LNG storage tanks via two parallel 30-inch-diameter 4,500-foot-long transfer lines. Four marine unloading arms would be installed on each jetty platform, three of which would be used for liquid delivery to the LNG storage tanks and one of which would provide vapor return to the LNG ship. To provide flexibility, one of the unloading arms would be capable of providing liquid delivery or vapor return. Each unloading arm would be designed with swivel joints to provide range of movement between the LNG ship and onshore connections. Each unloading arm would also be fitted with powered emergency release coupling (PERC) valves to protect the arm and the ship and to minimize LNG spillage. Each unloading arm would be operated by a hydraulic system. A counterbalance weight would be provided to reduce the dead weight of the arm on the shipside connection and to reduce the power required to maneuver the arm into position. Each set of unloading arms would be designed to provide an average unloading rate of 12,000 m^3 per hour.

Creole Trail would design the marine facilities in accordance with applicable codes and standards, including but not limited to those promulgated by the Oil Companies International Marine Forum (OCIMF), the Society of International Gas Tanker and Terminal Operators (SIGTTO), the American Petroleum Institute (API), and the American Society of Civil Engineers (ASCE). The facilities would be designed to provide safe berthing for the receipt and mooring of LNG ships and to ensure the safe transfer of LNG cargoes from the ships to onshore storage facilities.

2.1.1.2 LNG Storage Tanks

The LNG would be stored in four insulated, single-containment, double-walled tanks, each designed to store a nominal working volume of 1,006,400 barrels (160,000 m^3) of LNG at a normal operating temperature of -260 degrees Fahrenheit (°F) (minimum temperature -270 °F) and a normal operating pressure range of 1.0 to 2.2 pounds per square inch gauge (psig) (maximum pressure 2.5 psig). Each tank would be surrounded by an individual earthen-dike impoundment sized to contain 110 percent of the gross capacity of the tank. To provide flood protection, the LNG tank impoundment area would be enclosed by dikes that would be about 21 feet above MLG in height with the sloped impoundment floor at elevations from 4 to 2 feet above MLG (see section 4.1.3.5 for additional information related to flooding due to hurricane storm surge).

Each tank would consist of a primary inner container of 9 percent nickel steel, a secondary outer container of carbon steel, a carbon steel domed roof, and an insulated aluminum deck over the inner container suspended from the roof (see figure 2.1.1-2). The outside diameter of the outer container would be approximately 270 feet and the height to the top of the dome would be approximately 175 feet. The inner container would contain the LNG. The space between the inner and outer containers would be filled with expanded perlite insulation to allow the LNG to be stored at a temperature of -260 °F while maintaining the outer container surface near ambient temperature. The roof deck of the inner container would be covered with fiberglass blanket insulation and the bottom would be insulated with cellular glass, load-bearing insulation capable of supporting the weight of the inner container and the LNG. The LNG tanks would be supported on piled foundation systems at an elevation such that base heating would not be required to prevent frost heave. There would be no penetrations through the inner or outer container sidewalls or bottoms, and all piping into and out of the inner or outer containers would enter from the top of the tank.

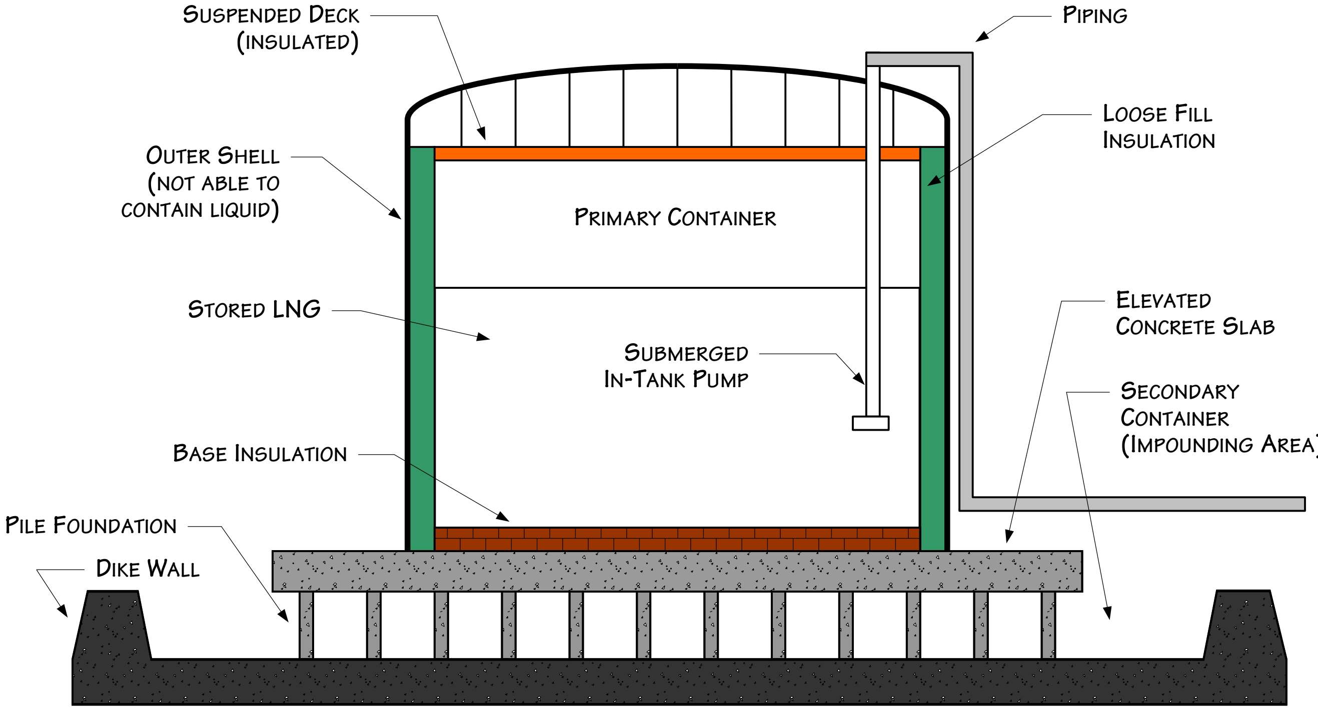
Each tank would contain three submersible, vertical type LNG pumps that would deliver the LNG to the high-pressure sendout pumps. The pumps would be set inside pump-wells accessed from the top of the tank. A fourth in-tank pump column would be included to accommodate installation of a spare pump without having to decommission the tank.

2.1.1.3 Vaporization System

LNG from the storage tank would need to be pressurized and vaporized so that natural gas could be sent out through the proposed natural gas pipeline system. Key components of the proposed LNG vaporization and sendout system would include:

- twenty-one high-pressure LNG sendout pumps that would discharge at a pressure sufficient for vaporization and sendout to the natural gas pipelines. Each pump would have a capacity of 1,686 gpm (384 m^3 per hour);
- twenty-one high-pressure LNG submerged combustion vaporizers (SCV) with a capacity of 183 MMcfd each; and
- on-site natural gas metering facilities.

The LNG sendout pumps would be multi-stage and seal-less with the motors submerged in LNG. The pumps would boost the pressure of the LNG from approximately 85 psig to 1,580 psig. The SCVs would be a water-bath type with a stainless steel water basin. Tube bundles would be submerged in the bath. LNG would enter the tube bundles and vaporized gas would exit the bundles. Heat for vaporization would be provided by burning a portion of the boil-off gas (BOG) or vaporized gas (see section 2.1.1.4). Blowers would provide combustion air at a pressure sufficient to force the combustion products up through the water basin where the combustion products would heat the water.



For environmental review purposes only.

Figure 2.1.1-2
Creole Trail Project
Conceptual Design of LNG Storage Tank

A complete "vaporization train," consisting of one high-pressure LNG sendout pump and one SCV, would produce approximately 183 MMcfd of natural gas, depending on LNG composition and other factors. Of the 21 vaporization trains, 19 would be used routinely and 2 trains would be used as spares. However, the number of vaporization trains placed in service at any given time would be based on customer demand.

Approximately 1,500 feet of dual 36-inch-diameter interior plant pipes would connect the vaporization trains to a metering facility that would measure the total natural gas output of the LNG terminal to the sendout pipeline. The first 300 feet of piping from the vaporizers would be stainless steel and would be located aboveground. The remaining portion of the piping would be made of carbon steel and would be buried underground.

2.1.1.4 Vapor Handling System

During normal operations, ambient heat input into the LNG storage tanks and piping would cause a small amount of LNG to be vaporized continuously. Some vaporization would also result from factors such as barometric pressure changes, heat input from pumping, and ship flash vapor. This LNG vapor is referred to as BOG.

The proposed vapor handling system would include three BOG compressors, approximately 6,923 cubic feet per minute (cfm) (11,764 m^3 per hour) each, and a BOG condensing system to handle the BOG from the LNG tanks and unloading systems. After being compressed to about 100 psig, some of the compressed gas would be taken for fuel gas for the SCVs and the remainder would be mixed with part of the LNG from the in-tank pumps and condensed in the BOG condenser system prior to being pressurized in the LNG sendout pumps.

During LNG ship unloading, vapors are also released from the LNG storage tanks due to displacement as the storage tanks are filled. Vapor return blowers would be used to return a portion of the vapor to the ship in order to maintain ship tank pressure. The vapor handling system would include four vapor return blowers, approximately 3,531 cfm (6,000 m^3 per hour) each, sized to make up the LNG volume displaced from the ships. The vapor return blowers would discharge at about 10 psig and would boost the pressure to overcome the pressure drop in the pipeline to the ship.

2.1.1.5 Utilities

The normal source of fuel gas would be from the discharge of the BOG compressors as described above. Alternate supplies of fuel would be downstream of the vaporizers. The fuel would be heated in separate coils in the SCV water baths, and each vaporizer would have a coil designed to heat the amount of fuel required for that vaporizer.

Instrument and utility air would be provided from three 50 percent package units of 285 cfm each. Each unit would have a lubricated screw compressor with electric motor driver, filters, and an air dryer.

The proposed LNG terminal would require about 65 megawatts of electricity for operation. To meet this demand, Creole Trail would install gas turbine generators with a standby generator to provide back-up power for critical loads in the event of a disruption to the power supply. Voltage stepdown from 13.8 kilovolt (kV) to 4.180 kV substations would be provided, and electric service would be extended via transformers located throughout the terminal to voltage levels required by motors, lighting, and other equipment. The standby generator would be diesel engine driven, and would have an output rating of 4160 V, 3 phase, 60 Hertz, 3,000 kilowatts, 0.8 power factor.

Potable water would be provided through a nonjurisdictional water line that would be constructed by Cameron Parish Water Works. The water line would extend from the existing 10-inch-diameter Cameron Parish Water Works District No. 10 water line.

Sanitary wastes originating from each building would be collected and treated in self-contained sanitary treatment packages. The treated wastes would be discharged with the facility stormwater. Creole Trail would be required to obtain a Louisiana Pollutant Discharge Elimination System (LAPDES) Permit to Discharge Water from Natural Gas Facilities for this purpose.

2.1.1.6 Buildings

The LNG terminal would include the following service buildings:

- control building;
- administration building;
- warehouse/maintenance building;
- main electrical substation building;
- two jetty electrical substation buildings;
- standby generator building;
- compressor enclosure building;
- gate house building;
- customs/marine buildings; and
- firewater pumphouse.

2.1.1.7 Stormwater Handling and Pollution Prevention

The LNG terminal would be designed to provide drainage of surface water to designated areas through a system of grading, ditches, and swales. The drainage system would be designed to handle a 10-year storm in accordance with 49 CFR 193.2103. Stormwater collected by the spill impoundment collection system would drain to the spill impoundment basins, which would be routinely pumped out by the impoundment basin sump pumps. These pumps would transfer rainwater into the firewater pond, which would ultimately discharge overflow water to a drainage system leading to the Calcasieu Ship Channel. The Calcasieu Ship Channel would receive water via new or existing drainages and intentional site grading. The spill impoundment basins would also have an additional set of larger-capacity stormwater pumps to pump out larger quantities of stormwater. The pumps would start and stop automatically on level control and would be interlocked with low-temperature sensors and switches to prevent operation of the pumps in the event of an LNG spill.

2.1.2 LNG Ships

LNG is currently shipped from a variety of sources around the world, including such locations as Algeria, Australia, Brunei, Indonesia, Malaysia, Nigeria, Oman, Qatar, Trinidad, and United Arab Emirates. Creole Trail anticipates that LNG could be delivered to the proposed LNG terminal from any of these worldwide sources. Although LNG ships and their operation are directly related to the use of the proposed import terminal, they are not subject to the section 3 authorization sought in the FERC application. However, the Coast Guard is responsible for determining the suitability of the Calcasieu River (which is also the Calcasieu Ship Channel in the vicinity of the proposed LNG terminal) for these LNG ships and must issue an LOR for the operation of the proposed facility. On February 27, 2006, the Coast Guard made a preliminary determination that the Calcasieu River to the proposed LNG terminal site may be suitable for accommodating the type and frequency of LNG vessels proposed for the Creole Trail Project.

The ships that transport LNG are specially designed and constructed to carry LNG for long distances. LNG ship construction is highly regulated and consists of a combination of conventional ship design and equipment, with specialized materials and systems designed to safely contain liquids stored at temperatures of -260 °F.

The following sections present a brief overview of the main design and safety features of a typical LNG ship that may transport LNG to the proposed Creole Trail LNG terminal.

Profile

LNG ships have a distinctive appearance compared with other transport ships. A LNG ship has a high freeboard (i.e., that portion of the ship above water) when compared with a vessel such as an oil tanker because of the comparative low density of the cargo. Because of the high freeboard, wind velocity can adversely affect the maneuverability of the ship, particularly at slow speed, such as during docking.

Hull System

All LNG ships are constructed with double hulls, which increases the structural integrity of the hull system and provides protection for the cargo tanks in case of an accident. The space between the inner and outer hulls is used for water ballast. The *International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk* (Gas Tanker Code) and Coast Guard regulations require that LNG ships meet a Type IIG standard of subdivision, damage stability, and cargo tank location.

The Type IIG design ensures the LNG ship could withstand flooding of any two adjacent compartments without any adverse effect on the stability of the ship. Type IIG design also requires that the cargo tanks must be a minimum of 30 inches from the outer hull and a minimum distance above the bottom of the ship equal to the beam of the ship divided by 15, or 6.5 feet, whichever is less. This distance is intended to prevent damage to the cargo tanks in case of low energy-type accidents that might occur in harbors and during docking. Most large LNG ships have a distance of 10 to 15 feet between the outer hull and cargo tank.

Containment Systems

The LNG containment system on LNG ships consists principally of the cargo tank (sometimes called a primary barrier), the secondary barrier, and insulation. The containment system also includes cargo monitoring and control and safety systems.

Three basic tank designs have been developed for LNG cargo containment: prismatic free-standing, spherical, and membrane. The earliest form of LNG containment is the prismatic free-standing tank. It consists of an aluminum alloy or 9 percent nickel steel, self-supporting tank that is supported and restrained by the hull structure. Insulation consists of reinforced polyurethane foam on the bottom and the sides, with fiberglass on the top. The spherical tank design, also known as the Moss design, uses an unstiffened, spherical, aluminum alloy tank that is supported at its equator by a vertical cylindrical skirt, with the bottom of the skirt integrally welded to the ship's structure. This free-standing tank is insulated with multi-layer close-cell polyurethane panels. In the membrane containment system, the ship's hull constitutes the outer tank wall, with an inner tank membrane separated by insulation. Two forms of membrane are commonly used: the Technigaz membrane using stainless steel and the Gas-Transport membrane using Invar.

LNG tankers are of the double-hulled design regardless of the containment system used. A double bottom and double sides are provided for the full length of the cargo area and arranged as ballast tanks, independent of the cargo tanks. The double-hulled design provides greatly increased reliability of cargo containment in the event of grounding and collisions. Further, the segregated ballast tanks prevent ballast water from mixing with any residue in the cargo tanks.

Pressure/Temperature Control

A basic goal of all LNG containment systems is to maintain the LNG cargo at or near atmospheric pressure at the boiling temperature of the LNG (about -260 °F). This is accomplished using "auto-refrigeration," a phenomenon that results from the constant heat flow into the tank and the removal of the associated vapor. The vapor ranges from 0.15 to 0.25 percent (by volume) per day and is used to supplement the bunker fuel in the ship's boilers. Currently, all LNG ships utilize this boil-off as fuel. The Coast Guard does not permit routine venting of BOG to the atmosphere in the United States. Thus, all LNG ships that trade in the United States are fitted with an internalized combustion energy system that allows the ship's boiler to consume all of the BOG to fuel the ship's steam propulsion system. As a result, LNG ships have reduced emissions when compared with conventional oil-fired ships.

Ballast Tanks

Sufficient ballast water capacity must be provided to permit the ship to return to the loading port safely under various sea conditions. LNG cargo tanks are not used as ballast tanks because these tanks must contain a minimal amount of LNG to remain at cryogenic temperatures. Consequently, LNG ships must be designed to provide adequate ballast capacity in other locations.

Ballast water tanks are arranged within the LNG ship's double hull. It is essential that ballast water not leak into the LNG containment system. To reduce the potential for leakage, the ballast tanks, cofferdams, and void spaces are typically coated to reduce corrosion. LNG ships are also periodically inspected to examine the coating and to renew it as necessary.

A ballast control system, which permits the simultaneous ballasting during cargo transfer operations, is also incorporated into each LNG ship. This allows the LNG ship to maintain a constant draft during all phases of its operation to enhance performance. Under normal operating conditions, ballast water would be taken onto the ship during LNG off-loading at the marine terminal. Creole Trail anticipates that a 125,000 m^3 LNG ship would typically take on about 56,000 m^3 (14.8 million gallons) of ballast water at a rate of about 4,700 m^3/hr (about 1.2 million gallons/hour). Creole Trail's proposed LNG terminal would be designed to accommodate larger LNG ships anticipated to be available in the future. Creole Trail anticipates that a 250,000 m^3 ship would take on about 109,000 m^3 (about 28.8 million gallons) of ballast water at a rate of about 9,100 m^3/hr (about 2.4 million gallons/hour). Ballast water would not be discharged into the Calcasieu Ship Channel during unloading operations.

Ship Safety Systems

The LNG vessels proposed for use in this project would have to comply with all federal and international standards regarding LNG shipping. As such, ships that transport LNG to the Creole Trail LNG terminal would be fitted with an array of cargo monitoring and control systems. These systems would automatically monitor key cargo parameters while the ship is at sea and during the remote-control phase of cargo operations at the marine basin.

The system includes provisions for pressure monitoring and control, temperature monitoring of the cargo tanks and surrounding ballast tanks, emergency shutdown of cargo pumps and closing of critical valves, monitoring of tank cargo levels, and gas and fire detection.

The LNG ships that transport LNG to the terminal would be fitted with many navigation and communication systems, including:

- two separate marine radar systems, including automatic radar plotting;
- LORAN-C receivers;
- echo depth finders; and
- a satellite navigation system.

All LNG ships also have redundant, independent steering control systems that are operable from the bridge or steering gear room to maintain rudder movement in case of a steering system failure.

Fire Protection

All LNG ships arriving at the Creole Trail LNG terminal would be constructed according to structural fire protection standards contained in the *International Convention for the Safety of Life at Sea* (SOLAS). This would be done under the review and approval of the Coast Guard.

LNG ships using the terminal would also be fitted with active fire protection systems that meet or exceed design parameters in Coast Guard regulations and international standards, such as the Gas Tanker Code and SOLAS, including:

- a water spray (deluge) system that covers the accommodation house and central room, and all main cargo control valves;

- a traditional firewater system that provides water to fire monitors on deck and to fire stations found throughout the ship;

- a dry powder extinguishing system for LNG fires; and

- a carbon dioxide system for protecting the machinery, ballast pump room, emergency generators, cargo compressors, etc.

Crew Qualifications and Training

All officers and crews of the LNG ships would comply with the *International Convention Standards of Training, Certification and Watch Keeping for Seafarers*. Key members of the crew must have specific training in the handling of LNG and the use of the safety equipment. Officers must receive simulator training in the handling of the ship and the cargo systems specific to the conditions at the project site. In addition, a pilot from the Port of Lake Charles would board each ship and guide it through the Calcasieu Ship Channel.

Ship Selection

The specific identity of LNG ships that would unload at the terminal would depend on the commercial terms of the LNG purchase agreement(s). The project would be designed to accommodate the full range of LNG ships in service today (87,000 m^3 to 138,000 m^3) as well as larger LNG ships with capacities up to 250,000 m^3 that are expected to be in service in the future.[3] Table 2.1.2-1 shows the dimensions of typical LNG ships considered in the *Vessel Maneuvering Simulation Study for Creole Trail LNG Terminal* (May 2005).

TABLE 2.1.2-1

Typical LNG Ship Characteristics

Specifications	Existing Ships	Future Ships	
Capacity (m^3)	125,000 - 140,000	200,000	250,000
Length Overall (feet)	920	1,033	1,128
Beam (feet)	142	164	177
Draft (feet)	37.4	39.4	39.4

Ships using the Creole Trail LNG terminal would comply with the Coast Guard regulations for LNG ships. This compliance is demonstrated by the operator of the LNG ship having proper certificates authorizing the transport of LNG as follows:

- U.S. Flag LNG Ship – The Coast Guard Certificate of Inspection must be valid and endorsed for the ship to transport LNG (46 CFR 154, 1979). A Coast Guard Certificate of Inspection (COI) is issued for a period of 5 years and retention of the COI depends upon the continued maintenance of the vessel in a safe operating condition and satisfactory completion of required annual inspections during the 5-year COI period.

- Foreign Flag LNG Ship – The ship must have a valid Certificate of Compliance issued by the Coast Guard. The certificate is issued after the ship has proven that it complies with the Coast Guard regulations and after it has been satisfactorily inspected by a Coast Guard Marine Safety Office (46 CFR 154, 1979). A Certificate of Compliance (COC) is valid for a 2-year period and remains valid pending satisfactory completion of an annual mid-period examination between COC renewals.

Both U.S. and foreign flag ships must be inspected annually by the Coast Guard and the flag state. Coast Guard officers from the Marine Safety Unit, Lake Charles, Louisiana, may board the LNG ships arriving in the Calcasieu Ship Channel to ensure safety standards are met. Creole Trail would continually monitor ship operations to ensure that operations are occurring according to established procedures and ensure that the ships are maintained to all standards.

2.1.3 Pipelines

Pipelines

The Creole Trail Project would include the construction and operation of two natural gas dual pipeline segments. Segment 2 of the dual pipeline system consists of two adjacent and parallel 25.3-mile-

[3] ExxonMobil Corporation has ordered eight LNG ships with capacities of 200,000 m^3 for delivery between 2008 and 2009.

long, 42-inch-diameter pipelines that would be constructed from the proposed LNG terminal to a point southwest of the intersection of State Highway 108 and State Highway 27. Segment 3 would consist of two 91.5-mile-long, 42-inch-diameter pipelines that would originate at the terminus of Segment 2 and would end at a point near Rayne, Louisiana, in Acadia Parish. Figure 2.1-1 and Appendix B show the proposed pipeline routes. Approximately 1.0 mile and 60.7 miles (4 percent and 66 percent, respectively) of Segment 2 and Segment 3 would parallel existing rights-of-way. The pipelines would be designed for a maximum allowable operating pressure (MAOP) of 1,440 psig. The dual pipelines would have a capacity of 3.3 Bcf of natural gas. The proposed pipeline system would interconnect with several existing intrastate and interstate pipeline systems as identified in the list of proposed M&R facilities discussed below.

2.1.4 Aboveground Facilities

The proposed aboveground facilities include 17 M&R facilities, 8 MLV locations, 1 pig launcher location, and 1 pig receiver location. Table 2.1.4-1 lists the aboveground facilities. Within the dual pipeline segments, each M&R facility would connect with both of the pipelines. Similarly, pig launcher/receiver assemblies and MLVs along the dual pipeline segments would be installed for each of the two pipelines.

A typical M&R facility would include a control building within a chain link fence enclosure and a permanent access road that would generally be within the boundaries of the permanent easement. Meter runs would be installed at each M&R station to measure the flow of natural gas from the Creole Trail pipeline system to the existing pipelines. Each M&R station would also include a supply line from the pipeline, an emergency bypass line, pressure regulation (if required), and a discharge line. Meter run piping and components would be located outside the building. Electrical power would be provided for cooling, lighting, ventilation, and control equipment, and a satellite dish would be installed for Supervisory Control and Data Acquisition (SCADA). Telephone service at the M&R station would be required for voice communications and SCADA backup.

In most cases, the M&R station sites would be located close to the actual intersection of the proposed pipeline with the interstate or intrastate pipeline. A total of about 1.7 miles of 10- and 16-inch-diameter interconnecting pipeline would be required for the Bridgeline/ANR Pipeline Company (ANR) M&R facility, the Texas Eastern Transmission Corporation (TETCO) M&R facility, and the ANR M&R facility.

MLVs segment the pipeline for safety, operating, and maintenance purposes. MLVs would be installed in accordance with U.S. Department of Transportation (DOT) safety requirements based on area population classifications. Creole Trail would install MLVs near roads to facilitate access, but would avoid locations near populated areas to minimize the impacts of blowdown noise and the risk of vandalism. Two of the eight proposed MLV sites would also include pig launcher or receiver assemblies. MLV sites would be fenced and have permanent all-weather access roads. Each section of the pipeline between MLVs would have a blowdown MLV with capacity sufficient to allow evacuation of the gas as rapidly as practicable. Some MLVs may be capable of being remotely monitored and controlled from a central facility via a SCADA system.

A pig launcher would be installed at the beginning of Segment 2 at the LNG terminal at MP 0.0. A pig receiver would be installed at the terminus of Segment 3 (MP 91.5). The pigging facilities would allow monitoring of the pipeline using internal inspection tools.

TABLE 2.1.4-1 **Aboveground Facilities Associated with the Creole Trail Project**		
Pipeline Segment/ Facility	Milepost	Parish
SEGMENT 2		
Meter and Regulation (M&R) Stations		
Bridgeline Holdings, L.P. (Louisiana Resources Company) M&R	0.0	Cameron Parish
ANR Pipeline Company (ANR) M&R	0.0	Cameron Parish
Mainline Block Valves (MLV)		
MLV 1	0.0	Cameron Parish
MLV 2	21.8	Calcasieu Parish
Pig Launcher and Receiver		
Pig launcher	0.0	Cameron Parish
SEGMENT 3		
M&R Stations		
Sabine Pipeline Company M&R	0.0	Calcasieu Parish
Targa Louisiana Intrastate L.L.C. M&R	9.8	Calcasieu Parish
Varibus L.L.C. M&R	21.7	Calcasieu Parish
Gulf South Pipeline Company, L.P. M&R	22.8	Calcasieu Parish
Transcontinental Gas Pipe Line Corporation (Transco) M&R	32.0	Beauregard Parish
Trunkline Gas Pipeline Company (TGC) M&R	32.0	Beauregard Parish
Texas Eastern Transmission Corporation (TETCO) M&R	32.7	Beauregard Parish
Tennessee Gas Pipeline M&R	50.4	Allen Parish
TETCO Egan M&R	70.8	Acadia Parish
Texas Gas Transmission Corporation M&R	70.8	Acadia Parish
ANR M&R	71.7	Acadia Parish
Florida Gas Transmission Company M&R	74.1	Acadia Parish
Transco M&R	79.4	Acadia Parish
Columbia Gulf Transmission Company M&R	91.5	Acadia Parish
Cypress Gas Pipeline, L.L.C. M&R	91.5	Acadia Parish
MLVs		
MLV 1	8.6	Calcasieu Parish
MLV 2	25.3	Beauregard Parish
MLV 3	43.8	Allen Parish
MLV 4	63.6	Jefferson Davis Parish
MLV 5	79.4	Acadia Parish
MLV 6	91.5	Acadia Parish
Pig Launcher and Receiver		
Pig receiver	91.5	Acadia Parish

2.2 LAND REQUIREMENTS

A total of about 3,096.9 acres of land would be affected during construction of the Creole Trail Project as summarized in table 2.2-1. A detailed discussion of land requirements is presented in section 4.8.

TABLE 2.2-1 **Summary of Land Requirements Associated with the Creole Trail Pipeline Facilities**		
Facility	Land Affected During Construction (acres)	Land Affected During Operation (acres)
LNG Terminal		
On-land LNG Terminal Site [a]	315.4	123.7
Marine Basin and Tugboat Dock (Dredge Area) [b]	51.9	0.0[c]
LNG Terminal Subtotal	367.3	123.7
Pipeline and Associated Aboveground Facilities		
Pipeline Right-of-Way - Segments 2 and 3 [d]	2,369.9	1,066.5
Additional Temporary Workspaces	78.9	0.0
Aboveground Facilities [e]	7.6	12.1
Access Roads	48.9	14.4
Wareyards	224.3	0.0
Pipeline and Associated Aboveground Facilities Subtotal	2,729.6	1,093.0
Total	3,096.9	1,216.7

a Including the LNG storage tanks, piping, and vaporization; buildings; LNG marine berth/tugboat facility; roads and parking; meter facility; gas turbine generators facility; and temporary construction work areas.

b Consists of the open water area outside of LNG terminal boundary that would be dredged for construction of the marine facilities.

c A total of 49.8 acres of land would be converted to open water for marine facilities. This acreage is included in the on-land operations acreage to reflect the land requirements based on currently existing land type.

d Based on construction rights-of-way requested by Creole Trail, which vary between 135 feet in wetland and upland areas and 150 feet in agricultural areas. Operation acreage is based on a 75-foot-wide permanent right-of-way in all areas.

e Based on area that would be constructed and operated outside of the proposed pipeline construction rights-of-way and additional temporary workspaces. Some aboveground facilities would be constructed entirely within these areas already dedicated to the pipeline construction and therefore would result in no additional impact.

2.2.1 LNG Terminal Facilities

The LNG terminal would be located on a 771.6-acre tract of land under lease to Creole Trail. Construction activities would affect a total of 367.3 acres, of which about 51.9 acres would be open water. Following construction, 123.7 acres would be permanently occupied by the LNG terminal facilities, including the marine basin, tugboat facility, LNG storage tanks, processing equipment, metering facilities, gas turbine generator, permanent roads, and buildings. Of the 123.7 acres, about 49.8 acres would be permanently converted from land to open water for the marine basin (49.4 acres) and tugboat facilities (0.4 acre). About 102.9 acres of wetlands would be affected during construction of the LNG terminal, of which about 34.5 acres would be permanently filled for operations of the terminal. The plot plan for the LNG terminal facilities is shown on figure 2.1.1-1.

2.2.2 Pipeline and Associated Aboveground Facilities

Construction of the pipeline facilities (i.e., Segments 2 and 3, and interconnecting pipelines) would disturb a total of 2,729.6 acres of land, including the pipeline construction rights-of-way, temporary extra workspace, wareyards (i.e., pipe storage and contractor yards), aboveground facilities, and access roads. Of this total, 2,369.9 acres would be disturbed by the pipeline construction rights-of-way, 78.9 acres would be disturbed by temporary extra workspace, 224.3 acres would be disturbed by wareyards, 7.6 acres would be disturbed by aboveground facilities (beyond the limits of the construction rights-of-way for the pipelines), and 48.9 acres would be disturbed by access roads.

Approximately 1,093.0 acres of the area used for construction would be required for operation of the pipeline facilities. Of this total, 1,066.5 acres would be for the permanent rights-of-way, 12.1 acres would be for the aboveground facilities, and 14.4 acres of permanent access roads or temporary access roads that would be permanently modified by grading. The remaining 1,636.6 acres would be allowed to revert to pre-construction use.

Creole Trail proposes to use a 135-foot-wide construction right-of-way along the majority of Segments 2 and 3, including in wetlands, to accommodate construction of the dual 42-inch-diameter pipelines (see section 4.4.2 for further discussion of the right-of-way width in wetlands). On agricultural lands, where additional topsoil segregation would be necessary, Creole Trail proposes to use a 150-foot-wide construction right-of-way. Following construction, Creole Trail proposes to retain a 75-foot-wide permanent right-of-way along Segments 2 and 3 for operation and maintenance of the dual pipelines. Proposed right-of-way configurations for Segments 2 and 3 are shown on figure 2.2.2-1.

Creole Trail proposes 75-foot-wide construction rights-of-way and 50-foot-wide permanent rights-of-way for the interconnecting pipelines at the Bridgeline/ANR, TETCO, and ANR M&R facilities.

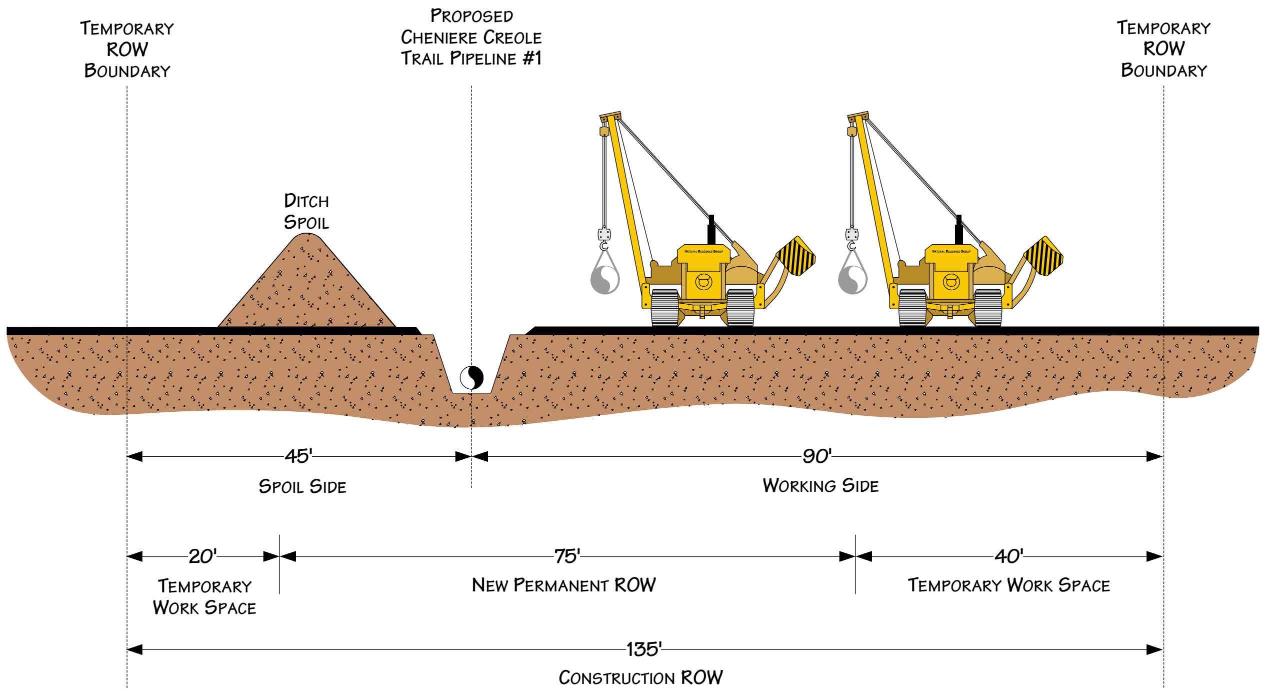
As noted previously, approximately 1.0 mile (4 percent) of Segment 2 and approximately 60.7 miles (66 percent) of Segment 3 would parallel existing pipeline, road, or utility rights-of-way (see section 4.8.1.2 for further information regarding where the proposed pipelines would parallel existing rights-of-way). The remaining 24.3 miles (96 percent) of Segment 2 and 30.8 miles (34 percent) of Segment 3 would be constructed on newly created right-of-way. Where the proposed pipelines would be constructed adjacent to existing pipelines, Creole Trail would typically install its nearest proposed pipeline 50 feet from the existing pipeline. Creole Trail would attempt to overlap 20 feet of its temporary construction right-of-way with the existing pipeline's permanent easement where such an overlap would still allow for the 50-foot separation between the proposed and existing pipelines.

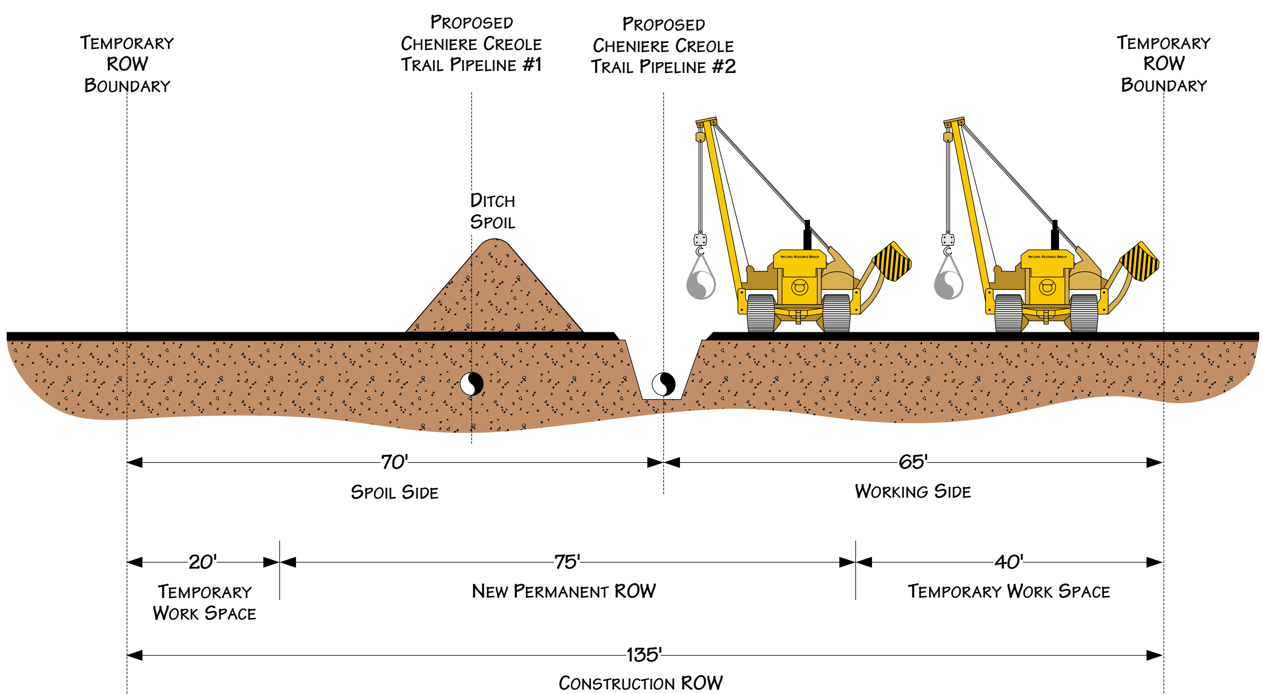
2.3 CONSTRUCTION PROCEDURES

This section describes the general procedures proposed by Creole Trail for construction of the LNG terminal and pipeline facilities. Refer to section 4.0 for more detailed discussions of proposed construction, mitigation, and restoration procedures as well as additional measures that we are recommending to mitigate environmental impacts.

The proposed LNG terminal and natural gas pipelines would be designed, constructed, operated, and maintained in accordance with federal safety standards that are intended to ensure adequate protection for the public and to prevent LNG and natural gas pipeline accidents or failures.

Under the provisions of the Natural Gas Pipeline Safety Act of 1968, as amended, Creole Trail would design, construct, operate, and maintain the LNG terminal facilities in accordance with the DOT's *Liquefied Natural Gas Facilities: Federal Safety Standards* (49 CFR 193). The facilities would also meet the National Fire Protection Association (NFPA) *Standards for the Production, Storage, and Handling of LNG* (NFPA 59A). These standards specify siting, design, construction, equipment, and fire protection requirements for new LNG facilities. The ship unloading facilities and any appurtenances located between the LNG ships and the last valve immediately before the LNG storage tank would comply with applicable sections of the Coast Guard regulations in *Waterfront Facilities Handling Liquefied Natural Gas* (33 CFR 127) and Executive Order 10173.





For environmental review purposes only.

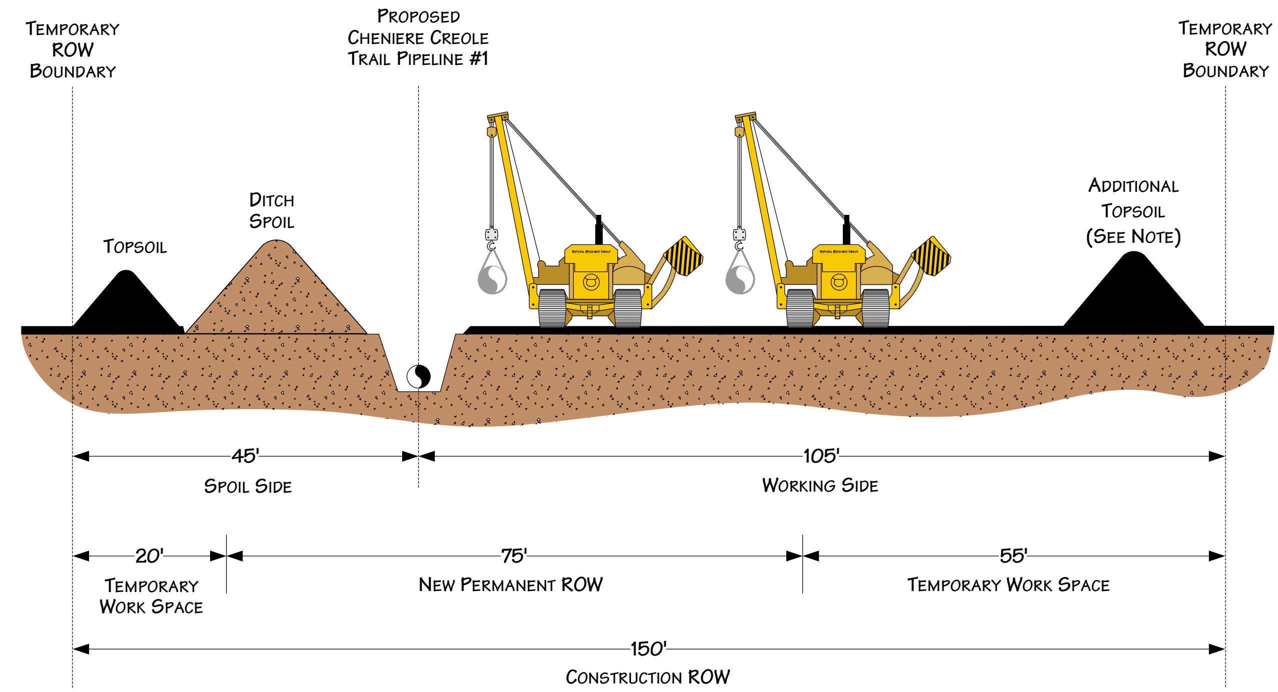
Figure 2.2.2-1

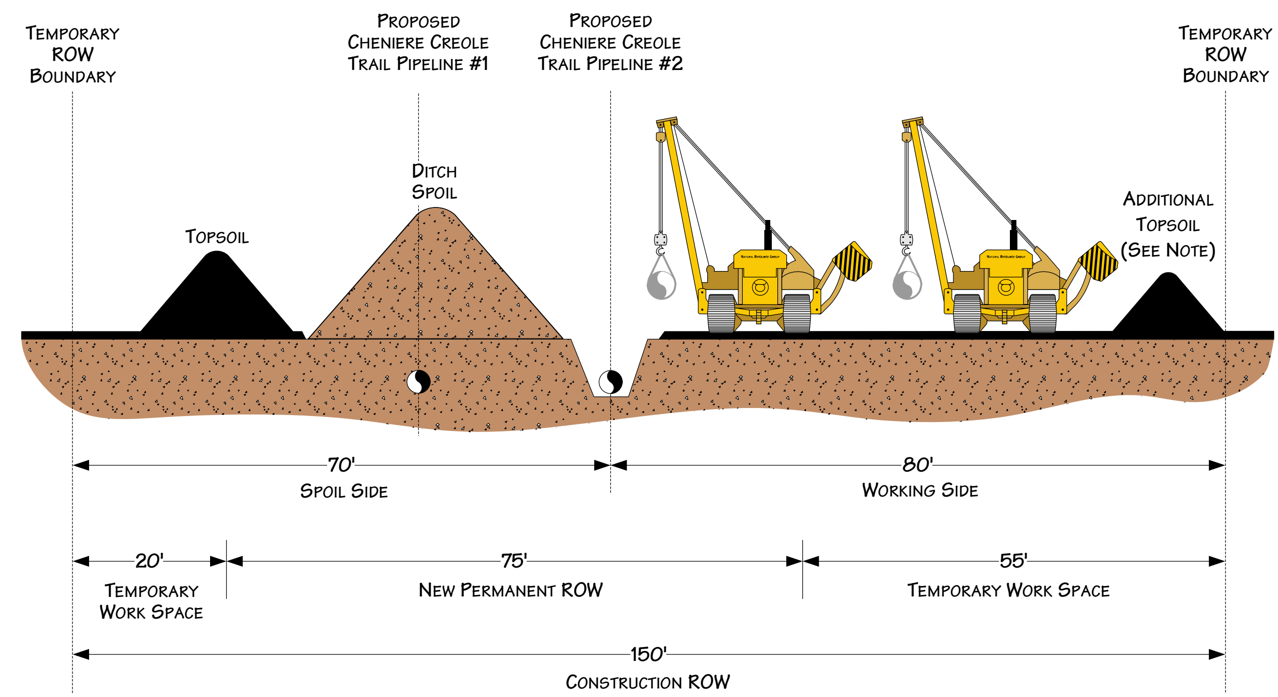
Creole Trail Project

Typical Construction Right-of-Way Cross Section for Upland Construction

Segments 2 and 3

Sheet 1 of 4





Note: Topsoil to be placed on edge of construction ROW to prevent moving topsoil twice
Topsoil to be left in place to maintain segregation from irrigated fields.

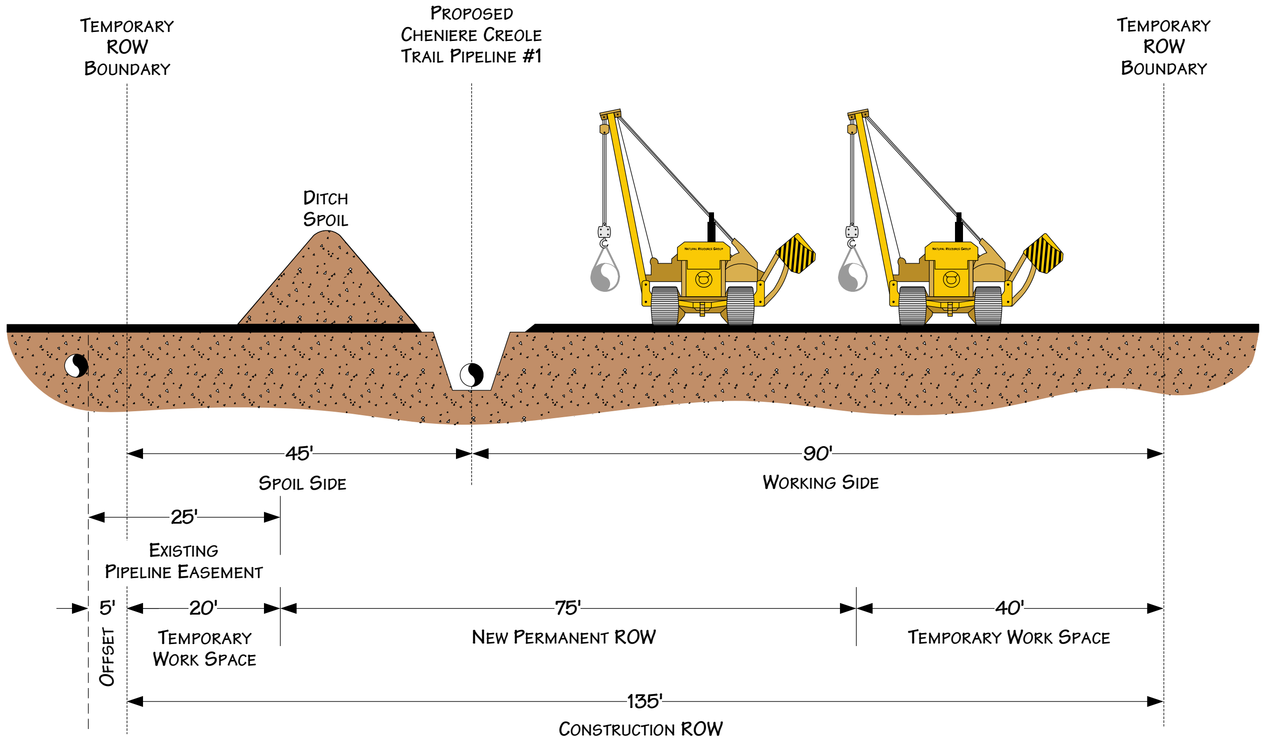
For environmental review purposes only.

Figure 2.2.2-1

Creole Trail Project

Typical Construction Right-of-Way Cross Section for Agricultural Construction Segments 2 and 3

Sheet 2 of 4



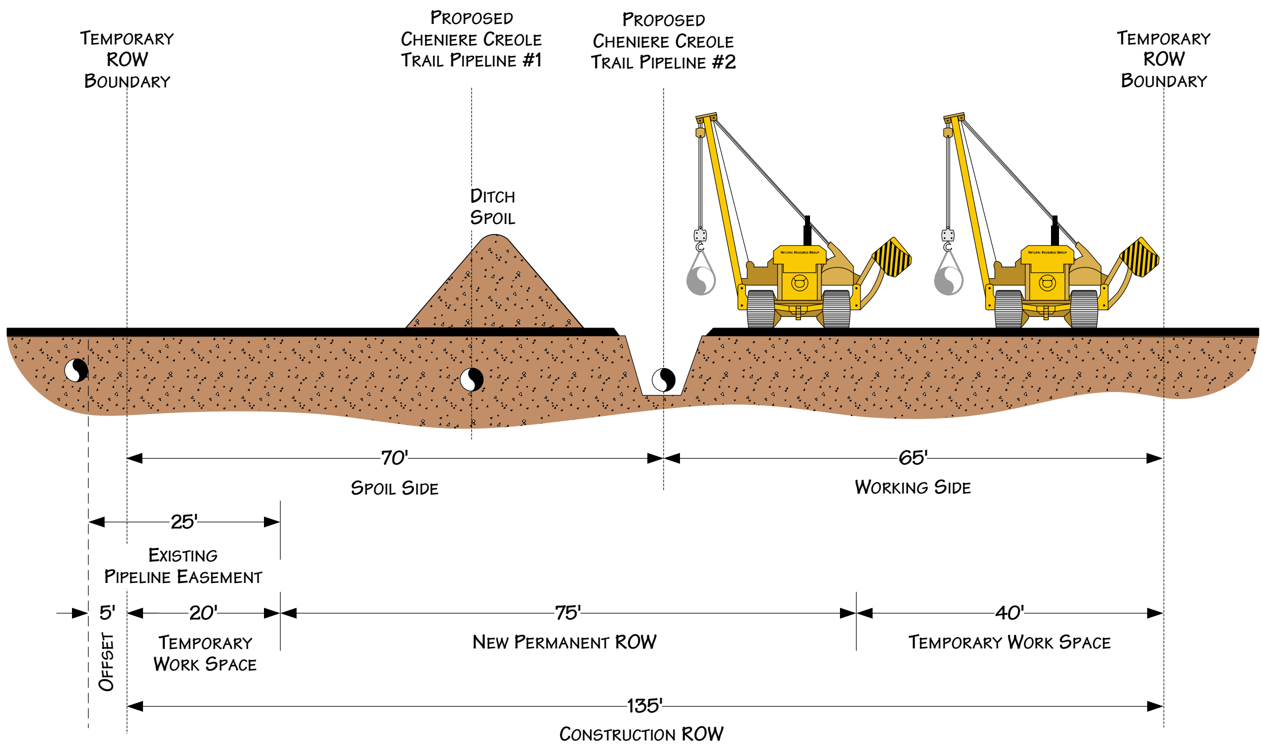


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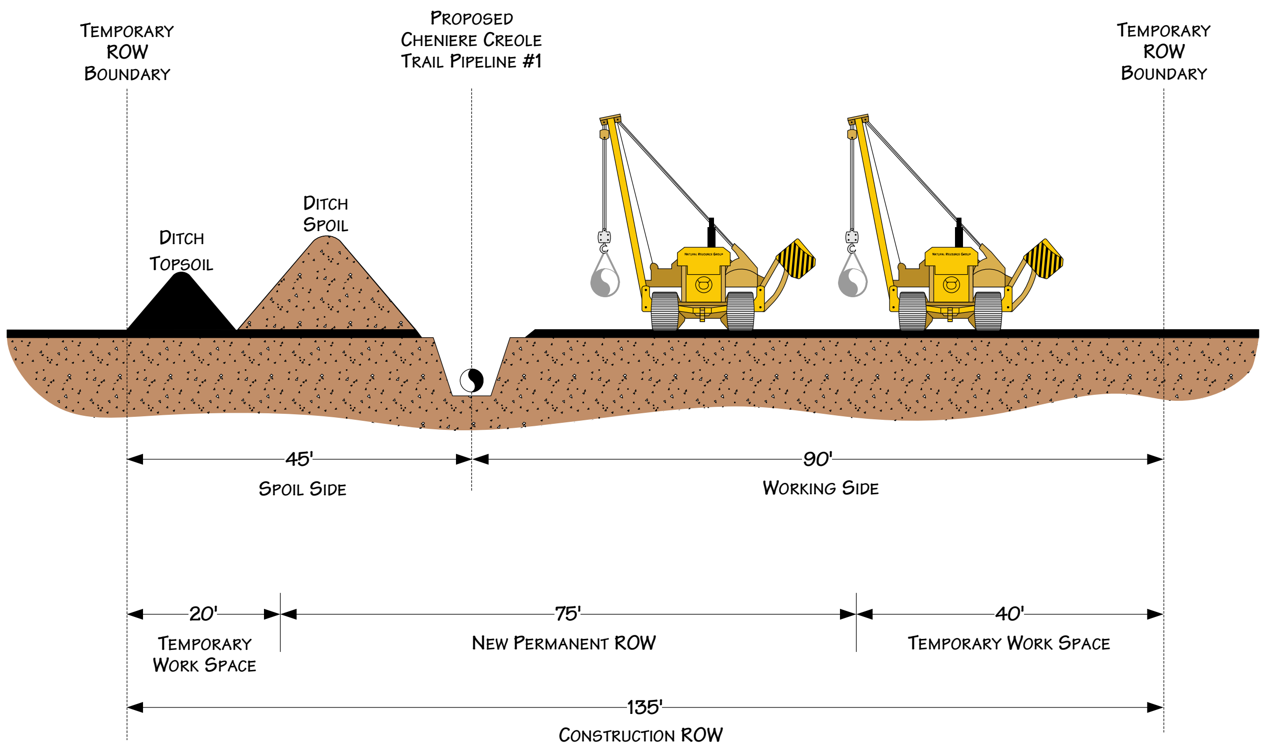
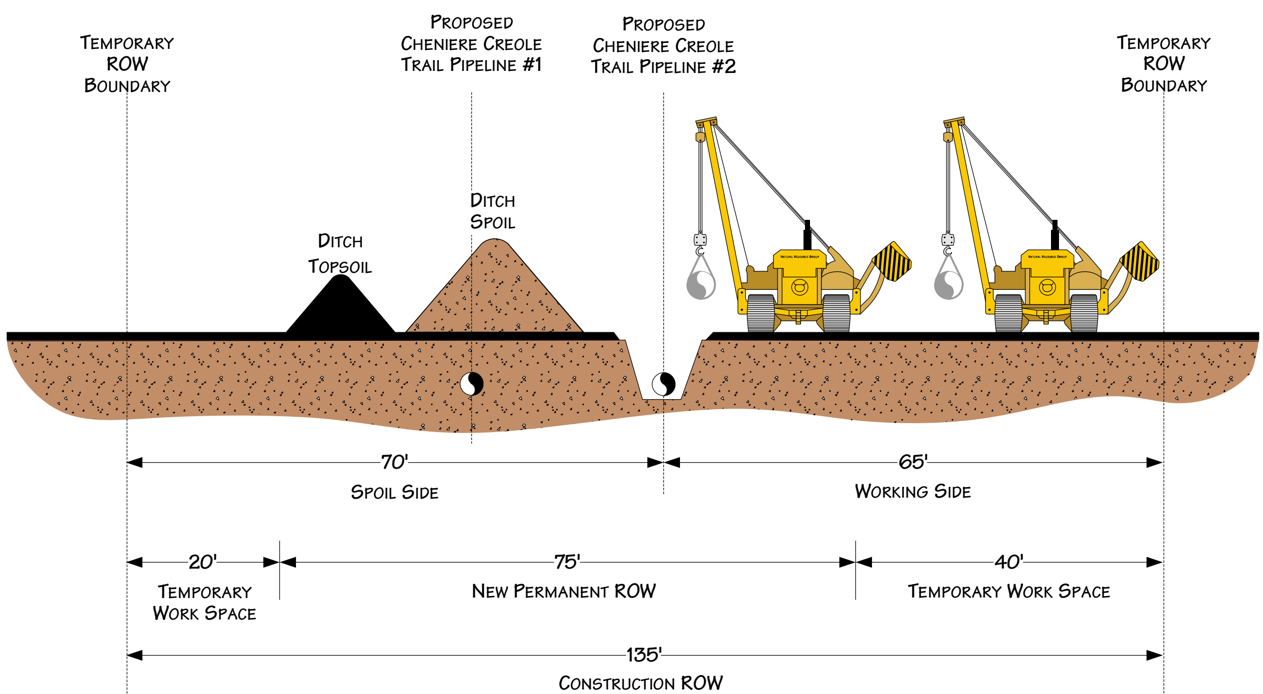
Figure 2.2.2-1

Creole Trail Project

Typical Construction Right-of-Way Cross Section for Paralleling Existing Pipeline Segments 2 and 3

Sheet 3 of 4





For environmental review purposes only.

Figure 2.2.2-1
Creole Trail Project
Typical Construction Right-of-Way Cross Section for Wetlands
Segments 2 and 3

Sheet 4 of 4

The proposed pipeline facilities would be designed, constructed, operated, and maintained in accordance with DOT regulations in *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards* (49 CFR 192). Among other design standards these regulations specify pipeline material selection; minimum design requirements; protection from internal, external, and atmospheric corrosion; and qualification procedures for welders and operations personnel. In addition, Creole Trail would comply with the siting and maintenance requirements in 18 CFR 380.15 and other applicable federal and state regulations.

Creole Trail would construct the proposed LNG terminal facilities and pipeline facilities in accordance with our *Upland Erosion Control, Revegetation and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures) with certain approved variances. Proposed variances are discussed in sections 4.2, 4.3.2, and 4.4.2. See the FERC's Internet website (http://www.ferc.gov) for copies of our Plan and Procedures. Creole Trail has committed to also preparing project-specific *Spill Prevention, Containment and Countermeasure Plans* (SPCC Plans) for the LNG terminal and for the proposed pipeline facilities. The SPCC Plans would address potential spills of fuels, lubricants, and other hazardous materials and describe spill prevention practices, spill handling and emergency notification procedures, and training requirements. Creole Trail has committed to filing its SPCC Plans with the Commission prior to construction as part of its Construction Implementation Plan.

2.3.1 LNG Terminal Facilities

2.3.1.1 Site Preparation

Before beginning construction, clearing, grubbing, and backfill activities would take place to establish temporary construction facilities. The entire construction site would be divided into areas required by the major contractors or subcontractors for their construction support offices, warehousing, equipment storage, temporary access roads, parking lots, material laydown areas, and a concrete batch plant.

To prepare for the construction of the terminal components, the site would be stripped of vegetation and cut-and-fill would be conducted to rough grade. Site grading would include finish grading only as required for roadways, culverts, ditches, concrete LNG spill collecting troughs, and similar structures. Access roads to the storage tank and process areas would be constructed. Soil preparation in and around the area of the LNG storage tanks would follow the rough grading activities. Other site preparation activities would include cutting necessary drainage ditches, installing perimeter fencing and temporary construction fencing, and cut-and-fill for roads.

The majority of the site would be retained at existing elevations. Certain areas would be built up to ensure that equipment is above flood levels as discussed in section 4.1.3.5.

The primary critical path activity for the LNG terminal would be the construction of the LNG storage tanks, which would take the longest to complete. Therefore, site preparation and soil stabilization activities would initially be concentrated in the areas required for tank construction. Once the tank area has been fully prepared, sitework activities would be conducted on remaining areas.

Construction traffic would access the site from State Highway 27/82. A 30-foot-wide, two-lane, asphalt access road would be constructed from the highway into the site and would run parallel to the eastern property boundary.

2.3.1.2 Site Fill

The LNG process area would be filled to a level approximately 3 feet above the existing ground surface to allow for settling over time. Creole Trail expects that the total settlement as a result of placing this fill would be approximately 17 inches, with about 25 percent of the predicted settlement occurring during fill placement, and the balance of the settlement occurring at a decreasing rate over a period of about 30 to 50 years. Creole Trail would identify settlement observation points prior to fill placement. The settlement of these points would be monitored at various times during and following fill placement to verify the predicted amount of settlement.

Approximately 450,000 yd^3 of imported clay and 65,000 yd^3 of imported gravel and crushed stone would be used to raise, level, and finish the process area, utilities areas, roads, and other areas of the terminal. Approximately 765,000 yd^3 of existing soils (10 to 12 feet deep) would be improved in place in the LNG storage tank area by mixing the soils with lime and fly ash. Currently, there are no regulations or permits necessary to mix the fly ash or lime into the soil. However, if Creole Trail were to place this material in a wetland or in the terminal property at elevations 5 feet below MLG, Creole Trail would be required to obtain the necessary permits to fill from the COE and the LADNR Coastal Management Division.

About 160,000 yd^3 of the improved soil would be used to construct the LNG tank impoundment dikes. The dike construction would entail installation of wick drains beneath the dike, extension of the wick drains some distance beyond the edge of the dike, placement of a sand blanket for access and drainage of the wick drains, and staged placement of compacted fill. Construction of the dike would allow for settlement to result in a final dike height of about 15 feet above the existing grade. The area of the LNG tank impoundments would use about 160,000 yd^3 of imported clay for additional dike building, 310,000 yd^3 of imported sand for wick draining, and about 60,000 yd^3 of imported gravel and crushed stone for surfacing.

The clay fill and sand are readily available and would be obtained from nearby suppliers in the general project area. Gravel and crushed stone surfacing is routinely imported into the Lake Charles and Cameron areas by barge.

2.3.1.3 Marine Facilities

Marine Dredging

The Calcasieu Ship Channel provides adequate clearance for LNG ships that would be anticipated to call on the proposed LNG terminal. Maintenance dredging takes place immediately outside the entrance jetties, but no maintenance dredging has been required between Calcasieu Lake and the jetties because the combined flows from the river and the lake have heavily scoured the channel. The combined flows of the river and lake have created a deep hole immediately in front of the proposed LNG marine basin. This “Cameron Hole” is almost 90 feet deep, and the depth is 50 feet or more on either side of the hole for most of the width of the channel.

Prior to dredging of the marine basin, about 51,100 yd^3 of surface material in the landward portion of the basin area would be mechanically excavated to an elevation of about 4 feet above MLG. The marine basin would then be dredged to a depth of 45 feet below MLG, with an allowable overdepth of 2 additional feet. The basin would be dredged roughly perpendicular to the Calcasieu Ship Channel. The width of the navigable area within the berth would be about 1,700 feet at the entrance. The width would decrease to 1,000 feet beginning about halfway into the berth and to about 700 feet at the end. The end of the basin would be about 2,000 feet from the near bottom edge of the ship channel. Creole Trail estimates that about 4.0 million yd^3 of dredge material (including allowable overdepth) would be removed to achieve these dimensions. Dredging would be conducted using hydraulic cutterhead dredges.

Dredging would also be conducted to construct the tugboat dock. The tugboat dock would be dredged to a depth of 25 feet below MLG with a 2-foot allowable overdepth. Construction of the tugboat dock would involve about 79,400 yd^3 of dredge material (including allowable overdepth).

In total, construction of the marine basin and tugboat dock would require dredging about 4.1 million yd^3 of mostly virgin clays. Louisiana coastal use regulations (Louisiana Revised Statutes 49:214.30(H)(1) and 49:214.32(F)(1)) require that dredged materials in excess of 500,000 yd^3 be put to beneficial use. (In comments on the draft EIS, the LADWF noted that under Louisiana Revised Statute 49:214.30(H)(2), even activities requiring dredging of 25,000 yd^3 may be required to put the dredged material to beneficial use.) To meet this requirement, Creole Trail has been working with federal and state agencies, local officials, landowners, and other appropriate entities to identify and evaluate potential DMPAs. This effort has resulted in the identification of six alternatives, which are described in section 3.5 of this EIS. Creole Trail stated in its application that its preference would be to develop a single plan that would combine beneficial use of the dredged material from the LNG terminal, replacement of the COE DMPA "O," and mitigation for wetland impacts resulting from the project. As noted previously, the Port of Lakes Charles filed comments citing recent legislation in which portions of DMPA "O" are to be exchanged for another property referred to as Area M. While the final beneficial use plan is yet to be determined, it might include pumping the dredged material via a dredged material pipeline to the selected DMPA site. Creole Trail is developing a comprehensive ARMP that will include its beneficial use plan. Once completed, Creole Trail will submit its ARMP to the COE and other resource and regulatory agencies and file a copy with the FERC.

Ship Unloading Facilities

The jetty facilities would be constructed after excavation and dredging of the marine basin are completed. Work on the jetty platforms, approach trestles, and pipe supports would begin first because they must be constructed prior to installation of certain equipment and pipeline. Piles would be driven for these structures, followed by construction of the superstructure. This would involve placing concrete, erecting precast concrete elements, and erecting structural steel components.

After the piles have been installed for the jetty platforms, approach trestles, and supports, pile-driving equipment and crews would install piles for mooring and breasting structures. Concrete placement for other structures would follow completion of the jetty platform.

Pilings for marine structures would be 42-inch-diameter, tubular steel piles with a reinforced concrete infill for the top 10 feet. All steel pilings would be coated with coal tar epoxy from a point 15 feet below the mud line or ground line to the soffit of the pile cap. Concrete-filled high-density polyethylene pipe sleeves would be required for all pilings under the pipe trestle. Pile driving would be primarily conducted from the water using barge-supported equipment. Landside piling may be installed using land-based equipment.

The primary materials used in the jetty construction would be steel-pipe pilings, concrete, and reinforcing steel for concrete. Creole Trail anticipates that the steel-pipe piles would be fabricated off site and shipped to the site by barge. The reinforcing steel would likely be fabricated off site and trucked to the site. The concrete would be produced in the batch plant within the terminal site. Equipment required for the construction of the jetty facilities includes barges to support construction equipment and transport materials. Tugboats would be used to move these barges.

The jetty platforms would be constructed with a maximum nominal elevation of 27.0 feet above MLG. The platforms would support the following fixed equipment:

- substation building;
- marine unloading arms and vapor return arm;
- gangway tower/crane;
- LNG and utility piping;
- fire suppression equipment;
- elevated access platforms; and
- elevated firewater monitors.

Tugboat Dock

The tugboat facility would accommodate three tugs and two line boats. Davits would be provided for the line boats, and a hydraulic crane would be provided for loading and unloading materials and equipment. The tugboat dock would be equipped with energy absorbing fenders and mooring cleats. The bulkhead for the tugboat dock would be constructed using steel sheet piling with a concrete cap. Davit and crane foundations would consist of driven steel pipe piles or precast concrete piles and cast-in-place concrete caps. The area behind the bulkhead would be paved to support vehicular traffic. The tugboat dock would be constructed prior to tank construction. The tugs would be used to maneuver barges delivering construction materials, including piles, and equipment to the terminal site.

2.3.1.4 LNG Storage Facilities

Tank Construction

Construction of the LNG storage tanks would be the most time-consuming element in the development of the Creole Trail Project and would essentially span the majority of the estimated 36 to 42 month construction schedule for the LNG terminal. Each tank would be constructed on a reinforced concrete slab supported by precast piles. This design would be based on site-specific soil conditions as determined by geotechnical analysis. Piles for the LNG tanks would be about 110 to 150 feet deep. Figure 2.3.1-1 shows the basic construction sequence for the LNG storage tanks.

Concrete Batch Plant

A temporary concrete batch plant would be on site within the temporary construction area for about 16 months. The batch plant would be used by both the primary contractor and the LNG tank subcontractor.

Construction of Other Facilities

Construction of the foundations, pipe racks, and terminal buildings together with installation of major mechanical equipment, process and utility piping, and electrical and instrumentation would occur once tank construction is underway. These facilities would be completed and pre-commissioned prior to completion of the LNG tanks.

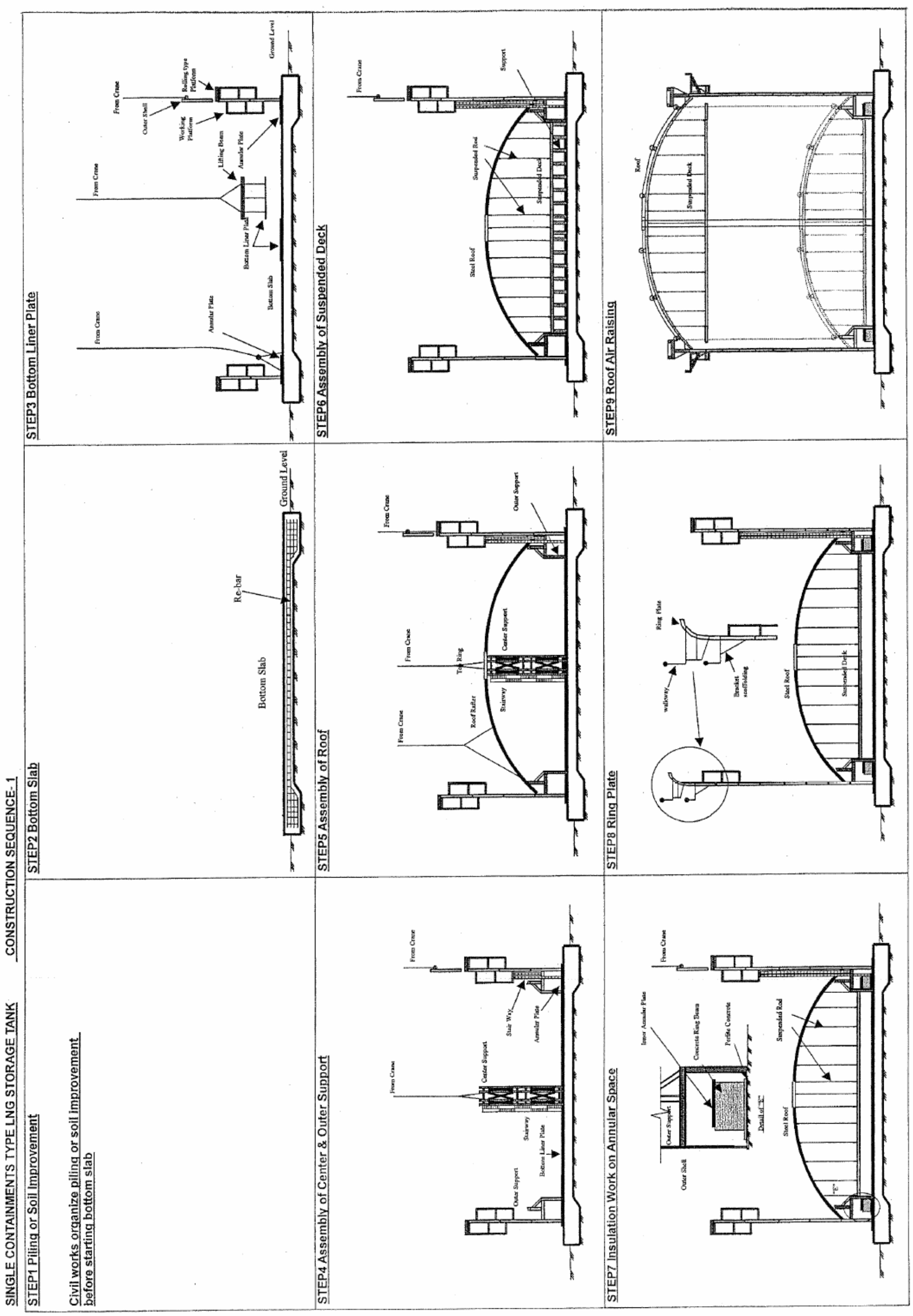


Figure 2.3.1-1, LNG Storage Tank Construction Sequence, 1 of 2

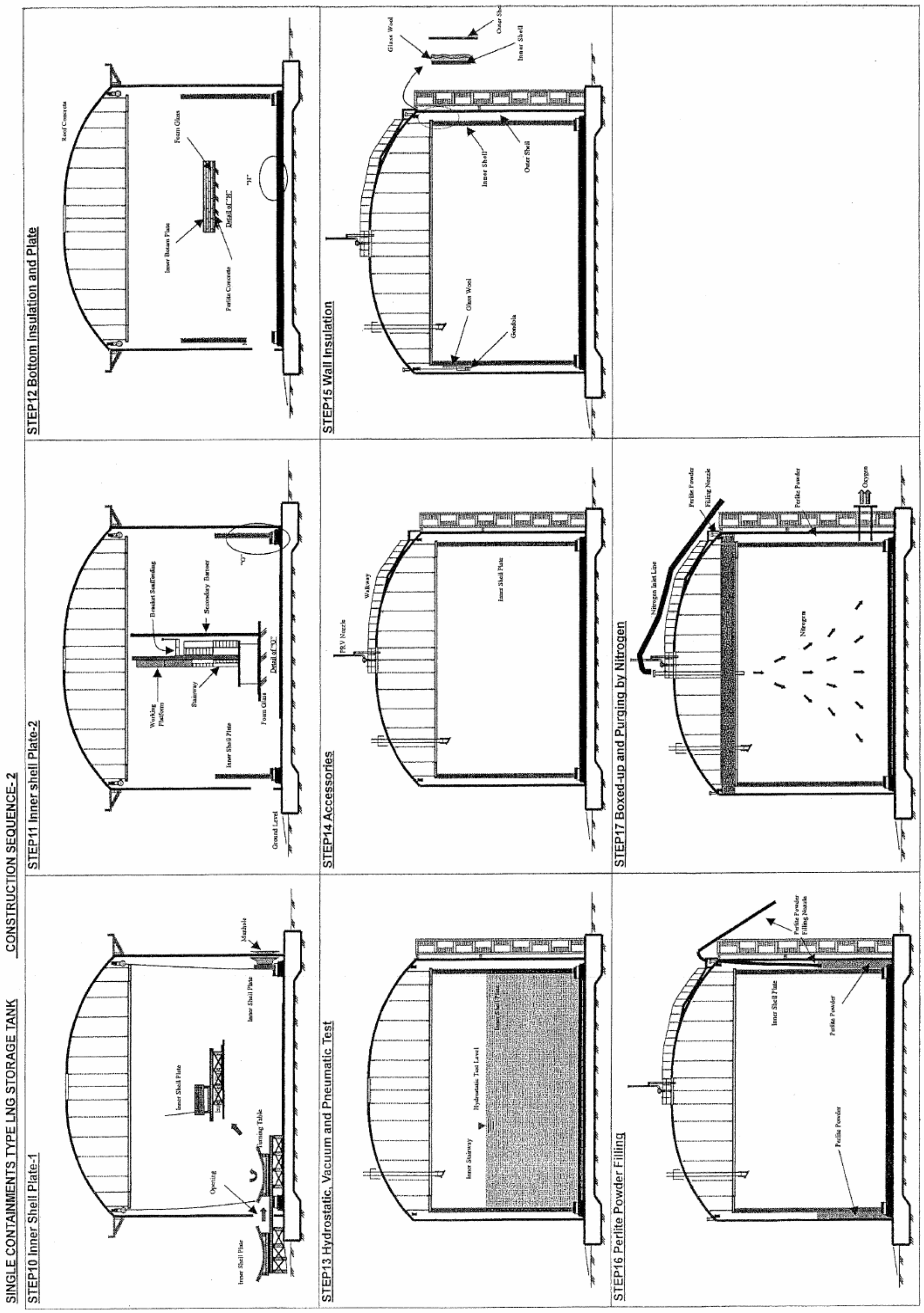


Figure 2.3.1-1, LNG Storage Tank Construction Sequence, 2 of 2

Buildings, process equipment, and pipe racks would be constructed on pile-supported foundations. Pilings for process areas would primarily consist of precast concrete piles. These piles would be driven to depths of 60 to 90 feet below final ground surface. Several thousand piles would be required for the process areas, tanks, and pipe racks. Piles would be delivered to the site's tugboat dock by barge. After piles are installed, the work in the process area and pipe racks would proceed. The pipe racks would be completed first, followed by the process and utility areas. As the piping installation, static hydrotesting, pneumatic testing, and equipment installation is completed, the remaining painting and insulation work would be completed.

Wherever practical, large equipment would arrive at the site in preassembled packages that would facilitate final hookup and testing. Some larger equipment such as the SCVs and compressors would come in several subassemblies and would be assembled and interconnected on their foundations. Larger equipment would be transported to the site on barges, while other equipments would be delivered by truck.

As noted previously, Cameron Parish Water Works would construct a nonjurisdictional water line to provide potable water for the LNG terminal. The 2,400-foot-long, 10-inch-diameter water line would be constructed from an existing water line belonging to Cameron Parish Water Works, District 10, south of the proposed LNG terminal entrance and routed along the east side of the terminal main entrance road. Construction of the water line by Cameron Parish Water Works would be in accordance with applicable state and local regulations and would include an appropriate level of environmental review. The permanent water line would not be constructed for a few years because it would not be needed until the terminal is close to being operational. Cameron Parish Water Works would be responsible for acquiring all applicable permits and approvals for the water line and has not provided Creole Trail with information about its final alignment, affected resources, land requirements, and construction procedures. However, we anticipate that typical pipeline construction methods would be used to install the water line, and that the land affected within the LNG terminal site would be primarily coastal prairie. It is also likely that Cameron Parish Water Works would require its contractor to implement best management practices to minimize and mitigate environmental impacts in accordance with applicable permits and regulations.

Flooding

The Federal Emergency Management Agency (FEMA) indicates that the 100-year base flood elevation is 9.8 to 10.8 feet above MLG at the project site. Improved areas of the facility would be graded to 7 to 8 feet above MLG. The bottoms of platforms for critical and LNG-containing equipment would be installed at about 14 feet above MLG. The LNG tank impoundment area would be enclosed by dikes to about 21 feet above MLG with the sloped impoundment floor at elevations from 4 to 2 feet above MLG. See section 4.1.3.5 for additional information related to flooding due to hurricane storm surge.

Final Grading and Site Restoration

Areas of the property disturbed by construction of the proposed facilities would be stabilized with temporary erosion controls until construction is completed. After installation of the equipment and piping is completed, final road paving, finish site grading, landscaping, and cleanup would be done. Permanent access roads would have gravel or asphalt surfaces. Within the terminal, some ground surfaces would be covered with gravel, asphalt, or concrete. Other areas would be stabilized, seeded, and mulched to establish vegetative cover.

2.3.2 Pipelines and Associated Aboveground Facilities

Construction of the natural gas pipelines would primarily involve the standard cross-country construction techniques described in section 2.3.2.1. Creole Trail would construct the project in four construction spreads as summarized in table 2.3.2-1.

TABLE 2.3.2-1

Pipeline Construction Spreads

Milepost to Milepost	Construction Spread
Segment 2	
0.0-25.3	Calcasieu Lake Water spread
Segment 3	
0.0-26.5	Upland and Agriculture spread
26.5-60.4	Upland and Agriculture spread
60.4-91.5	Upland and Agriculture spread

Special construction techniques would be used when constructing the pipeline across wetlands, waterbodies, roads and railroads, foreign pipelines and electric transmission lines, agricultural areas, and residential and commercial areas. These special construction techniques are described in section 2.3.2.2. Construction of the aboveground facilities associated with the pipeline is described in section 2.3.2.3.

Pipeline construction workers would use existing highways and roads that intersect the right-of-way for construction access. Some of the existing access roads may require modifications or improvements to accommodate the weight and dimensions of construction equipment and materials. As described in section 4.8.1.2, Creole Trail would construct 18 new access roads for permanent access to aboveground facilities.

Creole Trail has identified seven wareyards that would be used for pipe storage and/or contractor yards. The majority of these yards are existing developed sites that would not require additional construction or modification. Wareyards are described further in section 4.8.1.2.

In information filed after the occurrences of Hurricanes Katrina and Rita, Creole Trail confirmed that the hurricanes did not affect the availability of the proposed access roads and wareyards or result in the need for unanticipated improvements or modifications.

2.3.2.1 General Pipeline Construction Techniques

Figure 2.3.2-1 shows the typical steps of cross-country pipeline construction. Standard pipeline construction proceeds in the manner of an outdoor assembly line composed of specific activities that make up the linear construction sequence. These operations collectively include survey and staking of the right-of-way, clearing and grading, trenching, pipe stringing and bending, welding and coating, lowering-in and backfilling, hydrostatic testing, and cleanup. For the dual pipeline construction, Creole Trail anticipates that the contractor would use a sequence referred to as “laying the pipe ahead of the ditch,” in which the stringing, bending, and welding steps would precede trenching.

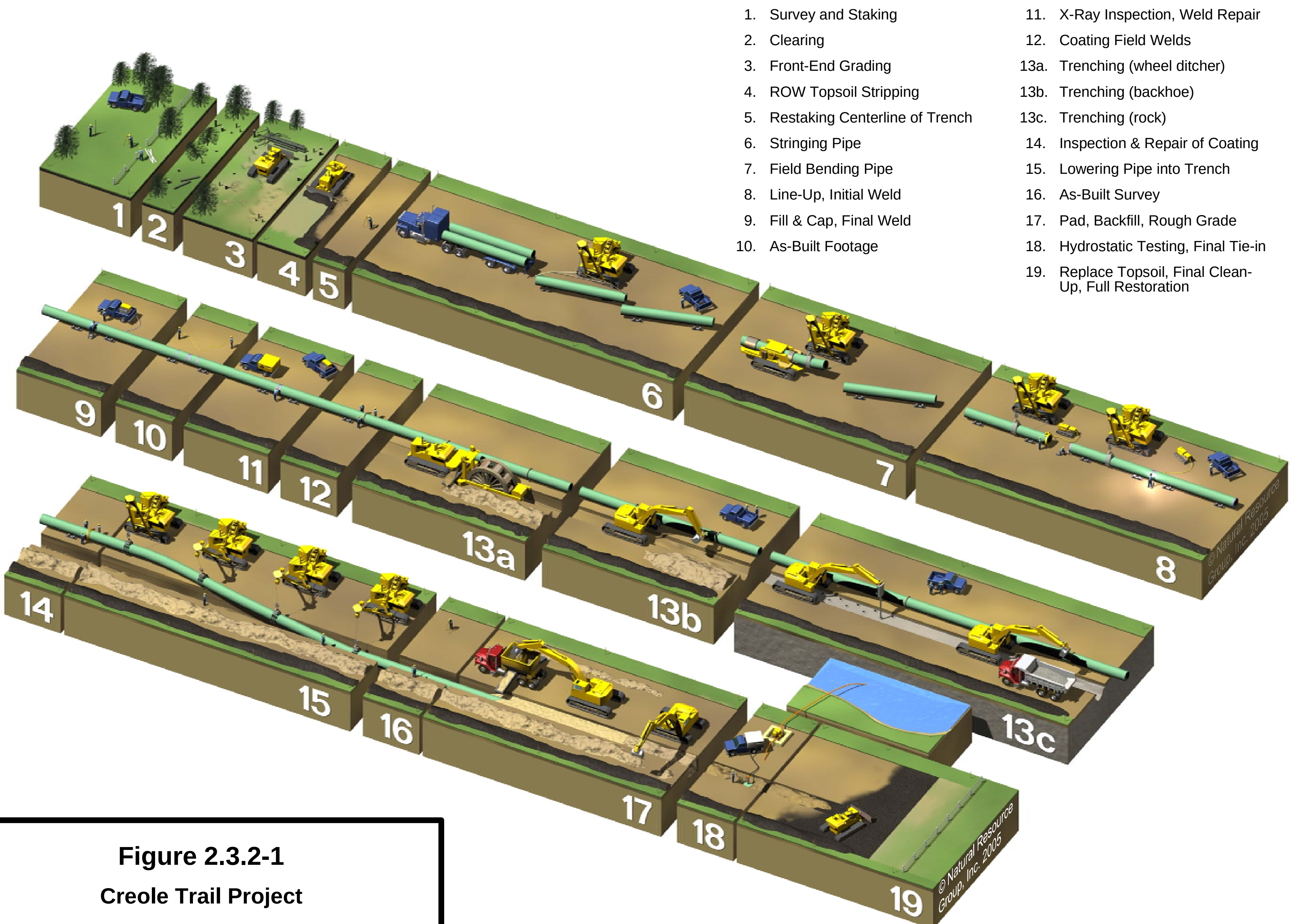


Figure 2.3.2-1

Creole Trail Project

Typical Pipeline Construction Sequence

Construction of the on-land dual pipelines would generally be as follows. First, clearing and grading would be conducted in a single pass for both of the dual pipelines within a given spread. Next, one pipeline would be constructed from stringing through backfill and rough cleanup. The second pipeline would then be constructed in a similar manner. Final cleanup and restoration would then occur simultaneously for both of the dual pipelines. Concurrent construction of the dual pipelines in a given spread would occur at locations that are typically installed by specialized crews. These areas include but are not necessarily limited to road/railroad crossings, foreign pipeline crossings, congested residential areas, larger waterbody crossings, and other bored crossings.

Survey and Staking

Before construction, Creole Trail crews would survey and stake the centerline and exterior boundaries of the construction right-of-way. Drainage centerlines and elevations, highway and railroad crossings, and any temporary extra workspaces (e.g., laydown areas or at stream crossings) would also be staked. The exterior boundary stakes would mark the limit of approved disturbance areas and would be maintained throughout the construction period. Utility lines would be located and marked to prevent accidental damage during pipeline construction. Creole Trail would use the "Call Before You Dig" or "One Call" system to identify utility locations. If there is a question about utility locations, field instrumentation and test pits would be used to verify their locations.

Clearing and Grading

Creole Trail would clear the right-of-way of obstacles such as trees, brush, and logs. Trees to be saved would be marked before clearing begins. Timber would be stacked along the edge of the right-of-way or disposed of in accordance with landowner agreements or as specified by Creole Trail's construction inspectors. Brush might be piled at the edge of the right-of-way to provide filter strips or wildlife habitat. Trees and brush not used for other purposes would be disposed of in accordance with our Plan, applicable state and local regulations, and landowner agreements by chipping, burning, or at an approved landfill. Where necessary, fences would be cut and braced along the right-of-way and temporary gates would be installed to control livestock and limit public access. The right-of-way would then be graded where necessary to allow access and safe operation of construction equipment. Where applicable (e.g., residential and agricultural lands), conserved topsoil would be stockpiled along one side of the right-of-way, allowing the other side to be used for access, material transport, and pipe assembly. Creole Trail would install temporary erosion control measures immediately after initial disturbance of the soil.

Creole Trail stated that it might bury cleared materials within the construction right-of-way in upland areas other than agricultural lands or residential areas as approved by the Chief Inspector and/or Environmental Inspector (EI), and with landowner permission. Items V.A.6 and VII.A.4 of our Plan indicate that construction debris should be removed from construction work areas unless otherwise allowed or requested by the landowner or land managing agency. Burial of cleared materials within the construction right-of-way is not a preferred method of disposal because it could result in subsidence of the right-of-way over time due to decomposition of the construction debris. To avoid adverse impacts associated with burial of cleared materials within construction work areas, **we recommend that:**

- **Creole Trail limit burial of cleared materials or other construction debris (e.g., timber, slash, mats, garbage, drilling fluids, excess rock) within the construction work area to upland locations other than agricultural or residential land at which it has received explicit permission or requests from the landowner or land management agency as specified in our Plan. If this method of disposal is used, Creole Trail should monitor for subsidence at the applicable locations during its**

post-construction monitoring, and should correct for any subsidence that may occur due to decomposition of the buried construction debris.

In comments on the draft EIS, the COE and LADWF indicated that removal of debris from the construction area should include debris and other items remaining from Hurricane Rita. The agencies also commented that disposal of such debris should be coordinated with the LADEQ. FERC requirements pertaining to the removal and disposal of debris apply to any debris removed from the construction work areas for the purposes of the proposed project, which would include hurricane-related debris where it occurs in the construction work areas. Our Plan requires that construction debris be disposed of at approved disposal locations and in compliance with applicable regulatory requirements.

Trenching

A rotary trenching machine, track-mounted backhoe, or similar equipment would be used to excavate trenches to sufficient depths to provide a minimum 3-foot depth of cover over the pipelines. Due to the absence of consolidated bedrock near the surface, Creole Trail does not anticipate the need for blasting. Depending on soil conditions, the top of the trenches for each dual 42-inch-diameter pipeline would typically be 12 to 14 feet wide and the bottom of the trenches would typically be about 5 to 6 feet wide. In unstable and saturated soils, the trenches could be wider.

Spoil material excavated during trenching operations would be temporarily piled to one side of the right-of-way adjacent to the trench. In agricultural areas where topsoil stripping is required, the topsoil and subsoil would be stored in separate windrows or piles on the construction right-of-way and would not be allowed to mix. To accommodate the dual pipeline construction, the spoil for the second pipeline would be stored over and adjacent to the backfilled trench containing the first pipeline. Where the pipeline route is adjacent to an existing pipeline, the subsoil spoil would be placed on the same side of the trench as, but not directly over, the existing pipeline to keep working equipment off the operating pipeline.

Stringing and Bending

Individual joints of pipe would be strung along the right-of-way either prior to trenching (anticipated method) or adjacent to the excavated trench and arranged so that they would be accessible to construction personnel. This operation typically involves specially designed stringing trucks to deliver pipe from the pipe yard to the right-of-way. Small portable cranes and/or side-boom tractors would be used to unload the stringing trucks and place the pipe along the trench line. A mechanical pipe-bending machine would bend individual joints of pipe to the desired angle to accommodate changes in the natural ground contour or pipeline alignment. In certain areas, prefabricated fittings would be used where field bending is not practicable.

Welding and Coating

After stringing and bending are complete, pipe sections would be placed on temporary supports and the ends would be aligned and welded together. To ensure that the assembled pipe meets or exceeds the design strength requirements, Creole Trail would inspect all welds, both visually and radiographically (i.e., x-ray), and would make any necessary repairs. Pipe is typically delivered with a factory coating of fusion-bonded epoxy or similar material. Following weld inspection, the previously uncoated ends of the pipe at the welds would be epoxy coated. The coating on the completed pipe section would be inspected and any damaged areas repaired.

Lowering-in and Backfilling

After welding and coating are completed, the pipe would be lowered into the trench by side-boom tractors. Bladed equipment or a specially designed backfilling machine would be used to backfill the trench.

Hydrostatic Testing

After backfilling, Creole Trail would hydrostatically test the pipelines in accordance with DOT regulations to ensure that the system is capable of operating at the design pressure. The testing process involves filling a segment of the pipeline with water and maintaining a prescribed pressure for a specified amount of time. If a leak or break in the line were to occur during testing, Creole Trail would repair and retest that section of pipe until DOT specifications are met. Creole Trail would also conduct hydrostatic "pre-tests" on horizontal directional drill (HDD) sections prior to installing them.

Surface water used for testing would be withdrawn from various waterbodies along the route. Creole Trail has not yet identified specific discharge locations, but anticipates that in most cases the test water would be discharged to the same waterbody from which it was obtained. Withdrawal and discharge rates would be about 6,000 gpm. Test water may be transferred for re-use between test sections. Hydrostatic test water withdrawals and discharges would be conducted in accordance with the applicable permit conditions and our Procedures.

Cleanup

Typically, after the pipeline has been installed, backfilled, and successfully tested, the right-of-way, temporary extra workspaces, and other disturbed areas are regraded and restored as nearly as practicable to the original contour of the land. Topsoil is respread over areas from which it was originally removed and permanent soil stabilization (e.g., installation of permanent erosion controls) efforts begin. However, because a second pass of the construction equipment would be required for the sequential construction of the dual pipelines, Creole Trail proposes to defer final cleanup and revegetation on Segments 2 and 3 until both dual pipelines have been constructed. Creole Trail would conduct only rough cleanup following installation and backfill of the first dual pipeline and would install temporary erosion control measures (including temporary seeding). Final grading and restoration would be conducted after the installation and backfill of the second pipeline. Creole Trail estimates that the time between backfilling the first and second pipeline would average about 45 days and that the maximum period would be about 60 days. See section 4.2 for discussion of the variance Creole Trail has proposed to our Plan to allow for this modified approach.

Construction debris would be disposed of and fences, gates, driveways, and roads disturbed by the pipeline construction would be restored. The restored construction right-of-way would be revegetated in accordance with our Plan and Procedures, other permit requirements, and site-specific landowner requests.

2.3.2.2 Special Pipeline Construction Techniques

Wetland Crossings

Creole Trail would construct its pipelines across wetlands in accordance with our Procedures, which include several measures designed to minimize construction-related impacts. Examples of measures included in our Procedures are described in section 4.4.2. Creole Trail has requested certain variances from the Procedures as also discussed in more detail in section 4.4.2. As one of its requested variances, Creole Trail has proposed a 135-foot-wide construction right-of-way to cross wetlands along Segments 2 and 3 to accommodate the 42-inch-diameter dual pipelines.

At certain locations, wetlands would be crossed by the HDD method in conjunction with associated waterbody crossings (see Appendix C). For the remaining wetlands, Creole Trail proposes to use three types of wetland crossing methods as described below. In comments on the draft EIS, both the COE and the LADWF stated that timber may not be stacked along the edge of the right-of-way within wetlands, and that no burning may be conducted in wetlands. Creole Trail proposes to chip and dispose of trees and brush in the wetlands subject to receiving the necessary permits and approvals. If chipped material is left in wetlands, the COE would consider that material to be wetland fill and would include the fill material in its evaluation of wetland impacts. The COE would not allow any unchipped cleared material or debris to be buried in wetlands. Our Procedures (Item VI.B.2.f) require that cleared vegetation be removed from wetlands. Therefore, if the COE approves Creole Trail's proposal to chip and dispose of the material in wetlands, Creole Trail would also need to obtain a variance from our Procedures.

Wetland Method I would be used in unsaturated wetlands where soils are dry enough at the time of construction to support equipment. Construction would be similar to the upland construction method described above but would require segregation of topsoil over the trench line. Stumps would be removed only from the trench line unless additional stump removal is required to provide safe working conditions.

Wetland Method II is consistent with conventional wetland construction techniques used to cross wetlands with saturated soils or soils otherwise unable to support construction equipment. In such areas, it would be necessary to stabilize the right-of-way or use wide-tracked/low ground weight equipment. During clearing, Creole Trail would stabilize the right-of-way using timber riprap (corduroy roads) or fabricated timber mats. Creole Trail would attempt to use no more than two layers of timber for this purpose. Dirt, pulled tree stumps, or brush riprap would not be used to stabilize the travel lane.

Wetland Method III would involve push-pull construction. This method would be used in large wetland areas where sufficient water is present for floating the pipeline in the trench, and grade elevation over the length of the push-pull area would not require damming to maintain adequate water levels for floatation of the pipe.

When using the push-pull construction technique, clearing within the wetland would be limited to only that necessary to install the pipeline. Trees and brush would be cut at ground level by hand with low ground weight equipment or with equipment supported by timber work mats. Grading in inundated wetlands would be held to a minimum, and Creole Trail anticipates that grading would not generally be necessary due to the typically level topography and the lack of rock outcrops in such areas. Amphibious excavators (pontoon-mounted backhoes) or tracked backhoes (supported by fabricated timber work mats of floats) would be used for trenching.

Waterbody Crossings

Creole Trail proposes to install the pipeline across small perennial or intermittent waterbodies using open-cut crossing methods in accordance with applicable permits and approvals and generally in accordance with our Procedures. Creole Trail has requested certain variances to the Procedures as discussed in section 4.3.2.1. Intermittent streams that are dry at the time of crossing would be crossed using conventional upland construction techniques described above.

Horizontal Directional Drilling

Creole Trail proposes to install the pipeline at selected waterbodies using the HDD method (see table 4.3.2-1 in section 4.3.2.1). This technique involves drilling a pilot hole under the waterbody and banks, then enlarging that hole through successive reamings until the hole is large enough to accommodate the pipe. Throughout the process of drilling and enlarging the hole, a slurry made of naturally occurring non-toxic materials, such as bentonite clay and water, would be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and hold the hole open. This slurry is referred to as drilling mud. Pipe sections long enough to span the entire crossing would be staged and welded along the construction work area on the opposite side of the waterbody and then pulled through the drilled hole.

Calcasieu Lake

Between MPs 3.0 and 20.1 of Segment 2, Creole Trail would install the dual pipelines across Calcasieu Lake. In comments on the draft EIS, the LADWF noted that it has mandates under Louisiana Revised Statutes 56:3:434 and 435.1 related to the protection of oyster resources (see section 4.6.2.3 for further discussion of the LADWF's responsibilities and Creole Trail's proposed mitigation measures for oysters). To carry out this mandate, the LADWF has a Memorandum of Understanding with the LADNR Coastal Management Division under which the LADWF's requirements related to construction within Lake Calcasieu would have to be included with a permit issued by the LADNR for operations within the lake. The LADWF filed several additional comments related to Creole Trail's proposed construction methods in Calcasieu Lake, which are incorporated in the following paragraphs and/or addressed in our responses to comments in Appendix M. In addition, our recommendation in section 4.3.2.1 indicates that the detailed construction plans to be filed for construction in Calcasieu Lake should be developed in cooperation with the LADWF.

Creole Trail would use the HDD method to install the southern entry into the lake and northern exit from the lake. At the time Creole Trail filed its initial application, it anticipated that in both cases, the HDD rig would be set up on the land side with the stringing side located out in the lake. The HDD rig would drill a pilot hole and ream the hole to the appropriate diameter. The pipe strings would be welded from a barge working in the lake. A dredge barge in Calcasieu Lake would excavate additional material at a pre-determined distance before and after the exit point of the drill to enable the pipe to lay within the ditchline without using an overbend. The barge at the drill exit hole would connect the pipe string to the HDD drill stem. The HDD rig would pull the pipe string through the hole back to the land side. The lay barge would then continue laying pipe away from the end of the pipe string. In more recent information filed as comments on the draft EIS, Creole Trail indicated that for the southern entry into the lake, the HDD entry point would be in the lake and the exit would be on the land side, with the pipe string located on land. As noted in section 4.3.2.1, Creole Trail would file finalized, detailed construction plans for the Calcasieu Lake crossing once an Engineering, Procurement, and Construction contractor is retained.

Construction within Calcasieu Lake would be from a shallow water lay barge spread. The lay barge spread would consist of three connected lay barges with a total length of approximately 465 feet. Typically, a shallow lay barge would draw about 6 to 7 feet of water. To accommodate this draft, floatation channels of sufficient width and depth would need to be dredged along the proposed construction right-of-way through Calcasieu Lake. The floatation channels may be about 8 feet deep. Floatation channels would be required along the pipeline corridor and to provide access points from the Calcasieu River and the Gulf Intracoastal Waterway to the pipeline corridor. The actual barge and floatation channel dimensions would be determined once a contractor is selected to construct the Calcasieu Lake spread, but it is anticipated that a single lay barge would be 45 feet wide. Pipe supply barges, typically 40 feet wide, would be tied alongside the lay barge for unloading. About 5 feet of clearance would be required for both sides of the lay barge to allow for maneuvering. Therefore, the floatation channels would need to be about 95 feet wide (see figure 2.3.2-2).

Creole Trail currently anticipates that two access channels would be dredged. An approximately 1.5-mile-long channel would provide access from the East Fork of the Calcasieu River to approximate MP 3.7 on Segment 2. An approximately 1.1-mile long channel would allow access from the Texaco Channel Access Route to approximate MP 16.0 on Segment 2. About 111,467 yd^3 and 81,743 yd^3 would be dredged for the East Fork and Texaco Channel access channels, respectively.

Construction in Calcasieu Lake would begin with survey staking of foreign-line crossings, access point and floatation channel limits, and the centerline of the pipeline ditch. Creole Trail would install turbidity curtains within 1,500 feet of active oyster leases on the edges of the construction corridor next to dredging and backfilling equipment. The curtains would be secured to temporary pilings installed every 200 feet along the edge of the construction corridor. In comments on the draft EIS, the LADWF stated that there are no oyster leases within Calcasieu Lake and indicated that Creole Trail's intent may be to use turbidity curtains to protect existing oyster reefs. If so, the LADWF stated that Creole Trail would need to develop a specific, detailed plan for the use of turbidity curtains, as well as a monitoring plan for the period when the curtains are in use, for LADWF approval. Our recommendation in section 4.3.2.1 incorporates this and other LADWF comments regarding construction in Calcasieu Lake.

The floatation channel and turnaround areas would be dredged within the construction corridor where Calcasieu Lake is less than 8 feet deep. The floatation channel would be dredged with a clam or drag bucket. About 1.8 million yd^3 of material would be dredged for its construction. Creole Trail has requested the use of a 300-foot-wide construction right-of-way in Calcasieu Lake to accommodate the excavation of the floatation channel, pipeline ditch, and the turnaround areas. A 75-foot-wide permanent right-of-way centered over the pipelines would be retained following construction. Figure 2.3.2-2 illustrates a typical construction right-of-way cross section within Calcasieu Lake.

Creole Trail would excavate two separate trenches to install the dual pipeline in Calcasieu Lake. Creole Trail anticipates that using separate trenches would generate less excavation and spoil handling than using a single trench and would ensure long-term separation of the pipelines within their respective trenches. A separate shallow water lay barge would be used for each pipeline. It is anticipated that each dredge used to excavate the pipeline trenches would be equipped with a 140-foot boom mounted on an approximate 140 feet by 40 feet by 9 feet spud barge. Tugboats, crew boat, and a material/water barge would service the barges to ensure safety and efficiency.

Dredge material for the pipeline trenches (estimated to be approximately 575,387 yd^3) would be placed temporarily on one or both sides of the ditch. Creole Trail would place 50-foot-wide gaps at points 500 feet apart along the rows of stockpiled dredged material to allow boat access. Pilings with warning signs and lights would mark the edges of the gaps in accordance with Coast Guard requirements. In comments on the draft EIS, the LADWF noted that Creole Trail would be required to develop a specific plan for the location, size, and lighting of the warning signs for its review. The LADWF also commented that resuspension of sediments from erosion due to wind and waves would be reduced if the excavated material does not extend above the water surface. We agree that keeping the stockpiled material below the water level might reduce turbidity from the effects of wind and wave action; however, we also note that reducing the height of the spoil piles would require that the construction right-of-way within the lake be increased an undetermined amount to accommodate the wider piles. In addition, it is unknown at this time whether the construction equipment used to stockpile and then replace the excavated material would be able to reach the necessary distance. Without additional information, it is impossible to assess the potential environmental impacts or feasibility of implementing the LADWF's recommendation.

As noted above, we recommend in section 4.3.2.1 that Creole Trail coordinate with the LADWF and other resource agencies to develop its final construction plans for the Calcasieu Lake.

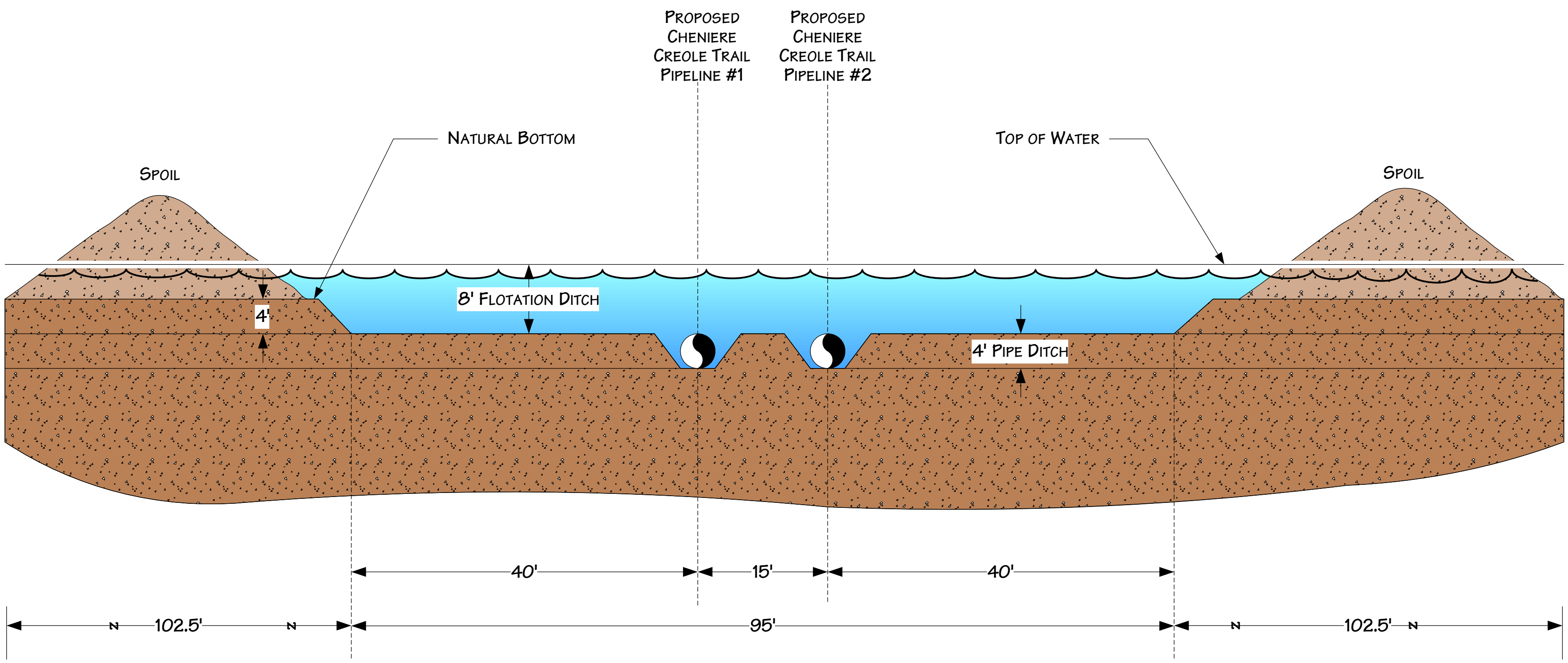
Once enough trench has been excavated, the lay barges would begin installation activities using pipe obtained form the pipe barges. The contractor would load pipe onto barges at a pipe-coating yard. The location of the pipe-coating yard has not yet been identified by Creole Trail; however, Creole Trail expects to rely on existing weight-coating facilities in the region and does not anticipate using an on-site temporary weight-coating facility. The pipe barges would be towed out to the job site by a tugboat and tied alongside the lay barge. The pipe would be offloaded from the barge to a segregated storage area on the lay barge. Aboard the lay barge, each joint of pipe would be moved to the line-up station by a system of conveyors and would proceed through fabrication stations that would include a cleaning and preheating rack; hydraulically-operated lineup rollers; welding stations; internal Non-Destructive Testing station; joint coating station; and holiday detection. After passing through the stations, the pipe would be lowered into the trench in the lakebed. The shallow water barge would use spuds to maintain its position and pull itself forward as each new pipe joint is added.

Before the pipeline is laid in the trench, a survey crew would stake the centerline to ensure proper alignment. As the pipeline is laid, the contractor may fill the pipeline system with water to ensure the pipe remains in place. Each pipe joint installed would be encased in approximately 6 inches of high-density concrete. Creole Trail has proposed between 10 feet and 25 feet of separation between the two pipelines in Calcasieu Lake. The actual distance between the pipelines would depend on the substrate conditions and foreign pipeline and other obstructions identified during construction.

The pipe trench would be backfilled with the dredge material that was temporarily placed along the edges of the trench, and lake bed contours would be restored to near pre-construction conditions using excavated backfill materials as required by our Procedures. In comments on the draft EIS, the LADWF stated its intent to require that Creole Trail conduct pre- and post-construction surveys to demonstrate that bottom contours have been re-established. The LADWF also intends to require that Creole Trail submit a survey monitoring plan for its approval prior to construction of the pipelines in Lake Calcasieu. After the pipeline is buried, the pipeline would be hydrostatically tested. After the hydrostatic test is successfully completed, the pipeline would be dewatered by pushing the water out with air.

To mitigate the impacts in the more sensitive southern portion of Calcasieu Lake, Creole Trail considered installing the dual pipelines with two lay barges or with one barge assembly that could lay both lines simultaneously. In comments on the draft EIS, Creole Trail stated that it has decided to construct the dual pipelines using a separate shallow water lay barge for each pipeline. Assuming a continuous 24-hour-per-day lay operation, Creole Trail anticipates that the lake lay portion, not including the HDD segments, could be completed in 50 to 75 days.

Creole Trail filed in its application alignment sheets showing the construction right-of-way for shallow barge construction within Calcasieu Lake and preliminary site-specific HDD plans for the shore approaches. In response to our recommendation in the draft EIS, Creole Trail filed additional information and alignment sheets related to this activity. This new information, filed in Creole Trail's comments on the draft EIS, has been incorporated into the discussion above. See section 4.3.2.1 for additional discussion regarding proposed construction in Calcasieu Lake. Section 4.3.2.1 also includes our recommendation regarding information that should be included in Creole Trail's final, site-specific, detailed engineering alignment sheets and construction installation plans to be filed with the Commission prior to construction.



For environmental review purposes only.

Figure 2.3.2-2

Creole Trail Project

Right-of-Way Cross Section – Calcasieu Lake Construction

Roads and Railroads

Road and railroad crossings would be constructed in accordance with applicable state and local regulations and permits or, in the case of private land, approval of the landowner. Creole Trail would use construction techniques designed to minimize disruptions to traffic flow patterns, and construction across existing highways and railroads would not significantly disrupt traffic flow.

With the exception of road crossings that would occur within the HDD paths for waterbody crossings, Creole Trail would install the pipeline under paved roads and some unpaved roads by boring beneath them. Two of the three railroads would also be crossed by boring, with the third proposed as an open-cut crossing. The bore method requires the excavation of a bore pit on either side of the road or railroad to accommodate the boring equipment and the pipe to be installed. A large-diameter auger would be used to excavate a hole between the two bore pits. Once the hole is complete, a section of pipe would be pulled back to complete the crossing.

Subject to landowner approval, the majority of unpaved roads would be crossed using the traditional open-cut method. Steel plates would be available on-site to cover the open area to allow passage by emergency vehicles. Access would be maintained except for the limited periods required for installing the pipeline. Open-cut road crossings would be constructed in one day. Steel plates would be used until fill is properly compacted.

Foreign Pipeline and Electric Transmission Line Crossings

Segments 2 and 3 would cross a total of 82 foreign pipelines. To allow the construction process to continue in an efficient manner, mainline crews would move around these crossings and the crossings would be constructed by specialized mini-crews. In addition to excavation and boring equipment, crossing other pipelines would require some hand digging beneath the foreign pipeline to ensure no damage to pipeline. Additional temporary workspace (ATWS) would be used at these crossings to accommodate storage of the increased amount of spoil resulting from the need to excavate a deeper trench, and to prevent spoil and construction equipment from being placed over the exiting pipelines. The general practice would be to install the new pipeline under the existing foreign pipeline(s) with an agreed upon separation distance that would meet or exceed applicable DOT requirements. Due to the diameter of Creole Trail's proposed dual pipelines and the size of most pipelines that would be encountered along the proposed route, Creole Trail anticipates that a typical crossing operation would take several days to complete.

Where the proposed pipelines would cross electric transmission lines, Creole Trail would adhere to specific criteria regarding minimum clearances between the powerline and pipeline construction equipment. Also, pipelines being constructed parallel to, crossing, or in proximity of electric power transmission lines would be subject to electrostatic and electromagnetic induced voltages and currents. Therefore, additional protection would need to be used to prevent damage due to fault currents and induced voltages. Accordingly, all equipment operating near powerlines would be properly grounded and insulated.

Agricultural Areas

In agricultural areas, Creole Trail would strip up to a maximum of 12 inches of topsoil from the trench line and spoil storage area based on landowner agreements. The topsoil would be temporarily stockpiled separate from the excavated subsoil within the construction right-of-way. Creole Trail would work with landowners prior to construction to identify irrigation pipelines within the construction right-of-way and would develop irrigation crossing standards that are satisfactory to the affected landowners.

Any irrigation pipeline systems damaged during construction would be repaired to the landowner's specifications or to pre-construction condition.

Residential and Commercial Areas

The proposed pipeline construction work areas would be within 50 feet of nine residences and nine structures (one residence and two structures within 50 feet of the work areas were destroyed by recent hurricane activities as discussed in section 4.8.2.2). Four residences would be within 50 feet of a proposed pipeline centerline. Creole Trail would implement the measures described below and in section 4.8.2.2 when working in residential areas and would coordinate with the appropriate landowners for the required site-specific mitigation measures. Three structures would be within the proposed construction work area and would be removed or relocated in accordance with landowner agreements (see section 4.8.2 where these issues are discussed in more detail).

Homeowners or business owners would be notified in advance of construction activities and any scheduled disruption of utilities. To minimize impacts on residences, residential areas, and commercial properties, Creole Trail would use specialized construction methods such as stovepipe and/or drag section construction. The duration that an excavated pipe trench could be left open would be limited to normal working hours for a distance of 100 feet on either side of a nearby residence or commercial property, (except in areas where the pipeline would be within 25 feet of a residence) and the trench 100 feet from either side would be backfilled immediately after the pipe is installed.

Disruptions would be minimized to the extent practicable. If project-related work activity in a residential or commercial area would disrupt ingress and egress to the affected property, Creole Trail would attempt to provide alternative access to the property. In the case of a residential property, it would offer to temporarily relocate the resident to a motel and provide a meal allowance. In addition, Creole Trail would attempt to leave any mature trees and landscaping intact within the construction work areas unless the trees and landscaping interfere with installation techniques or present unsafe working conditions. Topsoil segregation would be performed over the trench line only.

Clean up would occur quickly following construction activities. Sidewalks, driveways, and roads would be restored as soon as practicable, and fences, mailboxes, and other structures that have been removed would be restored. After cleanup, a Creole Trail representative would contact landowners to ensure that conditions of all landowner agreements have been met.

2.3.2.3 Aboveground Facilities

During installation of aboveground facilities, construction activities and storage of construction materials and equipment would be confined to the pipeline construction right-of-way or approved temporary workspace areas. Creole Trail would implement our Plan and Procedures and would construct the aboveground facilities in accordance with applicable permit conditions, regulations, and landowner agreements.

2.4 CONSTRUCTION SCHEDULE

Creole Trail proposes to have its LNG terminal and pipelines in service for the 2009 winter heating season.

To meet its anticipated in-service date, Creole Trail proposes to begin its final engineering design of the LNG terminal immediately after receipt of FERC authorization to incorporate FERC requirements. Creole Trail anticipates that it would mobilize construction activities soon thereafter. Creole Trail estimates that dredging and marine construction would take about 17 months to complete, and that it would take approximately 36 to 42 months to complete the terminal and commence operation. Creole Trail is working with construction contractors in an effort to expedite this schedule, potentially by beginning operations at a reduced sendout rate.

Subject to receipt of the necessary authorizations and permits, Creole Trail would begin negotiations in mid-2006 to establish an Engineering, Procurement, and Construction arrangement for the proposed pipeline facilities, and would procure right-of-way in 2007. Creole Trail initially anticipated that construction of the pipeline facilities would begin in the second quarter of 2009 and would be completed in time to meet the projected 2009 in-service date. However, in its comments on the draft EIS, Creole Trail stated that its updated construction schedule contemplates the commencement of select HDD crossings in 2007, followed by mainline and lake construction in 2008. Pipeline construction would be followed by about a year of cleanup and mitigation work. Creole Trail would file a detailed construction schedule as part of its Implementation Plan, which would be filed subsequent to receipt of Commission authorization to construct the project. Creole Trail would construct the project in four construction spreads, including one spread that would specifically encompass the in-water construction across Calcasieu Lake. Construction through the lake would occur continuously for 24 hours a day and would take approximately 50 to 75 days to complete.

2.5 ENVIRONMENTAL COMPLIANCE, INSPECTION, AND MITIGATION MONITORING

Creole Trail would use similar approaches to environmental compliance, inspection, and mitigation monitoring for both the proposed LNG terminal and the proposed pipeline facilities.

Creole Trail would employ a tracking system to ensure that relevant pre-construction surveys, clearances, permits, and plans are completed prior to releasing the construction contractor(s) to begin construction activities. For purposes of quality assurance and compliance with mitigation measures, other applicable regulatory requirements, and project specifications, Creole Trail would be represented by a Chief Inspector who would be assisted by one or more Craft Inspectors and EIs. For construction of the pipeline facilities, Creole Trail proposes to employ one Environmental Manager for the entire pipeline component, who would be supported by one Lead EI and a minimum of one additional EI per construction spread.

All of Creole Trail's inspectors would have access to the relevant compliance specifications and other documents contained in the construction contracts. The EIs' duties would be fully consistent with those contained in paragraph III.B (Responsibilities of the EI) of our Plan and would include ensuring compliance with the environmental conditions associated with any FERC authorizations and other permits or authorizations. The EIs would have authority to stop work or require other corrective action(s) to achieve environmental compliance. In addition to monitoring compliance, the EIs' duties would include training project personnel and reporting compliance status to the contractors, Creole Trail, the FERC, and other agencies as required.

Creole Trail would develop a project-specific environmental training program that would be designed to ensure that:

- qualified environmental training personnel provide thorough and well-focused training sessions regarding the environmental requirements applicable to the trainees' activities;
- all individuals receive environmental training before they begin work;

- adequate training records are kept; and
- refresher training is provided as needed to maintain high awareness of environmental requirements.

Creole Trail would incorporate post-construction environmental requirements into an Operation and Maintenance Plan and an Emergency Plan and Procedures for the LNG terminal. These documents would identify the relevant requirements and establish responsibilities for compliance.

Creole Trail would file with the Commission any updates to its proposed environmental inspection program, and is considering but has not committed to requesting the use of our Third-Party Compliance Monitoring and Variance Request Program for pipeline construction and restoration. In addition to Creole Trail's program, we would conduct periodic inspections to monitor the project for compliance with the Commission's environmental conditions.

2.6 OPERATION AND MAINTENANCE PROCEDURES

2.6.1 LNG Terminal Facilities

Imported LNG would be obtained from sources throughout the world and delivered via LNG ships to the LNG terminal. The LNG ships would enter the Calcasieu Ship Channel under the command of a local pilot. The pilot would decide whether the water current and wind conditions would allow safe entry to the Calcasieu Ship Channel. The pilot would direct the maneuvering of the LNG ship using the project's dedicated tugboats. The pilot would direct the securing of the lines and return the command back to the captain when the ship is secured.

The unloading arms would be coupled to the ship manifolds by shore-side operators. Connecting the ship-to-shore cable would connect the ship and the shore-side instrument control systems. This essentially would create one control system for the entire unloading operation. The emergency shutdown system would be tested before unloading could begin.

The shore-side operators would open the required valves after performing the required safety checks and procedures so that the LNG tank(s) are ready to receive the LNG. The ship operator would then start the in-tank pumps on the ship. The BOG blower would return cold LNG vapors created during the unloading process to the ship through the vapor return arm to maintain a vapor balance within the ship's LNG tanks. During unloading, the ship's manifold would be visually monitored by a ship operator on deck and by video cameras mounted on the dock that transmit pictures to the dock and the main control rooms.

LNG vaporization would not be interrupted during the unloading operation. LNG can enter an LNG tank and be withdrawn at the same time. The control room operator would verify that the planned vaporization rate is maintained. LNG stored in the tanks would be pumped to the vaporizers using a series of in-tank and send-out pumps. The LNG would be vaporized in SCV vaporizers and discharged into the interior plant piping that would connect the vaporization trains to the metering facility, which would measure the total natural gas output of the LNG terminal.

Creole Trail would operate and maintain its facilities in compliance with 49 CFR 193.2503 and 193.2605 and sections 11.3.1 and 11.5.2 of NFPA 59A, 33 CFR 127, and other applicable federal and state regulations. Before construction, Creole Trail would be required to prepare and file with the DOT for approval operation and maintenance manuals that address specific procedures for the safe operation and maintenance of the LNG storage and processing facilities. Creole Trail would also prepare an operations manual that addresses specific procedures for the safe operation of the ship unloading facilities in accordance with 33 CFR 127.305. Operating procedures would address normal operations as well as safe startup, shutdown, and emergency conditions.

All operations and maintenance personnel at the LNG terminal would be trained to properly and safely perform their assignments. The terminal operators would be trained in LNG safety, cryogenic operations, and the proper operation of equipment. The operators would meet all the training requirements of the Coast Guard and other applicable regulatory entities.

Creole Trail would maintain a full-time maintenance staff to perform routine maintenance and minor overhauls at the LNG terminal. Major overhauls and major maintenance activities would be handled by trained and qualified contract personnel. All maintenance activities, including scheduled and unscheduled maintenance, would be managed through a computerized maintenance management system (CMMS). Scheduled preventative and predictive maintenance would be entered into the CMMS to automatically print out work orders either on a time basis or on an hours-of-operation basis, depending on the requirement. Scheduled maintenance would be performed on safety and environmental equipment, instrumentation, and any other equipment that would require maintenance on a routine basis. When a problem is detected that requires unscheduled maintenance attention, the person that detects the problem would enter it into CMMS. If the problem requires immediate attention, the appropriate person would be notified and the problem would be entered into CMMS.

Creole Trail would train all personnel (operations, maintenance, and others) on the use of the CMMS. The CMMS would print out work orders every morning, which would be distributed to the appropriate personnel. The person that completes the maintenance work would close out the work order on the CMMS.

Creole Trail would conduct maintenance dredging of the marine facilities on an as needed basis, but anticipates that minimal dredging would be required. Any maintenance dredging would be limited to the footprint of the original dredged area. A hydraulic cutterhead dredge would be used. Based on projected shoaling rates, 25,000 to 40,000 yd^3 per year of shoaling could be expected. The dredged material would be placed on DMPAs previously approved by the COE and LADNR. Creole Trail would sample and test sediments for priority pollutants prior to each maintenance dredging event. Levees would be designed by a registered professional engineer, and return water quality would meet section 401 (CWA) certification requirements. Creole Trail would be required to obtain applicable permits prior to maintenance dredging, including a section 404 permit from the COE, and section 401 water quality certification and a Coastal Zone Consistency determination from the LADNR.

2.6.2 LNG Ships

Although LNG vessels and their operation are directly related to the use of the proposed import terminal, they are not subject to the section 3 authorization sought in this application. The LNG ships arriving at the Creole Trail LNG terminal must comply with all federal and international standards regarding LNG shipping. Design and safety features of LNG ships are discussed in sections 2.1.2 and 4.12.5.

2.6.3 Pipeline and Associated Aboveground Facilities

Creole Trail would operate and maintain the proposed pipeline facilities in accordance with 49 CFR 192, *Minimum Federal Safety Standards for the Transportation of Natural and Other Gases by Pipeline*, as required by the DOT and in a manner designed to ensure pipeline integrity and provide for a safe, continuous supply of natural gas.

The pipelines would be patrolled on a routine basis. Personnel qualified to perform both emergency and routine maintenance on natural gas pipeline facilities would handle emergency maintenance. Regular pipeline surveillance would include corrosion and leak surveys, and would provide information on adjacent third-party construction activities, soil erosion, exposed pipe, possible encroachment, and other potential problems that may affect the safety and operation of the pipeline. All pipeline marker posts, aerial markers, and decals would be painted or replaced to ensure that the pipeline locations are visible from the air and ground. All MLV sites would be regularly inspected and maintained.

Other maintenance functions would include periodic seasonal mowing of the permanent right-of-way in accordance with the vegetative maintenance restrictions outlined in our Plan and Procedures, terrace repair, backfill replacement, and periodic inspection of waterbody crossings. Creole Trail would not use herbicides or pesticides within 100 feet of a wetland or waterbody during vegetative maintenance unless approved by appropriate state and local agencies and the landowner.

2.7 SAFETY CONTROLS

2.7.1 LNG Terminal Facilities

The LNG terminal facilities would be sited, designed, constructed, operated, and maintained in compliance with federal safety standards. Federal siting and design requirements for LNG facilities are summarized in table 2.7.1-1.

TABLE 2.7.1-1

Federal Siting and Design Requirements for LNG Facilities

Federal Citation	Requirement
Thermal Radiation Protection (49 CFR 193.2057 and section 2.2.3.2 of NFPA 59A)	This requirement is designed to ensure that certain public land uses and structures outside the LNG facility boundaries are protected in the event of an LNG fire.
Flammable Vapor-Gas Dispersion Protection (49 CFR 193.2059 and sections 2.2.3.3 and 2.2.3.4 of NFPA 59A)	This requirement is designed to prevent a flammable vapor cloud associated with an LNG spill from reaching a property line of a property suitable for building.
Wind Forces (49 CFR 193.2067)	This requirement specifies that all facilities be designed to withstand wind forces of not less than 150 miles per hour without the loss of structural integrity.
Impounded Liquid (section 2.2.3.8 of NFPA 59A)	This requirement specifies that liquids in spill impoundment basins cannot be closer than 50 feet from a property line of a property suitable for building or a navigable waterway.
Container Spacing (section 2.2.4.1 of NFPA 59A)	This requirement specifies that LNG containers with capacities greater than 70,000 gallons must be located a minimum distance of 0.7 times the container diameter from the property line or buildings.
Vaporizer Spacing (section 2.2.5.2 of NFPA 59A)	This requirement specifies that integral heated vaporizers must be located at least 100 feet from a property line of a property suitable for building and at least 50 feet from other select structures and equipment.
Process Equipment Spacing (section 2.2.6.1 of NFPA 59A)	This requirement specifies that process equipment containing LNG or flammable gases must be located at least 50 feet from sources of ignition, a property line of a property suitable for building, control rooms, offices, shops, and other occupied structures.
Marine Transfer Spacing (33 CFR 127.105)	This requirement specifies that each LNG unloading flange must be located at least 985 feet from any bridge crossing a navigable waterway.

2.7.1.1 Spill Containment

The LNG impoundment systems for the terminal facilities would be designed and constructed to comply with DOT regulations (49 CFR 193, sections 193.2149 through 193.2185). These regulations require that each LNG container and each LNG transfer system be provided with a means of secondary containment that has been sized to hold the quantity of LNG that could be released as a result of the design spill that is appropriate for the area and LNG equipment. The design spills are defined in NFPA 59A.

The four LNG storage tanks would be double-walled, single-containment tanks, each with an inner 9 percent nickel steel inner container, surrounded by an outer carbon steel tank. Each tank would be surrounded by low earthen dikes that would form an individual impoundment area sized to contain 110 percent of the volume of the tank. The proposed dike dimensions are 555 feet by 555 feet at the bottom inside edge and 592 feet by 592 feet at the top inside edge. The dike height would be approximately 18 feet. The finished elevation of the dikes would be about 21 feet above MLG with the sloped impoundment floor at elevations from 2 to 4 feet above MLG. The dikes would be graded such that any spill would drain away from the LNG tank and pool at the opposite end of the dike.

The area around the LNG process area would be surrounded by a curb and graded so that LNG spills would flow to a collection sump located east of the vaporizers. The sump would be 60 feet by 60 feet and 20 feet deep, which creates a holding capacity of 72,000 cubic feet. The sump would be designed to hold the volume of LNG that could be released during a 10-minute spill from both of the unloading lines. The sump would be sloped for drainage and rainfall would be removed by sump pumps and transferred to the firewater pond. The pumps would be operated with level switches, and low-temperature detectors would prevent the pumps from operating if LNG is present.

Spill containment troughs would be provided for the LNG transfer lines, from the ships to the storage tanks, and from the storage tanks to the vaporizers. These troughs would be designed to drain LNG away from the transfer lines and into impoundment basins. Any spill from the dock area would be channeled to a collection sump located west of the unloading lines between the tank impoundment and the two ship berths. The sump size and design would be the same as the process area sump.

2.7.1.2 Hazard Detection System

Creole Trail’s hazard detection system have design-based strategies that include direct visual monitoring, remote visual monitoring (through closed-circuit television), automatic detection, a centralized alarm system, and an emergency shutdown system. Creole Trail would install hazard detectors throughout the facility to provide operating personnel early detection of released flammable gases, LNG, and fires, to show the location of the release or fire, to initiate automatic equipment shutdowns, and to initiate the automatic fire control systems. The hazard detection system would consist of separate flame detectors, natural gas detectors, low and high temperature detectors, and smoke detectors. All area monitors would be hardwired from the field device to the control room. Audible and visible alarms would be provided throughout the plant area to alert on-site personnel.

An independent Safety Instrumented System (SIS) for the Emergency Shutdown System would be installed to allow for the safe, sequential shutdown and isolation of rotating equipment, fired equipment, and LNG storage facilities. All fire and gas area monitors would be hardwired from the field device to the control room SIS panel. Fire and gas detectors would activate alarm systems, but would not operate or initiate any plant shutdowns other than those associated with equipment room heating and ventilation systems. Operators in the control room would take the appropriate actions to safeguard the equipment and facility.

Smart instrument type area monitors for monitoring flammable gases would be located in the LNG storage tank area, vaporization area, at the jetties, and in various buildings. Low temperature sensors would be located in the spill impoundment basins to shut down and prevent startup of the pumps in case of an LNG spill. Flame detectors, smoke detectors, gas detectors, and ultraviolet/infrared monitors for fire/flame detection would be located throughout the facility. High-temperature detectors would protect essential components on the LNG tank roofs, including the instrument nozzle areas, roof platform, and pressure relief valve areas.

Creole Trail would visually monitor the process and marine areas. A security video monitoring system would also be used to monitor the fence line and plant entrance. High resolution, low-light cameras would be located throughout the facility, and cameras would be mounted appropriate to provide a view of the main gate, administration building, process area, unloading arms, ship manifold, the LNG storage tanks, and the marine areas.

2.7.1.3 Fire Protection System

The fire protection system for the proposed LNG terminal would include several independent systems based on water, foam, and chemical agents.

The proposed LNG terminal would have a firewater system that would include:

- a 7 million-gallon firewater pond;
- two firewater pumps, each designed to provide 4,500 gpm at 150 pounds per square inch differential;
- a jockey pump and a booster pump;
- 44 monitors, 12 of which would be elevated and 6 of which would be remotely operated;
- 17 fire hydrants;
- hose reels; and
- underground/aboveground firewater pipeline distribution system.

The firewater pond would be filled initially by a portion of the water used to hydrostatically test the LNG storage tanks. Stormwater and SCV overflow water would maintain the level in the firewater pond, which would have a capacity that would exceed 2-hour duration event. Water would be replenished after testing the firewater protection system using the overflow from the SCVs. The firewater distribution piping would be designed such that water could be supplied from two directions. In addition to the fixed system, the tugs dedicated to the facility would contain firewater pumping equipment that could be used in an emergency.

Each LNG tank would have a pressure relief valve. To extinguish a fire that might develop in the relief valve discharge piping, a nitrogen purging system would be installed. Nitrogen would be supplied to the purging system via piping along the outside of the tank.

Creole Trail would provide a portable foam injection trailer for the proposed LNG terminal. This high expansion foam system would be self-powered, so no electrical power would be required. The system would have a carbon steel foam solution storage tank, two high-expansion foam generators, and all other necessary accessories for proper operation. The system would have the ability to flood a 60-foot by 60-foot impoundment basin with foam to a depth of 6 feet within 1 minute. Connections would be provided to the firewater system for use with this foam system.

About 50 hand-held fire extinguishers would be located in appropriate locations near the utility stations and/or in other areas to allow easy access in the event of an emergency. Approximately 15 wheeled hose reel units would also be distributed around the perimeter of the facility.

Fireproofing would be used for protecting steel structures, equipment, electrical components, and motor-operated valves that may be exposed to a fire. Fireproofing would be used where the structures, equipment or electrical components cannot be protected by other means.

2.7.1.4 Fail-Safe Shutdown

The LNG terminal would have an emergency shutdown system to allow for the safe termination of operations in the event of an operational problem. Emergency shutdowns would be provided for the entire LNG facility, for each of the two ship unloading systems, and for specific equipment. The system design would comply with ANSI/ISA-S84.01. Initiation of the shutdown sequence would be either manually by means of push buttons or automatically based on information originating from the various fail-safe hazard detectors positioned at critical locations throughout the facility. The system would allow for either the shutdown of individual sections of the LNG terminal or the entire terminal depending on the particular incident. Three levels of shutdown would be configured for the LNG terminal as summarized below. To allow for Level 1 and Level 2 LNG ship unloading shutdowns, separate emergency shutdown stations would be provided for the east and west jetties.

Level 1 (LNG Ship Unloading Shutdown): Level 1 shutdown could be initiated manually or automatically by local instrumentation, storage tank high-high liquid level, storage tank high pressure, or by the LNG ship. Level 1 shutdown would include LNG ship transfer pump stoppage in a safe and controlled manner without disconnecting the LNG transfer arms. LNG ship transfer pump stoppage could be activated by either the ship's own shutdown system or by the facility's overall SIS shutdown system.

Level 2 (LNG Ship Unloading Shutdown and PERC release): Level 2 shutdown could be initiated manually, by the LNG ship, or by unloading arm operating parameters that exceed safe operating limits. All shutdowns described for Level 1 above would occur, plus the PERC's on the unloading arms would release.

Level 3 (SCV Train Shutdown): Level 3 may be initiated manually and initiates a shutdown and isolation of all SCV trains. LNG ship unloading would be unaffected by the SCV Level 3 shutdown. Level 3 shutdown buttons would be located in the control room.

A partial facility shutdown could be initiated by activating either Levels 1, 2, or 3 pushbuttons in response to a major incident, such as fire, vapor, or liquid release. A total facility emergency shutdown could only be initiated in the control room by activating all three level pushbuttons. Upon activation of the total facility shutdown, the SIS would sequentially shut down and isolate the terminal equipment, including stopping LNG ship unloading and disconnecting the unloading arms from the LNG ship(s).

2.7.1.5 Security System

Security measures would be designed to deter and prevent unauthorized access in order to avoid injury to the public or to plant personnel, theft, vandalism, and damage to the plant. Security measures at the LNG terminal would include fencing, security services, warning signs, surveillance, intrusion detection, and access control with supervision of contractors and visitors. In the event of an emergency, Creole Trail would coordinate with public safety officials to maintain access for emergency responders while restricting sightseers from potentially hazardous areas. Security of the LNG terminal is discussed further in section 4.12.6.

2.7.2 Pipeline and Associated Aboveground Facilities

The pipeline and aboveground facilities associated with the Creole Trail Project would be designed, constructed, operated and maintained in accordance with 49 CFR 192. These safety standards are discussed in section 4.12.7.

2.7.2.1 Corrosion Protection and Detection System

To protect the pipeline facilities from corrosion, cathodic protection would be provided by an impressed current system. A corrosion protection coating would be applied to all buried facilities, and all aboveground facilities would be primed and painted. The meter stations would be electrically isolated from foreign gas company facilities and the mainline by insulating joints or flanges. Corrosion protection would be monitored regularly to maintain the required protection level.

2.7.2.2 Emergency Response Procedures

Pipeline system emergencies can include gas leaks, fires or explosions, and/or damage to the pipeline and aboveground facilities. In accordance with DOT regulations, Creole Trail would develop an emergency response plan to address procedures to be followed in the event of an emergency along the pipeline. This plan would include training of employees on emergency procedures; establishing liaisons with appropriate fire, police, and other community officials; and informing the public on how to identify and report an emergency condition on the pipeline route.

2.8 FUTURE PLANS AND ABANDONMENT

2.8.1 LNG Terminal

Creole Trail has no specific plans for future expansion or abandonment of the proposed LNG terminal. If future expansion is warranted by additional demand for natural gas service, Creole Trail would design any new facilities to be compatible with those proposed for this project. Should the facilities be expanded or abandoned, Creole Trail would be required to obtain the appropriate FERC authorization, and we would conduct an appropriate environmental analysis. The expansion or abandonment would also be subject to applicable federal, state, and local regulations in effect at that time.

The composition of LNG from many LNG export plants contains higher British thermal unit (Btu) components (such as ethane and propane) such that additional processing is required to reduce the heating value of the natural gas before the natural gas is injected into the U.S. pipeline system. Creole Trail has not included Btu control in its current design. Based on the final selection of LNG sources and compositions and pipeline markets, Btu control may or may not be required. Creole Trail would have space available on the proposed LNG terminal site for future Btu control equipment, and would make provisions in the facility piping to facilitate interconnection if such equipment is necessary.

2.8.2 Pipeline Facilities

At this time, Creole Trail has no plans for future expansion or abandonment of any facilities associated with the proposed pipeline facilities. If the pipeline facilities should be expanded in the future, the facilities would be subject to appropriate FERC authorization and environmental analysis, and would be subject to applicable federal, state, and local regulations in effect at that time.