

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF THE STAFF'S ENVIRONMENTAL ANALYSIS

The conclusions presented are those of the environmental staff of the FERC. The Coast Guard will present, in its LOR and LNG Operations Plan, its own conclusions and recommendations, prior to construction and operation. The LOR will address the suitability of the Calcasieu Ship Channel for LNG ship transportation, and the Coast Guard's LNG Operations Plan will address issues related to the public impact of safety or security zones for LNG vessels. Likewise, the COE will present its own conclusions and recommendations in the dredging and wetland permits it may issue pursuant to section 10 of the River and Harbors Act and section 404 of the CWA. The EPA has the authority to review and veto the COE decisions on the section 404 permits.

We have determined that construction and operation of the Creole Trail Project would result in limited adverse environmental impacts. If the proposed project is found to be in the public interest and is constructed and operated in accordance with recommended mitigation measures, it would be an environmentally acceptable action. Our conclusion is based on information provided by Creole Trail and data developed from data requests; field investigations by Commission staff; literature research; alternatives analysis; comments from federal, state, and local agencies; and input from public groups and individual citizens.

If the Coast Guard issues a LOR finding the waterway suitable for LNG marine traffic, the arrival, transit, cargo transfer, and departure of LNG ships in the Calcasieu Ship Channel would be required to adhere to the procedures of a *Liquefied Natural Gas Vessel Management and Emergency Plan* to be developed by the Coast Guard Marine Safety Unit Lake Charles. In addition, Creole Trail would develop Operations and Emergency Manuals in consultation with the Coast Guard. These procedures would be developed to ensure the safety and security of all operations associated with LNG ship transit and unloading.

As part of our review, we developed measures that we believe would appropriately and reasonably avoid, minimize, or mitigate for environmental impacts resulting from construction and operation of the proposed project. We are, therefore, recommending that our mitigation measures be attached as conditions to any authorization issued by the Commission.

5.1.1 Infrastructure Facilities

Associated infrastructure facilities for the project would include a 2,400-foot-long, 10-inch-diameter water line to be constructed by the Cameron Parish Water Works. The Cameron Parish Water Works would be responsible for obtaining applicable permits and approvals for the waterline.

5.1.2 Geology

Construction and operation of the proposed Creole Trail Project would have minimal impact on geologic resources. There are no known producing gas and oil wells within 0.25 mile of the LNG terminal property. However, there are 17 oil or gas wells within 0.25 mile of the LNG terminal property that are reported as either dry and/or plugged and abandoned. Fourteen of these wells are within the property to be leased for the LNG terminal and the remaining three wells are outside of the property boundary. Twenty-two plugged or abandoned wells appear to be located within 150 feet of the proposed pipelines. Creole Trail would field locate wells and associated gathering lines prior to construction. In the event a well location falls within the construction or operation limits, the well would be removed to a depth deeper than the construction or operations limit, or a minor route adjustment would be made to

avoid the well. If a non-reported abandoned gas or oil well were discovered during construction, Creole Trail would implement a response protocol that includes notifications, spill control, and cleanup measures. Therefore, construction and operation of the proposed LNG terminal should not affect oil and gas production in the area.

The LNG terminal and pipelines would lie in an area of low seismic risk. Site-specific analysis of the LNG terminal site revealed that due to the very low ground motions predicted at the site and the lack of observed surface faulting, earthquake hazards were not considered a controlling factor in facility design. Similarly, for the proposed pipeline facilities, the combination of low seismic activity in the region, absence of significant faulting, and use of pipeline construction materials that have tolerances for moderate ground movement would result in minimal overall hazard associated with seismicity and faulting.

Due to the presence of saturated sediments beneath the LNG terminal site, structures constructed at the site could be susceptible to liquefaction under sufficiently strong ground motion. However, because of the relatively low levels of seismic activity and possible ground motion predicted for the site, the presence of necessary liquefaction criteria would be limited and the risk of soil liquefaction is minimal. No significant risk of soil liquefaction is anticipated for the pipeline facilities.

Geotechnical studies conducted at the proposed LNG terminal site indicated that the slopes in the marine berth would provide adequate slope stability. Based on recommendations by Creole Trail's geotechnical consultant, TWEI, we have recommended that Creole Trail file a final, detailed slope stability analysis to confirm that slopes at the LNG terminal site would remain stable under anticipated static and dynamic conditions. Geotechnical studies also determined that the soft sediments in the upper 65 feet of the LNG site would be unable to support the LNG tanks and other heavy load structures without soil improvement or engineered foundations, and that fill materials placed at the site would undergo primary and secondary settlement. Creole Trail would offset these hazards by conducting filling at the LNG terminal site and constructing each LNG storage tank and other components of the LNG terminal on deep driven pile foundations. Creole Trail would implement a field testing program during construction to ensure that the final foundation designs would meet the stringent stability requirements of the LNG tanks and other heavy load structures at the site. By constructing the proposed LNG terminal in accordance with engineered plans that meet applicable regulatory requirements, and with our recommendations, the potential for slope instability, settlement, or geotechnically unsuitable soils to significantly affect the proposed terminal would be low.

Under significant weather events, the LNG terminal facilities would be subjected to severe flooding, storm surges, high winds, erosion along the shoreline and docking facilities, and potential site access interruptions. Structural and mechanical elements have been designed into the LNG terminal facilities to withstand coastal flooding and storms. Because these elements were designed prior to Hurricane Rita, which struck southwestern Louisiana in September 2005, Creole Trail conducted post-hurricane site visits and commissioned a formal hurricane effects study to re-evaluate the effects of recent hurricanes and the potential for future hurricanes to affect the proposed LNG terminal. Based on this additional assessment, Creole Trail does not propose changes to its proposed design basis. The proposed design includes the construction of critical infrastructure on piled platforms such that these facilities would be above the FEMA 100-year base flood elevation for the site.

The potential for shoreline erosion to occur at the LNG terminal site would be minimized by Creole Trail by using articulated concrete block mats, bulkheads, and/or geotextile materials. Weather events would not typically affect the proposed pipelines because they would be buried underground. Creole Trail would conduct regular visual inspection of the pipeline rights-of-way, which would identify any exposed pipe or other flood-related damage. In addition, the pipeline approaches to Calcasieu Lake

and the crossings of the Calcasieu Ship Channel would all be accomplished by the HDD method, thereby avoiding disturbance of shorelines in these areas that could contribute to erosion.

Biogenic gas was not found during geotechnical investigations completed at the LNG facility. However, because soils in the project area contain organics that could possibly produce biogenic gas, Creole Trail would install positive ventilation systems beneath enclosed buildings and structures that would be occupied and would be located at ground level to mitigate the potential for biogenic gas accumulation.

5.1.3 Soils and Sediments

Construction of the LNG terminal would affect soils that generally consist of materials that were dredged from coastal marshes during construction and maintenance of the Calcasieu Ship Channel. Soil impacts at the site would be minor because the soils are not prime farmland and have already been affected by previous dredge disposal activities and by oil and gas exploration and production. Construction of the proposed pipelines would affect hydric and prime farmland soils. Erosion and sedimentation at the proposed terminal site and along the pipeline routes would be minimized and mitigated through implementation of measures specified in our Plan and Procedures, with approved variances. To minimize erosion and sedimentation during the period between backfill of the first and second pipelines along the dual pipeline segments, Creole Trail would stabilize the construction right-of-way until the second line is installed by applying a NRCS-approved seed mix within 10 days of backfilling the trench. Creole Trail would maintain all erosion and sedimentation control devices until the second line is installed and final restoration achieves at least 80 percent vegetation cover as compared to adjacent, undisturbed areas. With the proposed construction procedures and the compaction minimization measures contained in our Plan and Procedures, impacts due to soil compaction would also be minimized.

Construction of the LNG terminal would require dredging of sediment to create the proposed marine facilities. The dredged material generated from LNG terminal construction would need to be beneficially used in accordance with Louisiana law. Creole Trail is currently developing a beneficial use plan in consultation with the COE and other appropriate agencies. The sampling and analysis conducted by Creole Trail indicate that most of the soils and sediments within the proposed dredging footprint for the LNG marine facilities are not contaminated. However, one sample from a single sediment core contained measurable concentrations of several PAHs, three of which the EPA stated are highly bioaccumulative. In its comments on the draft EIS, the EPA recommended further evaluation of this sample station. We have recommended that Creole Trail consult with the EPA and the COE regarding the need to conduct further evaluation of this sampling station and file copies of associated communication and the results of any additional testing with the Secretary prior to dredging at the LNG terminal.

With the possible exception of the site mentioned above, the potential to encounter contaminated soils during construction of the LNG terminal and proposed pipelines is relatively low. However, mismanagement of contaminated materials encountered during construction could result in impacts on soils and other sensitive resources. Therefore, we have recommended that Creole Trail file prior to construction a Plan for the Discovery and Management of Contaminated Soils and Groundwater.

Only a small percentage of the soils affected by the project are predicted to have a low revegetation potential following construction. Creole Trail would implement the topsoil segregation requirements specified by our Plan and by individual landowner agreements. Creole Trail would mitigate the effects of poor revegetation potential in accordance with our Plan and Procedures and would apply a seed mixture developed through consultation with the NRCS and in accordance with landowner agreements to reestablish vegetation following final grading.

5.1.4 Water Resources

Groundwater

Construction and operation of the proposed Creole Trail Project would not have a significant impact on groundwater resources in the project area, including the underlying Chicot Aquifer. No public water supply wells or springs are located within 150 feet of the proposed construction right-of-way. However, four private water supply wells are located within 150 feet of the construction right-of-way along pipeline Segment 3 and Segment 3 would cross nine Wellhead Protection Areas. Field surveys also identified three water irrigation outlets within the proposed permanent right-of-way along Segment 3, and two additional water irrigation outlets within proposed temporary work space along Segment 3.

To protect existing water supply wells, Creole Trail would reduce the construction workspace to provide a buffer, and mat or pad work areas where water well piping may be present. Creole Trail would conduct pre- and post-construction monitoring; provide an alternative potable source of water until the original water source has been reestablished and would fully restore or replace wells. Further, Creole Trail would work with the affected landowners to relocate the irrigation outlets and to ensure the continued operation of the irrigation systems in accordance with landowner requirements.

The greatest potential for impact on groundwater would be from spills, leaks, or other releases of hazardous substances during project construction or operation. Creole Trail would implement a project-specific SPCC Plan that would conform to the guidelines in our Procedures to prevent and minimize accidental or inadvertent chemical spills. Based on land use activities in the project area, the potential exists for contaminated groundwater to occur in the area. The Plan for the Discovery of Contaminated Soil and Groundwater that we have recommended Creole Trail develop would specify measures for protecting the environment in the case of unanticipated encounters with contaminated groundwater. With the implementation of the proposed construction measures, our Plan and Procedures, and our recommendations, we believe that there would be no impacts on groundwater resources as a result of construction and operation of the project.

Surface Water

The Creole Trail Project would be located within the Calcasieu and Mermentau River watersheds. No potable water intakes are located within 3 miles downstream of the proposed waterbody crossings. Eleven waterbodies crossed by the proposed pipeline routes are on the LADEQ's 303(d) list of Impaired Waterbodies (LADEQ 2004b). All but two of these waterbodies would be crossed by HDD, which would avoid disturbance of the bottom sediments or banks. The other two waterbodies, Indian Bayou and Marsh Bayou, are currently proposed as open-cut crossings (see further discussion below). These waterbodies are listed as impaired (category 4a) due to low dissolved oxygen levels resulting from organic enrichment. These waterbodies are not known to be contaminated with heavy metals such as mercury. Compliance with our Procedures would limit disturbance of these two waterbodies to 48 hours at Marsh Bayou (an intermediate waterbody) and 24 hours at Indian Bayou (a minor waterbody).

The primary impact on surface waters from construction of the LNG terminal would be the dredging in and adjacent to the Calcasieu Ship Channel to create the LNG marine facilities. Dredging would result in a temporary increase in suspended solids in the water around the dredged area and the subsequent settling of the suspended particles. Creole Trail would use a hydraulic cutterhead dredge, which generally creates less turbidity than other types of dredges, and the cutter speed could be adjusted if excessive turbidity is detected, thus minimizing turbidity. Creole Trail also anticipates that turbidity would be minimized by the types of materials to be dredged, which are primarily stiff clays with some silty deposits. Most of the sediment that would become suspended during dredging would settle within

the dredging footprint. The dredged materials would be moved to an approved DMPA, which is yet to be identified by Creole Trail.

The pipeline would cross 175 waterbodies, including 43 perennial streams, 1 lake (Calcasieu Lake), 4 manmade ponds, 65 intermittent streams, and 62 manmade ditches. To minimize impacts on these waterbodies, Creole Trail would implement our Procedures and its project-specific SPCC Plan, as well as the requirements in the permits issued by other federal and state agencies.

Creole Trail proposes to use the HDD crossing method to install the pipeline under 26 waterbodies and at the Calcasieu Lake entrance and exit (some HDDs would encompass more than one waterbody). Barnes Creek and the Calcasieu River, which are designated as Louisiana Natural and Scenic Rivers at the project crossing locations, would be crossed by the HDD method. In response to comments from the COE and the LADWF, we have recommended that Creole Trail evaluate the feasibility of using the HDD method to cross Indian and Marsh Bayous and develop site-specific construction plans for these crossings in coordination with the COE and LADWF. We have also recommended that Creole Trail file a site-specific plan for each proposed HDD crossing prior to construction in case any of the proposed HDDs are unsuccessful. Further, we have recommended that Creole Trail develop and file a Drilling Mud Contingency Plan for each waterbody proposed to be crossed by the HDD method and identify measures that would be implemented in the event of a frac-out.

Creole Trail would construct the proposed pipelines within Calcasieu Lake using a combination of the HDD method for the lake entry and exit, and open-cut construction from lay barges. The methods Creole Trail anticipates would be used for the HDD installations at the entrance into and exit from Calcasieu Lake would include the use of collection pits that would contain drilling fluids used for these HDD operations, and a tank barge and pumping system that would be used to maintain the level of drilling mud released into the pit at a level that would limit the potential for drilling fluid to migrate beyond the containments pits. Additionally, the drilling fluid and cuttings mixture would be denser than the lake water, resulting in rapid settling of the material when it exits the drill hole. The LADWF filed several comments on the draft EIS regarding the proposed construction in Calcasieu Lake. The LADWF expressed concerns about the use and locations of turbidity curtains, the potential for suspension of sediments from stockpiled materials due to wind and wave action, lighting and signage, restoration of bottom contours, and achieving proper depth of cover. Creole Trail has stated that it would file final, site-specific, detailed engineering alignment sheets and construction plans for the Calcasieu Lake crossing once it has retained an Engineering, Procurement, and Construction contractor. We have recommended that Creole Trail develop its final plan for construction in Calcasieu Lake in coordination with the COE, LADNR, and LADWF, and that the plan address several specific items, including those issues raised by the LADWF in its comments.

Operational impacts of the LNG terminal would include resuspension of bottom sediments from occasional maintenance dredging, incidental propeller wash from LNG ships, the creation of additional impervious surfaces at the facility, discharge of sanitary wastewater, and discharge of water that would be generated during the LNG vaporization process. Dredging and incidental propeller wash would result in temporary increases in turbidity in localized areas. Turbidity from propeller wash would be minor and short-term and would decrease as the berthings of LNG ships at the facility become routine. Turbidity caused by maintenance dredging would be short-term and localized. Maintenance dredging would have to be approved by the COE and the LADEQ prior to implementation.

The SCVs proposed to be used at the LNG terminal would generate water during the LNG vaporization process. Approximately 547,200 gpd of condensate would be discharged during normal operation of the SCVs. Because this process water is slightly acidic, it would be buffered to raise the pH prior to discharge. As proposed, the water would be discharged into the firewater pond with the excess

discharging into the Calcasieu Ship Channel. The volume of water that would be discharged into the Calcasieu Ship Channel would vary based on daily conditions. Creole Trail would be required to comply with its LAPDES permits and discharges would be required to meet water quality standards established by the LADEQ. Therefore, project-specific discharges would not be expected to contribute to a reduction in overall water quality. In comments on the draft EIS, the COE and LADWF indicated that water generated by the SCVs could be discharged into adjacent wetlands. We do not object to this use of the condensate if required and approved by the COE. We have recommended that Creole Trail file a copy of its COE permit with the Commission prior to construction.

5.1.5 Wetlands

The proposed project would be constructed in areas that support extensive wetlands, including lacustrine, palustrine, and estuarine marshes. Construction of the project would affect a total of 209.6 acres of wetlands, including 102.9 acres of emergent and scrub-shrub wetland at the LNG terminal site, and 54.3 acres of emergent, 47.8 acres of forested, and 4.7 acres of scrub-shrub wetland for the pipelines. Permanent wetland impacts would include the conversion of 34.5 acres of emergent and scrub-shrub wetland for the LNG terminal facilities. Operational impacts associated with the pipeline facilities include the permanent conversion of 25.4 acres of forested wetlands and 2.8 acres of scrub-shrub wetlands to other wetland types.

To minimize impacts on wetlands at the LNG terminal site and along the pipeline routes, Creole Trail would implement the requirements of our Procedures. Additionally, Creole Trail would cross several wetlands along the proposed pipeline rights-of-way using the HDD method, which would avoid the need to clear or otherwise disturb about 11.1 acres, 10.2 acres, and 0.09 acre of emergent, forested, and scrub-shrub wetlands, respectively.

Creole Trail has requested variances to our Procedures for construction in and near wetlands, including the use of a 135-foot-wide construction right-of-way within all wetlands crossed by Segments 2 and 3. In the draft EIS, we concluded that a 110-foot-wide construction right-of-way in wetlands would be reasonable to accommodate the dual pipelines along Segments 2 and 3, but did not approve the requested 135 feet due to lack of adequate justification. In its comments on the draft EIS, Creole Trail filed an expanded discussion and justification for its proposed variance. Creole Trail explained in more detail why the proposed 135-foot right-of-way width would be needed to maintain safe working conditions, provide for effective and efficient operation of equipment, and contain the excavated material within the right-of-way limits. Based on our review of the additional information filed by Creole Trail, we believe that the proposed 135-foot-wide right-of-way in wetlands is necessary and justified for construction of the dual 42-inch-diameter pipeline in wetlands in the project area, and we approve Creole Trail's variance request.

Creole Trail has prepared a draft ARMP (see Appendix E) that is under review by the COE, LADWF, NOAA Fisheries, FWS and other resource agencies to meet the section 401/404, Coastal Use, and other federal, state, and local requirements. The draft ARMP describes project-related impacts on wetlands, including EFH, and proposed mitigation measures. For impacts resulting from construction and operation of the LNG terminal site, Creole Trail proposes a mitigation ratio of 1.5:1 for both tidal wetlands (including EFH) and non-tidal wetlands. Creole Trail's proposed mitigation would result in the creation or restoration of 154.3 acres of tidal marsh. Further, in its draft ARMP, Creole Trail has evaluated six potential DMPA sites for the beneficial use of dredged material that would result from construction of the proposed LNG terminal. To mitigate for impacts on forested wetlands along the pipeline routes, Creole Trail proposes a mitigation ratio of 1:1 for the temporary loss of forested wetlands that would be allowed to revert to pre-construction conditions, and a ratio of 2:1 for the permanent conversion of forested wetland to emergent or scrub-shrub wetland. Creole Trail proposes to purchase

wetland mitigation credits from approved wetland mitigation banks. In comments on the draft EIS, the COE, FWS, and LADWF stated that compensatory mitigation, including mitigation ratios, should be determined based on an acceptable evaluation method in coordination with the appropriate agencies, and the COE noted that compensatory mitigation would be assessed after Creole Trail's COE application has gone through the section 404 (CWA) avoidance and minimization review process.

Creole Trail would need to replace an existing COE DMPA at the LNG terminal site that would no longer be available once the LNG terminal is constructed. 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." Area M was not identified as one of the alternative DMPA locations being evaluated by Creole Trail. However, Area M is a currently approved DMPA for the COE, and all COE DMPAs undergo NEPA review as part of the approval process. In comments on the draft EIS, the Port of Lake Charles expressed concern about how incremental costs associated with this exchange would be covered, and requested 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. It is our understanding that the COE will not approve an ARMP without having a final agreement on a replacement for DMPA "O." Because the draft ARMP is still under review by the agencies, we have recommended that Creole Trail file a copy of the final approved ARMP with the Commission prior to the start of 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.

5.1.6 Vegetation

Construction of the proposed LNG terminal would affect about 315.4 acres of vegetated land. About 123.7 acres would be converted to non-vegetated surfaces (e.g., buildings, process areas, open water, roads). The remaining 191.7 acres would be restored to preconstruction contours, planted with native grasses, and maintained in an herbaceous state by periodic mowing. These impacts are not expected to be significant on a regional scale, as large areas with vegetative characteristics similar to those that currently exist on the property surrounding the LNG site.

Construction of the proposed pipelines, associated aboveground facilities, and access roads would affect approximately 1,782.8 acres of vegetated land. Upon completion of construction, approximately 923.7 acres of vegetation would be within the permanently maintained pipeline right-of-way, aboveground facilities, or permanent access roads. All temporary workspace would be reseeded or allowed to revegetate naturally to pre-construction conditions in accordance with our Plan and Procedures. Pre- and post-construction measures would be implemented to ensure successful revegetation of these areas.

5.1.7 Wildlife and Aquatic Resources

Wildlife

The impact of construction and operation of the proposed project on wildlife would be the temporary alteration and permanent loss of habitat. Other negative impacts of construction and operation of the Creole Trail Project are expected to be minimal.

Initial clearing and construction activities would result in the disruption of wildlife habitat comprising open water, coastal prairie/grasslands, upland forest, agricultural land, developed land, and emergent, forested, and scrub-shrub wetlands. Other than a permanent loss of habitat at the LNG terminal

site, we do not expect wildlife to be affected by the operation of the LNG terminal. Once construction is completed, wildlife could re-occupy available habitat at the LNG terminal site.

The areas disturbed by construction, excluding areas occupied by aboveground facilities, would be revegetated after construction has been completed. Wildlife populations that use areas converted for the permanent pipeline rights-of-way would not be affected. Although temporary and permanent impacts on food, cover, and water sources may occur, none of the species identified within the project area are specialized in such a way that construction of a pipeline would inhibit the overall fitness or reproductive viability of the populations as a whole. Many of the mammal, bird, reptile, and amphibian species are adaptive to changing habitat conditions and have the capability of temporarily expanding or shifting their home ranges to find alternative sources of food, water, and shelter until the right-of-way habitats become re-established.

The FWS noted that lighting, communication, and/or flare towers associated with the operation of the LNG terminal could result in impacts on trans-Gulf of Mexico migratory birds. Creole Trail has committed to implementing the FWS's guidelines for the siting, construction, operation and decommissioning of communication towers at the LNG terminal site.

The majority of the project area consists of emergent marsh and coastal prairie/grassland that provide habitat for wintering waterfowl and rookeries. Given the abundant adjacent areas that can provide alternative habitat, we conclude that there would be no significant impact on migratory waterfowl. Creole Trail would continue to monitor the project area for colonial wading bird rookies and would conduct any additional necessary surveys within the year of construction.

Aquatic Resources

The proposed LNG terminal site would be south of Calcasieu Lake and at the southern end of the Calcasieu Ship Channel. Despite ongoing ship traffic, the Calcasieu Ship Channel supports a wide variety of shellfish and finfish species. The pipeline would cross several waterbodies, including Calcasieu Lake. Potential impacts on aquatic resources from project construction and operation include those associated with dredging of the berth area, and pipeline construction across waterbodies and through wetlands.

Given the existing water quality conditions with relatively high suspended sediment concentrations, dredging would not be expected to noticeably increase turbidity in the already turbid waters of the Calcasieu Ship Channel. Overall impacts on the fishery resources in the project area generally would be minimal and short term. The fish and benthic organisms of the area would be affected slightly during the construction phase of the marine terminal basin and construction dock, but recruitment and re-colonization would replenish the species with a minor potential for a subtle shift of species using the slip area. In addition to the loss/alteration of aquatic habitats, the primary impacts on fishes associated with dredging include entrainment of organisms by dredging machinery and increased turbidity due to the re-suspension of bottom sediments. Incidental take of benthic organisms due to entrainment during the dredging of the marine terminal basin and construction dock would be expected, but would not be extensive enough to have a significant impact on the fishery resources of the area. The LADWF is mandated under Louisiana law to protect oyster resources and also has authority over the establishment of artificial reefs in navigable waters of Louisiana. Creole Trail proposes monetary compensation to the LADWF for impacts on substrate and oysters and fishery resources within Calcasieu Lake. In addition to monetary compensation, Creole Trail proposes to create up to 45 acres of reef for finfish and oysters to enhance EFH in Calcasieu Lake.

Other potential effects of construction include temporary interruption of fish and invertebrate movement in and out of the estuary either during development changes or during foraging. Construction may cause temporary emigration of fish populations from the immediate area in order to avoid areas of elevated suspended sediments. However, it is unlikely that relocation or disrupted migration would significantly affect fish populations because construction activities would be short term and localized.

Direct spills of petroleum or other toxic products into waterbodies during construction and facility operation could be harmful to aquatic organisms, depending on the type, quantity, and concentration of the spill. To reduce the potential for direct surface water contamination, Creole Trail would implement the procedures in its SPCC Plan, including restrictions on refueling equipment and storing fuel and other potentially toxic materials at least 100 feet from waterbodies during construction.

Post-construction and operational impacts would be minimal and primarily associated with periodic maintenance dredging in the berthing area. The increased ship traffic would not result in a measurable increase in aquatic impacts.

Impacts on fisheries resources resulting from pipeline construction activities at waterbody crossings can include sedimentation and turbidity, alteration or removal of instream and stream bank fish cover, introduction of water pollutants, or entrainment of small organisms during hydrostatic testing. Studies generally have indicated that pipeline construction through waterbodies results in temporary impacts on streams and rivers, and that there are no long-term effects on water temperature, pH, dissolved oxygen, benthic invertebrate populations, or fish populations. Creole Trail would implement the measures in our Procedures, which include the use of screening on intake hoses, to minimize entrainment or impingement of fish when withdrawing water for hydrostatic testing.

Post-construction or operational impacts of the pipeline would be minimal. Restoration of the vegetation along the pipeline construction work areas would minimize erosion potential relative to waterbodies. Minimal impact on fisheries is expected from maintenance mowing or manual removal of woody vegetation in the vicinity of the pipeline right-of-way as maintenance would be in accordance with our Plan and Procedures.

Essential Fish Habitat

Construction of the proposed project is not expected to have a significant impact on EFH. Impacts on EFH from the construction of the proposed project can be divided into two general categories: those associated with loss or alteration of habitat and those associated with dredging activities. These impacts can be further divided into those that result in temporary or permanent effects on EFH and species. The primary impact of construction and operation of the project facilities would be the alteration and, to a lesser extent, direct loss of habitat types that could function as EFH for the various species.

NOAA Fisheries identified aquatic and tidally influenced wetland habitats in the project area as designated EFH for postlarval, juvenile, and subadult life stages of two species of shellfish (brown and white shrimp); postlarval, juvenile, and subadult life stages of red drum (EFH for the adult stage of red drum is also present in the general vicinity, including an area that could potentially be affected if DMPA Alternative 4 is selected); and the late juvenile, subadult, and adult life stages of bonnethead shark. Potential for EFH that would be affected during construction of the LNG marine facilities includes the open water within and adjacent to the Calcasieu Ship Channel that would be dredged during construction. Operation of the LNG terminal would result in the permanent loss of 64.3 acres of these wetlands. An additional 49.8 acres of open water habitat would be created by construction of the proposed marine facilities. Creole Trail estimates that installation of the pipeline would temporarily affect 735.7 acres of EFH along Segment 2, including 692.7 acres of EFH associated with Calcasieu Lake. Use of the HDD

method would avoid a total of 0.9 mile of EFH. Operation of the pipeline facilities should have minimal impacts on EFH since the pipeline would be buried and the existing EFH would become reestablished in the construction corridor. NOAA Fisheries has not yet verified EFH impacts.

Creole Trail has committed to mitigating unavoidable wetland and EFH impacts resulting from construction and operation of the LNG terminal and pipeline as outlined in its draft ARMP (see Appendix E). Creole Trail proposed to mitigate for temporary and permanent impacts on EFH wetlands at the LNG terminal site at a 1:5:1 mitigation ratio through creation or restoration of 154.3 acres of tidal wetlands. Creole Trail proposes to monitor the created or restored tidal wetlands annually for at least 3 years and to consult with appropriate agencies if monitoring indicates poor plant survival or insufficient coverage.

Pipeline construction in Calcasieu Lake would involve trenching and temporary stockpiling of excavated sediments adjacent to the pipeline trench and floatation channels. Approximately 692.7 acres of bottom sediments (EFH habitat) would be temporarily disturbed in Calcasieu Lake due to pipeline construction. Pipeline construction and restoration activities within and adjacent to waterbodies would be conducted in accordance with our Procedures and Creole Trail's ARMP, which would minimize impacts on EFH.

5.1.8 Threatened and Endangered Species

Agency consultations resulted in the identification of 21 federally listed threatened or endangered species that potentially occur in the project area. These include: five marine reptile species (hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, green sea turtle, and loggerhead sea turtle); seven marine mammals (sperm whale, blue whale, sei whale, fin whale, humpback whale, North Atlantic right whale, and West Indian manatee); one terrestrial mammal (Louisiana black bear); four bird species (bald eagle, brown pelican, piping plover, red-cockaded woodpecker); three fish species (Gulf sturgeon, pallid sturgeon, smalltooth sawfish); and one plant species (American chaffseed).

The FWS has stated that the project would not affect the West Indian manatee, Louisiana black bear, or pallid sturgeon. The FWS has also concurred that the project is not likely to adversely affect the bald eagle, brown pelican, American chaffseed, or waterbird rookeries. Construction and operation of the LNG terminal and pipelines would not affect the piping plover, but this species and its critical habitat are known to occur at one of the potential DMPA sites being evaluated for the beneficial use of dredged material. NOAA Fisheries stated that use of some of the DMPA sites would also have the potential to affect sea turtles. Creole Trail has agreed to implement a seasonal timing restriction if DMPA Alternative 4 is used to minimize potential impacts on sea turtles. Additional consultations with FWS and NOAA Fisheries will be conducted once the DMPA site(s) is selected.

Creole Trail would implement the updated version of NOAA Fisheries' Strike Avoidance Plan to minimize the potential for whale encounters and collisions by LNG vessels serving the proposed LNG terminal. In addition, Creole Trail would implement several measures developed in consultation with NOAA Fisheries to minimize adverse impacts of pile driving noise on sea turtles. Our analysis and comments received to date from the FWS and NOAA Fisheries indicate that the project is not likely to adversely affect 20 of the 21 species identified.

Creole Trail has conducted several surveys for the RCW in consultation with the FWS. In an April 13, 2006 letter, the FWS recommended that Creole Trail conduct additional nesting habitat surveys and foraging habitat analysis at select locations along Segment 2. We have recommended that Creole Trail consult further with the FWS after conducting the additional RCW surveys recommended by the FWS.

We have not yet completed consultation with the FWS because of incomplete information for the RCW. Construction of the LNG terminal would not begin until Creole Trail has obtained all of the necessary permits and approvals. According to comments Creole Trail filed on the draft EIS, its updated construction schedule for the proposed pipelines contemplates commencement of select HDD crossings in 2007, followed by mainline and lake construction in 2008. Therefore, we have recommended that Creole Trail not begin construction activities until we complete any necessary consultations with the FWS and Creole Trail receives written notification from the Director of OEP that construction and/or implementation of conservation measures may begin. We have also recommended that, if construction does not begin within 1 year of issuance of FERC authorization, Creole Trail conduct follow-up consultations with the FWS and NOAA Fisheries prior to beginning construction.

5.1.9 Land Use, Recreation, and Visual Resources

The LNG terminal facilities and marine basin would be located on property formerly used by the COE for dredge spoil placement. Existing land uses on the site include a mixture of open land, forest land, developed land, and open water. Land use impacts associated with the construction (367.3 acres) and operation (123.7 acres) of the LNG terminal primarily would be associated with the conversion of land that would be required for operation of the LNG facilities from existing uses to industrial use. There are no existing or planned residential developments located within 0.25 mile of the proposed LNG terminal. The closest residence is approximately 1.5 miles east of the proposed LNG terminal property boundary, across the Calcasieu Ship Channel in Cameron, Louisiana.

The LNG terminal site includes an abandoned petroleum storage tank battery that would be removed prior to construction. Creole Trail would also remove an abandoned 6-inch-diameter production flow line owned by Apache that has been inactive for more than 10 years and is located beneath the proposed LNG tanks. We have recommended that Creole Trail file additional information describing how it would remove and dispose of the abandoned petroleum storage tank battery and Apache pipeline, including a discussion of whether there would be any contamination associated with the abandoned facilities and, if so, how contaminated materials would be managed during removal and disposal of the facilities.

Construction of the proposed pipeline facilities would require disturbance of existing land uses within construction work areas (2,729.6 acres). The new permanent right-of-way required for operation and maintenance of the pipeline facilities would occupy 1,066.5 acres. Following recent hurricane events in the project area, 18 structures, including 9 residences, occur within 50 feet of the proposed pipeline construction work area (one additional residence and two additional structures within the construction area were destroyed by hurricane activity). Creole Trail would implement several measures to minimize construction impacts on residences and has developed site-specific plans for construction within 25 feet of residences. We have recommended that Creole Trail file an updated site-specific plan for one residence where access has not yet been granted once access has been obtained. We have also recommended that Creole Trail file evidence of landowner concurrence if the construction work area and fencing would be located within 10 feet of a residence.

The proposed pipelines would cross two Louisiana Natural and Scenic Rivers: Barnes Creek and the Calcasieu River. However, these rivers would be crossed by the HDD method which would preclude the need to disturb the stream bottoms or banks. Two visually scenic byways, the Creole Nature Trail National Scenic Byway (State Highway 27/82) and the Zydeco Cajun Prairie Scenic Byway, would be crossed by the dual pipelines. These pipeline crossings would be conducted using the road bore method. Therefore, impacts would be short term, limited to the duration of construction and restoration. Once construction is complete, long-term effects would be minor. Segment 3 would also cross the Barnes Creek Savannah Natural Area. Impacts on this natural area would be minimized by the proposed route,

which includes collocation with an existing right-of-way through a portion of the area, and a deviation from the existing right-of-way that would avoid an additional portion of the natural area. Other recreational areas in the vicinity of the proposed pipeline route include the Cameron Prairie National Wildlife Refuge and the Crown Point Distinctive Site. These areas are within 0.25 mile of the route, but would not be crossed by the proposed pipelines.

Five hazardous waste sites have been identified within 0.25 mile of pipeline construction work areas. Creole Trail would coordinate with landowners and operators of these facilities to ensure that these facilities are not impacted by pipeline construction or operation.

Operation of the project facilities would affect recreational boating and fishing during the arrival, unloading, and departure of the LNG ships. If the Coast Guard issues a LOR finding the waterway suitable for LNG marine traffic, the Coast Guard would impose a moving safety zone around LNG ships during transit up the Calcasieu Ship Channel and a moored security zone while berthed at the LNG terminal. If moving safety zones, security zones at the terminal, and one-way traffic were implemented, they would affect other commercial, ferry, and recreational traffic using the channel. The moving safety zones, if implemented, may have the effect of temporarily limiting commercial shipping in the Calcasieu Ship Channel to one-way traffic. This presently occurs in the project area because vessels over 32 feet in draft are not allowed to meet opposing traffic within the system above the jetties if their combined beam exceeds 50 percent of the channel project width. Crude vessels constitute the majority of the ship traffic, and many of these vessels have a beam width greater than 140 feet. In addition, LNG vessels have a moving safety zone that prohibits any passing of these vessels. However, the Lake Charles Pilots have stated that this safety zone does not include recreational vehicles, which are requested to transit along the bank furthest from the LNG vessel. The Coast Guard has stated that it would make every effort to minimize disruption to other water way users

The primary project components that could have a visual impact on the surrounding areas are the marine terminal basin, where large LNG ships would dock, and the LNG storage tanks. Potential public viewpoints include the community of Cameron, Louisiana, boaters on the Calcasieu Ship Channel and Calcasieu Lake, and motorists on the Creole Nature Trail National Scenic Byway. The shoreline of the Calcasieu Ship Channel is largely industrial.

The LNG terminal and a large portion of the pipeline routes are located within a coastal zone management area. Creole Trail submitted its Coastal Use Permit application to the Coastal Management Division on October 10, 2005 concurrent with its COE section 404 permit application. We have recommended that Creole Trail file a copy of the CZMP consistency determination issued by the LADNR before construction begins.

5.1.10 Socioeconomics

Construction and operation of the Creole Trail Project would result in short- and long-term socioeconomic impacts. Temporary and permanent fiscal benefits would result from construction and operation of the project in the form of additional tax revenues at the state and parish level.

The construction workforce for the LNG terminal is expected to average 390 workers per month with a peak of 610 workers over a 36- to 42-month period. The construction workforce for the pipeline is expected to average 300 to 400 workers over a 9-month period. A percentage of the workforce would be comprised of non-local workers migrating into the project area. The temporary influx of the construction workforce would cause a short-term increase in population, which could have minor effects on the availability of temporary housing and public services around the project area. The data for this EIS was collected before the occurrence of Hurricane Rita and the EIS was written before the full economic and

social effects of the hurricane were completely cataloged. Accordingly, our analysis is based on the assumption that recovery and rebuilding efforts will restore the project area to approximate pre-Hurricane Rita conditions. Before Hurricane Rita, Cameron Parish would have been able to accommodate the temporary construction workers for the LNG terminal who prefer to live in this parish. Nearby communities in Calcasieu Parish (e.g., Sulphur, Lake Charles) also had more than sufficient housing to accommodate the peak workforce for the LNG terminal. Accommodating temporary construction workers is likely to be a regional priority for several years.

Because the pipeline facilities would be divided into four construction spreads, the workforce for the pipelines would be distributed geographically throughout the project area and would have access to larger population centers. Given the relatively short pipeline construction period, most workers would likely prefer temporary quarters, and many non-local construction workers would likely provide their own housing (e.g., trailers, campers). We believe that the non-local workforce associated with construction of the pipeline facilities would not unduly burden the local supply of temporary housing.

Truck and worker construction traffic to the LNG terminal site may generate more than 400 trips during the morning and the evening commuting hours, which has the potential to adversely impact commuters to the Cameron Ferry departure port. Therefore, we have recommended that Creole Trail develop a Traffic and Transportation Mitigation Plan to prevent the adverse impacts on commuters to and users of the Cameron Ferry associated with heavy construction traffic to and from the LNG terminal site via State Highway 27/82.

During operation of the LNG terminal, although there would be a moving safety zone around transiting LNG ships, the addition of 300 to 400 LNG ships per year would not have a long-term impact on commercial ship traffic in the area. The moving safety zones, if implemented, may have the effect of temporarily limiting some commercial shipping activity in the Calcasieu Ship Channel to one-way traffic. This presently occurs with large vessel because of existing restrictions in the ship channel above the entrance jetties.

Creole Trail would employ between 76 and 93 full-time workers to maintain and operate the LNG terminal facilities. About 10 full-time positions would be created for operation of the pipeline.

5.1.11 Cultural Resources

Creole Trail consulted with the Louisiana SHPO and performed cultural resource investigations for the APE for the LNG terminal. No prehistoric or historic cultural resources were located at the LNG terminal site as a result of surveys completed. In a letter dated March 21, 2005, the Louisiana SHPO concurred with the recommendations in the draft survey report for the LNG terminal. In addition, the Louisiana SHPO concurred on June 8, 2006 that no known archaeological sites or historic properties would be affected by the proposed dredge material placement area alternatives.

Creole Trail consulted with the Louisiana SHPO and performed cultural resource investigations for the APE for the proposed pipeline routes. One cultural resource was identified along Segment 2 and 10 cultural resources were identified along Segment 3. The Segment 2 cultural resource has been previously determined to be not eligible for listing on the NRHP by the Louisiana SHPO and would be avoided. Three of the 10 cultural resources along Segment 3 are recommended eligible for listing on the NRHP. Creole Trail realigned its proposed pipeline route to avoid impacts on one of the sites and has stated it would avoid impacts on the other two sites. Approximately 0.4 mile of Segment 2 and 6.9 miles of Segment 3, as well as temporary extra workspace areas associated with the HDD crossing at the Gulf Intracoastal Waterway and the Calcasieu Ship Channel, have not been surveyed where access to property is pending.

Underwater surveys of the nautical portion of Segment 2 through Calcasieu Lake identified 88 magnetic anomalies. The magnetic anomalies are recommended for further investigation because they cannot be eliminated as potential shipwrecks. Creole Trail has proposed to avoid the sites by use of a 164-foot buffer. If any of the anomalies cannot be avoided, Creole Trail recommends additional investigations (e.g., additional magnetic survey, probing the bottom sediments) to determine if they represent potential shipwrecks. In the event a potential buried shipwreck was discovered by probing, an archaeological diver would assess the site to determine its potential eligibility for listing on the NRHP.

Present evidence suggests that no historic properties would be affected by construction of the project. However, surveys have not been completed for portions of the pipeline route where land owners have denied access and the Louisiana SHPO's comments are pending.

In order to assure that the ACHP would have the opportunity to comment on any historic properties that might be identified by these studies, we have recommended that Creole Trail not be allowed to construct any facilities, use any staging, storage, or temporary work areas, or use any access roads, until it files the survey reports, any required treatment plans, and the SHPO comments with the Commission, and is given written authorization to proceed by the Director of the OEP.

5.1.12 Air Quality and Noise

Air emissions resulting from construction of the LNG terminal and pipelines would be short term and would not significantly affect air quality in the region. Creole Trail would minimize fugitive dust emissions during construction by the use of dust suppression techniques such as watering.

During operation, air emissions would result from the operation of the SCVs, standby diesel generator, firewater pump, electric turbine generator, and fugitive emission sources. In addition, emissions would result from maneuvering and hoteling of LNG ships at the marine berth, and from an onsite natural gas electric turbine generator. The terminal would be subject to appropriate state air permitting requirements. As requested by the LADEQ in its comments on the draft EIS, information in this EIS regarding emissions sources and estimated emissions has been revised to reflect the information included in a January 2006 supplement that Creole Trail filed with the LADEQ for its pending air permit application. We have recommended that Creole Trail file a complete copy of its air permit application with the Commission prior to beginning construction of the LNG terminal. The use of STV technology was considered as an alternative to the proposed SCVs based on comments from the TCEQ. Because Creole Trail has proposed control technologies on the SCVs and turbine generators and would have to demonstrate the use of best available control technology on significant emissions sources, we did not recommend the use of STV instead of SCV technology.

Except for pile driving, construction activities would be unlikely to increase the existing ambient noise levels at the nearest NSAs when equipment is in operation. Creole Trail estimates that pile driving would be completed over a 13-month period during daytime hours, unless delays dictate that nighttime work is required to meet the schedule. Noise from pile driving activities would depend on the type of pile and equipment used. Noise calculations completed by Creole Trail based on monitoring of pile driving activities at the Sabine Pass LNG facility determined that the estimated increase in noise at the nearest NSAs to the Creole Trail LNG terminal site would not exceed 2 dBA. In general, the human ear's threshold of perception for noise change is 3 dBA; therefore, noise impacts from pile driving on the nearest NSAs are expected to be minimal.

Calculated noise levels anticipated from operation of the LNG terminal would be below 55 dBA. No adverse, long-term impacts would therefore be anticipated. However, we have recommended that Creole Trail complete a noise survey no later than 60 days after the project goes into operation to confirm

that noise attributable to operation of the LNG terminal would not exceed an L_{dn} of 55 dBA at the nearest NSA.

The greatest potential for noise impacts associated with the proposed pipeline facilities would be from HDD operations during construction. Noise from HDD activities is a temporary impact. The increase in dBA L_{dn} as a result of HDD construction noise near the NSAs is expected to range 0.9 to 22 dBA L_{dn} . Creole Trail would attempt to adhere to a 12-hour drilling schedule to minimize noise impacts on nearby NSAs. If a longer drilling period is required, Creole Trail would notify the affected NSAs of the anticipated additional noise levels and implement noise mitigation measures, as necessary. Noise mitigation measures may include the construction of acoustical enclosures around noise producing pumps and engines and upgrading intake and exhaust silencers on engines.

5.1.13 Alternatives

We evaluated the alternatives of no action or postponed action; system alternatives; alternative LNG terminal sites; pipeline system alternatives; route alternatives; and route variations. We do not recommend the no action or postponed action alternatives. Our evaluation determined that the use of existing LNG import and storage systems is not a reasonable alternative to the proposed Creole Trail Project. In conclusion, we have determined that the proposed project is the preferred alternative that can meet the project objectives.

For the Coast Guard's proposed action, which is the issuance of a Coast Guard LOR finding the waterway suitable for LNG marine traffic with certain conditions, the no action alternative would be the issuance of Coast Guard LOR finding the waterway not suitable for LNG marine traffic. Reasonable alternatives to the Coast Guard action of issuing an LOR with conditions include: 1) Issuance of a Coast Guard LOR finding the waterway suitable for LNG marine traffic without any conditions, and 2) Postponing the issuance of a Coast Guard LOR pending further analysis and study.

To date, there are one existing, two approved, and three proposed offshore LNG projects in the Gulf of Mexico. These offshore LNG terminal technologies are new technologies for LNG storage and vaporization and we do not consider them to be environmentally preferable and practical alternatives to the proposed project. Of the four existing onshore LNG terminals, only one (Trunkline LNG Terminal and its recently approved expansion) could serve the same markets as the proposed project. In addition, there are seven approved onshore LNG projects and seven proposed onshore LNG projects (excluding the Creole Trail Project, and including expansions of two existing LNG terminals) that would be located along the Gulf coast. Our analysis found that expansion of any one of these existing, approved, or proposed projects to accommodate the proposed volumes of the Creole Trail Project would likely result in a similar level of environmental impacts, and/or would not be capable of accommodating the natural gas volumes or serving the customers proposed by Creole Trail.

We assessed regional and port alternatives, as well as individual site alternatives at multiple port locations. Our analysis identified five potential LNG terminal sites, including the proposed site. After analyzing each site against critical criteria and project objectives, four potential sites were eliminated. We concluded that there are no practical LNG terminal sites which meet the proposed project objectives and that offer a clear environmental advantage to the proposed Creole Trail LNG terminal site.

We also assessed potential alternative berth locations, LNG process areas, and LNG storage tank locations within the proposed site. No preferred alternatives were identified as superior to the proposed locations.

Additionally, six alternative DMPAs were analyzed. Creole Trail is continuing to work with the appropriate agencies, officials, and landowners to develop an acceptable plan to accomplish the proposed dredging at the LNG terminal site while satisfying the beneficial use requirement, necessary wetland mitigation, and replacement of the portion of COE DMPA "O" that would be lost by construction of the proposed berth. As noted previously, a site referred to as "Area M" may be exchanged with a portion of DMPA "O" as a result of recent legislation. Creole Trail is preparing, and will submit to the Commission when available, a final ARMP in which it will recommend a plan to meet the above objectives and to support its application for the COE Section 404 permit, LADEQ Section 401 permit, and LADNR Coastal Use Permit.

System alternatives such as use of existing or proposed pipeline systems for the proposed Creole Trail pipeline were assessed. To transport the additional 3.3 Bcfd proposed by Creole Trail, these systems would require significant modification, including either construction of additional pipelines, larger diameter pipelines, additional looping, or compression, which would result in the same or greater levels of environmental impact as the proposed action. Further, it may not be possible for the existing pipelines along the routes of the approved or proposed pipelines to accept the added 3.3 Bcfd at their various proposed interconnect locations.

In evaluating pipeline alternatives, we reviewed both route alternatives and route variations for the pipeline segments. Of the eight route alternatives analyzed, all would result in equal or greater environmental impacts and therefore were not considered preferable to the proposed project.

Creole Trail filed nine proposed route variations and minor relocations of certain M&R stations in its August 31, 2005 supplemental filing. Based on our review, we believe that these route variations M&R station relocations are appropriate and would minimize environmental impacts.

5.1.14 Reliability and Safety

We evaluated the safety of both the proposed facilities and the related LNG vessel transit through the Calcasieu Ship Channel. As part of our evaluation, we performed a cryogenic design and technical review of the proposed terminal design and safety systems. Several areas of concern were noted with respect to the proposed facility, and specific recommendations have been identified to be addressed: prior to initial site construction; prior to construction after final design; prior to commissioning; or prior to commencement of service.

Thermal radiation and flammable vapor hazard distances were calculated for an accident or an attack on an LNG vessel. For 1-, 1.4-, 2.5-, 3.0-, and 3.9-meter-diameter holes in an LNG cargo tank, we estimated distances to range from 2,164 to 5,250 feet for a thermal radiation level of 1,600 Btu/ft²-hr, the level which is hazardous to unprotected persons located outdoors. Based on a 1-meter-diameter hole, an unignited release would result in an estimated pool radius of 421 feet. The unignited vapor cloud would extend to 9,776 feet to the lower flammability limit and 14,377 feet to one half the lower flammability limit. Flammable vapor dispersion for larger holes was not performed since, realistically, the cloud would not even extend to the maximum distance for a 1-meter-diameter hole before encountering an ignition source. However, the evaluation of safety is more than an exercise in calculating the consequences of worst case scenarios. Rather, it is a determination of the acceptability of risk which considers: the probability of events, the effect of mitigation, and the consequences of events. Based on the extensive operational experience of LNG shipping, the structural design of an LNG vessel, and the operational controls imposed by the Coast Guard and the local pilots, the likelihood of a cargo containment failure and subsequent LNG spill from a vessel casualty – collision, grounding, or allision – is highly unlikely. For similar reasons, an accident involving the onshore LNG import terminal is unlikely to affect the public. As a result, the risk to the public from accidental causes should be considered negligible.

As part of our marine safety analysis, we considered how vessel security requirements for LNG ships calling on the proposed LNG terminal might affect other ship and boat traffic in Calcasieu Ship Channel. Based on the Coast Guard's longstanding experience in controlling the movements of dangerous cargo vessels in the Calcasieu Ship Channel (including LNG vessels), potential impacts can be evaluated for several general security requirements: 1) moving safety zone for inbound and outbound LNG vessels; 2) security zone around a moored LNG vessel; and 3) other measures as deemed appropriate. If the Coast Guard issues a LOR finding the waterway suitable for LNG marine traffic, the moving safety zone, and the security zone at the terminal, may affect other commercial, ferry, and recreational traffic using the channel. The impact on Cameron Ferry traffic would generally be small because the ferry only crosses the LNG ship route and conflicts could be managed by schedule coordination. The Cameron Ferry Marine Operations Supervisor, the ferry Captains, and the Lake Charles Pilots are accustomed to working together to ensure safe and efficient marine operations.

The extent of the impact on recreational boaters would depend on the number of boats in the project area during the multiple LNG vessel transits per week when LNG ships would call on the LNG terminal, and on several other variables such as the size of the Coast Guard-imposed moving safety and moored security zone and the width of the channel at the point where a boat encounters the LNG ship. However, the Lake Charles Pilots have stated that this safety zone does not include recreational vehicles, which are requested to transit along the bank furthest from the LNG vessel. Vessels attempting to travel through the channel while an LNG ship is being maneuvered into the berth may experience delays up to 60 minutes. To minimize potential impacts on other marine traffic, the Coast Guard is expected to use a program of announcements to give advance notice of each moving safety and moored security zone schedule and could schedule the transit of LNG ships for times of day less likely to affect recreational boaters.

Unlike accidental causes, historical experience provides little guidance in estimating the probability of a terrorist attack on an LNG vessel or onshore storage facility. For an LNG import terminal proposal that would involve having a large volume of energy transported and stored near populated areas, the perceived threat of a terrorist attack is a primary concern of the local population and requires that resources be directed to mitigate possible attack paths. While the risks associated with the transportation of any hazardous cargo can never be entirely eliminated, they can be managed.

An issue that has developed for several LNG terminal projects is a concern that local communities would have to bear some of the costs of ensuring the security/emergency management of the LNG facility and the LNG vessel while in transit and unloading at the dock. The specific security/emergency management costs for the proposed project are not yet available. The final costs associated with security would be determined after the specific security needs and responsibilities have been established by the Coast Guard through consultations with other federal, state, and local agencies.

As required by its regulations (section 127.009), the Coast Guard is responsible for issuing a LOR as to the suitability of the waterway for LNG marine traffic. Creole Trail submitted a LOI to the Coast Guard on January 21, 2005. On August 15, 2005, Creole Trail submitted a WSA for the proposed project to the Captain of the Port for Coast Guard Marine Safety Unit Lake Charles. The Coast Guard, with input from various stakeholders, which included the Lake Charles Harbor and Terminal District, marine pilots, towing industry representatives, and members of the Calcasieu Area Harbor Safety Committee and Area Maritime Security Committee, has completed a review of Creole Trail's WSA in accordance with the guidance in NVIC 05-05. The WSA review focused on the navigation safety and maritime security risks posed by LNG marine traffic, and the measures needed to responsibly manage these security risks.

On February 27, 2006, the Coast Guard sent a letter to FERC, based on the above WSA review, providing input on the capability of the port community to implement the risk management measures

necessary to responsibly manage the risks of LNG marine traffic in the port. As described in this document, the Coast Guard has preliminarily determined that the Calcasieu River to the proposed LNG terminal in Cameron, Louisiana may be suitable for accommodating the type and frequency of LNG vessels being proposed by the applicant. This determination, however, is preliminary because the required NEPA analysis has not yet been completed. This determination is also contingent upon the port security community having the appropriate resources to implement all the measures necessary to responsibly manage the safety and security risks of LNG marine traffic in this area.

Once these plans are finalized and the resources required to implement them have been identified, Creole Trail will be able to more specifically discuss the funding of such resources. In order to better define how the potential burden on local communities would be addressed, we have recommended that Creole Trail provide a plan that identifies the mechanisms for funding project-specific security/emergency management costs that would be imposed on state agencies and local communities.

5.1.15 Cumulative Impacts

There are four proposed or approved LNG projects along the Calcasieu Ship Channel: the Creole Trail Project (which is addressed in this EIS), the Cameron LNG Project (which was approved by the Commission in September 2003), the Cameron LNG Expansion Project (an expansion of the Cameron LNG Project and currently under review by the Commission), and the Trunkline LNG Terminal Expansion Project (an expansion of an existing LNG terminal at Lake Charles, which was approved by the Commission in December 2002; construction for the expansion is ongoing). If the Creole Trail Project is approved in addition to these two projects, all four LNG projects would result in cumulative impacts on land use, wetlands, and ship traffic in the Calcasieu Ship Channel.

Additionally, if all or some of the several approved and proposed pipeline projects in the region are constructed, they would result in cumulative impacts on biological resources, socioeconomics, and land use. Several of the reasonably foreseeable pipeline projects would be collocated within the same rights-of-way proposed by Creole Trail. We have recommended that for areas where the Creole Trail Project would be collocated with one or more planned pipeline(s) adjacent to an existing right-of-way, the first pipeline to be constructed should be constructed closest to the existing right-of-way, and the Creole Trail pipeline should be constructed with a 25-foot offset from the nearest existing pipeline. We have also recommended that Creole Trail file alignment sheets and environmental information to support the new alignment with the Secretary for review and written approval by the Director of OEP.

5.2 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission issues their authorization for the proposed project, we recommend that the Commission's Order include measures 1 through 91. We believe that these measures would further mitigate the environmental impacts associated with the construction and operation of the proposed project:

1. Creole Trail LNG, L.P., and Cheniere Creole Trail Pipeline Company (Creole Trail) shall follow the construction procedures and mitigation measures described in its application(s) and supplement filings (including responses to staff data requests) and as identified in the environmental impact statement (EIS) unless modified by this Order. Creole Trail must:
 - a. request any modification to these procedures, measures, or conditions in a filing with the Secretary of the Commission (Secretary);
 - b. justify each modification relative to site-specific conditions;

- c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
 - d. receive approval in writing from the Director of the Office of Energy Projects (OEP) **before using that modification.**
2. For the liquefied natural gas (LNG) facilities, the Director of OEP has delegated authority to take all steps necessary to ensure the protection of life, health, property and the environment during construction and operation of the project. This authority shall include:
- a. stop-work authority and authority to cease operation; and
 - b. the design and implementation of any additional measures deemed necessary to assure continued compliance with the intent of the conditions of this Order.
3. For the pipeline facilities, the Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the project. This authority shall allow:
- a. the modification of conditions of this Order; and
 - b. design and implementation of any additional measures deemed necessary (including stop work authority) to assure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from project construction and operation.
4. **Prior to any construction**, Creole Trail shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors (EI), and contractor personnel will be informed of the EIs' authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.
5. The authorized facility locations shall be as shown in the EIS, as supplemented by filed alignment sheets, and shall include all of the staff's recommended facility locations. **As soon as they are available, and before the start of construction**, Creole Trail shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by this Order. All requests for modifications of environmental conditions of this Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

Creole Trail's exercise of eminent domain authority granted under Natural Gas Act (NGA) section 7(h) in any condemnation proceedings related to this Order must be consistent with these authorized facilities and locations. Creole Trail's right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

6. Creole Trail shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, and documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be

affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction** in or near that area.

This requirement does not apply to extra workspace allowed by the *Upland Erosion Control, Revegetation, and Maintenance Plan*, minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

- a. implementation of cultural resources mitigation measures;
- b. implementation of endangered, threatened, or special concern species mitigation measures;
- c. recommendations by state regulatory authorities; and
- d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

7. **Within 60 days of the acceptance of this certificate and before construction begins**, Creole Trail shall file an initial Implementation Plan with the Secretary for review and written approval by the Director of OEP describing how Creole Trail will implement the mitigation measures required by this Order. Creole Trail must file revisions to the plan as schedules change. The plan shall identify:

- a. how Creole Trail will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;
- b. the number of EIs assigned per spread, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;
- c. company personnel, including EIs and contractors, who will receive copies of the appropriate material;
- d. the training and instructions Creole Trail will give to all personnel involved with construction and restoration (initial and refresher training as the project progresses and personnel change), with the opportunity for OEP staff to participate in the training session(s);
- e. the company personnel (if known) and specific portion of Creole Trail's organization having responsibility for compliance;
- f. the procedures (including use of contract penalties) Creole Trail will follow if noncompliance occurs; and
- g. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:
 - (1) the completion of all required surveys and reports;
 - (2) the mitigation training of onsite personnel;
 - (3) the start of construction; and
 - (4) the start and completion of restoration.

8. Creole Trail shall develop and implement an environmental complaint resolution procedure. The procedure shall provide landowners with clear and simple directions for identifying and resolving

their environmental mitigation problems/concerns during construction of the project and restoration of the right-of-way. **Prior to construction**, Creole Trail shall mail the complaint procedures to each landowner whose property would be crossed by the project.

- a. In its letter to affected landowners, Creole Trail shall:
 - (1) provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;
 - (2) instruct the landowners that, if they are not satisfied with the response, they should call Creole Trail's Hotline; the letter should indicate how soon to expect a response; and
 - (3) instruct the landowners that, if they are still not satisfied with the response from Creole Trail's Hotline, they should contact the Commission's Enforcement Hotline at (888) 889-8030.
 - b. In addition, Creole Trail shall include in its weekly status report a copy of a table that contains the following information for each problem/concern:
 - (1) the date of the call;
 - (2) the identification number from the certificated alignment sheets of the affected property;
 - (3) the description of the problem/concern; and
 - (4) an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.
9. Creole Trail shall employ a team of EIs (at least two per construction spread), with one available at the LNG terminal as appropriate during site preparation. The EIs shall be:
- a. responsible for monitoring and ensuring compliance with all mitigation measures required by this Order and other grants, permits, certificates, or other authorizing documents;
 - b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;
 - c. empowered to order correction of acts that violate the environmental conditions of this Order, and any other authorizing document;
 - d. a full-time position, separate from all other activity inspectors;
 - e. responsible for documenting compliance with the environmental conditions of this Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and
 - f. responsible for maintaining status reports.
10. Creole Trail shall file updated status reports prepared by the lead EI with the Secretary on a weekly basis **until all construction and restoration activities are complete**. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:
- a. the current construction status of the project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;

- b. a listing of all problems encountered and each instance of noncompliance observed by the EIs during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);
 - c. corrective actions implemented in response to all instances of noncompliance, and their cost;
 - d. the effectiveness of all corrective actions implemented;
 - e. a description of any landowner/resident complaints which may relate to compliance with the requirements of this Order, and the measures taken to satisfy their concerns; and
 - f. copies of any correspondence received by Creole Trail from other federal, state or local permitting agencies concerning instances of noncompliance, and Creole Trail response.
11. Creole Trail must receive written authorization from the Director of OEP **before commencing service** of the project. Such authorization will only be granted following a determination that the LNG facility has been constructed in accordance with Commission approval and applicable standards, can be expected to operate safely as designed, and the rehabilitation and restoration of the right-of-way is proceeding satisfactorily.
12. **Within 30 days of placing the certificated facilities in service**, Creole Trail shall file an affirmative statement with the Secretary, certified by a senior company official:
- a. that the facilities have been constructed and installed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or
 - b. identifying which of the certificate conditions Creole Trail has complied with or will comply with. This statement shall also identify any areas affected by the project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.
13. Creole Trail shall prepare a schedule identifying when trenching or blasting would occur within each waterbody greater than 10 feet wide. Creole Trail shall file the schedule with the Secretary **within 30 days** of the acceptance of the certificate and revise it as necessary to provide **at least 14 days advance notice**. Changes within this last 14-day period must provide for **at least 48 hours advance notice**.
14. Creole Trail shall replace any potable water supply system that it damages during construction and cannot repair to its former capacity and quality. **Within 1 year of completion of construction**, Creole Trail shall file a report with the Secretary identifying all potable water supply systems damaged by construction and how they were repaired.
15. **Before construction**, Creole Trail shall file with the Secretary the location by milepost of all private wells within 150 feet of (pipeline construction or blasting) activities. Creole Trail shall conduct, with the well owner's permission, pre- and post-construction monitoring of well yield and water quality for these wells. **Within 30 days of placing the facilities in service**, Creole Trail shall file a report with the Secretary discussing whether any complaints were received concerning well yield or water quality and how each was resolved.
16. Creole Trail shall 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 shall monitor for subsidence at the applicable locations during its post-construction monitoring, and shall correct for any subsidence that may occur due to decomposition of the buried construction debris. (page 2-33)

17. Creole Trail shall file with the Secretary the results of the final, detailed slope stability analysis to confirm the stability of the proposed final slopes at the LNG terminal under static and dynamic conditions as recommended by Toulany-Wong Engineers, Inc. (TWEI). Creole Trail shall also file any plans developed to implement the recommendations indicated by this study for review and written approval by the Director of OEP **prior to beginning construction of the LNG terminal.** (page 4-12)
18. Creole Trail shall prepare a Plan for the Discovery and Management of Contaminated Soils and Groundwater for the proposed Creole Trail Project. This plan shall comply with applicable state and federal regulations and shall include procedures for the identification and management of unknown contaminants if any are encountered during construction of the proposed LNG terminal and pipeline facilities. The plan shall be filed with the Secretary for review and written approval by the Director of OEP **prior to construction.** (page 4-15)
19. Creole Trail shall consult further with the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) regarding the need to conduct a Tier III evaluation, as described in the Inland Testing Manual, for sampling station CTL-04M. Creole Trail shall file copies of all associated communications with the COE and EPA, as well as the results of any additional testing or evaluation if applicable, with the Secretary **prior to dredging at the LNG terminal.** (page 4-22)
20. Creole Trail shall confirm with the Cameron Parish Water District 10 that the water demands of the proposed project would be met by the water district, and file documentation of this confirmation with the Secretary **prior to beginning construction of the LNG terminal.** (page 4-29)
21. Creole Trail shall file with the Secretary a site-specific plan for the crossing of each waterbody proposed as a horizontal directional drill (HDD) crossing in the event that the HDD is unsuccessful. These site-specific plans shall include scaled drawings identifying all areas that would be disturbed by construction. Creole Trail shall file these plans for review and written approval by the Director of the OEP along with the COE permit **prior to construction across those waterbodies.** (page 4-34)
22. Creole Trail shall evaluate the feasibility of using the HDD method to cross Indian and Marsh Bayous and develop a site-specific construction plan for each of these crossings in coordination with the COE and Louisiana Department of Wildlife and Fisheries (LADWF) that clearly identifies all construction work areas including the laydown area for the pipe string if the HDD method is determined to be feasible. Creole Trail shall file the results of its evaluation, the site-specific construction plans, and any agreed-upon mitigation measures to minimize impacts on riparian areas and the associated forested wetlands. Creole Trail shall file the above information with the Secretary for review and written approval by the director of OEP **prior to construction of the proposed pipeline.** (Section 4.3.2.1, page 4-35)
23. Creole Trail shall develop and file a Drilling Mud Contingency Plan for each waterbody proposed to be crossed by the HDD method. Each plan shall address how Creole Trail:

- a. will handle any inadvertent release of drilling mud into the waterbody or areas adjacent to the waterbody, including procedures to contain inadvertent releases;
- b. will seal the abandoned drill hole; and
- c. will clean up any inadvertent releases.

Creole Trail shall file each plan with the Secretary for review and written approval by the Director of OEP **before construction** of each HDD. (page 4-36)

24. Creole Trail shall develop its final plans for construction in Calcasieu Lake in coordination with the COE, Louisiana Department of Natural Resources (LADNR) Coastal Management Division, and LADWF. The plan shall describe in detail the construction methods to be used in Calcasieu Lake and include supporting alignment sheets; scaled drawings identifying all areas that would be disturbed by construction; and typical drawings to illustrate construction methods and workspace requirements. As warranted based on Creole Trail's discussions with the COE, LADNR, and LADWF, the plans shall also address:

- a. locations and dimensions of collection pits to be excavated in the lake for HDD operations;
- b. final locations and dimensions of land- and water-based workspaces required for HDD operations at the pipeline entrance and exit into and out of Calcasieu Lake;
- c. locations of turnaround areas;
- d. locations of turbidity curtains and associated supports (e.g., pilings);
- e. measures to be implemented to minimize suspension of sediments from stockpiled material excavated from the pipeline trenches; and
- f. measures to be implemented to ensure that the proper depth of cover is obtained.

In addition to the detailed construction plans, Creole Trail shall file at the same time copies of any related plans required by or developed in coordination with the COE, LADNR, or LADWF such as a lighting/signage plan, turbidity curtain monitoring plan, and/or survey monitoring plan for bottom contours. Creole Trail shall file this information with the Commission for review and written approval by the Director of OEP **prior to beginning pipeline construction**. (page 4-38)

25. **Prior to construction**, Creole Trail shall file with the Secretary a copy of the finalized Aquatic Resources Mitigation Plan developed in consultation with the COE, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service (FWS), LADNR, LADWF, and Port of Lake Charles. (page 4-61)

26. Creole Trail shall consult with the FWS after conducting the additional surveys for the red cockaded woodpecker as recommended by the FWS. The results of consultations with the FWS, any additional survey reports, and FWS comments on the survey reports shall be filed with the Secretary **as soon as they become available**. (page 4-106)

27. Creole Trail shall not begin construction activities **until**:

- a. the FERC completes any necessary consultations with the FWS; and
- b. Creole Trail receives written notification from the Director of OEP that construction and/or implementation of conservation measures may begin.

If construction has not begun **within 1 year** from the date of issuance of the FERC approval of the project, Creole Trail shall consult with the appropriate offices of the FWS and NOAA Fisheries to update the species list and to verify that previous consultations and determinations of effect are still current. Documentation of these consultations, and the need for additional surveys and survey reports (if required), and FWS or NOAA Fisheries comments on the surveys and survey reports and their conclusions, shall be filed with the Secretary of the Commission **prior to beginning construction.** (page 4-109)

31. Creole Trail shall file information describing how it would remove and dispose of the abandoned petroleum storage tank battery and Apache Corporation pipeline present at the LNG terminal site. This information shall also include a discussion of whether there would be any contamination associated with the abandoned facilities and, if so, how contaminated materials would be managed during removal and disposal of the facilities. Creole Trail shall file this information with the Secretary for review and written approval of the Director of OEP **prior to beginning construction of the LNG terminal.** (page 4-112)
32. Creole Trail shall file:
 - a. an updated site-specific plan (or reconfirmation of the current site-specific plan, if no changes are deemed necessary) for the residence at MP 48.2 on Segment 3 once access to the property becomes available, and
 - b. evidence of landowner concurrence if the construction work area and fencing would be located within 10 feet of a residence.

Creole Trail shall file the above information with the Secretary, for review and written approval by the Director of OEP, **prior to beginning construction of the pipeline system.** (page 4-124)

33. Creole Trail **shall not begin construction of any facilities** associated with the Creole Trail Project until it files with the Secretary a copy of the Coastal Zone Management Program consistency determination issued by the LADNR. (page 4-130)
34. Creole Trail shall develop a Traffic and Transportation Mitigation Plan and file this plan with the Secretary of the Commission **prior to beginning construction of the LNG terminal.** This plan shall explain the measures that Creole Trail would take to prevent adverse impacts on commuters to and users of the Cameron Ferry associated with heavy construction traffic to and from the LNG terminal site via State Highway 27/82. (page 4-139)
35. Creole Trail shall defer implementation of any treatment plans/measures (including archaeological data recovery), construction of pipeline facilities, and use of associated staging, storage, or temporary work areas and new or to-be-improved access roads **until:**
 - a. Creole Trail files with the Secretary cultural resources survey and evaluation reports, any necessary treatment/avoidance plans, and the Louisiana SHPO comments; and
 - b. the Director of OEP reviews all cultural resources survey reports and plans, and notifies Creole Trail in writing that treatment plans/mitigation measures may be implemented or construction may proceed.

All material filed with the Commission containing **location, character, and ownership information** about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: “**CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE.**” (page 4-145)

- 36. Creole Trail shall file a copy of its complete air permit application as submitted to the LADEQ, including all supplemental information, with the Secretary of the Commission **prior to beginning construction of the LNG terminal.** (page 4-156)
- 37. Creole Trail shall make all reasonable efforts to ensure its predicted noise levels from the LNG terminal are not exceeded at the noise sensitive areas (NSAs) and file noise surveys with the Secretary **no later than 60 days** after placing the LNG terminal in service. However, if the noise attributable to the operation of the LNG terminal exceeds a day-night sound level of 55 decibels on the A-weighted scale at a NSA, Creole Trail shall file a report on what changes are needed and shall install additional noise controls to meet the level **within 1 year** of the in-service date. Creole Trail shall confirm compliance with these requirements by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls. (page 4-168)
- 38. For areas where the Creole Trail Project would be collocated with one or more planned pipeline(s) adjacent to an existing right-of-way, the first pipeline to be constructed shall be constructed closest to the existing right-of-way. The Creole Trail pipeline shall be constructed with a 25-foot offset from the nearest existing pipeline. For the Creole Trail Project, these areas include:

MILEPOST	POTENTIALLY COLLOCATED PROJECT
(Segment 3)	
1.4 to 10.7	Cameron LNG Project
8.9 to 10.7	Liberty Storage Project
26.5 to 26.8	Liberty Storage Project
26.5 to 26.8	Port Arthur LNG Project
29.0 to 32.0	Liberty Storage Project

Prior to construction, Creole Trail shall file alignment sheets and environmental information to support the new alignment with the Secretary for review and written approval by the Director of OEP. (page 4-231)

- 39. Creole Trail shall **annually** review its waterway suitability assessment relating to LNG vessel traffic for the project; update the assessment to reflect changing conditions which may impact the suitability of the waterway for LNG marine traffic; provide the updated assessment to the cognizant Captain of the Port/Federal Maritime Security Coordinator (COTP/FMSC) for review and validation and if appropriate, further action by the COTP/FMSC relating to LNG vessel traffic; and provide a copy to FERC staff.. (page 4-203)
- 40. **Prior to accepting** ships greater than 140,000 cubic meters in capacity, Creole Trail should provide the necessary information to demonstrate that the transient hazard areas identified in the final EIS are applicable. Creole Trail shall file this information with the Secretary for review and

written approval of the Director of OEP. This information should also be provided to the U.S. Coast Guard (Coast Guard). (page 4-216)

The following measures shall apply to the LNG terminal design and construction details. Information pertaining to these specific recommendations shall be filed with the Secretary for review and approval by the Director of OEP either: prior to initial site preparation; prior to construction of final design; prior to commissioning; or prior to commencement of service as indicated by each specific recommendation. Items relating to Resource Report 13-Engineering and Design Material and security should be submitted as critical energy infrastructure information (CEII) pursuant to 18 CFR § 388.112 and PL01-1. Information pertaining to items such as: offsite emergency response; procedures for public notification and evacuation; and construction and operating reporting requirements would be subject to public disclosure. This information shall be submitted a minimum of 30 days before approval to proceed is required.

41. A complete plan and list of the hazard detection equipment shall be filed **prior to initial site preparation**. The information shall include a list with the instrument tag number, type and location, alarm locations, and shutdown functions of the proposed hazard detection equipment. Plan drawings shall clearly show the location of all detection equipment. (page 4-173)
42. Creole Trail shall provide a technical review of its proposed facility design that:
 - a. Identifies all combustion/ventilation air intake equipment and the distances to any possible hydrocarbon release (LNG, flammable refrigerants, flammable liquids and flammable gases).
 - b. Demonstrates that these areas are adequately covered by hazard detection devices and indicate how these devices would isolate or shutdown any combustion equipment whose continued operation could add to or sustain an emergency.
 - c. Creole Trail LNG shall file this review **prior to initial site preparation**. (page 4-173)
43. A complete plan and list of the fixed and wheeled dry-chemical, fire extinguishing, and high expansion foam hazard control equipment shall be filed **prior to initial site preparation**. The information shall include a list with the equipment tag number, type, size, equipment covered, and automatic and manual remote signals initiating discharge of the units. Plan drawings shall clearly show the planned location of all fixed and wheeled extinguishers. (page 4-173)
44. Facility plans showing the proposed location of, and area covered by, each monitor, hydrant, deluge system, hose and sprinkler, as well as piping and instrumentation diagrams, of the fire water system shall be filed **prior to initial site preparation**. (page 4-173)
45. A copy of the hazard design review and list of recommendations that are to be incorporated in the final facility design shall be provided **prior to initial site preparation**. (page 4-173)
46. The size and location of the line proposed for the accidental process spill calculation, in compliance with National Fire Protection Association (NFPA) 59A 2.2.2.2, shall be identified and the containment configuration drawings, vapor dispersion and thermal radiation calculations for the accidental spill impoundment shall be filed **prior to initial site preparation**. (page 4-173)
47. Procedures shall be developed for offsite contractors' responsibilities, restrictions, limitations and supervision of these contractors by Creole Trail LNG staff **prior to initial site preparation**. (page 4-174)

48. Creole Trail shall demonstrate that the tank impoundment volume is at least 110 percent of the maximum liquid volume of the tank. All thermal radiation and flammable vapor exclusion zones related to resized dikes or impoundments shall be recalculated. This information shall be filed with the Commission **prior to initial site preparation**. (page 4-186)
49. Creole Trail shall develop an Emergency Response Plan (including evacuation) and coordinate procedures with local emergency planning groups, fire departments, state and local law enforcement, and appropriate federal agencies. This plan shall include at a minimum:
 - a. designated contacts with state and local emergency response agencies;
 - b. scalable procedures for the prompt notification of appropriate local officials and emergency response agencies based on the level and severity of potential incidents;
 - c. procedures for notifying residents and recreational users within areas of potential hazard;
 - d. evacuation routes/methods for residents of Cameron and other public use areas that are within any transient hazard areas;
 - e. locations of permanent sirens and other warning devices; and
 - f. an “emergency coordinator” on each LNG vessel to activate sirens and other warning devices.

The Emergency Response Plan shall be filed with the Secretary for review and written approval by the Director of OEP **prior to initial site preparation**. Creole Trail shall notify FERC staff of all planning meetings in advance and shall report progress on the development of its Emergency Response Plan at **3-month** intervals. (page 4-196)

50. The Emergency Response Plan shall include a Cost-Sharing Plan identifying the mechanisms for funding all project-specific security/emergency management costs that would be imposed on state and local agencies. In addition to the funding of direct transit-related security/emergency management costs, this comprehensive plan should include funding mechanisms for the capital costs associated with any necessary security/emergency management equipment and personnel base. The Cost-Sharing Plan shall be filed with the Secretary for review and written approval by the Director of OEP **prior to initial site preparation**. (page 4-196)
51. Creole Trail shall examine provisions to retain any vapor produced along the transfer line trenches and other areas serving to direct LNG spills to associated impoundments. Measures to be considered may include, but are not limited to: vapor fencing; intermediate sump locations; or trench surface area reduction. Creole Trail LNG shall file final drawings and specifications for these measures with the Secretary **prior to initial site preparation** for review and approval by the Director of OEP. (page 4-189)
52. The **final design** shall include spill and leak detection in the jetty isolation valve area. (page 4-174)
53. The **final design** of the hazard detection equipment shall identify manufacturer and model. (page 4-174)
54. The **final design** shall specify that all hazard detectors be installed with redundancy, fault detection and fault alarm monitoring. (page 4-174)
55. The **final design** of the hazard detection equipment shall provide flammable gas and ultraviolet/infrared hazard detectors with local instrument status indication as an additional safety feature. (page 4-174)

56. The **final design** of the fixed and wheeled dry-chemical, fire extinguishing and high expansion foam hazard control equipment shall identify manufacturer and model. (page 4-174)
57. The **final design** shall include a spectacle blind in the vapor return line, between the vapor block valve and the connection to the LNG unloading line of the dual service unloading arm, on each platform. (page 4-174)
58. The **final design** shall include details of the LNG flow measurement system provided for the top and bottom fill to each tank. (page 4-174)
59. The **final design** shall include a discretionary vent for each tank, to be operated through the distributed control system. (page 4-174)
60. The **final design** shall include provisions to flare all low pressure boiloff and flash gas. (page 4-174)
61. The **final design** shall include drawings and specifications of the spill protection system to be applied to the LNG tank roof and outer shell. (page 4-174)
62. The **final design** shall include details of the storage tank piping support structure. (page 4-174)
63. The **final design** shall include details of the LNG tank tilt settlement and differential settlement limits between each LNG tank and piping and procedures to be implemented in the event that limits are exceeded. (page 4-174)
64. The **final design** shall include a cooldown bypass valve round the discharge control valve of each intank pump. (page 4-174)
65. The **final design** shall include a recycle line from the end of the LNG sendout pump suction header to storage. The line shall be sized to allow the boiloff gas (BOG) condenser and suction header to be stabilized prior to pump cool down. (page 4-174)
66. The **final design** shall specify that at the maximum LNG specific gravity, specified for the design of the system and at full LNG tank conditions and maximum BOG condenser operating pressure, the discharge pressure of the LNG sendout pumps shall not exceed 90 percent of the LNG vaporizer design pressure. (page 4-174)
67. The **final design** shall include installation of a check valve down stream of the minimum flow recycle line in the secondary pump discharge piping. (page 4-175)
68. The **final design** shall include automatic shutoff isolation valves for the suction and discharge of the return blowers. (page 4-175)
69. The **final design** shall include provisions to install temporary high pressure boiloff compression in the event that sendout operation is curtailed, or ceased for a period in excess of thirty days. Details shall include plans and drawings of the boiloff gas recovery system and specifications of the equipment and compressors to be installed. (page 4-175)
70. The **final design** shall include details of the proposed installation of the liquid removal systems associated with the operation of the BOG compressor knock-out drum V-103 and liquid drain pot V-104. (page 4-175)

71. The **final design** shall include provisions to alarm the condition of high liquid level in the drip leg and prevent the return blowers from operating in the event of a High-High level. (page 4-175)
72. The **final design** shall include provisions to pipe unloading line relief valves and other LNG reliefs and vents directly to storage or to an intermediate vent vessel. (page 4-175)
73. The **final design** shall include an LNG sample vaporization system. (page 4-175)
74. The **final design** shall include a fire protection evaluation carried out in accordance with the requirements of NFPA 59A, chapter 9.1.2. (page 4-175)
75. The **final design** shall include details of the shut down logic, including cause and effect matrices for alarms and shutdowns. (page 4-175)
76. The **final design** shall include emergency shutdown of equipment and systems activated by hazard detection devices for flammable gas, fire and cryogenic spills, when applicable. (page 4-175)
77. The **final design** shall include details of the air gaps to be installed downstream of all seals or isolations installed at the interface between a flammable fluid system and an electrical conduit or wiring system. Each air gap shall vent to a safe location and be equipped with a leak detection device that: shall continuously monitor for the presence of a flammable fluid; shall alarm the hazardous condition; and shall shutdown the appropriate systems. (page 4-175)
78. The **final design** shall include a hazards and operability review of the completed design. A copy of the review and a list of the recommendations shall be provided. (page 4-175)
79. All valves including drain, vent, instrument root, main and car sealed valves shall be tagged in the field during construction and **prior to commissioning**. (page 4-175)
80. Copies of the Coast Guard security plan and vessel operating plan shall be provided to FERC staff shall be filed **prior to commissioning**. (page 4-176)
81. Security personnel requirements for prior to and during LNG carrier unloading shall be provided **prior to commissioning**. (page 4-176)
82. Operation and maintenance procedures and manuals, as well as safety procedure manuals, shall be filed **prior to commissioning**. (page 4-176)
83. The contingency plan for failure of the LNG tank outer shell shall be filed **prior to commissioning**. (page 4-176)
84. A copy of the criteria for horizontal and rotational movement of the inner vessel for use during and after cool down shall be filed **prior to commissioning**. (page 4-176)
85. **Prior to commissioning**, Creole Trail shall coordinate, as needed, with the Coast Guard to define the responsibilities of Creole Trail's security staff in supplementing other security personnel and in protecting the LNG ships and the terminal. (page 4-194)
86. The FERC staff shall be notified of any proposed revisions to the security plan and physical security of the facility **prior to commencement of service**. (page 4-176)

87. Progress on the construction of the LNG terminal shall be reported in **monthly** reports filed with the Secretary. Details shall include a summary of activities, problems encountered and remedial actions taken. Problems of significant magnitude shall be reported to the FERC **within 24 hours**. (page 4-17)

The following measures shall apply throughout the life of the facility:

88. The facility shall be subject to regular FERC staff technical reviews and site inspections on at least a **biennial** basis or more frequently as circumstances indicate. Prior to each FERC staff technical review and site inspection, Creole Trail LNG shall respond to a specific data request including information relating to possible design and operating conditions that may have been imposed by other agencies or organizations. Up-to-date detailed piping and instrumentation diagrams reflecting facility modifications and provision of other pertinent information not included in the semi-annual reports described below, including facility events that have taken place since the previously submitted semi-annual report, shall be submitted. (page 4-176)
89. **Semi-annual** operational reports shall be filed with the Secretary to identify changes in facility design and operating conditions, abnormal operating experiences, activities (including ship arrivals, quantity and composition of imported LNG, vaporization quantities, boil-off/flash gas, etc.), plant modifications including future plans and progress thereof. Abnormalities shall include, but not be limited to: unloading/shipping problems, potential hazardous conditions from offsite vessels, storage tank stratification or rollover, geysering, storage tank pressure excursions, cold spots on the storage tanks, storage tank vibrations and/or vibrations in associated cryogenic piping, storage tank settlement, significant equipment or instrumentation malfunctions or failures, non-scheduled maintenance or repair (and reasons therefore), relative movement of storage tank inner vessels, vapor or liquid releases, fires involving natural gas and/or from other sources, negative pressure (vacuum) within a storage tank and higher than predicted boiloff rates. Adverse weather conditions and the effect on the facility also shall be reported. Reports shall be submitted **within 45 days** after each period ending **June 30 and December 31**. In addition to the above items, a section entitled "Significant plant modifications proposed for the next 12 months (dates)" also shall be included in the semi-annual operational reports. Such information would provide the FERC staff with early notice of anticipated future construction/maintenance projects at the LNG facility. (page 4-176)
90. In the event the temperature of any region of any outer tank shell, including pipe supports, becomes less than the minimum specified operating temperature for the material, the Commission shall be notified **within 24 hours** and procedures for corrective action shall be specified. (page 4-177)
91. Significant non-scheduled events, including safety-related incidents (i.e., LNG or natural gas releases, fires, explosions, mechanical failures, unusual over pressurization, and major injuries) and security related incidents (i.e., attempts to enter site, suspicious activities) shall be reported to FERC staff. In the event an abnormality is of significant magnitude to threaten public or employee safety, cause significant property damage, or interrupt service, notification shall be made **immediately**, without unduly interfering with any necessary or appropriate emergency repair, alarm, or other emergency procedure. In all instances, notification shall be made to FERC staff **within 24 hours**. This notification practice shall be incorporated into the LNG facility's emergency plan. Examples of reportable LNG-related incidents include:
- a. fire;
 - b. explosion;

- c. estimated property damage of \$50,000 or more;
- d. death or personal injury necessitating in-patient hospitalization;
- e. free flow of LNG for five minutes or more that results in pooling;
- f. unintended movement or abnormal loading by environmental causes, such as an earthquake, landslide, or flood, that impairs the serviceability, structural integrity, or reliability of an LNG facility that contains, controls, or processes gas or LNG;
- g. any crack or other material defect that impairs the structural integrity or reliability of an LNG facility that contains, controls, or processes gas or LNG;
- h. any malfunction or operating error that causes the pressure of a pipeline or LNG facility that contains or processes gas or LNG to rise above its maximum allowable operating pressure (or working pressure for LNG facilities) plus the build-up allowed for operation of pressure limiting or control devices;
- i. a leak in an LNG facility that contains or processes gas or LNG that constitutes an emergency;
- j. inner tank leakage, ineffective insulation, or frost heave that impairs the structural integrity of an LNG storage tank;
- k. any safety-related condition that could lead to an imminent hazard and cause (either directly or indirectly by remedial action of the operator), for purposes other than abandonment, a 20 percent reduction in operating pressure or shutdown of operation of a pipeline or an LNG facility that contains or processes gas or LNG;
- l. safety-related incidents to LNG vessels occurring at or en route to and from the LNG facility; or
- m. an event that is significant in the judgment of the operator and/or management even though it did not meet the above criteria or the guidelines set forth in an LNG facility's incident management plan.

In the event of an incident, the Director of OEP has delegated authority to take whatever steps are necessary to ensure operational reliability and to protect human life, health, property or the environment, including authority to direct the LNG facility to cease operations. Following the initial company notification, FERC staff would determine the need for a separate follow-up report or follow-up in the upcoming semi-annual operational report. All company follow-up reports shall include investigation results and recommendations to minimize a reoccurrence of the incident. (page 4-177)