

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 Matagorda Ship and Point Comfort Channels 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 Calhoun LNG Project would result in limited adverse environmental impacts. If the Project is approved by the Commission 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 Calhoun Point Comfort and data developed from data requests; field investigations by the Commission staff; literature research; alternatives analysis; comments from federal, state, and local agencies; and input from public groups and individual citizens.

As part of our review, we developed measures that we believe would appropriately and reasonably avoid, minimize, or mitigate 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.

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 Matagorda Ship and Point Comfort Channels 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. In addition, Calhoun Point Comfort 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.

The discussion below summarizes the environmental impacts and the proposed or recommended mitigation for each resource analyzed in this draft EIS.

5.1.1 Geology

Construction and operation of the Project would have minimal impact on geological resources. The existing topography at the LNG terminal site would be permanently changed by the excavation and dredging of an unloading slip for the marine terminal. The natural topographic slope and contours would be temporarily altered along much of the pipeline route by grading and trenching activities. However, Calhoun Point Comfort would restore topographic contours and drainage conditions to the extent practicable to preconstruction conditions following installation of the pipeline.

Several natural gas production wells (Neuman Production) are planned near the Enhanced Recovery Project DMPA. We have recommended that Calhoun Point Comfort provide the results of its consultation with Neuman Production, and applicable state and federal agencies, regarding planned natural gas production wells near the Enhanced Recovery Project DMPA and any proposed reconfiguration of the Enhanced Recovery Project DMPA. Twelve oil and gas production wells would be within 150 feet of the pipeline construction right-of-way; however, of these wells, eight are dry and the remaining four may be operational. Prior to construction, Calhoun Point Comfort would conduct a detailed survey of the pipeline route and it would be adjusted to avoid any obstacles, including existing wells. Therefore, construction of the proposed pipeline would not affect these wells. No geologic hazards would be expected to affect the proposed facilities.

The terminal would lie in an area of low seismic risk. Site-specific analysis conducted for the LNG terminal site revealed that due to low level of ground motion predicted at the site, earthquake hazards were not considered a controlling factor in facility design. A low risk of seismic activity and faulting effects can be reasonably anticipated for the Project area. Calhoun Point Comfort determined that there is low risk of soil liquefaction at the LNG terminal site. To mitigate potential liquefaction risks at its LNG terminal site, Calhoun Point Comfort would construct the LNG storage tanks on a concrete pile cap supported by concrete piles. The concrete pile cap would be designed to act as a two-way slab to distribute vertical loads laterally.

5.1.2 Soils and Sediments

Construction of the LNG terminal would permanently affect 73 acres of manmade, industrial land that was created by the placement of dredged material from Lavaca Bay and Cox Bay. Construction of the pipeline would temporarily impact about 221.7 acres of prime farmland soil. Five aboveground facilities associated with the proposed pipeline would result in the removal of a total of 1.7 acres of prime farmland soils from agricultural use. Most impacts would be short-term and would not affect the potential use of prime farmland for agricultural purposes.

Calhoun Point Comfort would implement the FERC's Plan and Procedures during construction and restoration, which would minimize impact on soils. In addition, Calhoun Point Comfort would develop specific procedures in coordination with the appropriate agencies to prevent the introduction or spread of noxious weeds and soil pests resulting from construction and restoration activities.

About 4.2 million cubic yards of material would be dredged from Lavaca Bay. Of this amount, about 3.5 million cubic yards would be for the CCND's turning basin and 0.7 million cubic yards would be for Calhoun Point Comfort's ship berth. As part of Calhoun Point Comfort's draft DMMP, the CCND and Calhoun Point Comfort identified five DMPAs within Lavaca Bay and Cox Bay where it intends to dispose of, and permanently store, dredged material. In total, the DMPAs have the capacity to accommodate the 4.2 million cubic yards of material that would be dredged for the turning basin and the ship berth

There is a potential for LNG ship movements to cause shoreline erosion, and this impact is dependant on several factors, including the number of ships, ship size, hull shape, speed and draft, propeller action, and proximity to shore. Given the current volume of large ship traffic in

the channels, the additional incremental ship traffic resulting from operation of the Calhoun LNG Terminal is not expected to substantially increase shoreline erosion.

5.1.3 Water Resources

Groundwater

Construction and operation of the Project would not have a significant impact on groundwater resources in the Project area. There are no municipal or commercial water wells within 400 feet of the proposed construction workspaces of the LNG terminal, pipeline, or laterals. Four private water supply wells are near the Point Comfort Pipeline construction right-of-way and include livestock, unregistered, household, and irrigation wells. One of these wells is inside and one is within 3 feet of the edge of the construction right-of-way and would be staked, flagged, and avoided by Calhoun Point Comfort. Should these wells be impacted during construction, Calhoun Point Comfort would restore or replace the wells, or if necessary, provide an alternate source of water. The greatest potential for impact on groundwater would be from spills, leaks, or other releases of hazardous substances during construction or operation. Calhoun Point Comfort has agreed to implement the FERC's Procedures, which include use of Spill Prevention and Response Procedures that meet state and federal requirements and has developed a draft *Water Quality Management Plan*, which includes a SPCC Plan. The SPCC Plan would be implemented during construction of the facilities and addresses potential spills of fuel, lubricants, and other hazardous materials. It describes spill prevention practices, spill handling and emergency notification procedures, and training requirements and it also describes mitigation measures, including containment and cleanup, to minimize potential impacts should a spill occur. We believe that using the measures detailed in Calhoun Point Comfort's draft *Water Quality Management Plan* and SPCC Plan would minimize or eliminate the potential for adverse impacts on groundwater resources.

Surface Water

Construction of the terminal's new marine basin would impact about 66.1 acres of open water as a result of dredging to create the proposed turning basin while 13.2 acres would be affected by proposed excavation and dredging of the LNG ship berth. Water quality in the area being dredged would be temporarily affected by increased turbidity during dredging, but would return to preconstruction conditions following completion of dredging. The proposed pipeline would cross 65 surface waterbodies. Calhoun Point Comfort would cross eleven of these waterbodies using the horizontal directional drill method, fourteen waterbodies using the bore method, and the remaining 40 waterbodies using the open-cut method. To minimize impact on surface waters, Calhoun Point Comfort would implement the protective measures in the FERC's Procedures. Calhoun Point Comfort would be required to obtain several permits that would address dredging and dredge material management, including permits from the COE under Section 404 of the CWA and Section 10 of the Rivers and Harbor Act.

Operational impacts of the LNG terminal on marine waters would include periodic maintenance dredging of the maneuvering area and marine terminal basin. As part of its maintenance plan, the CCND and Calhoun Point Comfort estimate that 300,000 cubic yards of material would be dredged from the turning basin and ship berth on an annual basis. Over a 50-year planning period for maintenance dredging about 15.0 mcy of material would be dredged from these areas.

Maintenance material would be placed at the five DMPAs and Calhoun Point Comfort indicated that it could place excess volumes at Alcoa's bauxite impoundments or process water ponds or an identified upland confined placement area and would evaluate other suitable DMPAs during the implementation of the 50-year planning period. We have recommended that the CCND, on behalf of Calhoun Point Comfort, determine the final placement location of this maintenance dredge material before dredging operations begin.

As with other large cargo ships, LNG carriers would take on some ballast water to maintain stability and trim as they offload their cargo, but they would not be fully loaded when departing the Calhoun LNG Terminal. The amount of ballast water required by each LNG carrier would vary according to its size and the weather conditions. A typical 138,000 m³ LNG carrier would require about 13.7 millions gallons of water, which would be obtained in Lavac Bay and transported out of the waterway. The larger 200,000 m³ ships would withdraw about 19.8 million gallons of water. This would constitute a minor but long-term impact to water resources of Lavaca Bay.

5.1.4 Vegetation

Wetland Vegetation

No tidal wetlands or vegetated tidal flats would be impacted by the LNG terminal. Construction of the Point Comfort Pipeline would affect about 23.8 acres of wetlands. Of this amount, about 20.1 acres would be emergent, 0.8 acre would be scrub-shrub, 0.7 acres would be forested, and 2.2 acres would be and emergent/forested mix. During construction, Calhoun Point Comfort would minimize impact on wetlands by implementing measures in the FERC's Procedures.

Calhoun Point Comfort consulted with the FWS, COE, NOAA Fisheries, and the TGLO regarding the development of a mitigation plan that would compensate for impacts to discuss wetland mitigation options associated with the Point Comfort Pipeline. Based on its consultations, Calhoun point Comfort prepared a *draft Wetland and Waters of the U.S. Mitigation Plan* which considers three wetland mitigation options to compensate for unavoidable wetland losses: (1) on-site mitigation/restoration, (2) off-site restoration, and (3) mitigation banking. Based on Calhoun Point Comfort's meeting with the FWS, COE, NOAA Fisheries, and TGLO a consensus was reached that the purchase of wetland credits from a COE approved wetland mitigation bank would be the preferred mitigation option to compensate for forested wetlands impacts. Consultation between Calhoun Point Comfort and the agencies is on-going.

Terrestrial Vegetation

Calhoun Point Comfort's proposed 73-acre LNG terminal site consists of disturbed, undeveloped, manmade industrial land that is sparsely vegetated with grasses. Construction of the proposed pipeline would require about 416.6 acres of land, of which 338.6 acres would be open land (agricultural/range land), 27.4 acres would be woodland, and 50.6 acres would be developed land. The open land is covered by grasslands and scrub-shrub vegetation. After installation of the pipeline, crops could still be grown over the right-of-way. The permanent pipeline easement in open land would be kept in an herbaceous state. The aboveground facilities would be on industrial land and herbaceous, shrub, and brush range lands.

Calhoun Point Comfort indicated that a noxious weed, the Chinese tallow tree was found in wetlands along the pipeline right-of-way. To control the spread of this species within maintained areas, we recommended that Calhoun Point Comfort consult with the Jackson County Cooperative Extension Center about a management approach to control the spread of Chinese tallow tree along the permanent pipeline right-of-way.

Calhoun Point Comfort would follow our Plan and apply our mitigation measures for minimizing erosion and enhancing revegetation before, during, and after the construction of the Project. Therefore, we conclude that impacts on terrestrial vegetation would not be significant.

5.1.5 Wildlife and Aquatic Resources

Wildlife

Impacts on wildlife resulting from construction and operation of the Project would include the temporary alteration and permanent loss of habitat. The primary impact on wildlife would be during operation which would result in the permanent conversion of about 76.5 acres of upland habitat to industrial use. Of this amount, about 73 acres would be within the LNG terminal site and 3.5 acres would be within the aboveground facilities associated with the pipeline. This conversion to industrial use would represent a loss of wildlife habitat; however, impacts resulting from this loss would be minimal since the majority of the loss would be from the LNG terminal site where the existing habitat consists of unmanaged dredge material. Impacts to wildlife would not be significant.

Impacts on aquatic organisms would arise primarily from dredging, ship berth and dock construction, and ballast water intake by LNG ships, which could result in habitat removal and conversion; loss of organisms by direct removal, entrainment, or burial; and loss related to turbidity or noise impacts. We believe that these effects would be localized, short-term, and minor.

The primary impact on wildlife associated with the pipeline would be clearing of shrub- and wood- land habitat and temporary disturbance during construction. Some shrub- and wood- land habitat would be permanently converted to low shrub or grassland habitat as a result of vegetation maintenance on the pipeline right-of-way. During operation of the pipeline, relatively little vegetation maintenance would be required due to the large percentage of agricultural land crossed. Calhoun Point Comfort would avoid vegetation maintenance during the peak nesting period between April 15 and August 1 of any year. If vegetation clearing must be conducted during this time, Calhoun Point Comfort would survey for all migratory bird nests prior to commencing work. In addition, if an active migratory bird nest is found along the construction right-of-way, Calhoun Point Comfort would consult with the FWS to identify the most appropriate measure that should be taken to avoid or minimize impacts.

We do not expect wildlife to be significantly impacted by the Project. Once construction is completed and work areas restored, wildlife could re-occupy open available habitat. The majority of the LNG terminal site is currently industrial land with limited usefulness as wildlife habitat.

Aquatic Wildlife

NOAA Fisheries identified EFH for three shellfish species (subadult pink shrimp, and juvenile and subadult white and brown shrimp) and two species of finfish (adult red drum; adult and subadult Spanish mackerel). An EFH assessment is included in appendix B of this draft EIS. NOAA Fisheries is a cooperating agency for purposes of this EIS. NOAA Fisheries reviewed the administrative draft of this EIS and EFH Assessment and provided EFH conservation recommendations to offset adverse project impacts to EFH. We have addressed these recommendations in this draft EIS.

5.1.6 Threatened, Endangered, and Other Special Status Species

The FWS and NOAA Fisheries have identified a total of 22 federally-listed endangered or threatened species that could potentially occur in the Project area. We have made several recommendations in order to protect these endangered or threatened species. Calhoun Point Comfort prepared a bald eagle management plan that provides guidance on the protection of bald eagles, and their habitat, during construction. We have recommended that Calhoun Point Comfort consult with the FWS and TPWD regarding distances of primary and secondary management zones, should a bald eagle nest site be identified along the Point Comfort Pipeline construction right-of-way, and finalize its bald eagle management plan prior to construction. We have recommended that Calhoun Point Comfort not begin construction until all threatened and endangered species surveys are complete and filed with the FWS and the Commission, and FERC staff completes all consultations with FWS and NOAA Fisheries.

Based on our analysis of habitat that would be affected by the Project and our recommendations, we have determined that the Project would have no effect or would not likely adversely affect these species.

5.1.7 Land Use, Recreation, and Visual Resources

Construction of the Calhoun LNG Project would affect a total of about 568.9 acres of land and water. Construction of the LNG terminal would require about 73 acres of land, and about 79.3 acres offshore within the Lavaca Bay for the CCND's turning basin and Calhoun Point Comfort's ship berth. Calhoun Point Comfort's proposed pipeline route would mostly cross open land (i.e., agricultural and range land), following existing easements such as roads and other pipelines. Construction of the proposed pipeline and related facilities would disturb about 416.6 acres of land, including the construction right-of-way for the 36-inch-diameter main pipeline and 8- and 16-inch-diameter laterals, additional temporary workspaces, a contractor pipe yard, MLV, delivery points/interconnects, pig launcher and receiver, and access roads. Operation of the new facilities would require about 97.7 acres for the permanent easement along the 36-inch-diameter pipeline, 0.8 and 0.9 acre for the permanent easement along the respective 8- and 16-inch-diameter laterals, 2.9 acres for new permanent access roads, and 3.5 acres at the aboveground facilities.

No existing residences or structures are within one mile of the proposed LNG terminal. The nearest existing residential areas to the proposed LNG terminal are about 2.5 miles north of the terminal within the City of Point Comfort and 3.0 miles west within the community of Port

Lavaca. No residences are located within 50 feet of the proposed pipeline workspace. No public lands or special interest areas would be affected by the Project.

The most prominent visual features of the proposed LNG terminal would be two LNG storage tanks, each 133 feet above the current grade and 262 feet in diameter. Calhoun Point Comfort prepared photo simulations of views of the proposed LNG storage tanks from seven observation points. While the LNG storage tanks would be visible, they would not dominate the landscape, and the LNG tanks would be consistent in size and height with the existing structures of industrial facilities along the shoreline.

Operation of the project facilities would impact 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 Matagorda Ship and Point Comfort Channels 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 and recreational traffic using the waterway. The moving safety zones, if implemented, may have the effect of temporarily limiting some commercial shipping route in the Matagorda Ship and Point Comfort Channels to one-way traffic. This presently occurs with large vessels which can sometimes delay other vessels using the waterway as they wait or anchor at suitable locations to allow these vessels to pass. This could cause impacts on recreational boating and fishing but the impacts would be temporary while the LNG ship is in transit or moored at the ship unloading facility. Because the safety zone would be a moving zone around the ship, the impacts would be of short duration at any given point along the shipping route. The Coast Guard has stated that it would make every effort to minimize disruption to other waterway users.

The proposed LNG terminal and a portion of the proposed pipeline lie within designated coastal zone management area. Calhoun Point Comfort submitted its COE 404 permit application with the COE during June and July 2005, but has not received its coastal zone consistency determination from the TGLO. We have recommended that Calhoun Point Comfort not begin construction of any component of its Project until it files a copy of the consistency determination issued by the TGLO with the Secretary.

5.1.8 Socioeconomics

Construction workers commuting to the Project area are expected to add an average of approximately 834 vehicle trips per day. At the peak of construction, a maximum of 1,410 construction worker vehicle trips are expected. Existing roads would provide land access to the LNG terminal site via FM 1593, State Route 35, and existing access road for CCND's Port facilities. Access to the pipeline and associated aboveground facilities would be via existing private and public roadways. Calhoun Point Comfort notified the TDOT of its proposed Project and indicated that, one year prior to the start of construction; it would consult with the City of Point Comfort, Calhoun and Jackson County officials, and major industries in the project area to develop a traffic mitigation plan. Calhoun Point Comfort would prepare its traffic mitigation plan once construction details of its LNG terminal and pipeline are known.

During operation of the LNG terminal, although there would be safety zones around transiting LNG ships, the addition of 120 LNG ships per year would not have a long-term impact on

commercial ship traffic in the area. The moving safety zone enforced around each LNG ship and moored vessel security zone around the ship unloading facility while a ship is docked would be restricted to other commercial traffic unless permission to enter the zone is obtained from the Captain of the Port. The moving safety zones, if implemented, may have the effect of temporarily limiting the Matagorda Ship and Point Comfort Channels to one-way traffic. This presently occurs with large vessels which can sometimes delay other vessels using the waterway as they wait or anchor at suitable locations to allow these vessels to pass.

5.1.9 Transportation and Traffic

During the 35 month construction period for the terminal, Calhoun Point Comfort estimates that about 293 barges would supply construction material and equipment to the site thereby, resulting in an increase of about 9 barge trips per month. In addition, one dredging barge would be at the turning basin and ship berth site during the last 6 months of construction. While this would cause minimal water transportation impacts, operation of the terminal would result in regular LNG ship traffic. During operation, the LNG terminal would receive up to 120 LNG ships per year, or between two and three ships per week through the Matagorda Ship and Point Comfort Channels.

5.1.10 Cultural Resources

The combined archaeological overview and survey of the proposed Project, specifically the Point Comfort Pipeline, resulted in the discovery of one isolated lithic find, one historic surface scatter, and four historic standing structures. Calhoun Point Comfort recommended that these resources are not significant and not potentially eligible to the National Register of Historic Places and the SHPO concurred with these findings. Calhoun Point Comfort conducted a literature review of its proposed LNG terminal site and concluded that, since the proposed LNG terminal would be constructed entirely on manmade, industrial land that was created by the placement of dredged material from Lavaca Bay and Cox Bay, no further archeological investigations should be required. The SHPO concurred with Calhoun Point Comfort's assessment. Calhoun Point Comfort has filed an acceptable Unexpected Discoveries and Emergency Procedure Plan.

5.1.11 Air Quality and Noise

Air emissions resulting from construction of the proposed Calhoun LNG Project would be short term and would not significantly affect air quality in the region. Calhoun Point Comfort would utilize BACT for primary pollution control at the facility. A detailed BACT analysis is included in the facility's New Source Review Air Quality Permit application, which considers the technical practicability and economic reasonableness for reducing or eliminating the emissions for each major source pollutant generated by the facility. Since Calhoun and Jackson Counties are both classified as attainment areas for all criteria pollutants, the TECQ confirmed that a General Conformity review of the Project is not required. Emissions from the proposed Calhoun LNG Project are not expected to exceed 100 tons per year. Calhoun Point Comfort filed its permit application on March 18, 2005.

Noise from operation of the LNG terminal facility should not create a significant noise impact at the NSAs along the south side of the City of Point Comfort. During construction of the Point Comfort Pipeline, neighbors in the vicinity of the construction right-of-way would hear

construction noise. Traffic and farm machinery are the primary sources of ambient noise. Operational noise impacts would be limited to the meter stations' vicinity; however, predicted noise levels would not exceed the day-night sound level (L_{dn}) of 55 decibels on the A-weighted scale (dBA). We have recommended that Calhoun Point Comfort should make all reasonable efforts to assure its predicted noise levels from meter stations/interconnects are not exceeded at NSAs.

5.1.12 Reliability and Safety

We evaluated the safety of both the proposed LNG import terminal facility and the related LNG vessel transit through the Matagorda Ship and Point Comfort Channels. With respect to the onshore facility, we completed a cryogenic design and technical review of the proposed terminal design and safety systems, and have identified specific areas of concern and included recommendations to address these concerns. We also calculated thermal radiation and flammable vapor hazard distances for an accident or an attack on an LNG vessel. 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 on the Matagorda Ship and Point Comfort Channels. Based on the Coast Guard's longstanding experience in controlling the movements of dangerous cargo vessels in the Matagorda Ship and Point Comfort Channels and LNG vessels in other ports, potential impacts can be evaluated for several general security requirements: 1) moving safety zone for inbound and outbound LNG vessels; 2) one-way vessel traffic during LNG vessel transit; 3) security zone around a moored LNG vessel; and 4) other measures as deemed appropriate. The moving safety zone, the moored vessel security zone at the terminal, and one-way traffic would affect other commercial and recreational traffic using the Matagorda Ship and Point Comfort Channels. The addition of 120 LNG ships per year would have minor effect on ship traffic on the Matagorda Ship and Point Comfort Channels.

Calhoun Point Comfort submitted its LOI to the Coast Guard on March 14, 2005, which was received by the Coast Guard on August 15, 2005. The Coast Guard's LOR would address the suitability of the Matagorda Ship and Point Comfort Channels for LNG ship transportation; however, it does not constitute a final authority to commence LNG operations.

It is anticipated that the Coast Guard would decide on a LOR as soon as possible after the Commission issues the final EIS, or wait until after the Commission makes an overall public interest determination of the proposal. The Coast Guard's recommendation is subject to certain safety and security provisions, as well as Calhoun Point Comfort coordinating with the Coast Guard in their preparation of the *Liquefied Natural Gas Vessel Management and Emergency Plan*. This plan would be reviewed and updated as necessary to address issues specific to the Matagorda Ship and Point Comfort Channels and the proposed LNG vessels in transit and while

docked. Only personnel and vessels authorized by the Captain of the Port would be permitted in the safety and security zone.

The extent of the impact on recreational boaters would depend on the number of boats in the project area during the additional two to three 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 safety and security zones and the width of the channel at the point where a boat encounters the LNG ship. 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 vessel security zones 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.

The safety measures to be imposed may include moored vessel security and moving safety zones around the LNG carriers, a waterway traffic management plan, escorts by armed law enforcement vessels, and a variety of waterway and shoreline surveillance measures. Under normal security conditions, these measures should not affect vehicular traffic, nor restrict the public's access to shoreside recreation sites or unreasonably impede recreational boating. 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. While the LOR would address the suitability of Matagorda Ship and Point Comfort Channels for LNG ship transportation, it would not constitute a final authority to commence LNG operations. Issues related to the public impact of safety and security zones would be addressed later in the development of the Coast Guard's *Liquefied Natural Gas Vessel Management and Emergency Plan*. This plan would be developed in conjunction with state and local law enforcement and emergency response communities. In addition, the Coast Guard would establish a moving safety zone and moored vessel security zone under 33 CFR 165 for LNG vessels in transit and while docked. Only personnel or vessels authorized by the Captain of the Port are permitted within these zones.

Section 311 of the Energy Policy Act of 2005 stipulates that the FERC must require the LNG operator to develop an Emergency Response Plan that includes a Cost-Sharing Plan before any final approval to begin construction. The Cost-Sharing Plan shall include a description of any direct cost reimbursements to any state and local agencies with responsibility for security and safety at the LNG terminal and near vessels that serve the facility.

5.1.13 Alternatives

The EIS addresses alternatives to the proposed actions before both the FERC and the Coast Guard. The proposed action before the FERC is to consider issuing to Calhoun Point Comfort a

Section 3 authorization for the LNG import facilities and a Section 7 Certificate of Public Convenience and Necessity for a new natural gas pipeline. The proposed action before the Coast Guard is issuance of a Coast Guard LOR finding the waterway suitable for LNG marine traffic, with certain conditions. Section 3 of the EIS clearly describes the criteria for alternative selection.

We considered the alternatives of no action or postponed action, LNG system alternatives, LNG terminal site alternatives, and pipeline system and route alternatives. While the no action or postponed action alternatives would eliminate or postpone the environmental impacts identified in this EIS, the objectives of the proposed Project would not be met.

For the Coast Guard's proposed action, the no action alternative would be issuance of a Coast Guard LOR finding the waterway not suitable for LNG marine traffic. Similar to the no action alternative to the FERC proposed action, the no action alternative for the Coast Guard would avoid any project-related environmental effects; however, it would also prevent LNG vessels from delivering LNG to an import terminal and the project objectives would not be met. Reasonable alternatives to the Coast Guard action of issuing a LOR include: 1) Issuance of a Coast Guard LOR finding the waterway suitable for LNG marine traffic without any conditions; 2) Issuance of a Coast Guard LOR finding the waterway suitable for LNG marine traffic with conditions; and 3) Postponing the issuance of a Coast Guard LOR pending further analysis and study.

Our analysis of system alternatives included an evaluation of the use of existing LNG import and storage systems. None of the existing facilities has the capacity or space to add the capacity proposed in this Project. We also looked at the construction of an offshore terminal to meet the objectives of the proposed Project. Our review indicates that construction of an offshore alternative would involve a longer pipeline, the construction of a graving dock that would impact the shoreline, and a permanent onshore facility for terminal support activities. Therefore, we do not consider construction of an offshore facility a reasonable alternative to the proposed Project. We also looked at alternative port sites, none of which would provide an environmental advantage over the proposed site.

An alternative to the Coast Guard action of issuing a LOR which finds the waterway suitable for LNG vessel traffic with certain conditions is to issue a LOR without any conditions. This would avoid some of the economic effects related to any moving safety and moored vessel security zones, or other related LNG safety and security activities, which the Coast Guard would determine is necessary prior to the commencement of LNG vessels transiting the waterway. If the Coast Guard postpones issuance of a LOR pending further analysis or study, the effect is expected to be similar to the FERC postponing its action. That is, although it is speculative to predict the resulting effects, postponing issuance of a LOR may lead to Calhoun Point Comfort deciding to delay its entire project.

Our alternatives analysis included the evaluation of three pipeline route alternatives and five route variations. None of these route alternatives or variations would provide an environmental advantage over the proposed pipeline route.

In conclusion, we have determined that the proposed Calhoun LNG Terminal and Pipeline Project, as modified by our recommended mitigation, is the preferred alternative that can meet the project objectives.

5.2 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission issues their authorization for the proposed Project, we recommend that the Commission's Order (Order) include measures 1 through 90 of the following section. We believe these measures would further mitigate the environmental impacts associated with the construction and operation of the proposed Project.

1. Calhoun Point Comfort shall follow the construction procedures and mitigation measures described in its application, supplemental filings (including responses to staff data requests), and as identified in this EIS, unless modified by the Order. Calhoun Point Comfort must:
 - a. request any modification to these procedures, measures, or conditions in a filing with the 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 OEP **before using that modification**.
2. For 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 the Commission's Order; and
 - b. the 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.
3. For 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 the Order.
4. **Prior to any construction**, Calhoun Point Comfort shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors, and contractor personnel will be informed of the environmental inspector's 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.

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5. The authorized facility locations shall be as shown in this 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**, Calhoun Point Comfort 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 the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.
 6. Calhoun Point Comfort 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 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. **At least 60 days before the start of construction**, Calhoun Point Comfort shall file an initial Implementation Plan with the Secretary for review and written approval by the Director of OEP describing how Calhoun Point Comfort will implement the mitigation measures required by the Order. Calhoun Point Comfort must file revisions to the plan as schedules change. The plan shall identify:
 - a. how Calhoun Point Comfort 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 on-site construction and inspection personnel;
 - b. the number of environmental inspectors assigned per spread, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;

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- c. company personnel, including environmental inspectors and contractors, who will receive copies of the appropriate material;
 - d. the training and instructions Calhoun Point Comfort 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 the specific portion of Calhoun Point Comfort's organization having responsibility for compliance;
 - f. the procedures (including use of contract penalties) Calhoun Point Comfort 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 on-site personnel;
 - (3) the start of construction; and
 - (4) the start and completion of restoration.
8. Calhoun Point Comfort 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 of the pipeline**, Calhoun Point Comfort shall mail the complaint procedures to each landowner whose property would be crossed by the Project.
- a. In its letter to affected landowners, Calhoun Point Comfort shall:
 - (1) provide a local contact that the landowners shall call first with their concerns; the letter shall indicate how soon a landowner shall expect a response;
 - (2) instruct the landowners that, if they are not satisfied with the response, they shall call Calhoun Point Comfort's Hotline; the letter shall indicate how soon to expect a response; and
 - (3) instruct the landowners that, if they are still not satisfied with the response from Calhoun Point Comfort's Hotline, they shall contact the Commission's Enforcement Hotline at (888) 889-8030.
 - b. In addition, Calhoun Point Comfort 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.

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9. Calhoun Point Comfort shall employ a team of environmental inspectors. The environmental inspectors shall be:
 - a. responsible for monitoring and ensuring compliance with all mitigation measures required by the 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 7 above) and any other authorizing document;
 - c. empowered to order correction of acts that violate the environmental conditions of the 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 the 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. Point Comfort Pipeline shall file updated status reports prepared by the environmental inspectors 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 environmental inspectors 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 the Order, and the measures taken to satisfy their concerns; and
 - f. copies of any correspondence received by Calhoun Point Comfort from other federal, state or local permitting agencies concerning instances of noncompliance, and Calhoun Point Comfort's response.

 11. Calhoun Point Comfort 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 rehabilitation and restoration of the right-of-way and other areas affected by the project are proceeding satisfactorily.

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12. **Within 30 days of placing the certificated facilities in service**, Calhoun Point Comfort shall file an affirmative statement with the Secretary, certified by a senior company official:
 - a. that the facilities have been constructed 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 Calhoun Point Comfort 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. Calhoun Point Comfort shall use a 75-foot-wide construction right-of-way in all wetlands crossed by the Point Comfort Pipeline. If additional right-of-way is required, Calhoun Point Comfort shall notify the COE and file with the Secretary of the Commission for review and written approval by the Director of OEP a site-specific construction plan and written justification **before use of any additional right-of-way width**.
 14. The CCND, on behalf of Calhoun Point Comfort, shall determine the final placement location of the 6.53 mcy of maintenance dredge material that would be removed from Lavaca Bay over a 50-year planning period for maintenance. This information shall be filed with the COE and the Secretary **prior to the start of dredging operations**.
 15. Calhoun Point Comfort shall provide the results of its consultation with Neuman Production, and applicable state and federal agencies, regarding planned natural gas production wells near the Enhanced Recovery Project DMPA. Calhoun Point Comfort shall file its consultation results and any proposed reconfiguration of the Enhanced Recovery Project DMPA with the Secretary **prior to construction**.
 16. Calhoun Point Comfort shall develop a Marine SPCC Plan to include procedures that would be implemented should spills of oil, gas, lubricants, or other hazardous materials occur during construction and operation of the marine terminal. In addition to addressing emergency spill response and clean-up procedures, this plan shall include a description of general spill prevention measures such as material handling practices, personnel training, and inspection. The Marine SPCC Plan shall be filed with the Secretary for review and approval by the Director of OEP **prior to the start of site preparation at the LNG terminal**.
 17. **Prior to construction of the LNG terminal**, Calhoun Point Comfort shall file with the Secretary its finalized DMMP.
 18. Calhoun Point Comfort shall file with the Secretary any agreements reached with Formosa Plastic Corporation regarding the use of its industrial waste water to hydrostatically test the Point Comfort Pipeline and Formosa and Transco Laterals. Calhoun Point Comfort shall provide the amount of water to be obtained from Formosa Plastic Corporation and confirm that water from the Navidad River would not be used **prior to hydrostatic testing**.
 19. Calhoun Point Comfort shall continue its consultation with the COE, FWS, EPA, TPWD, and TGLO to further develop its Wetlands and Waters of the U.S. Mitigation Plan. Prior

to construction, Calhoun Point Comfort shall file its final plan with the Secretary for review and written approval by the Director of OEP.

20. Calhoun Point Comfort shall consult with the FWS and TPWD regarding distances of primary and secondary management zones, should a bald eagle nest site be identified along the Point Comfort Pipeline construction right-of-way, and finalize its bald eagle management plan prior to construction.
21. Calhoun Point Comfort shall not begin construction of the pipeline or LNG terminal **until**:
 - a. the staff completes any necessary consultations with FWS and NOAA Fisheries; and
 - b. Calhoun Point Comfort has received written notification from the Director of OEP that construction and/or implementation of conservation measures may begin.

If facilities are not constructed within one year from the date of issuance of the authorization from the Director of OEP that construction may begin, Calhoun Point Comfort shall consult with the appropriate offices of FWS and NOAA Fisheries to verify that previous consultations and determinations of effect are still current.

22. Calhoun Point Comfort shall not begin construction of any component of its Project **until** it files with the Secretary a copy of the consistency determination issued by the Texas General Land Office.
23. The CCND, on behalf of Calhoun Point Comfort, shall **defer construction** of its new turning basin and Calhoun Point Comfort's ship berth, until:
 - a. the CCND, on behalf of Calhoun Point Comfort, files a copy of the marine survey report with the SHPO and the Commission prior to the start of dredging and provides the SHPO comments on cultural resources investigation reports and plans;
 - b. the ACHP has been given an opportunity to comment if any historic properties would be adversely effected by the Project; and
 - c. the Director of OEP reviews and approves all marine survey reports and plans, and notifies the CCND, on behalf of Calhoun Point Comfort, in writing that it may proceed with treatment or construction.

All materials 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."

24. Calhoun Point Comfort shall conduct a noise survey at the nearest noise sensitive areas to establish actual existing and construction noise levels. If the actual noise levels during construction (*i.e.*, dredging and pile driving activities) exceed ambient noise levels, then Calhoun Point Comfort shall develop a noise mitigation plan to reduce noise levels and document that the noise mitigation plan effectively reduces noise from construction activities. The noise survey, noise mitigation plan, and documentation shall be filed with

the Secretary, for review and written approval by the Director of OEP, **prior to the initiation of any construction activities.**

25. Calhoun Point Comfort shall submit, prior to the end of the comment period, a drilling noise analysis, mitigation and compliance plan for HDD locations 3 through 7 for review and written approval. This plan should demonstrate that noise due to drilling operations are below 55 dBA L_{dn} at the nearest NSAs and specify all noise mitigation equipment necessary to reduce noise below 55 dBA L_{dn}. Calhoun Point Comfort shall detail the method by which they will ensure compliance and where surveys indicate that noise attributable to drilling exceeds 55 dBA L_{dn}, Calhoun Point Comfort shall:
 - a. immediately stop drilling and mitigate the noise at the affected NSAs to reduce the noise levels at those NSAs to 55 dBA L_{dn} or below, or
 - b. offer temporary housing until L_{dn} levels at the NSAs are 55 dBA or below.
26. Calhoun Point Comfort shall make all reasonable efforts to assure its predicted noise levels from meter stations/interconnects are not exceeded at NSAs and file noise surveys showing this with the Secretary **no later than 60 days** after placing the meter station/interconnects in service. If the noise attributable to the operation of meter station/interconnects exceeds 55 dBA L_{dn} at an NSA, Calhoun Point Comfort shall file a report on what changes are needed and shall install additional noise controls to meet the level **within one year** of the in-service date. Calhoun Point Comfort 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.

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 condition. Items relating to Resource Report 13-*Engineering and Design Material* and security shall be submitted as critical energy infrastructure information (CEII) pursuant to 18 CFR Parts 388.12 and PL01-1. Information pertaining to items such as: off-site 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.

27. 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.
28. Calhoun Point Comfort shall provide a technical review of its proposed facility design that:

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- a. Identifies all combustion/ventilation air intake equipment and the distances to any possible hydrocarbon release (LNG, flammable refrigerants, flammable liquids and flammable gases); and
 - 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.

Calhoun Point Comfort shall file this review **prior to initial site preparation**.

29. 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.
30. 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**.
31. A copy of the hazard design review and list of recommendations that are to be incorporated in the final facility design shall be filed **prior to initial site preparation**.
32. Drawings of the storage tank piping support structure and support of horizontal piping at grade shall be filed **prior to initial site preparation**.
33. The design pressure of the fractionation system shall be not less than the maximum shut off pressure from the low pressure LNG pumps, the same design pressure as the LNG/Gas exchangers, tube side of the process vaporizers and the LNG surge drum. The revised P&IDs and design information for the NGL fractionation system shall be submitted **prior to initial site preparation**.
34. Procedures shall be developed for offsite contractors' responsibilities, restrictions, limitations and supervision of these contractors by Calhoun Point Comfort staff, **prior to initial site preparation**.
35. The **final design** shall provide LNG drain and LNG relief valve discharge piping to the LNG tank, to contain LNG within the storage system as the LNG containment design philosophy and minimize the discharge of liquid and cryogenic vapor to the cold vent system.
36. The **final design** shall include details of the pipe supports and restraints designed to prevent damage to piping systems and equipment in the event of a storm surge anticipated for a class 4 hurricane.
37. The **final design** of the hazard detection equipment shall identify manufacturer and model.
38. The **final design** of the fixed and wheeled dry-chemical, fire extinguishing, and high expansion foam hazard control equipment shall identify manufacturer and model.

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39. The **final design** shall specify that unloading line check valves shall be located upstream of the block valve and adjacent to the manifold isolation valves as per note 15 of the P&ID.
 40. The **final design** shall specify that check valves be installed in the LNG drain lines round the unloading arm SDVs.
 41. The **final design** shall specify that the unloading recycle line 4"-P-1031 shall be connected at the end of the unloading header.
 42. The **final design** shall include provisions to install LNG transfer pumps at Jetty LNG sump, V-603.
 43. The **final design** shall include detailed drawings of the spill control system to be applied to the LNG tank roof.
 44. 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.
 45. The **final design** shall include with high flow alarm for the LNG tank fill flow measurement for each tank.
 46. The **final design** shall include details of the boiloff gas flow and temperature measurement provided for each tank.
 47. The **final design** shall include check valves in the intank LNG pump discharge piping downstream of the minimum flow recycle connection.
 48. The **final design** shall include LNG recycle from the recondenser to the LNG storage tank, designed to allow the vessel to be stabilized prior to LNG pump operation and recycle to storage for LP LNG pumps start up and testing.
 49. The **final design** shall specify that the low pressure and high pressure LNG pump recycle lines to the storage tanks, P-2019 and P-2511, shall be the same pressure class as the LNG pump discharge piping including the final block valve to the tank.
 50. The **final design** shall include provisions to recycle LNG from the suction header of the low pressure LNG pumps to storage.
 51. The **final design** shall specify that the LNG surge drum, V-241, shall be equipped with weld-end connections for piping.
 52. The **final design** shall minimize the use of flanged nozzles for connection of piping to high pressure vessels containing LNG and NGL.
 53. The **final design** shall specify that 4"-P-2143 be connected to the 24" bottom outlet line, to eliminate the connection to the vessel and provide drainage for the 24" outlet and elbow.
 54. The **final design** shall include provisions to recycle LNG from the suction header of the high pressure LNG pumps to storage.
 55. The **final design** shall specify that relief valves in the discharge piping of the high pressure LNG pumps and sendout vaporizers be designed and set for the system design pressure, consistent with the maximum shutoff pressure of the LNG pumps.

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56. The **final design** shall include dual low-low temperature alarm and shutdown at the discharge of the vaporizer.
 57. The **final design** shall consider locating the vaporizer flow measurement device upstream of the vaporizer.
 58. The **final design** shall specify that redundant pressure transmitters for high pressure alarm and shutdown shall be provided for the fractionation system and for protection of the pipeline.
 59. The **final design** shall specify that all piping with service temperature at or below -20°F shall be stainless steel.
 60. The **final design** shall specify that piping specifications shall state that spiral wound gaskets shall be of type CGI, to include both outer and inner retaining rings.
 61. The **final design** shall specify that cryogenic piping and equipment shall be designed for cool down with liquid nitrogen.
 62. The **final design** shall include P&IDs and drawings of the meter station.
 63. The **final design** shall include a fire protection evaluation carried out in accordance with the requirements of NFPA 59A, chapter 9.1.2.
 64. The **final design** shall include details of the shut down logic, including cause and effect matrices for alarms and shutdowns.
 65. 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.
 66. 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; alarm the hazardous condition; and shutdown the appropriate systems.
 67. The **final design** shall include a HAZOP review of the completed design. A copy of the review and a list of the recommendations shall be filed with the Secretary
 68. The P&IDs in the **final design** shall show and number all valves including drain, vent, main, and car sealed.
 69. The **final design** shall include safeguards to be installed to protect above ground fire water piping, including post indicator valves, from inadvertent damage.
 70. The **final design** shall specify that all hazard detection equipment shall include redundancy and fault detection and fault alarm monitoring in all potentially hazardous areas and enclosures.
 71. All valves including drain, vent, main, and car sealed valves shall be tagged in the field during construction and **prior to commissioning.**

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72. The design details and procedures to record and to prevent the tank fill rate from exceeding the maximum fill rate specified by the tank designer shall be filed **prior to commissioning**.
 73. A tabulated list of the proposed hand-held fire extinguishers shall be filed **prior to commissioning**. The information shall include a list with the equipment number, type, size, number, and location. Plan drawings shall include the type, size, and number of all hand-held fire extinguishers.
 74. Operation and Maintenance procedures and manuals, as well as safety procedure manuals, shall be filed **prior to commissioning**.
 75. The contingency plan for failure of the LNG tank outer containment approved by the tank manufacturer shall be filed **prior to commissioning**.
 76. 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**.
 77. The maintenance procedures to be filed **prior to commissioning** shall state that a foundation elevation survey of all LNG tanks shall be made on an annual basis.
 78. 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**.
 79. 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, projected schedule for completion, problems encountered and remedial actions taken. Problems of significant magnitude shall be reported to the FERC **within 24 hours**.

In addition, we recommend that the following measures shall apply throughout the life of the facility:

80. The facility shall be subject to regular FERC staff technical reviews and site inspections on at least an **annual** basis or more frequently as circumstances indicate. Prior to each FERC staff technical review and site inspection, the Company 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 annual report, shall be submitted.
81. **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.

82. In the event the temperature of any region of any secondary containment, including imbedded 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.
83. Significant non-scheduled events, including safety-related incidents (*i.e.*, LNG or natural gas releases, fires, explosions, mechanical failures, unusual over pressurization, 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 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 condition that could lead to a hazard and cause a 20 percent reduction in operating pressure or shutdown of operation of a pipeline or an LNG facility;

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- 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 an on-site inspection by FERC staff; and the timing of an initial incident report (normally within 10 days) and follow-up reports.

84. Calhoun Point Comfort shall provide in its comments on the draft EIS, or in a separate document submitted at the same time, supplementary measures to effectively prevent fire exposure resulting from leakage from any one tank affecting an adjacent tank.
85. Calhoun Point Comfort shall re-evaluate the proposed design of the LNG storage tank impoundment system and the tank fire protection systems to meet the requirement of Section 2.2.3.6 of NFPA 59A. This information shall be **provided in Calhoun Point Comfort's comments on the draft EIS**, or in a separate document submitted at the same time.
86. **Prior to commissioning**, Calhoun Point Comfort shall coordinate, as needed, with the Coast Guard to define the responsibilities of Calhoun Point Comfort's security staff in supplementing other security personnel and in protecting the LNG tankers and terminal.
87. Calhoun Point Comfort shall develop an Emergency Response Plan (including evacuation) and coordinate procedures with the Coast Guard, state, county, and 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 for residents and other public use areas that are within any transient hazard areas along the route of the LNG vessel transit;
 - 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 approval by the Director of OEP **prior to initial site preparation**. Calhoun Point Comfort 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.

88. 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 shall 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.**

89. Calhoun Point Comfort 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.
90. **Prior to accepting** ships greater than 140,000 m³ in capacity, Calhoun Point Comfort shall provide the necessary information to demonstrate that the transient hazard areas identified in the EIS are applicable. Calhoun shall file this information with the Secretary for review and written approval of the Director of OEP. This information shall also be provided to the Coast Guard.