

EXECUTIVE SUMMARY

This final environmental impact statement (EIS) for the LNG Clean Energy Project proposed by Gulf LNG Energy, LLC and Gulf LNG Pipeline, LLC (collectively referred to as Gulf LNG) has been prepared by the staff of the Federal Energy Regulatory Commission (FERC or Commission) to fulfill the requirements of the National Environmental Policy Act (NEPA) and the Commission's implementing regulations under Title 18 Code of Federal Regulations (CFR) Part 380. The purpose of this document is to inform the public and the permitting agencies about the potential adverse and beneficial environmental impacts of the proposed project and its alternatives, and to recommend mitigation measures that would avoid or reduce any significant adverse impact to the maximum extent possible.

The vertical line in the margin identifies text that has been modified in the final EIS and differs from the corresponding text in the draft EIS.

The FERC is the federal agency responsible for authorizing applications to construct and operate onshore liquefied natural gas (LNG) import and interstate natural gas transmission facilities. The U.S. Coast Guard (Coast Guard) is the federal agency responsible for issuing a Letter of Recommendation (LOR) regarding the suitability of the waterway for LNG marine traffic and this regulatory activity is addressed in this EIS. The Coast Guard exercises regulatory authority over LNG facilities that affect the safety and security of port areas and navigable waterways under Executive Order 10173; the Magnuson Act (50 United States Code (USC) section 191); the Ports and Waterways Safety Act of 1972, as amended (33 USC section 1221, et seq.); and the Maritime Transportation Security Act of 2002 (46 USC section 701). The Coast Guard is responsible for matters related to navigation safety, vessel engineering and safety standards, and all matters pertaining to the safety of facilities or equipment located in or adjacent to navigable waters up to the last valve immediately before the receiving tanks. The Coast Guard also has authority for LNG facility security plan review, approval, and compliance verification as provided in 33 CFR Part 105, and siting as it pertains to the management of marine traffic in and around the LNG facility.

The purpose of the LNG Clean Energy Project is to provide a new, long-term, and timely source of natural gas to markets in the United States. To accomplish this purpose, Gulf LNG proposes to construct and operate a new LNG import terminal in the Port of Pascagoula in Jackson County, Mississippi that would include marine facilities for LNG ship unloading, LNG storage, and vaporization. Gulf LNG would also construct a new natural gas sendout pipeline to deliver natural gas to three points of interconnection along the proposed pipeline route. Gulf LNG's proposed facilities would have a maximum sendout capacity of 1.5 billion cubic feet per day of natural gas.

To provide these services, Gulf LNG is requesting Commission approval under section 3(a) of the Natural Gas Act (NGA) for the LNG terminal consisting of the following facilities:

- a ship berth and unloading facilities (i.e., marine facilities) capable of accommodating one LNG ship;
- LNG transfer systems;
- two 160,000-cubic meter full containment LNG storage tanks;
- 10 high-pressure submerged combustion vaporizers (SCV);
- vapor handling systems; and

- hazard detection and response equipment, ancillary utilities, buildings, and service facilities.

In addition, Gulf LNG is requesting Commission approval under section 7(c) of the NGA for pipeline facilities consisting of:

- a 5.0-mile-long, 36-inch-diameter natural gas sendout pipeline; and
- associated pipeline support facilities, including three interconnects/meter stations, one pig¹ launcher, and one pig receiver.

PROJECT IMPACTS

The environmental issues associated with construction and operation of the LNG Clean Energy Project, including impacts from the operation of LNG vessels in the waterway from the territorial seas to the berthing area at the facility, are analyzed in this final EIS using information provided by Gulf LNG and further developed from data requests; field investigations; literature research; alternatives analysis; contacts with federal, state, and local agencies; and input from public groups and organizations. Major findings and conclusions are summarized below.

The proposed LNG terminal would be located on a 33.3-acre site within the Port of Pascagoula in Jackson County, Mississippi. The land is owned by the State of Mississippi and leased to the Jackson County Port Authority (JCPA) for port operations. Construction of the marine facilities associated with the LNG terminal would require dredging about 61.3 acres outside of the property fence line; however, all construction activity for the marine facilities would occur from the water and would not require the use of additional lands. A road would need to be constructed and permanently maintained to provide access to the LNG terminal. The access road would permanently affect about 9.3 acres of land.

Approximately 3.6 miles (72 percent) of the proposed natural gas sendout pipeline would parallel existing pipeline or road rights-of-way. The remaining 1.4 miles (28 percent) would be constructed on newly created right-of-way; however, 1.1 miles of this would be constructed adjacent to an existing dike associated with the Bayou Casotte Dredged Material Management Site (BCDMMS) and the proposed permanent access road associated with the LNG terminal. The aboveground facilities associated with the pipeline would consist of three interconnects/meter stations, a pig launcher, and a pig receiver. Construction of the proposed sendout pipeline and associated aboveground facilities would affect a total of about 82.4 acres of land. Of the 82.4 acres of land affected by construction of the pipeline facilities, about 24.9 acres would be retained as new permanent right-of-way and 1.2 acres would be retained for the aboveground facilities.

Geology

Construction and operation of the proposed project would have minimal impacts on geologic resources. The LNG terminal and sendout pipeline would be in an area of low seismic risk and earthquake hazards. The risk of damage resulting from other geologic hazards (i.e., subsidence, slope instability, and inadequate load-bearing capacity of soils) would be avoided or reduced by specific engineering design criteria, ground modification and other construction techniques, and operating procedures implemented by Gulf LNG. To minimize potential impacts associated with shoreline erosion, Gulf LNG would install an area of rock or concrete units on the slope parallel to the shoreline to minimize scour potential within the berth area from LNG ship propeller wash. During the transit along the

¹ A pig is an internal tool used to clean and dry a pipeline and/or to inspect it for damage or corrosion.

navigation channels, LNG ships would be operating at low speeds and would not create wakes that would increase the potential for shoreline erosion in the project area.

Storm surge associated with hurricanes and other tropical storms is often the most significant cause of damage to facilities and property in low-lying coastal areas. Gulf LNG assessed two models for evaluating future hurricane surge events (the Federal Emergency Management Agency's (FEMA) Flood Insurance Study Model and the U.S. Army Corps of Engineers' (COE) Sea, Lake and Overland Surges and Hurricanes Model (SLOSH Model)). After comparing the actual storm surge data along the Mississippi coast caused by Hurricane Katrina in August 2005 with the FEMA and COE model predictions, Gulf LNG determined that the SLOSH Model for a Category 4 hurricane would provide the most appropriate results to use as a design basis for the LNG Clean Energy Project. In order to mitigate the potential hazards associated with storm-induced flooding and waves, Gulf LNG would construct a dike wall 45 feet wide and 27 feet high to surround the entire 33.3-acre LNG terminal site. The jetty platform and pipe trestle would be constructed at an elevation above the Category 4 storm significant wave crest elevation of 33.1 feet above mean sea level.

Soils and Sediments

Soils at the proposed LNG terminal site and along the proposed natural gas sendout pipeline are variable with surface textures ranging from sandy clay loams to loamy sands. The LNG terminal site was utilized for placement of dredged material beginning sometime after 1952, when the site was entirely submerged beneath the Mississippi Sound, until as recently as the 1970s. Fill would be used to raise the surface grade where the LNG terminal would be constructed, with the exception of the tank storage area, which would be lower in elevation for secondary containment purposes. Additional soil amendments would also be used to re-engineer the soils at the site to provide a stable land surface for construction.

Gulf LNG has adopted our² *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) to establish a baseline for minimizing the potential for erosion as a result of water or wind action and to aid in reestablishing vegetation after construction. In addition to our Plan, Gulf LNG would develop a site-specific Stormwater Pollution Prevention Plan (SWPPP) as a requirement of its general permit for construction stormwater discharges. The SWPPP would incorporate best management practices (BMPs) as specified in our Plan, as well as guidance developed for erosion control and stormwater management in the State of Mississippi. Gulf LNG would also develop an Industrial SWPPP as a requirement of coverage under the National Pollutant Discharge Elimination System (NPDES) Industrial Stormwater General Permit. Gulf LNG has developed a Spill Prevention, Containment, and Countermeasure Plan (SPCC Plan) to address hazardous material and petroleum spills during construction of both the onshore and offshore project facilities. The SPCC Plan describes preventative measures to minimize the likelihood of spills and leaks and mitigative measures to minimize impacts should a spill occur. Gulf LNG would develop a separate SPCC Plan after construction of the project to identify similar preventative measures that would be employed during operation of the LNG terminal and associated facilities.

Construction of the LNG terminal would require the dredging of about 2.96 million cubic yards (yd³) of sediment to accommodate the marine facilities associated with the proposed project. Gulf LNG proposes to place the dredged material associated with construction at the Ocean Dredged Material Disposal Site (ODMDS) located approximately 5 miles south of Horn Island. Gulf LNG anticipates that the ship berth and maneuvering area would require periodic maintenance dredging. Based on estimated shoaling rates in the area, Gulf LNG estimates that between 115,000 to 180,000 yd³ of material would need to be removed from the ship berth and maneuvering area every 3 years. The ship berth and

² The pronouns "we," "us," and "our" refer to the environmental staff of the FERC's Office of Energy Projects.

maneuvering area would be owned by the JCPA after it is constructed and the JCPA would be responsible for the maintenance dredging. The BCDMMS is the proposed placement area for dredged material generated during maintenance dredging.

After receiving approval of its Sampling and Analysis Plan from the COE and the U.S. Environmental Protection Agency (EPA), Gulf LNG conducted sampling and analysis of the sediments contained within the proposed dredge area following standard guidelines for assessing dredged materials. The sediments that would be dredged for the marine facilities consist primarily of clays and silts. No organic contaminants were detected in any of the samples taken from the proposed dredge area. Except for aluminum, iron, and manganese, the proposed dredged materials contain generally low to very low concentrations of the 17 metals that were analyzed. To estimate the possible release of chemical constituents to the water column during dredging operations and dredged material placement, Gulf LNG conducted elutriate testing of the sediments. None of the organic compounds analyzed were identified above their detection limits in any of the elutriate samples. No metals were detected at concentrations above water quality standards; however, detection limits for two metals (copper and silver) and cyanide were higher than the standards. Although it is possible that these contaminants could be released at concentrations exceeding the water quality standards, elutriate tests provide conservative estimates of potential water quality impacts because the tests simulate a greater level of mixing and aeration than actually created by mechanical dredging. Furthermore, the results of bioassay and bioaccumulation testing indicated that the sediments would not have any adverse effects on the test species and would be suitable for offshore placement.

Water Resources

Construction and operation of the project would not have a significant impact on groundwater resources in the project area. The project would not affect any EPA-designated Sole Source Aquifers. There are two private wells located within 150 feet of the construction right-of-way for the natural gas sendout pipeline. To ensure that potential impacts on water supply wells are minimized during construction, Gulf LNG would identify and mark, as appropriate, any undocumented water wells and confirm the locations of existing, documented wells before construction. In addition, we have recommended that Gulf LNG conduct pre- and post-construction monitoring of in-use wells within 150 feet of the construction work area and replace any potable water supply system damaged during construction that cannot be repaired to its former capacity and quality.

The LNG Clean Energy Project would be located on the northern shoreline of the Mississippi Sound in the Port of Pascagoula, just southeast of the mouth of Bayou Casotte Harbor. Bayou Casotte is an estuary fed by two freshwater tributaries, the East Prong and West Prong, which drain the Bayou Casotte watershed (approximately 8.4 square miles in size). The Mississippi Sound extends approximately 100 miles from Lake Bourgne, Louisiana to Mobile Bay, Alabama, with a varying width of 7 to 15 miles. Dredging and dredged material placement would result in a temporary increase in suspended solids in the waters of the Mississippi Sound. However, because of the relatively turbid conditions already present in the Mississippi Sound, the added total suspended solids (TSS) levels resulting from the proposed dredging would not likely have a significant impact on surrounding water quality. Gulf LNG would be required to conduct water quality monitoring as a condition of its section 401 Water Quality Certification. Based on the results of water quality monitoring, Gulf LNG could adjust the rate of dredging to reduce impacts resulting from elevated TSS levels.

The 5.0-mile-long natural gas sendout pipeline would cross two minor waterbodies. Both of these waterbodies are manmade canals. The first would be crossed using horizontal directional drill (HDD) techniques, which would avoid disturbance of the canal. Because drilling mud could inadvertently be released during HDD operations, we have recommended that Gulf LNG prepare a HDD

Plan to minimize impacts associated with an inadvertent release of drilling mud. The second waterbody would be crossed using open-cut construction methods. The impacts of the open-cut construction method on the canal would be localized and short term. To minimize impacts on this waterbody, Gulf LNG would adhere to the measures contained in our *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures).

Gulf LNG proposes to discharge SCV combustion and nitrogen oxide (NO_x) emissions control water directly to the Mississippi Sound under a NPDES permit following pH adjustment. To minimize potential water quality impacts associated with the discharge to the Mississippi Sound, water from the SCV neutralization tank would be routed through a submerged high velocity outlet located within the ship berthing area. Through proper management of excess SCV water, we believe that potential impacts on receiving waters would be minimized.

Gulf LNG would conduct hydrostatic testing activities in accordance with our Procedures as well as all applicable permits, including NPDES discharge permits. To minimize effects of stormwater runoff during construction of the project, Gulf LNG would implement measures outlined in our Plan and its site-specific SWPPP. As previously discussed, Gulf LNG would minimize potential impacts associated with spills or leaks of hazardous materials during construction and operation by implementing its SPCC Plans. The LNG terminal was designed to account for an accidental spill of LNG during operation of the facility and to prevent any LNG from entering Bayou Casotte Harbor. In the unlikely event that LNG is spilled into the water either from the LNG terminal itself or from a ship during transit to the LNG terminal, the cryogenic liquid would vaporize rapidly upon contact with the warm air and water. Being less dense than water, LNG would float on the surface prior to vaporizing. Because LNG is not soluble in water and would completely vaporize shortly after being spilled, the LNG could not mix with or contaminate the water.

Wetlands and Vegetation

Construction of the LNG Clean Energy Project would affect approximately 20.0 acres of wetlands. Construction of the LNG terminal facilities would result in temporary impacts on 5.8 acres of wetlands. Permanent wetland impacts associated with the LNG terminal facilities (including the proposed access road) would include the permanent loss of 4.9 acres of emergent wetlands (coastal brackish marsh). Construction of the pipeline facilities would temporarily affect 14.1 acres of wetlands. Operation of the proposed pipeline facilities would result in the permanent conversion of 2.6 acres of forested wetlands to emergent wetlands within the permanently maintained right-of-way.

In general, wetland impacts would be minimized by avoidance, mitigation of impacts, and compensation in accordance with federal, state, and local regulations. By modifying the LNG terminal design and layout, Gulf LNG was able to reduce the total area of wetlands impacted by the LNG terminal site. Gulf LNG would mitigate construction-related impacts by implementing our Procedures and by complying with the Mississippi Department of Marine Resources (MDMR)/COE's section 404 and Mississippi Department of Environmental Quality's section 401 permit conditions. Gulf LNG has developed a draft Mitigation Plan in consultation with the COE; MDMR; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS); and other applicable agencies. The plan includes details on Gulf LNG's proposal to convert an area of existing upland to coastal brackish marsh to compensate for permanent wetland impacts associated with the development of the LNG terminal and access road. The Mitigation Plan also identifies criteria that would be used to determine the success of the restoration effort. We have recommended that Gulf LNG continue to consult with the COE, MDMR, NMFS, and other applicable agencies to finalize its Mitigation Plan.

The vegetative communities present on the LNG terminal site can be characterized as scrub-shrub uplands and intertidal mudflats. Although operation of the LNG terminal facilities would permanently remove native vegetation, these impacts are not expected to be significant on a regional scale because areas with similar vegetation characteristics are found on surrounding lands. Construction of the sendout pipeline and associated aboveground facilities would affect about 68.3 acres of upland vegetation, most of which consists of open uplands and/or industrial uses. Operation of the proposed pipeline facilities would require about 26.1 acres of vegetation be converted to permanently maintained pipeline right-of-way (24.9 acres) and aboveground facilities (1.2 acres). To minimize impacts on vegetation, Gulf LNG has routed the proposed natural gas sendout pipeline so that it would be collocated with existing facilities to the maximum extent possible. In addition, Gulf LNG would restore the construction right-of-way in accordance with our Plan and Procedures.

Wildlife and Aquatic Resources

The primary impact on wildlife would be associated with the cutting, clearing, and/or removal of existing vegetation within the construction work areas and the permanent loss of habitat associated with the LNG terminal. In general, impacts on terrestrial wildlife would be short term and minimal because much of the area affected by construction would be allowed to revert to the preconstruction habitat type following construction. Wildlife habitat would be permanently altered by construction of the LNG terminal. To minimize impacts on migratory birds, we have recommended that Gulf LNG develop a lighting plan consistent with the lighting guidelines developed by the U.S. Department of the Interior, Fish and Wildlife Service (FWS) for siting, construction, operation, and decommissioning of communication towers. We have also recommended that Gulf LNG consult with the Grand Bay Reserve biologist to determine the need for developing site-specific measures that would avoid or minimize impacts on unique, rare, and imperiled species within the reserve.

Dredging of the ship berth and maneuvering area for the proposed project would result in the permanent conversion of 61.3 acres of shallow, primarily sandy softbottom habitats to deeper, silty-sand softbottom habitats. Many of the aquatic species that currently inhabit shallow water habitat in the project area also inhabit the deeper water of the adjacent Bayou Casotte Channel. Although dredging activity would take the current benthic population of organisms living within the sediments, these species recolonize quickly, and are not likely to be negatively affected by the alteration in habitat. Aquatic species that prefer the shallow water habitat would experience a loss of habitat due to dredging; however, the large amount of similar habitat in the vicinity of the project area would provide ample habitat for individuals displaced by construction activities. Construction and maintenance dredging for the proposed marine facilities would result in temporary increases in turbidity, which could have impacts on aquatic resources. These impacts would be mostly temporary and localized, and mitigation measures would be implemented as required to reduce turbidity.

Gulf LNG has developed a draft Mitigation Plan and a Monitoring Plan in consultation with the COE, MDMR, NMFS, and other applicable agencies to address habitat alteration associated with dredging and dredge material placement activities as well as other impacts on aquatic species. Gulf LNG proposes to conduct beach seine and trawling studies and a Gulf sturgeon habitat assessment survey as part of its Monitoring Plan.

The EIS discusses potential impacts on shoreline and estuarine habitats if LNG were released from LNG ship cargo tanks while in transit. Because LNG would vaporize and is a cryogenic liquid, we conclude that the greatest threat to aquatic life from an LNG spill would be thermal stress.

Steel pipe piles would be installed as part of the construction of the marine facilities. In some cases, driving steel piles can generate intense underwater sound pressure waves that can adversely affect

nearby marine organisms. Gulf LNG would implement measures to minimize the effects of pile driving activities and associated noise on aquatic species, including the use of a bubble curtain to distribute air bubbles around 100 percent of the perimeter of a pile over the full depth of the water column while it is being driven.

The proposed project would have an impact on habitat types that function as Essential Fish Habitat (EFH). Species with EFH designated in the Mississippi Sound could potentially be impacted by loss/alteration of habitat, dredging, permanent loss of about 4.9 acres of intertidal wetland, entrainment of benthic invertebrates, and the temporary resuspension of sediments into the water column during construction. Although there would be permanent impacts on EFH as the result of project construction, Gulf LNG proposes to mitigate for losses of EFH by converting an area of existing upland to coastal brackish marsh to provide replacement of juvenile nursery, foraging habitat, and prey production for a number of important EFH species.

Threatened, Endangered, and Other Special Status Species

Fifteen federally listed endangered or threatened species were identified as potentially occurring in the project area. The 15 species include six mammals (sperm whale, blue whale, sei whale, fin whale, humpback whale, and North Atlantic right whale), two birds (bald eagle and brown pelican), five reptiles (hawksbill sea turtle, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle), and two fish (smalltooth sawfish and Gulf sturgeon). The portion of the Mississippi Sound affected by the project has also been designated as critical habitat for the Gulf sturgeon. In addition to those species protected under the Endangered Species Act, there are a number of other special status species that may occur in the project area. These include those identified by the Mississippi Natural Heritage Program, marine mammals, and migratory birds.

A variety of measures have been proposed by Gulf LNG that would minimize impacts on federally listed and other special status species, including implementation of our Plan and Procedures, implementation of Gulf LNG's SPCC Plans, implementation of special pile driving procedures, and providing LNG ship captains with the *Vessel Strike Avoidance Measures and Injured or Dead Protected Species Reporting Procedures (revised May 5, 2006)* to avoid or minimize impacts on marine mammals and sea turtles. Additionally, we have recommended other mitigation be implemented to avoid or minimize impacts on threatened, endangered, and other special status species (e.g., woody vegetation clearing and additional field surveys). These measures would reduce the loss of vegetated habitats, minimize water quality impacts, and lessen delays in restoration of areas temporarily disturbed during construction. While beneficial to general wildlife, fisheries, and vegetation in the area, these measures would also benefit listed species with the potential to occur in the vicinity of the project.

Because consultations with the FWS and NMFS have not yet been completed, we have recommended that Gulf LNG not begin construction until these consultations are complete and Gulf LNG receives written notification from the Director of the Office of Energy Projects that construction and/or implementation of conservation measures may begin. Additionally, we have recommended that, if construction does not begin within 1 year of issuance of FERC authorization, Gulf LNG consult with the appropriate offices of the FWS and NMFS to update the species list and to verify that previous consultations and determinations are still current.

Land Use, Recreation, and Visual Resources

There are no existing or planned residential developments located within 0.5 mile of the proposed LNG terminal or the centerline of the LNG ship transit route. The closest residences are approximately 1.7 miles northwest of the proposed LNG terminal site. No residences are located within 50 feet of the

proposed sendout pipeline and associated construction work areas. The closest residences are located about 0.4 mile west of the proposed pipeline facilities in the City of Pascagoula. The proposed project would not conflict with any approved residential or commercial development plans. The most prominent visual feature of the proposed LNG terminal would be the two LNG storage tanks. The LNG storage tanks would be visible from commercial and recreational boating traffic on the Mississippi Sound, industrial properties located to the north of the project site, and residential areas to the northwest along Beach Boulevard. The addition of the new industrial development at the proposed terminal site would be consistent with existing land uses in the area. Therefore, while the facility would be visible and permanently impact visual resources in the area, the overall aesthetic effect would be minor.

The proposed LNG terminal would be located within the Port of Pascagoula on land owned by the State of Mississippi and leased to the JCPA for port operations. In addition to the Port of Pascagoula, two other special interest areas have been identified in the project area. The sendout pipeline route would pass through about 0.5 mile of the Grand Bay Reserve. As previously discussed, we have recommended that Gulf LNG consult with the Grand Bay Reserve biologist to determine the need for developing site-specific measures that would avoid or minimize impacts on unique, rare, and imperiled species within the reserve. The transportation of dredged material to the ODMDS through the Horn Island Pass as well as LNG marine traffic during operation of the project could have indirect impacts on the Gulf Islands National Seashore. Gulf LNG has initiated consultation with the National Park Service regarding any potential concerns regarding construction and operation of the LNG Clean Energy Project. There are no developed recreation sites located on or adjacent to the LNG terminal site.

Because all of the facilities associated with the LNG Clean Energy Project would be located within the coastal zone of Mississippi, Gulf LNG is responsible for documenting that the project, including the LNG marine traffic in the waterways, is consistent with the Mississippi Coastal Management Program (CMP). Gulf LNG needs to demonstrate consistency with the Mississippi CMP and obtain concurrence of consistency from the MDMR prior to the FERC approving the start of any construction.

Socioeconomics

Project area population impacts are expected to be short term and relatively minor. Gulf LNG expects to employ predominantly local workers during construction of the project, which is expected to take 38 months. Gulf LNG estimates that about 64 percent of the construction workforce would consist of local hires and that the workers would commute to work from the local four-county area. During construction, Gulf LNG estimates an average workforce of 259 and a peak workforce of 556 occurring in month 25. During peak construction, a short-term influx of about 200 non-local workers is anticipated. Adequate housing would be available locally or within a reasonable commuting distance. Operation of the proposed LNG Clean Energy Project would require about 50 permanent positions. The project would have a beneficial impact on the local economy through expenditures for wages, purchase of materials, and taxes. We have not identified any human health or environmental effects that would be borne disproportionately by any minority or low-income group that are high and adverse.

Transportation and Traffic

About 150 LNG ships are expected to call at the proposed LNG terminal each year. Anticipated impacts on traffic are based on the assumption that the Coast Guard would establish a security zone for ships in transit to the LNG terminal. The exact size of the security zone has not been determined; however, assuming the security zone would extend 2 miles ahead and 1 mile behind the ship, the maximum delay expected due to the transit of an LNG vessel would be 1.5 hours. The realistic maximum delay an LNG ship transiting the channel could pose on a vessel transiting the Gulf Intracoastal Waterway

(GIWW) would be about 30 minutes. As a result, the LNG marine traffic associated with the LNG Clean Energy Project would not have a significant impact on marine traffic. In a letter dated March 7, 2006, the Coast Guard made a preliminary determination that the Pascagoula Bar, Horn Island Pass, Lower Pascagoula, and Bayou Casotte Channels may be suitable for the marine traffic associated with the LNG Clean Energy Project.

Cultural Resources

Based on consultations with the Mississippi State Historic Preservation Office (SHPO), a cultural resources survey of the proposed project area was not required. In consultation with the SHPO, we have determined that there would be no impact on any properties listed or eligible for listing in the NRHP for the proposed project; therefore, no mitigation would be required.

Air Quality and Noise

The emissions from construction activities associated with the project would include particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}), NO_x , carbon monoxide (CO), sulfur oxide (SO_x), and volatile organic compounds (VOC). Construction emissions of NO_x , CO, SO_x , and VOCs are not expected to have a significant impact on air quality in the vicinity of the project. $PM_{10}/PM_{2.5}$ would be the primary pollutant of concern during construction. Most of the predicted PM_{10} emissions are associated with fugitive dust produced during construction of the LNG terminal facilities and associated pipeline. Fugitive dust could have an impact in the immediate vicinity of construction activity and would cease once construction in a particular area is complete. Measures Gulf LNG would implement to reduce dust emissions include applying water, using BMPs, and scheduling construction operations to avoid concurrent operations by larger emission sources when feasible. We have recommended that Gulf LNG include these measures and additional mitigation measures to further reduce emissions in a Fugitive Dust Control Plan.

During operation, the primary source of emissions associated with the LNG terminal itself would be the SCVs. Gulf LNG would minimize air emissions from the proposed stationary sources through the use of clean fuel (natural gas and low sulfur diesel oil), the employment of BMPs for operation and maintenance procedures, and limiting annual hours of operation from the diesel-fired units.

In order to provide a thorough evaluation of the potential impacts on air quality in the vicinity of the proposed project, Gulf LNG conducted a quantitative assessment of project air emissions. The assessment included air dispersion modeling analyses to predict off-site (i.e., ambient) concentrations in the vicinity of the project for PM_{10} , sulfur dioxide, nitrogen dioxide, and CO resulting from the proposed emissions associated with operation of the project for comparison to appropriate federal air quality standards. When the predicted impacts are added to available monitored background concentrations in the vicinity of the proposed project, none of the impacts would exceed the National Ambient Air Quality Standards. Further, the results of the modeling demonstrated that the project would not significantly impact the existing air quality at the Breton National Wildlife Refuge (a federal Class I area).

During operation of the LNG Clean Energy Project, air emissions from LNG ships and other project-related vessels would occur along the entire waterway from the territorial seas to the ship berth. The emissions to any one localized area during ship transit would be temporary and transient and would be occurring at distances allowing for considerable dispersion before reaching any sensitive receptors; therefore, air emissions from ship transit are not expected to result in a significant impact on air quality.

Noise impacts associated with construction of the LNG terminal are expected to be minimal at the nearest noise-sensitive area. Gulf LNG performed computer modeling in order to calculate noise levels that would be generated by operation of the proposed LNG terminal. The results of the noise impact analysis indicate that the noise attributable to the project would be lower than the FERC sound level requirement. The actual noise generated during operation of the LNG terminal may be different from those obtained from modeling. Therefore, we have recommended that Gulf LNG make all reasonable efforts to assure its predicted noise levels from the LNG terminal are not exceeded.

Noise generated by LNG ships along the waterway from the territorial seas to the LNG terminal would be similar to noise from other large ships using the waterway. Underwater noise would cause a local and temporary avoidance behavior in fish but would not result in significant adverse impacts. Above-water noise associated with the LNG vessels would not result in significant impacts on environmental resources.

Reliability and Safety

We evaluated the safety of both the proposed facilities and the related LNG vessel transit through the Pascagoula Bar, Horn Island Pass, Lower Pascagoula, and Bayou Casotte Channels. 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 we identified specific recommendations to be addressed by Gulf LNG: 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-, 1.5-, 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 British thermal units per square foot per hour, 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 (LFL) and 14,377 feet to one-half the LFL. Flammable vapor dispersion for larger holes was not performed because, 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 that may be imposed by the Coast Guard and the local pilots, the likelihood of a cargo containment failure and subsequent LNG spill from a vessel casualty (i.e., 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 not be considered significant.

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 the Pascagoula Bar, Horn Island Pass, Lower Pascagoula, and Bayou Casotte Channels. Based on the Coast Guard's longstanding experience in controlling the movements of dangerous cargo vessels 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) security zone around a moored LNG vessel; and 3) other measures as deemed appropriate. If the Coast Guard issues an LOR finding the waterway suitable for LNG marine traffic, the moving safety zone, and the security zone at the terminal, may affect other commercial and recreational traffic using the waterway.

The extent of the impact on recreational boaters would depend on the number of boats in the project area during the 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 possible 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. To minimize potential impacts on other marine traffic, the Coast Guard may use a program of announcements to give advance notice of each moving safety 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, 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 Coast Guard, with input from the Pascagoula Area Maritime Security Committee, has completed an initial review of Gulf LNG's Waterway Suitability Assessment (WSA) in accordance with the guidance in *Navigation and Vessel Inspection Circular – Guidance on Assessing the Suitability of a Waterway for Liquefied Natural Gas (LNG) Marine Traffic* (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. As a result of this review, in its Waterway Suitability Report (WSR) the Coast Guard made a preliminary determination that the Pascagoula Bar, Horn Island Pass, Lower Pascagoula, and Bayou Casotte Channels may be suitable for the LNG marine traffic associated with this project. With the completion of this final EIS, the Coast Guard will complete its review and issue an LOR to address the suitability of the waterways for LNG transport.

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 navigation channels in the Port of Pascagoula 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 *LNG Vessel Transit Management Plan*. This plan would be developed in conjunction with state and local law enforcement and emergency response communities. In addition, the Coast Guard may establish a moving safety zone and moored vessel security zone under 33 CFR Part 165 for LNG ships in transit and while docked. Only personnel or vessels authorized by the Captain of the Port (COTP) are permitted within these zones.

Section 311 of the Energy Policy Act of 2005 stipulated that, in any order authorizing an LNG terminal, the Commission shall require the LNG terminal operator to develop an Emergency Response Plan in consultation with the Coast Guard and state and local agencies. The FERC must approve the Emergency Response Plan prior to any final approval to begin construction. The Emergency Response Plan must contain a Cost-Sharing Plan that includes a description of any direct cost reimbursements the applicant agrees to provide to any state and local agencies with responsibility for security and safety at the LNG terminal and near vessels that serve the facility.

ALTERNATIVES CONSIDERED

The EIS addresses alternatives to the proposed actions before both the FERC and the Coast Guard. The FERC must consider whether or not to approve the facilities proposed by Gulf LNG and to allow operation of the facilities.

The proposed action before the Coast Guard is to consider whether or not to issue Gulf LNG an LOR that finds the waterways suitable for LNG marine traffic. Alternatives considered by the Coast Guard consisted of 1) issuing an LOR finding the waterways not suitable for LNG marine traffic; and 2) issuing an LOR finding the waterways suitable for LNG marine traffic with or without conditions. Issuing an LOR that finds the waterways unsuitable for LNG marine traffic would result in the project not being implemented, and the waterways would continue to be used as they currently are. The environmental impacts associated with implementation of the LNG Clean Energy Project would be eliminated. With this alternative, however, the project objectives would not be met and the region's increasing energy demands would not be met.

Issuing an LOR finding the waterways to be suitable for the project would allow construction of the project, if Gulf LNG received FERC authorization and other required permits and approvals. Based on the finding of the WSR, the Coast Guard would include conditions with this alternative to provide the appropriate level of safety and security and to manage risk in the waterways. Therefore, the alternative of issuing an LOR finding the waterways suitable for LNG marine traffic without conditions is not considered reasonable and was not addressed further.

We evaluated the alternatives of no action or postponed action, LNG terminal system alternatives, site alternatives, LNG terminal design and ship berth configuration alternatives, dredged material placement alternatives, and pipeline system and route alternatives. Additionally, vaporization technology and power system alternatives were examined. While the no action or postponed action alternative would eliminate the positive and negative environmental impacts identified in this EIS, the project objective would not be met of providing a new source of natural gas to national markets that could be accessed through the proposed interstate pipeline interconnections.

We considered existing, approved, and proposed LNG terminals, both onshore and offshore, as system alternatives. The existing and proposed onshore LNG import terminals on the East and West Coasts would not be viable alternatives to the LNG Clean Energy Project because they are not connected to, and could not reasonably access, existing interstate pipeline systems. All but one of the existing, approved, and proposed onshore LNG import terminals along the Gulf Coast access or would access existing interstate pipeline systems. These projects appear to be technically, economically, and environmentally reasonable systems for meeting a number of the objectives of the LNG Clean Energy Project. However, the FERC does not consider these projects as alternatives to one another. Rather, these facilities would all provide a mechanism for importing LNG, and each could help satisfy the increasing demand for natural gas. When considering the capacities, operational experience, and level of impacts associated with the various types of offshore LNG facilities, we do not consider these facilities to be environmentally preferable and practicable alternatives to the proposed project.

We also looked at alternative port sites and alternative sites within the Pascagoula area, none of which would provide significant environmental advantages over the proposed site. Two design concepts for development of the onshore portion of the LNG terminal and three design concepts for the ship berth design were evaluated. Out of the four alternative vaporization technologies considered, SCVs were selected as the most appropriate technology for the proposed project. Electricity would be provided from an existing public utility rather than through the construction of an on-site electrical power generation system.

Our alternatives analysis included the evaluation of two sendout pipeline route alternatives to the route proposed by Gulf LNG. Neither of these route alternatives would provide significant environmental advantages over the proposed pipeline route.

The alternatives analysis also considered options for placement of the 2.96 million yd³ of materials dredged during construction of the LNG terminal marine facilities. Based on a number of factors, including the grain size of the sediments to be dredged, the amount of space available at the placement area, and the need for long-term maintenance and monitoring, the ODMDS is the proposed dredged material placement alternative. The BCDMMS is proposed for the material associated with maintenance dredging during operation of the project.

In conclusion, we have determined that Gulf LNG's proposed project, as modified by our recommended mitigation measures, is the preferred alternative that can meet the project objectives. The preferred alternative for the Coast Guard is to issue an LOR finding the waterway suitable for LNG marine traffic, with certain conditions including: 1) establishment of a moving safety zone during LNG vessels' transit of the waterway, including the requirements for daylight transit and one-way LNG marine traffic on the waterway, and for another safety zone around the LNG facility when the LNG vessels are moored; 2) the submission by the applicant of an annual review of its WSA to evaluate if any conditions in the waterway have changed that would require issuance of a new LOR and submit the annual review to the COTP for his/her review and issuance of a new LOR if necessary; 3) the requirement that LNG vessels must navigate the waterway from the Horn Island Pass sea buoy (LLNR 320) to the berthing area with a pilot from the Pascagoula Bar Pilots Association (Pascagoula Pilot) on board and that tug assistance be provided as deemed necessary by the Pascagoula Pilots; 4) the requirement that prior to crossing the GIWW, all LNG traffic will be required to make a SECURITE broadcast; 5) implementation of a Coast Guard-approved *LNG Vessel Transit Management Plan*; and 6) availability of Coast Guard resources to implement the above security measures.

PUBLIC INVOLVEMENT AND AREAS OF CONCERN

On November 17, 2004, Gulf LNG filed a request with the FERC to implement the Commission's Pre-Filing Process for the LNG Clean Energy Project. At that time, Gulf LNG was in the preliminary design stage of the project and no formal application had been filed with the FERC. On December 16, 2004, the FERC granted Gulf LNG's request and established a pre-filing docket number (PF05-5-000) to place information filed by Gulf LNG and related documents issued by the FERC into the public record. The purpose of the Commission's Pre-Filing Process is to encourage the early involvement of interested stakeholders, facilitate interagency cooperation, and identify and resolve issues before an application is filed with the FERC.

As part of the Pre-Filing Process, Gulf LNG initiated a public outreach program in which it contacted and/or met with various project stakeholders early in the preliminary design stage of the project. Stakeholders included agency representatives, elected officials and community leaders, civic clubs and organizations, local safety and security personnel, and landowners. The general public was given an opportunity to learn more about the project at an open house held in Moss Point, Mississippi on April 5, 2005. Additionally, Gulf LNG held a site visit that was open to the public on April 20, 2005.

The FERC formally introduced the Pre-Filing Process to various project stakeholders by issuing a *Notice of Environmental Review and Scoping for the Proposed LNG Clean Energy Project and Request for Comments on Environmental Issues* on March 3, 2005. Following this, the FERC issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Casotte Landing LNG Project, and Request for Comments on Environmental Issues, Notice of Public Scoping Meeting, and Site Visit for both Casotte Landing LNG Project and LNG Clean Energy Project* on April 7, 2005. These notices were sent to 225 interested parties including federal, state, and local officials; agency representatives; conservation organizations; Native American tribes; local libraries and newspapers; landowners within 0.5 mile of the proposed LNG terminals; and property owners along the proposed pipeline route. These notices encouraged project stakeholders or interested parties to provide input on environmental issues that

should be addressed during the environmental review process. In total, six comment letters on the LNG Clean Energy Project were received by the FERC in response to these pre-filing notices.

On April 20, 2005, the FERC conducted a public scoping meeting in Pascagoula to provide an opportunity for the general public to learn more about the Casotte Landing LNG Project and the LNG Clean Energy Project and to participate in our analysis by commenting on issues to be included in the EIS. Nine people commented at the meeting. Comments covered a wide variety of topics including reliability and safety, alternatives, land use, recreation, and socioeconomics. A transcript of these comments is part of the public record for the LNG Clean Energy Project.

The Coast Guard published a notice in the Federal Register on November 17, 2005 stating that it was preparing an LOR as to the suitability of the Pascagoula Bar, Horn Island Pass, Lower Pascagoula, and Bayou Casotte Channels for LNG marine traffic. On December 7, 2005, the Coast Guard conducted a public meeting in Pascagoula to provide an opportunity for the general public to provide comments on waterway suitability and maritime safety and security aspects of the proposed LNG facilities. Five people commented at the meeting. A transcript of these comments is part of the public record for the LNG Clean Energy Project.

In addition to the public notice and scoping process discussed above, the FERC conducted agency consultations and participated in interagency meetings to identify issues that should be addressed in this EIS. This included an interagency meeting in Pascagoula on April 20, 2005 to discuss the project and the environmental review process with other key agencies and stakeholders. The FERC staff also attended a meeting coordinated by Gulf LNG to discuss dredged material placement alternatives on September 21, 2005.

The FERC prepared a draft EIS for the LNG Clean Energy Project and issued a Notice of Availability (NOA) of the draft EIS on May 19, 2006. In accordance with the Council on Environmental Quality's regulations implementing NEPA, the NOA established a 45-day comment period ending on July 10, 2006; described procedures for filing comments on the draft EIS; and announced the time, date, and location of the public comment meeting. The NOA also indicated that additional project information could be obtained from the Commission's Office of External Affairs and on the FERC's internet website. A formal notice was also published in the Federal Register on May 25, 2006, indicating that the draft EIS was available and had been mailed to individuals and organizations on the mailing list prepared for the project.

The FERC mailed 214 copies of the draft EIS to interested parties, including federal, state, and local officials and agencies; special interest groups; parties to the proceedings; area libraries and newspapers; and individuals and affected landowners who requested a copy of the draft EIS. The FERC also conducted a public meeting in Pascagoula, Mississippi on June 22, 2006. A total of four people provided comments at this meeting. A transcript of the meeting is part of the public record for the LNG Clean Energy Project. These comments, as well as five written comments on the draft EIS prepared by the public and agencies, are provided along with our responses in Appendix K.

MAJOR CONCLUSIONS

We conclude that, with the use of Gulf LNG's proposed mitigation and adoption of our recommended mitigation measures, construction and operation of the proposed facilities would have limited adverse environmental impact. The impacts would be most significant during the construction period. As part of our analysis, we have developed specific mitigation measures that we believe to be appropriate and reasonable for construction and operation of the proposed project. We believe these

measures would substantially reduce the environmental impact of the project. The primary reasons for our decision are:

- the LNG terminal facility would make use of a site previously used for dredged material placement;
- the LNG terminal facility would be located on lands designated for water-dependent industrial development with access to a deep-water federal navigation channel;
- Gulf LNG would implement the FERC staff's Plan and Procedures to mitigate impacts on soils, wetlands, and waterbodies;
- Gulf LNG would implement approved Mitigation and Monitoring Plans to minimize and mitigate for impacts on wetlands, EFH, and Gulf sturgeon;
- Gulf LNG has routed the proposed natural gas sendout pipeline so that it would be collocated with existing facilities to the maximum extent possible;
- appropriate consultations with the FWS; NMFS; and the MDMR CMP would be completed before Gulf LNG would be allowed to begin construction;
- appropriate safety features would be incorporated into the design and operation of the LNG import terminal and LNG ships;
- operational controls may be imposed by the local pilots and Coast Guard to direct the movement of LNG ships and security provisions would be imposed to deter attacks by potential terrorists; and
- an environmental inspection and mitigation monitoring program would be implemented to ensure compliance with all mitigation measures that become conditions of any FERC authorization.