



Sabine Pass LNG, L.P.

**Docket Nos. CP04-47-001
CP05-396-001**

**SABINE PASS LNG
EXPORT PROJECT**

Environmental Assessment

**Cooperating Agency:
U.S. Department of Energy
DOE/EA - 1649
DOE Docket No. FE-08-77-LNG**

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**ENVIRONMENTAL ASSESSMENT
SABINE PASS LNG
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ACRONYMS AND ABBREVIATIONS

Bcf	billion cubic feet
BWE	ballast water exchange
CFR	Code of Federal Regulations
Commission	Federal Energy Regulatory Commission
COE	U.S. Army Corps of Engineers, Galveston District
DOE	Department of Energy
EA	Environmental Assessment
EFH	Essential Fish Habitat
FERC	Federal Energy Regulatory Commission
FWS	U.S. Fish and Wildlife Service
GMFMC	Gulf of Mexico Fishery Management Council
LDNR	Louisiana Department of Natural Resources
LNG	liquefied natural gas
m ³	cubic meters
NANPCA	Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
NAISA	National Aquatic Invasive Species Act of 2003
NEMW	Northeast Midwest Institute
NEPA	National Environmental Policy Act of 1969
NGA	Natural Gas Act of 1938, as amended
NISA	National Invasive Species Act of 1996
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ppt	parts per thousand
Sabine Pass	Sabine Pass LNG, L.P.
SHPO	State Historic Preservation Officer
U.S.	United States
WSA	Waterway Suitability Report (November 13, 2007)

1.0 PROPOSED ACTION

1.1 INTRODUCTION

On October 21, 2008, Sabine Pass LNG, L.P. (Sabine Pass) filed an application for an amendment to authorization granted by the Federal Energy Regulatory Commission (FERC or Commission) pursuant to Section 3(a) of the Natural Gas Act on December 21, 2004 in Docket No. CP04-47-000 (Sabine Pass LNG and Pipeline Project or Phase I facilities)¹ and on June 15, 2006 in Docket No. CP05-396-000 (Sabine Pass LNG Phase II Project or Phase II facilities)². These authorizations collectively authorized Sabine Pass to site, construct, and operate a liquefied natural gas (LNG) import, storage and vaporization terminal in Cameron Parish, Louisiana with a total sendout capacity of 4.0 billion cubic feet (Bcf) per day. Through this application, Sabine Pass is requesting authorization to operate its LNG terminal for the additional purpose of exporting foreign sourced LNG.

On August 15 (as modified on August 28), 2008, Cheniere Marketing, Inc., applied to the Office of Fossil Energy of the Department of Energy (DOE) requesting blanket authorization to export LNG that previously had been imported from foreign sources. The export authorization application (Docket Number FE-08-77-LNG) is for an amount up to the equivalent of 64 Bcf over a two-year period from the Sabine Pass LNG terminal owned by the applicant's affiliate, Sabine Pass LNG, L.P. DOE has authority under Section 3 of the Natural Gas Act of 1938, as amended, and the DOE Organization Act to authorize the import and export of natural gas, including LNG.

In compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations issued by the Council on Environmental Quality at Title 40 of the Code of Federal Regulations (CFR) Parts 1500-1508, and the Commission's regulations at 18 CFR Part 380 (2005), the environmental review for the Phase I and Phase II facilities were included in the Final Environmental Impact Statement issued in November, 2004 and in the Environmental Assessment (EA) issued in May 2006, respectively. The Commission authorized commencement of service for the Phase I facilities (2.6 Bcf per day) on September 30, 2008. The Phase II facilities (1.4 Bcf per day) are currently under construction and are anticipated to be placed into service during the second quarter of 2009.

¹ The December 21, 2004 Order authorized Sabine Pass to site, construct and operate an LNG import, storage, and vaporization terminal in Cameron Parish, Louisiana consisting of 2.6 Bcf per day of sendout capacity (Phase I).

² The June 15, 2006 Order authorized expansion of the Sabine Pass LNG terminal's sendout capacity by 1.4 Bcf per day (Phase II).

This EA assesses the environmental effects of the proposed modifications to the Sabine Pass LNG terminal and is referred to as the Sabine Pass LNG Export Project (Sabine Export Project or Project). DOE is a cooperating agency in the preparation of this EA. Figure 1.1-1 shows the general location of the authorized Sabine Pass LNG terminal.

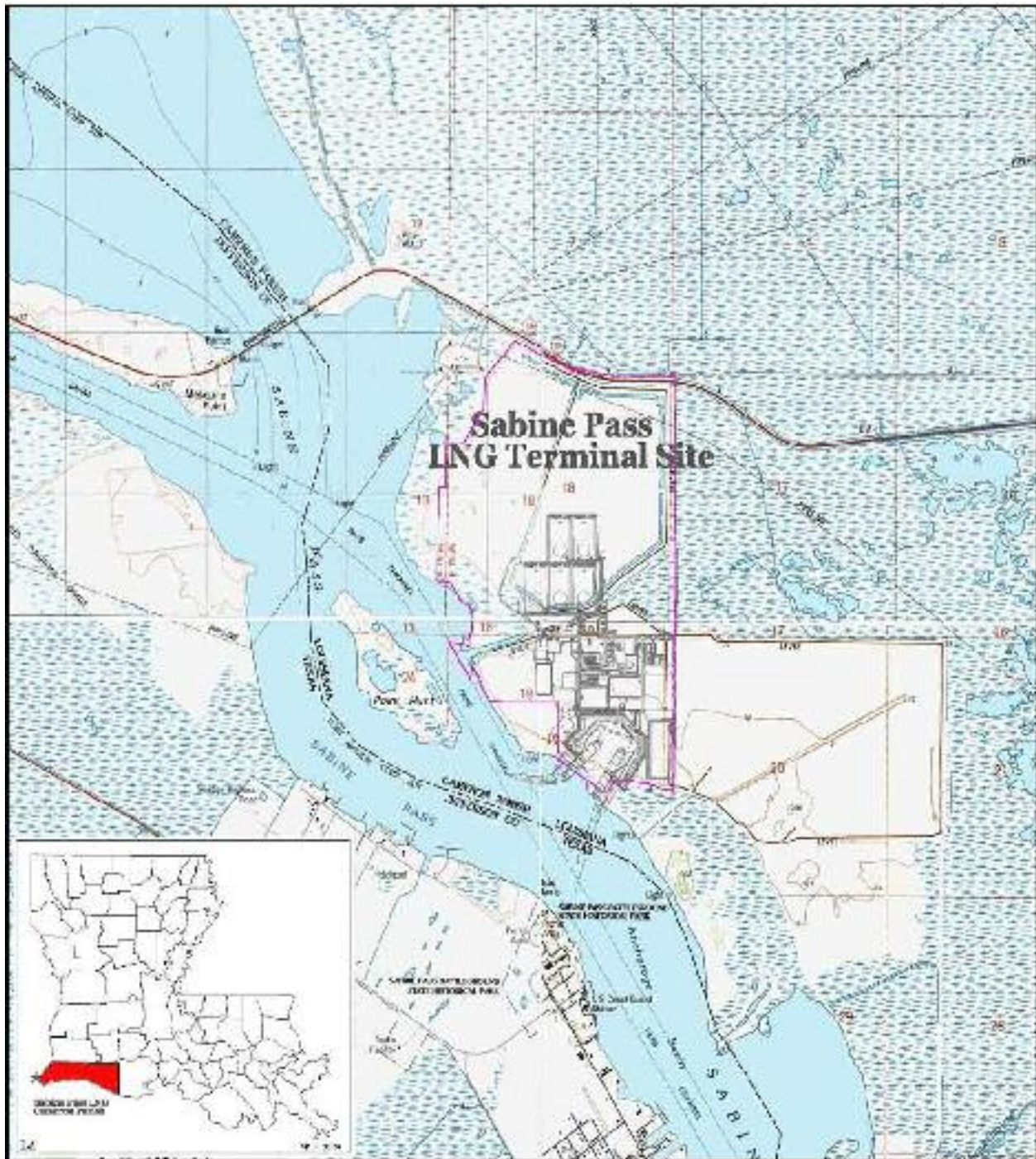
1.2 PROPOSED FACILITIES

In order to operate its facility for the purpose of exporting LNG, Sabine Pass is proposing to modify four 24-inch diameter check valves located on Transfer Arms A and D on the East and West Jetty Platforms. The modifications to the check valves would allow LNG to flow in the direction for ship loading from the LNG Storage Tanks.

The terminal operations currently utilize the Phase I facilities under Docket CP04-47-000. Until the Phase II facilities under Docket CP05-396-000 are fully operational, LNG export operations would be limited to one transfer arm on one Jetty (K-101D – East Jetty or K-102D – West Jetty). LNG would be loaded at a maximum rate of 6,000 m³/hr through the one transfer arm. Under this scenario, three LNG Storage Tanks utilizing seven LNG in-tank pumps would be on-line for ship loading and terminal cooling circulation. Once the Phase II facilities are fully operational, two transfer arms on one Jetty (K-101D/A – East Jetty or K-102D/A – West Jetty) would be used for exporting LNG at a loading rate of 12,000 m³/hr. Five LNG Storage Tanks with thirteen LNG in-tank pumps on-line would be utilized under this scenario.

The terminal would be able to operate in a dual import/export capacity or solely as an import terminal depending on market conditions. In a dual operational capacity that utilizes Phase I and II facilities, one jetty would be dedicated for loading and the other for unloading. During this operating scenario, one unloading arm would be dedicated for ship unloading at a decreased rate of 6,000 m³/hr, while the two unloading arms on the other jetty would load at a combined rate of 12,000 m³/hr. The valve modifications and unloading arms would not be permanent and could either be returned to full unloading or kept in-place to allow for dual import/export functionality.

Modification to the 24-inch-check valves would include removing the mechanical flapper located within the valve assembly or installing defeatable check valves. After removal, the gasket and bonnet assembly without the flapper would be reattached and the valve bonnet would be secured to torque specifications. The procedures to modify the check valves would be in accordance with the manufacturer's requirements and the facility's management of change procedures. No other modifications to equipment, plant processes, or safety systems would be required to facilitate export operations. Additionally, no new environmental resources and no new stakeholders would be affected.



U.S.G.S. 7.5-minute series Topographic Maps: Port Arthur, Texas Point Sabine Pass, and West of Johnsons Bayou

Figure 1.1-1 General Location Map of the Authorized Sabine Pass LNG Terminal

The LNG vessel calling on the existing terminal would discharge ballast water during LNG loading operations. All ballast water operations would be conducted in compliance with guidance provided under 33 CFR, Part 151, Vessels Carrying Oil, Noxious Liquid Substances, Garbage, Municipal or Commercial Waste, and Ballast Water, as well as the U.S. Coast Guard's Navigation and Vessel Inspection Circular 07-04, Change 1, dated October 29, 2004 (see section 2.2 of this EA).

1.3 PROJECT PURPOSE AND NEED

Sabine Pass states that the purpose of the Sabine Export Project would be to provide customers of its LNG terminal with the opportunity to purchase cargoes of LNG at LNG world market prices with the intent that such LNG could be exported for redelivery to a foreign market at a later date. Authorization of the export of imported LNG would: 1) foster continuing operation of the U.S. energy infrastructure and, 2) to the extent that imported LNG may be needed to meet U.S. demand, maintain LNG supplies in the U.S. for delivery to U.S. markets.

Sabine Pass states that its Sabine Pass LNG terminal is nearing full commercial operation and can help ensure a continuous supply of LNG in the U.S., even when U.S. market conditions may not otherwise support the sale of imported LNG. To the extent that imported LNG would not be required to meet current U.S. demand, providing LNG export services would allow terminal users the ability to both import and export LNG to meet worldwide demand, while also ensuring the availability of adequate supplies of LNG needed to maintain operational efficiency of the Sabine Pass LNG terminal³.

Sabine Pass is seeking authorization to export imported LNG or natural gas, and to maintain additional supplies of natural gas that can be made available to U.S. markets when needed, thus helping to moderate natural gas price volatility. The public interest would be served since the proposed LNG export service would not result in a reduction of U.S. natural gas supplies.

The Department of Energy, through the Office of Fossil Energy (DOE), must meet its obligation under Section 3 of the Natural Gas Act of 1938, as amended, to authorize the import and export of natural gas, including liquefied natural gas (LNG). The purpose

³ The practice of exporting LNG from receiving terminals is not new, but has been episodic to date and designed to meet short-term commercial needs. In the Far East, Japanese terminals have been used to supply cargoes to Korea. Additionally, Spain has dispatched cargoes to France, Italy, Korea, and the U.S. in recent years. Most recently, the operator of the Zeebrugge terminal in Belgium, Fluxys LNG, began to offer LNG loading services in response to demand from terminal users.

and need for DOE action is to respond to the August 28, 2008, application filed with DOE's Office of Fossil Energy (Docket Number FE-08-77-LNG) by Cheniere Marketing, Inc.

DOE would conduct its review under Section 3 of the Natural Gas Act, blanket authorization to Cheniere Marketing, Inc., to export LNG that previously had been imported from foreign sources in an amount up to the equivalent of 64 billion cubic feet of natural gas on its own behalf or as agent for others on a short-term or spot market basis from the Sabine Pass LNG Terminal owned by Cheniere's affiliate, Sabine Pass LNG, L.P., in Cameron Parish, Louisiana to the United Kingdom, Belgium, Spain, France, Italy, Portugal, Turkey, Brazil, Argentina, Chile, Mexico, Dominican Republic, Japan, South Korea, India, China, Taiwan and/or the Commonwealth of Puerto Rico over a two-year period commencing on the date of the authorization.

1.4 CONSTRUCTION, OPERATION, AND MAINTENANCE PROCEDURES

To modify the four 24-inch-check valves on unloading arms A and D on the West and East Jetty platforms, the LNG piping upstream and downstream of the valves would be isolated and bled/purged of all LNG or natural gas. The section of piping and the valves then would be warmed to ambient temperatures, purged with nitrogen, and exposed to atmospheric conditions. Once the piping and valves are emptied of LNG or natural gas, the valves would be modified, and the piping and valves would be pneumatically tested, cooled, inspected and placed back into service. Modifications to the 24-inch-check valves would be completed within 14 days.

Sabine Pass has modified its operating procedures as necessary to support the export activities. In summary, the existing plant system would be used to move LNG from the LNG storage tanks to the LNG transfer lines and onto the LNG carrier. This would involve use of the existing and in-situ in-tank LNG pumps to pump the LNG from the LNG storage tanks into the LNG transfer lines, and the existing LNG loading/unloading arms on the marine jetty platforms to load the LNG from LNG transfer lines to the LNG carrier. The procedures include the required valve alignments and operating conditions necessary to load LNG to a LNG carrier, and move LNG from the tanks to the vessel.

1.5 FUTURE PLANS AND ABANDONMENT

Currently, there are no future plans for additional development or abandonment of facilities located within the Sabine Pass LNG facility.

1.6 STATUS OF OTHER PERMITS AND AUTHORIZATIONS

As the lead federal agency for the Sabine Export Project, the FERC is required to comply with Section 7 of the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act, Section 106 of the National Historic Preservation Act, and Section 307 of the Coastal Zone Management Act. At the federal level, required permits and approval authority outside of the FERC's jurisdiction include compliance with the Clean Water Act, the Rivers and Harbors Act, the Clean Air Act, and U.S. Coast Guard regulations relating to LNG waterfront facilities. The current status of these reviews and approvals is summarized in Table 1.6-1.

TABLE 1.6-1 Permits, Approvals, and Consultations			
Agency	Permit/Consultation	Date Request Submitted	Status
Federal			
Federal Energy Regulatory Commission	Section 3 Application – Natural Gas Act	October 2008	Pending
U.S. Department of Energy	Authorization to Export LNG	August 15, 2008	Pending
U.S. Army Corps of Engineers	Section 404 – Clean Water Act Section 10 – Rivers and Harbors Act	September 29, 2008	No permit required
U.S. Fish and Wildlife Service	Section 7 Consultation – Endangered Species Act	September 29, 2008	No additional consultation required
NOAA Fisheries	Section 7 Consultation – Endangered Species Act Marine Mammal Protection Act	September 29, 2008	No additional consultation required
U.S. Coast Guard	Magnuson – Stevens Fishery Conservation and Management Act Waterways Suitability Assessment	August 26, 2008	No new WSA required
Louisiana			
Louisiana Department of Natural Resources Coastal Management Division	Coastal Management Plan Consistency Determination	September 29, 2008	Received February 11, 2009
Louisiana Department of Wildlife and Fisheries	Sensitive Species/Habitats Consultation	September 29, 2008	Pending
Louisiana State Historic Preservation Office	Section 106- National Historic Preservation Act	September 29, 2008	No additional consultation required

1.7 NON-JURISDICTIONAL FACILITIES

There are no non-jurisdictional facilities associated with the Sabine Export Project.

1.8 PUBLIC REVIEW AND COMMENTS

On November 20, 2008 the FERC issued a Notice of Intent to prepare an Environmental Assessment for the proposed Sabine Pass LNG Export Project, Requesting for comments on the Environmental Issues (NOI). This NOI was sent to 70 interested parties including federal, state, and local officials; agency representatives; conservation organizations; local libraries and newspapers; and property owners in the Project area. Issuance of the NOI opened time period for receiving comments and established a closing date of December 23, 2008 for receiving comments. We received no comments on the NOI. Also, the NOI outlined how to become an intervenor in the proceeding.

2.0 ENVIRONMENTAL ANALYSIS

The environmental analysis in this document incorporates by reference the environmental analyses conducted in the Final Environmental Impact Statement for the Sabine Pass LNG and Pipeline Project in Docket Nos. CP-04-38-000, CP04-47-000, CP04-39-000, and CP04-40-000 (referred to as Phase I); and Environmental Assessment for the Sabine Pass LNG Terminal Phase II Project, in Docket No. CP05-396-000 (Phase II). Therefore, discussion in this EA only focuses on changes in environmental impact that would be associated with adding four 24-inch-check valves to the West and East Jetty Platforms to modify the terminal for export activities.

2.1 GEOLOGY AND SOILS

Construction and operation of this Project would occur within the footprint of the authorized facility and would not alter geological impacts or result in increased susceptibility to geological hazards. The 24-inch-check valves would be installed on the existing man-made jetty platforms and there would be no impact on soils.

2.2 WATER RESOURCES

Construction and operation of this Project would result in no new environmental impacts on water resources with the exception of the discharge of ballast water at the terminal during loading of the LNG carriers. No new waterbodies, protected watersheds, or public or private wells would be affected by the Sabine Export Project.

The Sabine Pass LNG terminal is designed and authorized to accommodate up to 400 LNG vessels in a single year, of which 20 could be LNG carriers involved in export activities. These LNG carriers range in size from 125,000 cubic meters (m³) to 266,000 m³, with the capacity to discharge 35,000 to 120,000 metric tons (approximately 9 to 30 million gallons) of ballast water at a rate up to 6,000 metric tons (approximately 1.5 million gallons) per hour. Ballast water from exporting LNG carriers would be discharged within the open water portion of the marine berth at a discharge point that could be 28 to 35 feet below the water surface.

2.2.1 Ballast Water Regulations

Ballast water is collected and carried by LNG carrier ships to provide balance, stability, and trim during transport. Ballast water is typically pumped into ballast tanks when LNG cargo has been delivered to a port and the ship is departing with less cargo weight. Ballast water can be collected when a ship is already carrying cargo and needs additional weight, or when a ship has no cargo. Ballast water can be exchanged at any time, but is typically discharged at port upon loading and then purged or exchanged once

the vessel is underway. Ballast water from the export operations would be exchanged at mid-ocean locations in accordance with applicable regulations. These U.S. laws, regulations, and policy documents include the:

- *Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990* (NANPCA) that established a broad federal program “to prevent introduction of and to control the spread of introduced aquatic nuisance species...” The U.S. Fish and Wildlife Service (FWS), USCG., U.S. Environmental Protection Agency, U.S. Army Corps of Engineers (COE), and National Oceanic and Atmospheric Administration (NOAA) all were assigned responsibilities.
- *National Invasive Species Act of 1996* (NISA) that reauthorized and amended the NANPCA 1990 because “Nonindigenous invasive species have become established throughout the waters of the U.S. and are causing economic and ecological degradation to the affected near shore regions.” The Secretary of Transportation was charged with developing national guidelines to prevent import of invasive species from ballast water of commercial vessels, primarily through mid-ocean ballast water exchange (BWE), unless the exchange threatens the safety or stability of the vessel, its crew, or its passengers (Northeast Midwest Institute [NEMW], 2007).
- *National Aquatic Invasive Species Act of 2003* (NAISA), amended in 2005 and again in 2007, established a mandatory National Ballast Water Management Program. The primary requirements established under NAISA are: 1) all ships operating in U.S. waters are required to have on board an Aquatic Invasive Species Management Plan, 2) the U.S. Coast Guard was made responsible for the development of standards for mid-ocean BWE and ballast water treatment for vessels operating outside of the exclusive economic zone, and 3) implementing the best management practices and available technology related to ballast water treatment (NEMW, 2007).
- *National Ballast Water Management Program*, originally established by NANPCA 1990 and further amended by NISA 1996 and NAISA 2003, that made the ballast water management program mandatory, including BWE with reporting to the U.S. Coast Guard.
- *Shipboard Technology Evaluation Program*, a program authorized under the U.S. Coast Guard Ballast Water Management Program and designed to facilitate the development of “effective ballast water treatment technologies, through experimental systems, thus creating more options for vessel owners seeking alternatives to ballast water exchange.”
- *Navigation and Vessel Inspection Circular 07-04, Change 1*, a program developed by the U.S. Coast Guard for the management and enforcement of

ballast water discharge into U.S. ports and harbors (33 CFR 151, 69 Federal Register 44952, July 28, 2004).

Currently, the only approved ballast water treatment strategy is mandatory BWE for all vessels traveling beyond the U.S. exclusive economic zone. Correctly executed BWE can replace up to 99 percent of the volume of the initial coast water ballast water uptake with ocean water, thereby removing over 90 percent of coastal zooplankton within the ballast tanks (Minton et al., 2005; Ruiz and Smith, 2005).

Sabine Pass states that all ballast water would be discharged in accordance with federal oversight and regulations. Additionally, upon entry into Sabine Pass' marine berth and, as part of the Sabine Pass operating procedures, Sabine Pass staff would review any applicable documentation that the visiting ship is or has been operating(ed) the vessel in accordance with the federal standards and practices prior to discharging any ballast water.

2.2.2 Sabine-Neches Waterway

The Sabine-Neches Waterway, a 52-mile-long navigation channel extending inland from the Gulf of Mexico, is the natural outlet of the Sabine River, Neches River, and Sabine Lake into the Gulf of Mexico. It is bordered by Jefferson County, Texas to the west and Cameron Parish, Louisiana to the east and is routinely maintained (e.g., dredged) with depths of up to 42 feet below mean low tide. In 2003, according to the Sabine-Neches Navigation District and U.S. Army Corps of Engineers Waterborne Commerce Statistics, there were 74,794 vessel and barge trips through the waterway, of which 1,800 were foreign vessel calls. The Gulf Intracoastal Waterway enters the Sabine-Neches Waterway just south of Port Arthur, Texas, and exits via the Sabine River.

The Sabine Pass LNG terminal is located on that part of the waterway known as Sabine Pass, approximately 3.7 nautical miles from the open Gulf of Mexico, and is within the southernmost segment of the Sabine-Neches Waterway. Sabine Pass is within the Sabine Lake Louisiana, Texas, watershed U.S. Geological Survey cataloging number 12040201 in the Texas-Gulf Region, Galveston Bay-San Jacinto Subregion, and Galveston Bay-Sabine Lake Accounting Unit. The Louisiana Department of Environmental Quality's state water quality classification for Sabine Pass is Primary and Secondary Contact Recreation, Fish and Wildlife Propagation, and Shellfish Production.

The Sabine Pass channel is maintained at a depth of 40 feet while the LNG terminal marine berth is maintained at a water depth of approximately 45 feet below mean sea level. Bottom sediments are fine, consisting primarily of mud and silt (Gulf of Mexico Fishery Management Council [GMFMC] 1998). The water column is generally turbid, due to the high sediment load of inflowing waters and disturbance of bottom

sediments by wind-action and vessel traffic. The GMFMC (1985) classifies the Sabine Lake estuary as a Mixing Zone (salinity of 0.5-25 parts per thousand [ppt]), where saline Gulf waters mix with freshwater inflows from Sabine Lake and its tributaries (GMFMC, 1998).

The diurnal tidal range in Sabine Pass is 1.6 feet at Sabine Pass, Texas (NOAA, 2003). According to the NOAA (2005), mean tidal range at Sabine Pass is 1.09 feet. Mean tide level at the Sabine Pass jetty is 1.2 feet, falling to 0.6 feet at Mesquite Point, near the Sabine Pass's confluence with Sabine Lake.

Sources of fresh water in the bay-estuary system include streams and runoff; municipal, industrial, and agricultural return flow; and direct precipitation. According to the Environmental Protection Agency (1999), average daily gauged freshwater inflows into Sabine Lake and Estuary are about 487 cubic meters per second. The bay-estuary is little affected by daily tides, which are uniformly small. More significant in this area are wind-generated tides, which affect most bay and estuary environments and have produced wind-tidal flats and marshes.

2.2.3 Potential Impacts to Water Quality Impacts from Ballast Water

Impacts to water quality from ballast water could include those associated with the standard water quality parameters (e.g., temperature, salinity, pH and dissolved oxygen) or those introduced from anthropogenic contaminants. Ballast water discharged into the Sabine Pass marine berth likely would be composed of open ocean water retrieved during BWE and may be similar or different from that which occurs within the berth. Because ballast water is stored in the ship's hull below the water line, water temperatures are not expected to deviate much from ambient temperatures of the marine berth. The pH of the ballast water (reflective of open water conditions) may be slightly higher to that of freshwater estuaries, but this slight variation would not be expected to have any impact on marine organisms.

The most noticeable difference in the water quality from ballast water would likely be salinity and dissolved oxygen. Since the LNG terminal is near the open Gulf of Mexico, differences in salinity may be very subtle under normal tide cycles and rainfall, but could be more noticeable during periods of heavy rainfall when salinity levels may be decreased within the marine berth as a result of freshwater runoff. Since water becomes denser with increased salinity, it is common to observe lower salinities at the surface and higher salinities along the bottom of the water column. This stratification is often accentuated in estuaries with deep channels that extend into the open ocean. This phenomenon is commonly referred to as a saltwater wedge. The presence of deep

channels can often convey this saltwater wedge far into estuaries where the less dense, freshwater flows at the surface.

There is an existing salinity gradient from Sabine Lake to the Gulf of Mexico that has been documented by various studies over the years (Kane, 1967; Meselhe, 1998; Meselhe, 2003; Tolan, 2007). These observations recorded salinity gradients ranging from 5 to 10 ppt in Sabine Lake, from 10 to 20 ppt in Sabine Pass, and from 15 to 30 ppt in the Gulf of Mexico. Sabine Pass conducted a similar study in the marine berth; with an average surface and mid-water (25 feet below the surface) salinity of 15.4 ppt (Bio-West, 2008). Tolan's salinity observations in the Sabine-Neches Waterway that were collected between 1982 and 2004 (n = 4,025), documented a mean salinity of 6.1 ppt and a maximum salinity of 32.0 ppt. Open ocean salinities range from 32 to 37 ppt. In accordance with BWE standards, the ballast water that would be discharged into the marine berth would range from 32 to 37 ppt.

Dissolved oxygen is a critical component for the respiration of aquatic marine organisms and can be influenced by water temperature, water depth, phytoplankton, wind, and current. Typical water column profiles indicate a decrease in dissolved oxygen with an increase in depth. Some factors that influence this stratification include sunlight attenuation for photosynthetic organisms that can produce oxygen, and wind, wave, and current action that results in mixing. Water collected within the ballast tanks of a ship would lack these influences and could suppress dissolved oxygen, resulting in ballast water discharges that would have lower levels of dissolved oxygen than would be found at the water surface. Since the ballast water would be discharged near the bottom of the marine berth where the dissolved oxygen levels are already suppressed, these impacts should not be significant.

Sabine Pass estimates that only 20 LNG carriers per year would be used to export LNG and would need to discharge ballast water into the Sabine-Neches Waterway system. These discharges would range between 35,000 and 120,000 metric tons (9,002 to 30,863 thousand gallons) at any one time, with an expected average of 55,000 metric tons (14,145 thousand gallons). Combined long-term median flow for the Sabine and Neches Rivers, just upstream of Sabine Lake was 9,320 cubic feet per second (U.S. Geological Survey, 2008). Thus, the maximum ballast water discharge from an individual ship would equal approximately 0.512 percent of the median daily freshwater inflow and would represent a minor influence on the system as a whole during a single ballast water discharge event.

While there is the potential for the introduction of contaminants with the ballast water, this can be avoided or minimized through the use of best management practices incorporated into current U.S. Coast regulations regarding the intake and discharge of ballast water.

2.2.4 Fisheries and Essential Fish Habitat

Fishery resources in the vicinity of the Project are classified as warmwater marine or estuarine. In 1996, new habitat conservation provisions were added to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) that mandated the identification of Essential Fish Habitat (EFH) for managed species. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S. Code. 1802(10)). Eight aquatic species are listed by the GMFMC as managed fishery species that may occur within the Sabine Lake estuary, of which five species are known to be present based on relative abundance (brown shrimp, *Farfantepenaeus aztecus*; Gulf stone crab, *Menippe mercenaria*; red drum, *Sciaenops ocellatus*; Spanish mackerel, *Scomberomorus maculates*; and white shrimp, *Penaeus setiferus*).

Economically important marine fishery species that also use EFH areas for nursery and foraging habitat include the spotted seatrout (*Cynoscion nebulosus*), southern flounder (*Paralichthys lethostigma*), Atlantic croaker (*Micropogonias undulates*), Gulf menhaden (*Brevoortia patronus*), striped mullet (*Mugil cephalus*), and blue crab (*Callinectes sapidus*) (Gulf States Marine Fisheries Commission, 2007).

Estuarine aquatic species are adapted to living in a dynamic environment supporting both freshwater near the source of the freshwater (0.5 ppt) and open seawater conditions (30 to 40 ppt) (Patillo et al., 1995). Based on this research, the addition of ballast water would not affect a change in the salinity ranges that would be outside of the tolerable ranges for EFH species that may occur in the vicinity of LNG terminal area.

In its comments to the applicant on the Project, the National Oceanic and Atmospheric Administration, NMFS (NMFS, 2008 a) indicated that it did have concerns with the release of ballast water at the Sabine Pass terminal in that such releases could introduce exotic species from other ports of call. Since the ballast water would be replaced mid-ocean, the NMFS would have no concerns unless the mid-ocean ballast water exchange had not occurred for some reason. As stated in section 2.2.1 Sabine Pass would ensure compliance with federal oversight and regulations, regarding all ballast water discharges and mid-ocean exchange of ballast water.

2.2.5 Marine Mammals and Sea Turtles

A number of marine mammals (whales and dolphins) are commonly observed in the Gulf of Mexico, with some species having with a greater affinity to coastal, inshore waters, while others are more commonly observed offshore in deeper, pelagic waters. Many species are also commonly observed in shipping channels in Texas and Louisiana, the most common and prolific being the bottlenose dolphin (*Tursiops truncatus*).

Five of the world's seven sea turtle species have been recorded in the Gulf of Mexico: green Sea (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*) and loggerhead (*Caretta caretta*). All five species are federally- and state-listed as threatened or endangered.

There would be no overall increase in LNG ships as a result of the Sabine Export Project. As part of previous authorizations for the Sabine Pass LNG terminal, LNG carriers traveling to and from the LNG terminal would use established, well-traveled shipping lanes, thus reducing the potential for collisions as vessel traffic has helped to deter these species from using these areas. In addition, Sabine Pass has provided LNG ship captains with NOAA's "*Vessel Strike Avoidance Measures and Reporting for Mariners*" that outlines measures to avoid collisions with marine mammals and sea turtles.

Sabine Pass has consulted with NMFS regarding potential Project impacts to marine mammals and sea turtles. Because the Project would not substantially change previous reviews conducted for the Sabine Pass LNG terminal, NMFS has determined that reinitiation of consultation would not be necessary (NMFS, 2008 b).

2.3 WETLANDS

There would be no new impacts on wetlands associated with the export activities because all modifications would take place on the existing man-made jetties that have been previously authorized. The U.S. Army Corps of Engineers, Galveston District, (COE) has reviewed the Project and determined that, because the proposed modifications would not require installation or construction of aboveground facilities, ground disturbing activities, or impact to waters of the United States, and would occur entirely within the operational footprint of the LNG facility, no permit or modification to an existing permit under Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act, would be required (COE, 2008).

2.4 VEGETATION AND WILDLIFE

There would be no new impacts on vegetation and wildlife associated with the export activities because all modifications would take place on the existing man-made jetties that have been previously authorized.

2.5 ENDANGERED, THREATENED, AND OTHER SPECIES OF CONCERN

Sabine Pass has consulted with the FWS which has determined that the Project, as proposed, will have no effect on federally-listed threatened or endangered species (FWS, 2008). The Commission staff concurs.

2.6 LAND USE, RECREATION, AND VISUAL RESOURCES

The authorized Sabine Pass LNG terminal facilities are located entirely on private land. The proposed Project would not require any earth disturbing activities and all modifications would take place within the existing facilities. Therefore, there would be no new impact on land use, residences, recreational resources, or visual resources.

2.7 COASTAL ZONE MANAGEMENT AREA

In Louisiana, the Louisiana Coastal Resources Program is administered by the Coastal Management Division of the Louisiana Department of Natural Resources (LDNR). A Coastal Use Permit is required for certain projects in the Coastal Zone, including but not limited to dredge and fill work, bulkhead construction, shoreline maintenance, and other development projects. The purpose of the Coastal Use Permit process is to make certain that any activity affecting the Coastal Zone is performed in accordance with guidelines established in the Louisiana Coastal Resources Program.

The Sabine Pass LNG terminal is located entirely within the Coastal Zone. Sabine Pass has notified the LDNR of the proposed modifications and requested their comment and recommendations as to any permit requirements that may be associated with the Sabine Export Project. The LDNR requested that a joint permit application be submitted for their review. Sabine Pass has received its Coastal Use permit/Consistency Determination on February 11, 2009.

2.8 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act, as amended, requires the Commission to take into account the effects of its undertakings (including the issuance of Certificates) on properties listed or eligible for listing on the National Register of Historic Places, and to afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking. Sabine Pass has initiated consultation with the State

Historic Preservation Officer (SHPO) to determine if the proposed modifications would require any additional surveys or consultations. The SHPO determined that no known historic properties would be affected by the proposed modifications (SHPO, 2008) and Commission staff concurs.

2.9 AIR AND NOISE QUALITY

During export operations, LNG would flow through the transfer lines from the LNG storage tanks to the LNG vessel. Similarly, the vapor generated during ship loading would be managed and directed to the terminal's vapor recovery system and existing vapor handling equipment. The vapor sent back would be compressed and sent out to the send-out pipeline as natural gas. This process occurs in a closed loop system, and therefore would not impact air quality levels (see section 1.2). In addition, the proposed modifications in this project would not require any additional installation of equipment or construction resulting in air or noise impacts. The only modification proposed would be to the 24-inch-check valves, which would include removing the mechanical flapper to facilitate loading LNG from the tanks to the LNG vessel. All LNG transfer operations would occur in a closed loop system, therefore would not impact air quality, particularly Greenhouse gas emissions during export operations.

2.10 RELIABILITY AND SAFETY

Existing plant and safety systems and control processes would be utilized to manage flow rates, boil off gas (BOG), and loading operations. LNG would follow the same flow path through the transfer lines from the LNG storage tanks to the LNG vessel. Vapor generated during ship loading would be managed similarly by being directed to the terminal's vapor recovery system and existing vapor handling equipment. The proposed modifications and additional export operations at Sabine Pass would be required to comply with the requirements under: Title 49, CFR, Part 193; Title 33, CFR, Part 127; and NFPA 59A, 2001 edition.

As part of its application, Sabine Pass provided operating procedures for LNG loading operations, process and instrumentation diagrams for the plant systems that would be utilized during loading operations, site plans showing the locations of the proposed valve modifications, and a hazard design and operability review. The procedures to berth and connect an LNG ship for loading would follow the same protocol used for LNG ship unloading. These procedures include: isolation of the transfer arms and associated liquid and vapor piping not selected for loading operations; connection of the transfer arms to be utilized during loading operations; and verification of the vapor handling equipment and piping that would be used to manage BOG generated from the LNG ship. Sabine Pass indicated that the transfer arm(s) selected for loading operations and transfer lines would be cooled down prior to loading the ship. Once these steps have

been completed, Sabine Pass would load LNG onto the LNG vessel utilizing the existing LNG storage tank in-tank pumps. The hazard design and operability review, conducted by Sabine Pass, identified potential concerns and hazards associated with the additional loading capability proposed at the terminal and primarily focused on the proposed modifications to the check valves and operational processes to load LNG onto a ship. As a result of our technical review, we did not identify additional issues relating to the reliability, operability, and safety of the proposed modifications or operational processes to load LNG onto a ship.

The proposed modifications would not affect the capacity of the existing spill containment systems and the design spill volumes that were used to determine the exclusion zones for the existing Sabine Pass LNG terminal. The thermal and flammable vapor exclusion zones considered under Dockets CP04-47-000 and CP05-396-000 would therefore remain unchanged. We⁴ believe the proposed modifications required for loading operations would comply with the siting requirements of 49 CFR 193, Subpart B.

2.10.1 LNG Vessel Safety

The terminal is located on the east bank of the Sabine Pass Channel approximately 4.3 miles north from the shoreline on the Gulf of Mexico. Vessels exporting LNG from the Sabine Pass terminal would utilize the same transit routes used for LNG imports as described in the Phase I Project Final Environmental Impact Statement and Phase II Project Environmental Assessment under Dockets CP04-47-000 and CP05-396-000, respectively.

LNG vessels having capacities up to 266,000 m³ (Q-max class vessels) are currently authorized to transit through the Sabine Pass Channel up to the terminal as indicated in the January 30, 2008 letter issued by the Coast Guard COTP Port Arthur. The existing terminal is authorized to receive between 300 and 400 LNG vessels each year as described in the Letter of Intent (LOI) Sabine Pass submitted to the Coast Guard on June 10, 2003. Sabine Pass indicated that approximately 20 LNG vessels would be utilized for export operations at the terminal and does not anticipate that the additional export operations would increase the overall number beyond the 400 LNG vessels anticipated to call at the terminal considered in the LOI.

On January 5, 2009, the Coast Guard determined that the waterway impacts associated with the proposed export operations at the terminal would not affect the results

⁴ “Our,” “we,” and “us” refer to the environmental staff of the Federal Energy Regulatory Commission’s Office of Energy Projects.

from the original waterway suitability review.⁵ Based on its review of the proposed modifications required to export LNG, the Coast Guard concluded that a revised LOI and Waterway Suitability Assessment (WSA) would not be required. The export operations proposed for the terminal would therefore not require additional measures beyond those currently used to responsibly manage the maritime safety and security risks associated with LNG marine traffic. However, in its January 5, 2009 letter, the following items were identified in the Coast Guard's review of the proposed modifications required to export LNG:

- Applicable amendments to Sabine Pass LNG terminal's existing Operations Manual, Emergency Manual, and Facility Security Plan to reflect the proposed export operations; and
- Testing of the proposed equipment changes associated with export operations in accordance with 33 CFR 127.407.

The Coast Guard would require Sabine Pass to address these items prior to commencement of export activities at the facility.

⁵ We note that on December 22, 2008, the Coast Guard published a Navigation and Vessel Inspection Circular – Guidance related to Waterfront Liquefied Natural Gas (LNG) Facilities (NVIC 05-08). This guidance supersedes the 2005 NVIC 05-05 on assessing the suitability of waterways for LNG marine traffic.

3.0 ALTERNATIVES

The Sabine Export Project facilities would be limited to minor modifications of four valves on the existing facility jetties, resulting in minimal impact on environmental resources. Therefore, with the exception of the No-Action or Postponed Alternative, there is no feasible system or process alternative to the proposed action. Because discharge of ballast water within the Sabine Pass marine berth would be necessary and in compliance with all applicable guidelines and regulations, there is no feasible alternative for the discharge of ballast water.

The no-action action alternative would not address the need for the Project. Sabine Pass states that the purpose of adding export capabilities to the Sabine Pass LNG terminal would be to enable Sabine Pass to provide its customers, with added commercial flexibility. This would afford customers the ability to purchase cargoes of LNG at current LNG market prices for redelivery to a foreign market at a later date or, if U.S. market prices were to rise to a point where domestic sale of the LNG held in storage was economic, the LNG would be readily available for U.S. consumption. Additionally, export capabilities would provide a means to maintain full operation of the Sabine Pass LNG terminal when domestic natural gas prices and demand would otherwise make importing LNG cargos uneconomical.

The postponed action alternative would limit Sabine Pass' options to maintain efficient operation of the terminal by eliminating the option to purchase or trade LNG to maintain the plant at cryogenic temperatures. During those periods when U.S. market conditions do not support the import of LNG, the LNG terminal may be allowed to warm up, requiring re-cooling of the plant in conjunction with the next imported LNG cargo. Conversely, if the LNG terminal were maintained at optimal operating temperatures, Sabine Pass would have to purchase LNG at global LNG prices that are significantly higher than current natural gas prices and are projected to remain so for the foreseeable future.

4.0 STAFF'S CONCLUSIONS AND RECOMMENDATIONS

The Sabine Export Project would involve modification of four 24-inch-check valves on the existing West and East jetties to allow the Sabine Pass LNG terminal to provide LNG export capability. The only environmental impacts that would be associated with modifying the LNG terminal would be from the introduction of ballast water into the marine berth by the export LNG carriers. However, all ballast water discharge would be in compliance with applicable federal and U.S. Coast regulations and no significant impacts on aquatic species would be anticipated. Export activities would not increase the number of LNG carriers that the Sabine Pass LNG terminal is designed and authorized to accommodate.

We conclude that approval of this proposal would not constitute a major federal action significantly affecting the quality of the human environment. This finding is based on the above Environmental Assessment; and Sabine Pass' application and supplemental filings. We recommend that the Commission Order contain a finding of no significant impact and include the mitigation measures listed below as conditions to any Certificate the Commission may issue.

1. Sabine Pass shall follow the construction procedures and mitigation measures described in its application(s) and supplement filings (including responses to staff data requests) and as identified in the Environmental Assessment unless modified by the Order. Sabine Pass must:
 - a. request any modification to these procedures, measures, or conditions in a filing with the Secretary of the Commission (Secretary);
 - b. justify each modification relative to site-specific conditions;
 - c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and
 - d. receive approval in writing from the Director of the Office of Energy Projects (OEP) before using that modification.

2. 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 Order; and
 - b. design and implementation of any additional measures deemed necessary (including stop work authority) to assure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from project construction and operation.

3. **Within 60 days of the acceptance of this authorization and before construction begins**, Sabine Pass shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP. Sabine Pass must file revisions to the plan as schedule changes. The plan shall identify:
 - a. how Sabine Pass will implement the construction procedures and mitigation measures, if any, described in its application (including responses to staff data requests), identified in the EA, and required by the Order;
 - b. the training and instructions Sabine Pass will give to all personal involved with construction; and
 - c. provide a Gantt or PERT chart (or similar project scheduling diagram) and dates for start and completion of project.

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