



**Federal Energy
Regulatory
Commission**

**Office of
Energy Projects**

November 2020

Golden Pass LNG Terminal, LLC

Docket No. CP20-459-000

Golden Pass LNG Export Project Amendment

Environmental Assessment

Cooperating Agencies



Washington, DC 20426

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TECHNICAL ABBREVIATIONS AND ACRONYMS

Bcf/y	billion standard cubic feet per year
BOG	boil-off gas
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH ₄	methane
Coast Guard	U.S Coast Guard
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalents
Commission	Federal Energy Regulatory Commission
COTP	Captain of the Port
CWA	<i>Clean Water Act</i>
DOE	U.S. Department of Energy
DOE/FE	DOE's Office of Fossil Energy
EA	environmental assessment
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	<i>Endangered Species Act</i>
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gases
Golden Pass	Golden Pass LNG Terminal, LLC
GOM	Gulf of Mexico
HAP	hazardous air pollutant
HCA	high consequence area
HMB	heat and material balance
LNG	liquefied natural gas
LOD	Letter of Determination
LOR	Letter of Recommendation
m ³	cubic meters
MMPA	Marine Mammal Protection Act
MOU	memorandum of understanding
MTPA	million metric tons per annum
MTSA	<i>Maritime Transportation Security Act</i>
NAAQS	National Ambient Air Quality Standards
NEPA	<i>National Environmental Policy Act</i>
NFPA	National Fire Protection Association
NGA	<i>Natural Gas Act</i>
NMFS	National Marine Fisheries Service

N ₂ O	nitrous oxide
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
O ₃	ozone
OEP	Office of Energy Projects
PM _{2.5}	particulate matter less than or equal to 2.5 microns in aerodynamic diameter
PM ₁₀	particulate matter less than or equal to 10 microns in aerodynamic diameter
SNWW	Sabine Neches Waterway
SO ₂	sulfur dioxide
TCEQ	Texas Commission on Environmental Quality
tpy	tons per year
USDOT	U.S. Department of Transportation
USDOT PHMSA	Pipeline and Hazardous Materials Safety Administration
WSA	Waterway Suitability Assessment

A. PROPOSED ACTION

1.0 INTRODUCTION

On May 21, 2020, Golden Pass LNG Terminal, LLC (Golden Pass) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) in Docket No. CP20-459-000 for a limited amendment (Amendment) to the Commission's December 16, 2016 Order in Docket No CP14-517-000 (2016 Order). The 2016 Order authorized the Golden Pass LNG Export Project (Project) under section 3 of the Natural Gas Act (NGA). The facilities authorized in the 2016 Order include three liquefaction trains with a total production capacity of 15.6 million metric tons per annum (MTPA) of liquefied natural gas (LNG) at the Golden Pass LNG Terminal in Sabine Pass, Jefferson County, Texas. Golden Pass commenced construction of the Project in September 2017. Initial commencement of service is planned in 2024.¹

In the Amendment, Golden Pass requests to increase the total LNG production capacity of the Golden Pass LNG Terminal from the currently authorized 15.6 MTPA (equivalent to 740 billion cubic feet of natural gas per year [Bcf/y]) to 18.1 MTPA (937 Bcf/y). Golden Pass states the increase is based on a recalculation of the maximum design LNG production capability of the facilities and would not require any facility construction or modification.

We² prepared this environmental assessment (EA) in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality's (CEQ) regulations for implementing NEPA (Title 40 of the Code of Federal Regulations [CFR], Parts 1500-1508 [40 CFR 1500-1508])³, and the Commission's regulations for implementing NEPA (18 CFR 380). The assessment of environmental impacts is an important and integral part of the Commission's decision-making process. As such, we prepared this EA to assess the environmental impacts that may occur as a result of the Amendment. We have developed and incorporated measures into this EA that we believe would appropriately and reasonably avoid, minimize, or mitigate environmental impacts associated with the Amendment.

FERC is the lead federal agency for authorizing LNG export facilities under the NGA, and the lead federal agency for preparation of this EA, in accordance with NEPA (40 CFR 1501) and the Energy Policy Act of 2005. Consistent with NEPA (40 CFR 1501.6) and their respective responsibilities and regulations, the U.S. Department of Energy (DOE), U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (USDOT PHMSA), and U.S. Coast Guard (Coast Guard) participated as cooperating agencies in the preparation of

¹ On December 11, 2019, the Commission granted an extension of time until November 30, 2026 to complete the construction of the Golden Pass LNG Export Project and make it available for service.

² "We," "us," and "our" refer to the environmental and engineering staff of the Office of Energy Projects.

³ On July 16, 2020, CEQ issued a final rule, Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act (Final Rule, 85 Fed. Reg. 43,304), which was effective as of September 14, 2020; however, the NEPA review of this project was in process at that time and was prepared pursuant to the 1978 regulations.

this EA. Cooperating agencies have jurisdiction by law or special expertise with respect to the environmental impacts associated with Golden Pass's proposal.

2.0 PURPOSE AND NEED

Golden Pass states that evaluation of seasonal variations and other design margin factors provided more accurate knowledge and insight concerning the actual production capacity of the three liquefaction trains. Therefore, Golden Pass is requesting authorization to increase the authorized production capacity of the Project by 197 Bcf/y (equivalent volume of natural gas), to a facility wide production capacity of 937 Bcf/y (equivalent volume of natural gas). Golden Pass states that the proposed Amendment is necessary for Golden Pass to utilize the maximum design liquefaction capacity of the Golden Pass LNG Export Project facilities and meet market demand.

The Commission is an independent regulatory agency and conducts a complete independent review of project proposals, including an environmental review of proposed facilities. Under Section 3 of the NGA, FERC considers, as part of its decision to authorize natural gas facilities, all circumstances bearing on the public interest. Specifically, regarding whether to authorize natural gas facilities used for importation or exportation, FERC shall authorize the proposal unless it finds that the proposed facilities would not be consistent with the public interest. The Commission bases its decisions on both economic issues, including need, and environmental impacts.

3.0 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

The Amendment does not require the construction of new facilities or the modification of previously authorized facilities. Golden Pass states that the revised estimate of peak LNG production and export capability is based on taking into account seasonal production variation due to changes in average monthly temperature and higher feed gas/LNG density that would result in a proportionally higher LNG production rate and increased liquefaction efficiency.

Although no construction or facility/design modifications are proposed, based on our independent analysis, we believe it is reasonably foreseeable that the production rate increase could result in an increase in the number of LNG carrier transits, depending on LNG density and availability of the contracted LNG carrier fleet. In addition, we evaluated regulatory aspects of a potential change in marine traffic and verified that the hazard and engineering designs would not be affected by the proposed Amendment. Accordingly, the topics addressed in this EA include surface waters, fisheries, aquatic wildlife, species of special concern, air quality, reliability and safety, and alternatives. This EA describes the affected environment as it currently exists and the potential environmental consequences of the Amendment.

The environmental impacts for the following resources remain unchanged from that analyzed in the July 2016 Final Environmental Impact Statement (July 2016 FEIS) for the Golden Pass LNG Export Project in Docket No. CP14-517-000, and are therefore not addressed further in this EA:

- geology and soils;
- groundwater;

- wetlands;
- vegetation and terrestrial wildlife;
- land use, recreation, and visual resources;
- socioeconomics;
- cultural resources; and
- noise.

Additionally, because the proposed action would not involve new construction or modification of facilities, and impacts from potential vessel traffic increases would be minor, we conclude there would be no adverse cumulative impacts when considering the Amendment and other past, present, or reasonably foreseeable projects in the region. Therefore, cumulative impacts are not addressed further in this EA.

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- **COOPERATING AGENCIES**

The DOE, USDOT PHMSA, and Coast Guard participated as cooperating agencies in the preparation of the EA. Cooperating agencies have jurisdiction by law or special expertise with respect to environmental impacts involved with a proposal. The roles of the DOE, USDOT PHMSA, and Coast Guard in the Amendment review process are described below. The EA provides a basis for coordinated federal decision making in a single document, avoiding duplication in the NEPA environmental review process. In addition to the lead and cooperating agencies, other federal, state, and local agencies may use this EA in approving or issuing permits for all or part of the Project.

U.S. Department of Energy

Under Section 3 of the NGA, the DOE's Office of Fossil Energy (DOE/FE) is responsible for authorizing imports and exports of natural gas, including LNG, from or to a foreign country. By law, under Section 3(c) of the NGA, applications to export natural gas to countries with which the United States has free trade agreements (FTA) are deemed to be consistent with the public interest and the Secretary of the DOE/FE must grant authorization without modification or delay. In the case of applications to export LNG to non-FTA nations, NGA Section 3(a) requires DOE/FE to conduct a public interest review and grant authority to export unless DOE/FE finds that the proposed exports would not be consistent with the public interest. Additionally, NEPA requires DOE/FE to consider the environmental effects of its decisions regarding applications to export natural gas to non-FTA nations.

On September 27, 2012, DOE/FE issued Order No. 3147, authorizing Golden Pass to export LNG to FTA countries in a volume equivalent to 740 Bcf/y of natural gas for a 25-year term. On April 25, 2017, DOE/FE issued Order No. 3978, authorizing Golden Pass to export LNG to non-FTA countries in a volume equivalent to 808 Bcf/y of natural gas for a 20-year authorization period. On August 14, 2020, Golden Pass filed an application with DOE/FE to align its export authorizations to the peak capacity of the Golden Pass LNG Terminal, as proposed in the Amendment.

U.S. Department of Transportation

The USDOT PHMSA has established the minimum federal safety standards for LNG facilities in compliance with Title 49 of the U.S. Code, Section 60101, et seq (49 USC 60101). Those standards are codified in 49 CFR 193 *Liquefied Natural Gas Facilities: Federal Safety Standards* and apply to the siting, design, construction, operation, maintenance, and security of LNG facilities. The National Fire Protection Association (NFPA) Standard 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (2001 edition and portions of 2006 edition)*, is incorporated into these requirements by reference, with regulatory preemption in the event of conflict.

On February 11, 2004, the USDOT Research and Special Programs Administration (superseded by USDOT PHMSA), Coast Guard, and FERC entered into an Interagency Agreement to ensure greater coordination among these three agencies in addressing the full range of safety and security issues at LNG terminals, including terminal facilities and tanker operations, and maximizing the exchange of information related to the safety and security aspects of the LNG facilities and related marine operations. Under the Interagency Agreement, FERC is the lead federal agency responsible for the preparation of the analysis required under NEPA for impacts associated with terminal construction and operation. USDOT PHMSA and Coast Guard participate as cooperating agencies but remain responsible for enforcing their regulations covering LNG facility design, construction, and operation.

On August 31, 2018, FERC and USDOT PHMSA signed a memorandum of understanding (2018 MOU) to improve agency coordination on LNG project reviews and eliminate duplicated efforts. In the 2018 MOU, USDOT PHMSA agreed to issue a Letter of Determination (LOD) stating whether LNG facilities would be capable of complying with location criteria and design standards contained in 49 CFR 193 Subpart B.

In order to meet the USDOT PHMSA siting standards, Golden Pass submitted engineering design documentation to USDOT PHMSA from July 1, 2020 to September 30, 2020, to demonstrate that the proposed increase in total liquefaction production and export capacity does not impact the siting requirements under part 193, Subpart B. USDOT PHMSA's analysis and determination of the siting package will serve as one of the considerations for the Commission to deliberate in its decision to authorize or deny the Amendment.

On September 29, 2020, USDOT PHMSA provided a LOD to FERC on the 49 CFR 193, Subpart B, regulatory requirements. The LOD concluded that the Amendment does not include significant alterations or modifications that would impact the siting requirements under Part 193, Subpart B. If the Project is subsequently modified so that it differs from the details provided in the documentation submitted to FERC and USDOT PHMSA, further review will be conducted by USDOT PHMSA.

U.S. Coast Guard

The Coast Guard is the principal federal agency responsible for maritime safety, security, and environmental stewardship in U.S. ports and waterways. It is the federal agency responsible

for assessing the suitability of the Project Waterways (defined as the waterways that begin at the outer boundary of the navigable waters of the U.S.) for LNG marine traffic. 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 USC 191); the *Ports and Waterways Safety Act* of 1972, as amended (33 USC 1221, et seq.); and the *Maritime Transportation Security Act* (MTSA) of 2002 (46 USC 701). If the Amendment is approved, the Coast Guard would continue to exercise regulatory oversight of the safety and security of the LNG terminal facilities in compliance with 33 CFR 127.

Golden Pass conferred with the Coast Guard Captain of the Port (COPT) regarding the potential for increases in expected vessel traffic above the level reflected in the approved Water Suitability Assessment (WSA) associated with optimization of the ship class utilized to transport LNG. The COPT advised Golden Pass to defer any WSA amendment until such time that a determination can be made on ship class utilization. Any changes to the WSA would be driven by ship class optimization and not by the capacity increase.

4.0 PERMITS, APPROVALS, AND REGULATORY CONSULTATIONS

Table 1 provides a list of known federal, state, and local permits for the Amendment, as well as pertinent permits for the Golden Pass LNG Export Project received to date. The proposed Amendment would not result in any construction or footprint changes which would affect the previously received environmental clearances and authorizations for the Terminal. Additionally, the proposed increase in production capacity would not require any revisions of the air permit, as discussed further in section B.2 of this EA. Golden Pass would be responsible for obtaining all permits and approvals required for the Amendment.

Table 1 Anticipated Permits, Reviews, and Consultations for the Project		
Agency	Permit/Approval/Consultation	Status
Federal Aviation Administration	Notification of Proposed Construction or Alteration	Determination of no hazard received on April 22, 2019. An extension was requested on September 23, 2020. <i>Pending</i>
FERC	Authorization under Section 3 of the NGA	Order issued December 21, 2016 (157 FERC ¶ 61,222) authorized the construction and operation of LNG export facilities for 15.6 MPTA; Golden Pass seeks to increase the capacity to 18.1 MTPA under this Amendment Request.
U.S. Army Corps of Engineers, Galveston Texas District	Clean Water Act (CWA) Section 404 Permit	Permit SWG-2004-02118 received November 16, 2016.
	Rivers and Harbors Act Section 10 Permit	
	Letters of Permission to use Government property for disposal of non-Federal Dredged Material into a Federally Controlled Dredged Material Placement Area, 9A	Letters of Permission received March 29, 2017.
Coast Guard	Letter of Recommendation	On May 13, 2013, Golden Pass received confirmation from the Coast Guard that the WSA and LOR for import activities addresses the LNG vessel transits for the currently authorized export activities. On April 7, 2019, the Coast Guard advised that Golden Pass would need to update its LOI and WSA prior to commencement of export terminal operations, in accordance with 33 U.S.C., §127.007(h) (2020) for any changes in size or frequency of vessel traffic.
DOE	Authorization to Export LNG to FTA Countries	Authorization granted September 27, 2012 (DOE/FE Order No. 3147).
	Authorization to Export LNG to Non-FTA Countries	Authorization granted April 25, 2017 (DOE/FE Order No. 3978).
	Authorization to Increase Export Quantity to FTA countries from 740 Bcf/y to 937 Bcf/y, and to non-FTA countries from 808 Bcf/y to 937 Bcf/y	Application filed August 14, 2020. DOE/FE Notice published in Federal Register September 18, 2020, 85 Fed. Reg. 58347. Comment deadline is November 17, 2020. <i>Pending</i>
U.S. Environmental Protection Agency	CWA Section 402 Construction General Permit Notification	TXR10F748, Certified on November 7, 2019.
	CWA Section 402 Process Wastewater Permit ¹	Anticipated submittal 12-18 months prior to operations.
U.S. Fish and Wildlife Service	Section 7 of Endangered Species Act consultation	Complete: FERC December 21, 2016 Order (157 FERC ¶ 61,222).
	Migratory Bird Treaty Act consultation	
	Fish and Wildlife Coordination Act consultation	
National Marine Fisheries Service	Section 7 of Endangered Species Act consultation	On September 30, 2020, Golden Pass provided a letter to NMFS addressing potential impacts on federally-listed threatened and endangered species

		related to modified LNG carrier operations. <i>Response pending</i>
USDOT PHMSA	49 CFR 193 consultation (standards for LNG facilities)	Complete: On September 29, 2020, USDOT PHMSA provided a LOD to FERC on the 49 CFR 193, Subpart B, regulatory requirements.
State – Texas		
Texas Commission on Environmental Quality	New Source Review Preconstruction Air Permit for Construction Emissions Prevention of Significant Deterioration (PSD) Standard Permit	Received January 16, 2015. "As designed" permit amendment will be submitted prior to start of operation.
	PSD Permit for Greenhouse Gas emissions	Received September 11, 2015. "As designed" permit amendment will be submitted prior to start of operation.
	Title V Stationary Sources Permit	Will be completed approximately 18 months prior to start of operation.
	CWA Section 402 Process Wastewater Permit ¹	Anticipated submittal 12-18 months prior to operations.
Texas Historical Commission	National Historic Preservation Act Section 106 Consultation	Consultation concurrence received August 2013 for Terminal Facilities.
Texas Parks and Wildlife Department	Threatened and Endangered Species consultation	Complete: FERC December 21, 2016 Order (157 FERC ¶ 61,222).
Railroad Commission of Texas and Texas General Land Office	Texas Natural Resource Code Section 91.101 and Texas Water Code Section 26.131 Water Quality Certification Coastal Zone Management Act Application for Determination of Consistency with the Texas Coastal Management Program	Received August 22, 2016.

B. ENVIRONMENTAL ANALYSIS

The following sections discuss the Amendment's potential direct and indirect impacts on environmental resources, regulatory oversight, and engineering design. An impact would be considered significant if it would result in a substantial adverse change in the physical environment.

1.0 WATER RESOURCES

Golden Pass states that shipping fleet details have not been finalized and it is unknown at this time if the Amendment would result in an exceedance of the 200 vessels per year that was reviewed by the Coast Guard and assessed in the July 2016 FEIS for the Golden Pass LNG Export Project. As discussed further in section B.3 of this EA, we believe it is possible that the Amendment could result in an increase in the number of LNG carrier transits, and an additional 25 to 45 vessel transits per year may be required over the current level of 200 vessels per year (i.e., 13 to 23 percent increase). Therefore, we have assessed impacts on water resources from this potential increase.

LNG carriers calling on the Golden Pass LNG terminal would traverse the Gulf of Mexico (GOM) en route to the Sabine Neches Waterway (SNWW). The SNWW is a 79-mile ship channel that extends from the GOM north to Orange, Texas, and beyond via the Sabine River Channel. The tidally-influenced SNWW has been subject to significant alterations such as its initial dredging, widening and deepening projects, fill placement projects, changes to water flow direction, installation and abandonment of a railroad grade, and third-party pipeline installations. The channel is a Traditional Navigable Water as defined by 33 CFR 329 and is maintained by the U.S. Army Corps of Engineers.

Operating an LNG carrier while berthed would require the intake and discharge of cooling water and the discharge of ballast water. According to Golden Pass and depending on the specific carrier's size, LNG carrier engine operations while at berth would require the uptake and discharge of between 530,000 and 660,000 gallons of water per hour. Additionally, a berthed LNG carrier could discharge between 12 to 18 million gallons of ballast water into surrounding waters. An additional 25 to 45 vessel transits per year could result in up to an additional 810 million gallons of ballast water discharge. Ships at berth also increase the potential for an inadvertent release of equipment-related fluids.

Due to the size of the SNWW and the dynamic nature of the tidal and freshwater inflows into the system, and the frequency and amounts of water that would be required for LNG carrier operations, water intakes related to engine operations from an additional 25 to 45 vessel transits would not measurably impact SNWW water quality. The primary impacts of uploading water for LNG carrier engine operations would be experienced by aquatic organisms which are addressed in the Fisheries section below.

While traversing the GOM and while berthed in the SNWW, LNG carrier operations would result in cooling water discharges temporarily affecting surrounding water quality. According to Golden Pass, cooling water discharged into the SNWW would be between 2.7 and 7.2 degrees warmer than ambient water temperatures. Subsequently, the higher temperature

discharge(s) would increase the temperature of the receiving water, thereby temporarily decreasing water quality. However, this impact would be highly localized, and its magnitude would decrease quickly over distance and time (dilution) due to currents and tidal changes. Other water quality components in the SNWW including oxygen content, pH, and salinity could also be temporarily affected by LNG carrier discharges, but these impacts, similar to temperature impacts, would be highly localized and reduced by dilution.

As described above, a berthed LNG carrier would discharge ballast water as cargo is being loaded. According to Golden Pass, citing the final environmental impact statement for the Port Arthur Liquefaction Project, Texas Connector Project, and Louisiana Connector Project, the amount of ballast water discharged into the SNWW during each additional LNG vessel visit would represent approximately <0.1 percent of the water within a 500-meter stretch of the SNWW. Similar to cooling water discharges, the discharge of ballast water could impact water quality; temperature, oxygen content, pH, and salinity. However, these impacts would be highly localized, reduced by dilution, and temporary in nature. Additionally, LNG carrier ballast water would be managed and discharged in accordance with the requirements of 33 CFR 151 (Vessels Carrying Oil, Noxious Liquid Substances, Garbage, Municipal or Commercial Waste and Ballast Water) and 46 CFR 162.060 (Ballast Water Management Systems), and would be inspected in accordance with the Coast Guard's Navigation and Vessel Inspection Circular 07-04.

LNG carrier operations could result in the inadvertent release of equipment-related fluids into the SNWW. The introduction of equipment-related fluids into the SNWW would decrease affected water quality. However, like LNG carrier discharges and depending on the amount of fluid released, impacts on water quality would be temporary and localized. To reduce the potential for an inadvertent release of equipment-related fluids and to address a release should one occur, all vessels with 400 gross tonnage and above, such as LNG carriers, are required by guidelines outlined by the International Maritime Organization under the Marine Environmental Protection Committee to develop and implement a Coast Guard approved Shipboard Oil Pollution Emergency Plan.

Based on the characteristics of the SNWW and the impacts on this waterbody resulting from additional LNG carriers calling on the Golden Pass LNG terminal, we conclude that increasing the authorized export capacity would not significantly affect water resources.

Fisheries

A wide variety of commonly-occurring fish and other aquatic organisms (aquatic invertebrates and plankton) are present within the SNWW. Recreational and commercial fishing activities occur in the SNWW. LNG carriers traversing the GOM and berthed in the SNWW (thru the uptake and discharge of marine/estuarine waters or the inadvertent release of equipment-related fluids) would affect fisheries and other aquatic organisms. Changes to water quality, ship generated noise, and the physical disturbance of the water column would affect species present, causing fish to avoid the LNG carriers, and increasing the rates of stress, injury, and mortality experienced by fish and other aquatic organisms. Additionally, LNG carrier water intakes could result in small fish, fish eggs and larvae, phytoplankton, and other aquatic organisms becoming entrained or impinged. Entrainment and/or impingement would further increase the rates of stress, injury, and mortality experienced by fish and other aquatic

organisms. Lastly, the discharge of ballast water would result in the introduction of exotic aquatic invasive species which through competition and predation could affect the rates of stress, injury, and mortality experienced by fish and other aquatic organisms.

Impacts on fisheries and other aquatic organisms resulting from berthed LNG carriers would be reduced due to screened water intakes. Therefore, based on the size of the SNWW, the fisheries and other aquatic resources present, and the frequency and amounts of water associated with LNG carrier operations and ballast water discharges; we conclude impacts on fisheries and other aquatic organisms would be highly localized, temporary, and not significant.

Essential Fish Habitat

The Magnuson-Stevens Fisheries Conservation and Management Act (MSFCMA) was established, along with other goals, to promote the protection of Essential Fish Habitat (EFH) during the review of projects to be conducted under federal permits and licenses or other authorities that affect or have the potential to affect such habitat. EFH is defined in the MSFCMA as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. Federal agencies that authorize, fund, or undertake activities that may adversely affect EFH must consult with National Marine Fisheries Service.

EFH is present (and would be traversed by LNG carriers) within the GOM and the SNWW for numerous species including brown shrimp, white shrimp, red drum, and coastal migratory species. Based on our review of the Project and the effects of additional LNG carriers calling on the Golden Pass LNG terminal, it is the view of staff that these vessels may (thru the uptake and discharge of marine waters) affect EFH in the GOM and the SNWW. Effects on EFH would include changes to water quality and the physical disturbance of the water column. Subsequently, fish dependent on affected EFH may experience increased rates of stress, injury, and mortality. However, as described previously, and based on the size of the GOM and the SNWW and the frequency and amounts of water that would be required for LNG carrier operations and ballast, this affect would be highly localized, temporary, minor, and not significant. Therefore, we conclude that effects on EFH would not be adverse and because these effects are not adverse, an EFH assessment and further consultation with the National marine Fisheries Service (NMFS) is not required.

Marine Mammals

The Marine Mammal Protection Act (MMPA) prohibits the “take” of marine mammals in U.S. waters without appropriate authorization. Dolphins and several whale species are known to occur in the GOM and the occasional manatee has been observed in coastal waters. However, these species are not known to frequent the SNWW. LNG carriers traversing the GOM could affect marine mammals. LNG carrier transits to and from the Golden Pass LNG Terminal would disturb the water column and could affect water quality in the immediate vicinity of the ship. Also, these transits could result in a marine mammal being struck. Ship generated noise could affect marine mammals use of sound to communicate, navigate, avoid predators, mate, and locate food. Marine mammal species have differing hearing capabilities in terms of sensitivity and frequency and these variances can lead to differences in susceptibility to injury or disturbance. Habitat disturbance, ship strikes, and the potential disruption of normal behaviors

would result in avoidance and displacement and could increase the rates of stress, injury, and mortality experienced by marine mammals.

To reduce the potential for impacts on marine mammals due to ship strikes, LNG carrier operators would adhere to the "Vessel Strike Avoidance Measures and Reporting for Mariners" guidance. Additionally, LNG carriers traversing the GOM and the SNWW are generally operating at slower speeds and generate more noise than typical large vessels, and as a result would be more readily avoided by marine mammals. Furthermore, LNG carriers use established and well-traveled shipping lanes.

Marine mammals are accustomed to ship traffic within the GOM and to some extent have become habituated to this traffic. Additionally, marine mammals in the GOM are transitory and for some species seasonal. Therefore, based on the amount of existing ship traffic in the GOM and the SNWW, which according to Golden Pass there was approximately 59,209 vessels transits in the SNWW in 2017, and LNG carrier compliance with common best practices including the "Vessel Strike Avoidance Measures and Reporting for Mariners" and other applicable requirements, we conclude that impacts on marine mammals would not be significant.

Federally-listed Threatened and Endangered Species and other Protected Species

LNG carriers calling on the Golden Pass LNG Terminal are non-jurisdictional facilities. As such, the Commission has no authority to regulate these vessels and cannot require them to adhere to any impact avoidance, minimization, or mitigation measures. Therefore, consistent with the Commission's regulatory authority and its NEPA responsibilities, we are merely disclosing the impacts of their transits through the GOM and the SNWW in this analysis.

Acting as FERC's non-federal representative for Section 7 Endangered Species Act (ESA) consultation, Golden Pass provided a letter to NMFS, Protected Resources Division dated September 30, 2020⁴ addressing potential impacts on federally-listed threatened and endangered species related to modified LNG carrier operations. In this letter, Golden Pass described the proposed action before the Commission, identified and described federally-listed threatened and endangered species and marine mammals known to occur or potentially occurring in the project area, indicated potential occurrence, and anticipated effects of a potential increase in vessel transits. Species analyzed include the West Indian manatee, and several species of sea turtles, corals, fish, sharks, rays, and whales. We concur with Golden Pass LNG's analysis of impacts on federally-listed threatened and endangered species. Therefore, we request NMFS to consider this analysis as our biological assessment for the Amendment. We also request NMFS' concurrence with our determinations that LNG carriers associated with the Amendment would result in *no effect* and *are not likely to adversely affect* federally-listed threatened and endangered species under the jurisdiction of the NMFS. To ensure compliance with section 7 of the ESA, **we recommend that:**

- **Golden Pass should not begin construction activities until:**

⁴ <https://elibrary.ferc.gov/eLibrary/search> Accession no. 20200930-5157

- a. **FERC staff receives comments from the NMFS regarding the proposed action;**
- b. **FERC staff completes ESA consultation with the NMFS; and**
- c. **Golden Pass has received written notification from the Director of Office of Energy Projects (OEP), or the Director's designee, that construction or use of mitigation may begin.**

Lastly, we conclude that authorizing the Amendment would not affect any other federal or state protected species.

2.0 AIR QUALITY

Golden Pass states that the changes described as the basis for increased production capacity would not increase the levels of any criteria pollutants or greenhouse gas (GHG) emissions above what was authorized by the terminal's air permit issued by the Texas Commission on Environmental Quality (TCEQ). The air permit conservatively used the daily LNG maximum production fuel gas rate annualized without consideration for downtime. The proposed amendment is not expected to result in any emissions changes in the permitted facilities that would require an increase in the facility potential to emit therefore, no air permit amendment or alteration would be required to authorize the production capacity increase. An amendment to the TCEQ air permit would be submitted to reflect detailed design updates and vendor guarantees prior to operation of the facility as part of the normal progression of the Project facilities approved in the 2016 Order in Docket No. CP14-517-000.

The effect of proposed changes in the Amendment would be to increase equipment availability and align the authorized liquefaction capacity with the maximum design LNG production capability of the Project facilities. The production capacity requested can be achieved without any design modifications, additional construction, air permit amendment, or exceedance of the documented rates if larger capacity vessels (200,000 cubic meters [m^3]) are used. Golden Pass has entered into a long-term agreement to export to Ocean LNG Limited (OLNG), which controls 100 percent of the vessels that are 216,000 m^3 or larger of the LNG world fleet. Golden Pass does not expect an increase in vessel traffic to be required; however, shipping fleet details have not been finalized and as explained further in section B.3 below, it is possible that an additional 25 to 45 vessel transits per year may be required over the current level of 200 vessels per year (i.e., 13 to 23 percent increase) if the more abundant 165,000 m^3 to 180,000 m^3 capacity vessels are utilized. Therefore, we have assessed impacts on air quality from this potential increase. A summary of the estimated emissions from LNG vessels is provided in table 2, based on the current frequency of 200 vessel transits per year by 185,000 m^3 vessels.

**Table 2
Emissions from LNG Carriers ¹**

Description	Emission Estimates (tons/yr)				
	NO _x	CO	VOC	SO ₂	PM ₁₀
Main Propulsion Engines ²	332.8	32.6	11.1	414.3	5.8
On-board Electric Generators – Vessels Transiting ³	84.2	4.7	9.7	58.0	1.9
On-board Electrical Generators – Vessels at the Slip ⁴	252.4	14.7	28.2	178.5	5.9
Total	669.4	52.0	49.0	650.8	13.6

Source: Table 9-C-1 (Emissions from LNG Ships); Appendix 9-C Marine Vessel Operation Emissions Estimates LNG Ships; Docket No. CP04-386-000; Accession No. 20040729-4005.

Notes:

¹ Emission estimates are based on design estimates available for 185,000 m³ LNG carriers.

² Emission estimates assume that fuel oil is combusted; assumes that diesel engines provide the propulsion for the LNG carriers during transit and docking operations.

³ Assumes that onboard electric generators will be used to supply electrical power while the LNG carrier is in transit and docking.

⁴ Assumes that onboard electric generators will be used to supply power while the LNG carrier is at the slip.

In the event that larger capacity vessels are not available and 165,000 to 180,000 m³ are used, the changes in potential to emit from an incremental increase of 25 to 45 transits would occur per year; these emissions are presented in table 3.

**Table 3
Possible Incremental Increase in Emissions from LNG Carriers**

Description	Emission Estimates (tons/yr)				
	NO _x	CO	VOC	SO ₂	PM ₁₀
25 LNG Carriers per Year	83.7	6.5	6.1	81.4	1.7
45 LNG Carriers per Year	150.6	11.7	11.0	146.4	3.1

Notes:

¹ Emission estimates are based on design estimates available for 185,000 m³ LNG carriers.

If an incremental increase in LNG carriers occurs, the Project would, during normal operation, result in increases to boil-off gas (BOG). The facility is designed to recover all BOG from loading operations at the marine berths into the facility fuel gas system. BOG from the berth increases during ship loading activity, which reduces the amount of fuel from feed gas make-up required for the facility. No increase in GHG emissions is expected, and since any additional boil-off gas would displace fuel from feed gas make-up, overall fuel consumption in loading operations would not change.

The Amendment is not anticipated to increase existing emissions; if an increase in LNG carriers per year becomes necessary due to fleet availability, the incremental emissions would be de minimus. Based on the nature of the Amendment and minimal potential emissions, we conclude the Amendment would not have significant impact on air quality in the area.

3.0 RELIABILITY AND SAFETY

The regulatory oversight, hazards, and engineering designs remain unchanged from that analyzed in the July 2016 FEIS for the Golden Pass LNG Export Project in Docket No. CP14-517-000. By receiving richer feed gas through the pipeline, the total LNG production rate would be closer to the rich feed gas, cold ambient condition heat and material balance case analyzed as part of the Golden Pass LNG Export Project and would be an increase above the production rates authorized in the 2016 Order.

Marine Traffic

The Coast Guard is the principal federal agency responsible for the safety of an LNG terminal's marine transfer area and LNG carrier traffic, as well as over security plans for the waterfront facilities handling LNG and LNG carrier traffic in U.S. ports and waterways. In addition, the Coast Guard also has authority for LNG facility security plan review, approval, and compliance verification as provided in 33 CFR 105. If the Amendment is approved, constructed, and operated, the Coast Guard would continue to exercise regulatory oversight of the safety and security of the LNG terminal facilities in compliance with 33 CFR 127.

The Coast Guard is also responsible for issuing a LOR as to the suitability of the waterway for LNG marine traffic. For the Golden Pass LNG Export Project in Docket No. CP14-517-000, the Coast Guard stated that it would not require a revised WSA because the Export Project did not result in an increase in the size and/or frequency of LNG marine traffic in the Sabine-Neches waterway that was considered during the original review for the Golden Pass LNG terminal that commenced service in 2011 as an LNG import facility. As discussed in the July 2016 FEIS, the existing Golden Pass marine terminal has berthing capabilities to moor two LNG carriers with cargo capacities between 125,000 and 266,000 m³. During import operations in 2011, the existing terminal received LNG carriers with capacities up to 266,000 m³.

FERC staff reviewed the Amendment and determined that increasing LNG production could result in an increase in the number of LNG carriers or ship size/capacity which have been approved by the Coast Guard. Our analysis also indicates the LNG vessel sizes would remain within the maximum capacity previously proposed, approved, and received when in operation. As such, there would be no required modifications to the existing ship berth at the Golden Pass LNG Terminal. Any increase in LNG vessel traffic or change in LNG vessel sizes would be subject to Coast Guard review and inspection process, which is responsible for the safety and security of the Port and waterway.

To maintain the current level of LNG vessel traffic of 200 vessels per year reviewed by the Coast Guard, the average LNG carrier capacity would need to be 200,000 m³ or possibly up to 216,000 m³ depending on LNG density. LNG carriers with over 210,000 m³ of capacity make-up less than 10 percent of the world's fleet. Therefore, Golden Pass assessed a range of the potential increase in carrier operations that could occur if the larger capacity vessels are not available by considering vessel capacities of 165,000 m³ to 180,000 m³ (to consider the upper capacity limit for 85 percent of the LNG fleet in the world). Using these capacities, the range in additional LNG carriers required would result in an increase in 25 to 45 vessel transits

per year over the current level of 200 vessels per year (i.e., 13 to 23 percent increase). An incremental increase in vessel transits of this magnitude would not result in any significant deviations from planned loading/unloading operations.

Golden Pass states that the shipping fleet details have not been finalized and it is unknown at this time if the Amendment would result in a number of vessel transits that would exceed the number of vessels approved under the current WSA. Golden Pass also acknowledges that there is a limited number of vessels with higher capacities and entered into a long-term agreement to export to OLNNG an annual contract quantity that is the greater of (1) the aggregate of the tested annual capacity of the first liquefaction train, the second liquefaction train, and the third liquefaction train from the Golden Pass Terminal or (2) 810,000,000 million British Thermal Units. The stakeholders in OLNNG control 100 percent of the LNG carriers that are 216,000 m³ or larger of the LNG carrier world fleet. Therefore, an increase in vessel traffic may not necessarily be required. If needed, Golden Pass has committed to submitting an updated Letter of Intent and WSA prior to commencement of export terminal operations reflecting any changes in size or frequency of vessel traffic, in accordance with 33 CFR §127.007(h) as required by the Coast Guard.

Process Review

Our analysis indicates that increasing the total LNG production capacity of the Golden Pass LNG Export Project from the currently authorized 15.6 MTPA, equivalent to 740 Bcf/y of natural gas, to 18.1 MTPA, equivalent to 937 Bcf/y of natural gas would not require any construction, and would be in compliance with applicable LNG design and other regulatory requirements. Golden Pass re-evaluated the heat and material balances (HMB) to estimate the peak LNG production rate for a range of feed gas compositions and ambient conditions. Golden Pass states that rich feed gas in cold ambient conditions would result in the maximum LNG production rate and would be the governing case for equipment/piping sizing, air emissions and hazard analyses. We confirm that the liquefaction using rich feed gas in cold ambient conditions represents the maximum LNG production rates. We also confirm that rich feed gas in average ambient conditions represents an annualized averaged production rate of 18.1 MTPA.

The process design of the Project remains unchanged from the previously authorized Golden Pass LNG Export Project. There is no modification to increase the efficiency of the refrigeration process outside of process and maintenance optimizations. The previously authorized Liquefaction Impoundment Sump (for Trains 1 through 3) discussed in the July 2016 FEIS remains valid with the increased flow rates associated with the Amendment. As stated in the July 2016 FEIS, the sizing spill would fill the Liquefaction Impoundment Sump and backflow into the troughs.

Golden Pass indicated that the Amendment does not propose any modification to the facilities previously authorized by the Commission's 2016 Order. In addition, as noted in section A.4 of this EA, USDOT PHMSA provided a LOD to FERC on September 29, 2020 concluding that the Amendment does not include significant alterations or modifications that would impact the siting requirements under 40 CFR 193, Subpart B. The Golden Pass LNG Terminal is subject to regular FERC inspections throughout the life of the facilities to verify

that equipment is being properly maintained and to verify basis of design conditions, such as feed gas and process conditions, do not exceed the authorized basis of design.

4.0 ALTERNATIVES

Because the proposed Amendment does not involve any change in the previously authorized LNG terminal site (i.e., “project footprint”), we did not evaluate any site alternatives. We assessed the No-Action Alternative; that is, if the newly proposed capacity uprate is not initiated and the LNG production capacity remains at 15.6 MTPA. We conclude that the No-Action Alternative would not allow Golden Pass LNG to meet the purpose and need of the Amendment, and any alternative project to meet the market demand would not likely provide a significant environmental advantage over the proposed action. Therefore, we conclude that the proposed action is the preferred alternative to meet the Amendment’s objectives.

C. CONCLUSIONS

Based on the analysis in this EA, we have determined that if Golden Pass operates the proposed facilities in accordance with its application and supplements, approval of the Amendment would not constitute a major federal action significantly affecting the quality of the human environment. We recommend that the Order contain a finding of no significant impact and include the following mitigation measures listed below as conditions to any authorization the Commission may issue.

1. Golden Pass shall follow the procedures and mitigation measures described in its application and supplements and as identified in the EA, unless modified by the Order. Golden 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 OEP, or the Director's designee, **before using that modification.**
2. The Director of OEP, or the Director's designee, has delegated authority to address any requests for approvals or authorizations necessary to carry out the conditions of the Order, and take whatever steps are necessary to ensure the protection of life, health, property, and the environment during operation of the project. This authority shall allow:
 - a. the modification of conditions of the Order;
 - b. stop-work authority and authority to cease operation; and
 - c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impact resulting from project operation.
3. Golden Pass shall continue to comply with all environmental and engineering conditions set forth in the Appendix of the December 16, 2016 Order issued in Docket No CP14-517-000.
4. Golden Pass shall **not begin** construction activities **until**:
 - a. FERC staff receives comments from the NMFS regarding the proposed action;
 - b. FERC staff completes ESA consultation with the NMFS; and
 - c. Golden Pass has received written notification from the Director of OEP, or the Director's designee, that construction or use of mitigation may begin.

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