APPENDIX A

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Mississippi Development Authority
        Brent Christensen, Executive Director, MS
Mississippi Governor's Office
        Chris Champion, Policy Directo, MS r
Mississippi Wildlife, Fisheries and Parks

Museum of Natural Science

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Andy Sanderson, Natural Heritage Program Coordinator, MS

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Government Affairs and Public Relations
Betty Ann White, Manager, MS
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Intervenors

Florida Gas Transmission Company, LLC

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Bosarge Boats Inc., MS
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BP America Production Company, TX
CAMCO 3 LLC, MS
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APPENDIX B

BIOLOGICAL ASSESSMENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

API	American Petroleum Institute
BA	Biological Assessment
BCDMMS	Bayou Casotte Dredge Material Management Site
bcfd	billion cubic feet per day
BOG	boil-off gas
BU	Beneficial Use
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
Commission	Federal Energy Regulatory Commission
CSA	construction support area
cy	cubic yards
dB	decibels
EEM	estuarine emergent
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	*Endangered Species Act of 1973*
FERC	Federal Energy Regulatory Commission
FGT	Florida Gas Transmission Company, LLC
ft^3	cubic feet
FWS	U.S. Fish and Wildlife Service
GLE	Gulf LNG Energy, LLC
GLP	Gulf LNG Pipeline
Grand Bay NERR	Grand Bay National Estuarine Research Reserve
Grand Bay NWR	Grand Bay National Wildlife Refuge
Gulf LLC	Gulf LNG Liquefaction, LLC
JCPA	Jackson County Port Authority
kV	kilovolt
LNG	liquefied natural gas
LOR	Letter of Recommendation
LOR-A	Letter of Recommendation-Analysis
m	meter
m^3	cubic meters
MDEQ	Mississippi Department of Environmental Quality
MDWFP	Mississippi Department of Wildlife, Fish, and Parks
Migratory Bird Plan	*Migratory Bird Impact Assessment and Conservation Plan*
MPC	Mississippi Power Company
msl	mean sea level
MW	megawatt
NAVD	North America Vertical Datum of 1988
NFPA	National Fire Protection Association
NGL	natural gas liquids

NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PCE	primary constituent elements
Project	Gulf LNG Liquefaction Project
re	referenced to
RMS	root mean square
SEL	sound exposure level
SH	State Highway
SPCC Plan	*Spill Prevention, Control, and Countermeasure Plan*
SPL	sound pressure level
Strike Avoidance Procedures	*Vessel Strike Avoidance Measures and Reporting for Mariners*
SWPPP	*Stormwater Pollution Prevention Plan*
Transco	Transcontinental Gas Pipe Line Company, LLC
U.S.C.	United States Code
USCG	U.S. Coast Guard
μPa	micropascal

1.0 INTRODUCTION

1.1 GENERAL PROJECT INFORMATION

The environmental staff of the Federal Energy Regulatory Commission (FERC or Commission) prepared this biological assessment (BA) to assess effects on federally listed threatened and endangered species and/or their designated critical habitat resulting from construction and operation of the liquefied natural gas (LNG) facility referred to in this document as the Gulf LNG Liquefaction Project (Project). The Project is a joint collaboration between three companies: Gulf LNG Liquefaction, LLC (Gulf LLC); Gulf LNG Energy, LLC (GLE); and Gulf LNG Pipeline (GLP) (collectively referred to as Gulf LNG or the applicant).

On June 19, 2015 Gulf LNG filed an application with the FERC requesting authorization to construct and operate liquefaction and export facilities adjacent to and integrated with the existing GLE LNG Import Terminal (existing Terminal) in Jackson County, Mississippi. All federal agencies, in consultation with the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS), are mandated by Section 7(a)(2) of the *Endangered Species Act of 1973*, as amended (ESA) to ensure that any action that is authorized, funded, or carried out by the federal government would not jeopardize the continued existence of a federally listed threatened or endangered species, or result in the destruction or adverse modification of designated critical habitat (16 United States Code [U.S.C.]§ 1531, et seq.). As the lead federal agency, the FERC is responsible for consulting with the FWS and/or NMFS to determine whether any federally listed endangered or threatened species or designated critical habitat is near the proposed action, and to determine the proposed action's potential effects on those species or critical habitats. The FWS has jurisdiction over terrestrial animals, freshwater fish, beach-nesting sea turtles, pinnipeds, and manatees. NMFS has jurisdiction over marine and estuarine species, including diadromous and catadromous fish species, pelagic sea turtles, and cetaceans. The Project would be located in areas with species under both the FWS's and NMFS's jurisdictions; therefore, consultation with both agencies is required.

Although the species and critical habitat areas that are currently proposed, petitioned, or are a candidate for federal listing do not receive formal ESA protection, we considered the potential effects on these species and habitats so that Section 7 ESA consultation could be facilitated if these species or habitats became listed before or during Project construction. Should a federally listed, proposed, petitioned, or candidate species or critical habitat be identified during construction that was not been previously identified during field surveys or was not assessed through Section 7 ESA consultation, the applicant would be required to suspend any construction activity that could potentially affect that species and notify the Commission, the FWS, and/or NMFS about the newly identified species. The construction activity would not be permitted to resume until the Commission completed its additional required FWS and NMFS Section 7 ESA consultations.

The Project area includes habitat that supports threatened and endangered species, including marine mammals. Federally threatened and endangered marine mammal species are protected by the ESA; additionally, all marine mammals (both ESA-listed and unlisted species) are protected under the *Marine Mammal Protection Act of 1972*, as amended (16 U.S.C. § 1361 et seq.). Many of these species that may occur in the Project action area are either transient in nature (i.e., migratory or highly mobile over large territories); would be unlikely to respond adversely to temporary and permanent impacts associated with the proposed Project and facilities; or lack suitable foraging or nesting habitat within the Project area.

As discussed below, based on the limited amount of available habitat in the area, the temporary or short-term nature of the construction impacts for the Project, and the mitigation measures proposed, we believe that the Project is *not likely to adversely affect* 19 federally listed species and would *not contribute to a trend toward federal listing* for 3 species under federal review.

1.2 CONSULTATION HISTORY

Gulf LNG initiated informal Section 7 ESA consultation with both the FWS Mississippi Ecological Services Field Office and the NMFS Panama City, Florida Habitat Conservation Division Office[1] in an April 18, 2014 letter. Gulf LNG conducted terrestrial wildlife and habitat surveys in June 2014 and August 2014 in addition to completing a scientific literature review. Although Gulf LNG did not identify any federally listed species during field surveys, the U.S. Army Corps of Engineers (COE) made two incidental observations of piping plovers during December 2014 visits to the proposed Project area. Gulf LNG submitted the results of its field surveys to the FWS and NMFS.

The FERC staff held conference calls with the FWS and NMFS on December 10, 2014; June 29, 2015; and September 23, 2015 to discuss impacts on federally threatened and endangered species, species of special concern, and critical habitat. The agencies also discussed if there was any need for additional consultations with federal and state agencies to ensure that Gulf LNG would use consistent surveying, monitoring, and reporting protocols during protection and mitigation activities. FWS and NMFS staff agreed to be cooperating agencies for the Project and that the BA and Essential Fish Habitat (EFH) assessments would be separate appendices to the EIS. In addition, it was agreed that further discussions about the mitigation plans were needed. Gulf LNG met with the COE on September 15, 2015 to discuss the proposed wetland mitigation site location. On September 16, 2015, Gulf LNG requested for NMFS to review and comment on the analysis of protected species included within the June 19, 2015 Gulf LNG FERC application resource reports. On October 30, 2015, NMFS provided comments to the FERC about Gulf sturgeon habitat at the proposed wetland mitigation site. On November 21, 2018 we requested the FWS and the NMFS accept the BA, which was provided in the draft EIS, and concur with our determinations of effect for the Project. On February 22, 2019 the FWS agreed with our determinations of effect for those species under their jurisdiction. A response from the NMFS has not been received. Consultations between the applicant, the FERC staff, and the NMFS about federally protected species are ongoing.

Using agency correspondence, literature review, and field survey data. Gulf LNG has compiled a list of 21 species potentially affected by the Project; 3 of these species are under review for ESA listing (see table 1.2-1).

[1] NMFS consultations were initiated with the Panama City, Florida office in 2014. However, due to staffing changes the Southeast Regional Office located in St. Petersburg, Florida is reviewing the Project.

TABLE 1.2-1

Gulf LNG Liquefaction Project
Federally Listed Endangered and Threatened Species Occurring in the Project Area

Common Name	Scientific Name	Federal Status a/	Presence in Project Area/Comments	Effect Determination
U.S. Fish and Wildlife Service Jurisdiction				
Terrestrial Reptiles				
Alabama Red-bellied Turtle	*Pseudemys alabamensis*	E	Suitable habitat is present within the Project area. No individuals were observed during surveys.	*Not Likely to Adversely Affect.*
Birds				
Eastern black rail	*Laterallus jamaicensis jamaicensis*	UR	Suitable habitat is present within the Project area. Between 1980 and 2016 there have been no confirmed sightings of the eastern black rail in the Project area. If the species is listed, the FERC would re-consult with the FWS regarding the eastern black rail.	*Project would not contribute to a trend toward federal listing.*
Interior Least Tern **b/**	*Sternula antillarum athalassos*	E	Suitable foraging habitat may be present within the Project area. No individuals were observed during surveys.	*Not Likely to Adversely Affect.* .
Least Tern	*Sternula antillarum*	E	Suitable foraging habitat may be present within the Project area. No individuals were observed during surveys.	*Not Likely to Adversely Affect.*
Piping Plover	*Charadrius melodus*	E	Suitable foraging habitat is present within the Project area, and two foraging individuals were observed at the Terminal Expansion site in December 2014.	*Not Likely to Adversely Affect.*
Rufa Red Knot	*Calidris canutus rufa*	T	Suitable foraging habitat is present within the Project area. No individuals were observed during surveys.	*Not Likely to Adversely Affect.* .
Wood Stork	*Mycteria americana*	T	Suitable foraging habitat may be present within the Project area. No individuals were observed during surveys.	*Not Likely to Adversely Affect.*

TABLE 1.2-1

Gulf LNG Liquefaction Project
Federally Listed Endangered and Threatened Species Occurring in the Project Area

Common Name	Scientific Name	Federal Status a/	Presence in Project Area/Comments	Effect Determination
Marine Mammals				
West Indian Manatee	*Trichechus manatus*	T	Suitable habitat is not present within the Project area, but this species could occur as a transient.	*Not Likely to Adversely Affect.*
Fish				
Saltmarsh Topminnow	*Fundulus jenkinsi*	UR	Suitable habitat is present at the Terminal Expansion site.	*Project would not contribute to a trend toward federal listing.*
National Marine Fisheries Service Jurisdiction				
Marine Mammals				
Blue Whale	*Balaenoptera musculus*	E	Suitable habitat may be present within the Project area, but this species is unlikely to occur in the Gulf of Mexico.	*Not Likely to Adversely Affect.*
Fin Whale	*Balaenoptera physalus*	E	Suitable habitat may be present within the Project area, but this species is unlikely to occur in the Gulf of Mexico.	*Not Likely to Adversely Affect.*
Humpback Whale	*Megaptera novaeangliae*	E	Suitable habitat may be present within the Project area, but this species is unlikely to occur in the Gulf of Mexico.	*Not Likely to Adversely Affect.*
Sei Whale	*Balaenoptera borealis*	E	Suitable habitat may be present within the Project area, but this species is unlikely to occur in the Gulf of Mexico.	*Not Likely to Adversely Affect.*
Sperm Whale	*Physeter macrocephalus*	E	Suitable habitat is present within the Project area.	*Not Likely to Adversely Affect.*
Bryde's Whale	*Balaenoptera edeni*	UR	Suitable habitat is present within the Project area.	*Project would not contribute to a trend toward federal listing.*
U.S. Fish and Wildlife Service and National Marine Fisheries Service Jurisdiction				
Fish				
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	T	Critical habitat located in Mississippi Sound and would be affected by wetland mitigation.	*Not Likely to Adversely Affect.*

TABLE 1.2-1

Gulf LNG Liquefaction Project
Federally Listed Endangered and Threatened Species Occurring in the Project Area

Common Name	Scientific Name	Federal Status a/	Presence in Project Area/Comments	Effect Determination
Smalltooth sawfish	*Pristis pectinatat*	E	Suitable habitat is not present within the Project area, but juveniles of this species could occur as transients.	*Not likely to Adversely Affect.*
Sea Turtles				
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	E	Suitable habitat is present within the Project area. There is no known nesting habitat in Mississippi.	*Not Likely to Adversely Affect.*
Leatherback Sea Turtle	*Dermochelys coriacea*	E	Suitable habitat is present within the Project area. There is no known nesting habitat in Mississippi.	*Not Likely to Adversely Affect.*
Green Sea Turtle	*Chelonia mydas*	T **c/**	Suitable habitat is present within the Project area. There is no known nesting habitat in Mississippi.	*Not Likely to Adversely Affect.*
Loggerhead Sea Turtle	*Caretta*	T	Suitable habitat is present within the Project area.	*Not Likely to Adversely Affect.*
Hawksbill Sea Turtle	*Eretmochelys imbricata*	E	Suitable habitat is not present within the vicinity of the Terminal Expansion site, but the species could occur along LNG vessel transit routes.	*Not Likely to Adversely Affect.*

Sources: FWS, 2018, MNHP, 2015, MDWFP, 2018

a T= threatened, E = endangered, UR = under review

b The state and federal listing information for the interior least tern applies to interior populations nesting along the Mississippi River only.

c The green sea turtle is federally threatened, with the exception of breeding colony populations in Florida and the Pacific coast of Mexico, which are federally endangered.

2.0 PROJECT DESCRIPTION

The Gulf LNG Liquefaction Project consists of two main components: (a) expansion of the existing Terminal in Jackson County, Mississippi (Terminal Expansion), and (b) piping modifications to add bi-directional flow capability (Pipeline Modifications) to the existing pipeline facilities. Figure 2.0-1 depicts the general location of the Project, figure 2.2-1 depicts the locations of the key components of the proposed Terminal Expansion, and figure 2.2-2 depicts the locations of the Pipeline Modifications.

2.1 EXISTING FACILITIES

2.1.1 Gulf LNG Import Terminal

The existing Terminal encompasses 33 acres and is near the City of Pascagoula at the south end of State Highway (SH) 611. Gulf LNG constructed the existing Terminal to regasify and transport natural gas imported to the United States from foreign markets. The environmental review for the existing Terminal was provided in the FERC final EIS issued in November 2006 (FERC, 2006). In 2007, the Terminal was authorized by the Commission to send out 1.5 billion cubic feet per day (bcfd) of natural gas through the Terminal facilities for delivery to interconnections with the interstate pipeline systems of Destin and Gulfstream, and the non-affiliated third-party processing plant owned by BP American Production Company (FERC, 2007).

Construction of the Gulf LNG Import Terminal was authorized by the FERC on February 16, 2007, and the facility was placed into service on October 1, 2011. A maximum of 200 LNG carriers per year are currently authorized to import foreign LNG at the marine berth of the Terminal. Unloading of LNG can occur at a rate of up to 12,000 cubic meters (m^3) per hour, with unloading typically requiring about 24 hours. The frequency and total number of LNG carriers calling on the existing Terminal each year could vary depending on the size of carriers, with authorized vessel sizes ranging from 88,000 to 170,000 m^3. The berthing facility was designed and constructed to accommodate LNG carriers up to 250,000 m^3 in size. The average frequency of LNG carriers that could call on the existing Terminal is about one carrier every 2.4 days.

The existing Terminal includes the following major facilities:

- one berthing facility on the Bayou Casotte Navigation Channel;
- two LNG storage tanks, each with a capacity of 160,000 m^3;
- hazard detection, control, and prevention systems, cryogenic piping and insulation, and electrical and instrumentation systems;
- a firewater system;
- a concrete storm surge protection wall surrounding the Terminal with a top elevation of 27 feet North America Vertical Datum of 1988 (NAVD);
- 23,000 volt electrical services provided by Mississippi Power Company (MPC), and a transformer to step down the voltage to 4,160 volts for service to the Terminal;
- two essential power backup gas turbine generators each with a capacity of 12 megawatts (MW); and
- ancillary utilities, buildings, and service facilities.

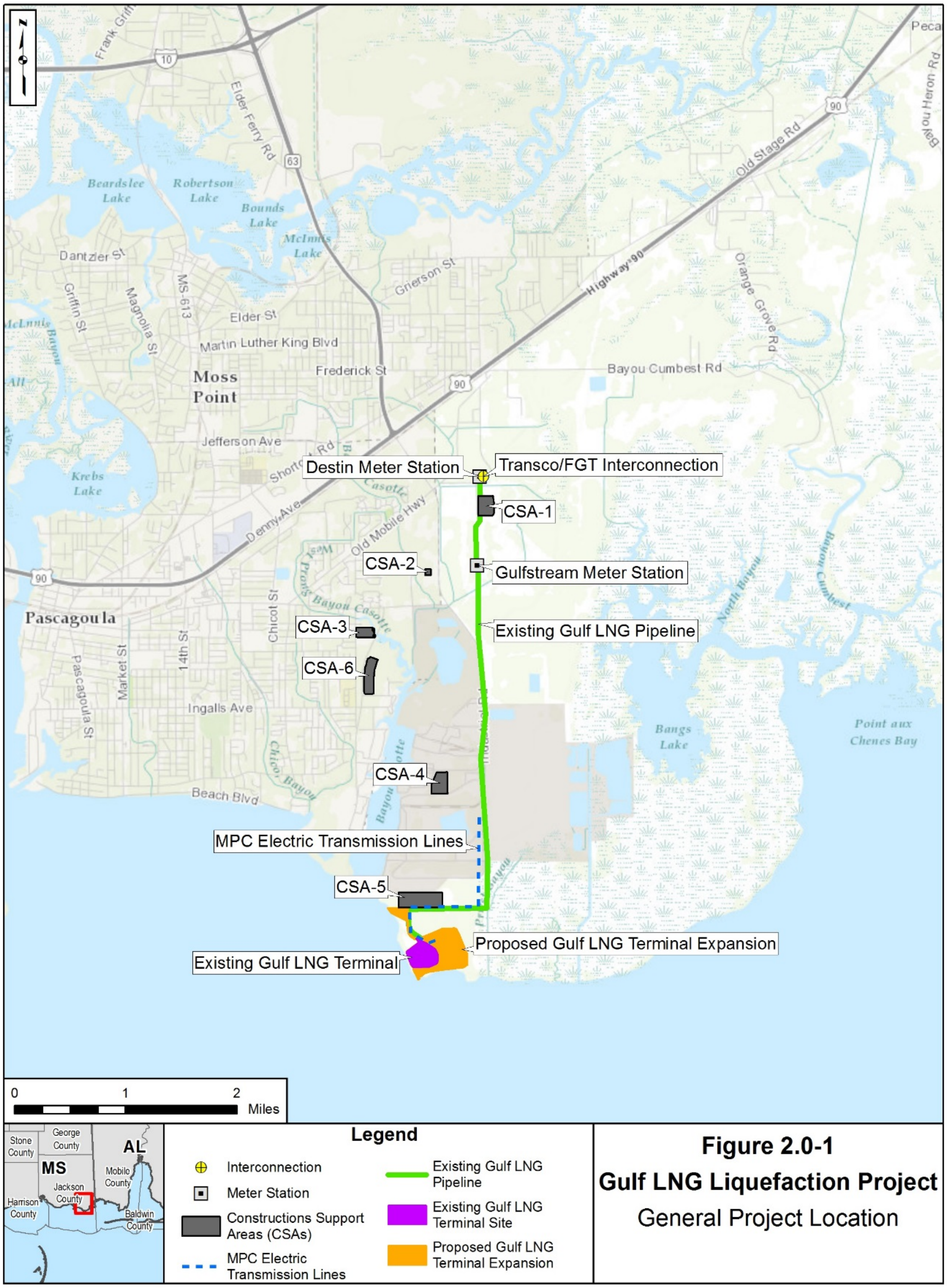

Figure 2.0-1
Gulf LNG Liquefaction Project
General Project Location

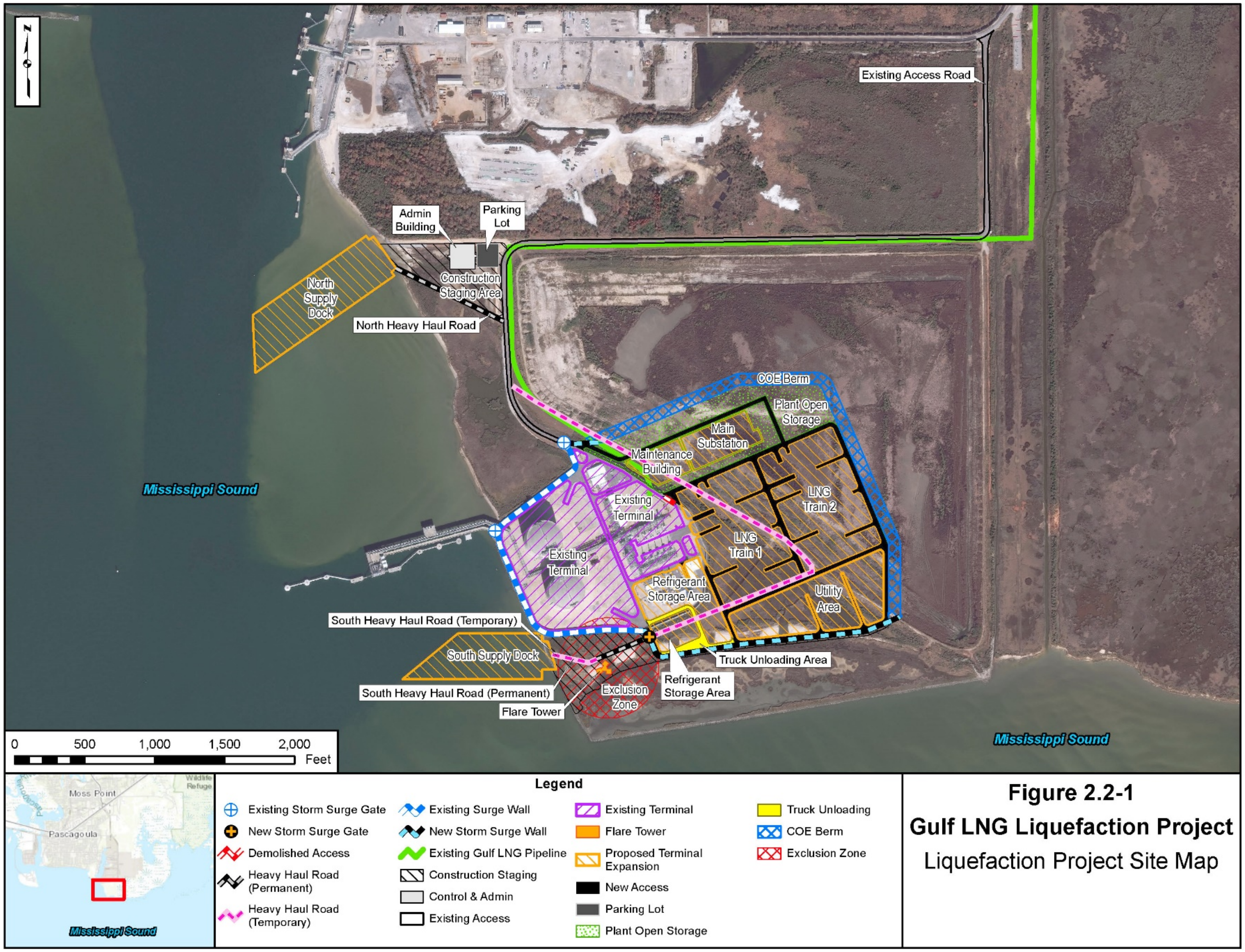

Figure 2.2-1
Gulf LNG Liquefaction Project
Liquefaction Project Site Map

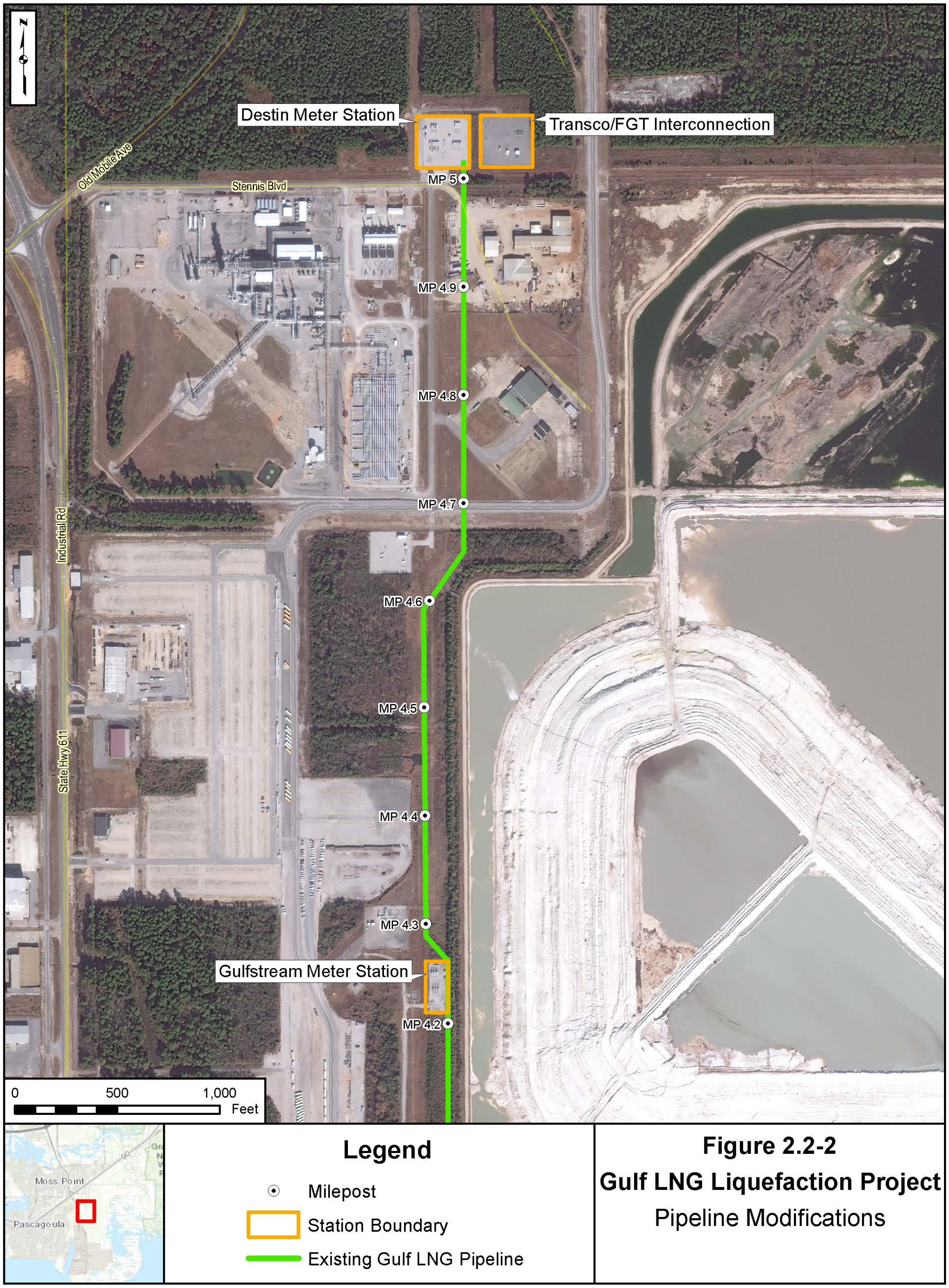

Figure 2.2-2
Gulf LNG Liquefaction Project
Pipeline Modifications

2.1.2 Gulf LNG Existing Pipeline System

Gulf LNG owns and operates the 5-mile-long, 36-inch-diameter natural gas send out pipeline and associated facilities that were constructed in conjunction with the existing Terminal (FERC, 2007). The existing Gulf LNG Pipeline extends north from the existing Terminal along SH-611 and connects to the Gulfstream, Destin, and Transcontinental Gas Pipe Line Company (Transco)/Florida Gas Transmission Company (FGT) pipeline systems and the Pascagoula Gas Processing Plant operated by BP American Production Company.

2.2 PROPOSED FACILITIES

2.2.1 Terminal Expansion

The Terminal Expansion facilities would be constructed adjacent to the existing Terminal boundaries on land currently owned by the COE and the Port of Pascagoula and part of the Bayou Casotte Dredge Material Management Site (BCDMMS) (see figure 2.0-1). The BCDMMS is used by the COE for placement of dredged materials from maintenance dredging of the Bayou Casotte Navigation Channel. Gulf LNG has not requested a change to the currently authorized number of or the transit route for the LNG carriers; however, Gulf LNG has requested authorization to increase the size of LNG carriers permitted at the facility from 170,000 m^3 to 208,000 m^3. The U.S. Coast Guard (USCG) determined that the navigation portion of the original Water Sustainability Assessment did not account for larger LNG carriers. The USCG prepared an updated draft Letter of Recommendation (LOR) and Letter of Recommendation-Analysis (LOR-A), which was provided to the FERC in January 2016. The USCG prepared the final LOR and LOR-A dated May 16, 2016 which was provided to the FERC on August 9, 2017. The USCG concluded that the Bayou Casotte Channel was suitable for LNG marine traffic.

2.2.1.1 Liquefaction Facilities

Liquefaction Trains, Utilities, and Systems

The existing Gulf LNG Pipeline and the Pipeline Modifications would transport natural gas (feed gas) to the liquefaction facilities at the existing Terminal. The liquefaction facilities would consist of two liquefaction trains, gas pretreatment units, utilities, and associated facilities (see figure 2.2-1). Prior to entering a liquefaction train, the feed gas would pass through a pretreatment unit to remove mercury, hydrogen sulfide, carbon dioxide, water, and heavy hydrocarbons. The heavy hydrocarbon removal unit would remove heavier hydrocarbons present in the feed gas (i.e. pentane, hexane, and benzene) which would be temporarily stored on-site, then trucked from the Project site to third-party customers.

After the feed gas is treated to remove the contaminants and heavy hydrocarbon components, the liquefaction unit would precool the feed gas using a closed loop propane system followed by condensing and subcooling the feed gas with a mixed refrigerant loop. The resultant liquid stream would enter an energy extraction LNG hydraulic turbine which would further lower the temperature of the LNG. Gulf LNG would then transport the LNG in cryogenic pipelines to the existing LNG storage tanks where it would be stored at -256 degrees Fahrenheit at atmospheric pressure.

Liquefaction utility components would include a boil-off gas (BOG) system, fuel gas system, hot oil system, flares, instrument and utility air systems, nitrogen generation system, source water system, tempered water system, firewater system, refrigerant storage system, natural gas liquids (NGL) storage, and hydrogen sulfide storage. BOG would be generated from the transfer of heat in the liquefaction process and diverted to three new BOG compressors and two new BOG recycle compressors. Much of the compressed BOG would be transported by pipeline to the fuel gas system, with excess BOG recycled through the liquefaction process.

Gulf LNG would install three in-service flares and a common spare flare on the southwestern portion of the Terminal Expansion site for venting excess natural gas, if necessary, during maintenance, startup/shutdown, and upset activities. The four flares would be constructed on a common 430-foot-tall support structure (see figure 2.2-1), with an overall height of 433 feet above mean sea level (msl).

2.2.1.2 LNG Storage

Gulf LNG would use the two existing 160,000 m^3 full-containment LNG storage tanks constructed of nickel steel and concrete (FERC, 2006). The only storage tank changes required for the Project would be the new LNG loading pumps installed in the existing storage tanks to transfer LNG-to-LNG carriers through the existing transfer lines.

2.2.1.3 Refrigerant and NGL Storage and NGL Trucking

Gulf LNG would construct and operate a truck loading/unloading facility to unload makeup refrigerant (propane and ethane) transported to the Terminal Expansion site for storage and use during the liquefaction process. Gulf LNG would store ethane in three pressurized storage tanks, each with a working capacity of 8,954 cubic feet (ft^3) and would store liquid propane in a tank with a capacity of 114,485 ft^3. Each refrigerant storage tank would be installed within a secondary containment system located, sized, and designed in accordance with American Petroleum Institute (API) Standard 2510 (Design and Construction of LPG Installations) and National Fire Protection Association (NFPA) Code 30 (Flammable and Combustible Liquids). Gulf LNG anticipates a delivery frequency of three to four trucks per month to the facility for propane and one to two trucks per month for ethane.

The heavy hydrocarbon removal unit within each of the liquefaction trains would continuously produce NGLs during the liquefaction process. Gulf LNG would construct a 2,800-ft^3 capacity, low-pressure storage tank and a truck loading facility for NGLs. The NGLs would be stored in the tanks prior to pick-up and delivery to third-party customers by truck. Gulf LNG anticipates five truck trips per month would be required to transport NGLs from the Terminal Expansion. Gulf LNG estimates ethane would be trucked into the facility up to two times each month and propane would be trucked into the facility up to four times each month. NGL trucking would be a non-jurisdictional activity once the trucks leave the Terminal Expansion site. After leaving the Terminal Expansion site, NGL trucking is regulated by U.S. Department of Transportation's Federal Motor Carrier Safety Administration.

2.2.1.4 Power Generation

To provide electrical power to the Terminal Expansion, MPC would build two 1.5-mile-long, 115-kilovolt (kV) electric transmission lines from adjacent to the existing Chevron Cogeneration Facility to the Terminal Expansion. MPC would also construct a new 115-kV substation within the Terminal Expansion area. The electric transmission line would be considered non-jurisdictional, which includes additional details on the electric transmission line.

Four 2.5-MW, diesel-fueled, stand-by generators would be installed in the utility area to provide a source of backup power generation for critical equipment and plant shutdown if the electrical power system were to fail. Diesel for the generators would be stored on-site in a new, 106,971-gallon (14,300 ft^3) diesel storage tank with secondary containment. The tank would store enough fuel for three generators for 7 days of backup power generation. The fourth generator would be on-site as a spare.

2.2.1.5 Supply Docks

Gulf LNG would construct two supply docks as part of the Project, a North Supply Dock and a South Supply Dock. The North Supply Dock would be a permanent facility on the northwestern part of the existing Terminal property at the mouth of Bayou Casotte in Mississippi Sound (see figure 2.2-1). The facility would extend 280 feet along the shoreline, with a 110-foot-wide docking area extending 310 feet into Bayou Casotte. Barges would moor on both sides of the 110-foot-wide extension, perpendicular to the ship channel. Gulf LNG would construct a heavy haul road from the North Supply Dock to the main gate of the existing Terminal.

During construction, Gulf LNG would use the North Supply Dock would be used for barge delivery of large equipment, piles, construction materials, and other construction loads. Following construction, ownership of the North Supply Dock would be transferred to the Jackson County Port Authority (JCPA). In addition to use of the North Supply Dock by barges and support vessels associated with operation of the Project, the dock may also be used by the JCPA as a berthing facility for barges waiting for a berth at one of the private or public terminals in the Bayou Casotte Harbor or for temporary berthing of other vessels not associated with the Project. Security of the North Supply Dock during operations of the Project would be addressed in Gulf LNG's *Facility Security Assessment and Facility Security Plan* (pursuant to 33 Code of Federal Regulations [CFR] 105) which would be reviewed and approved by the USCG.

The South Supply Dock would be a temporary facility just south of the existing berthing facility (see figure 2.2-1). It would extend about 200 feet along the shoreline and up to 100 feet from the shoreline and would accommodate one barge at a time. Gulf LNG would construct a heavy haul road from the South Supply Dock to a new gate installed in the storm surge protection wall (see figure 2.2-1). During construction, Gulf LNG would use the South Supply Dock for delivery of fill materials, aggregate, and the flare tower. Upon completion of construction of the Terminal Expansion, Gulf LNG would completely remove the South Supply Dock and restore the adjacent shoreline to pre-construction conditions. A portion of the South Heavy Haul Road (390 feet) would be retained by Gulf LNG during operations for access to the flare tower. Gulf LNG would transfer ownership of the North Supply Dock to the Port of Pascagoula; the dock would remain part of the Project and used occasionally for delivery of materials, supplies, and equipment during operation.

For both supply docks, dredging would be required between the shoreline and the existing channel to safely accommodate barge traffic Hydrographic surveys conducted by Gulf LNG determined that the current depth of the sea bed at both planned supply docks is relatively flat with water depths ranging from 1 to 4 feet below msl. Gulf LNG would dredge the supply docks to a depth of 12 feet below msl. Gulf LNG estimates, based on similar sediment deposition rates for the existing LNG carrier berth, that about 10,000 cubic yards of sediment would accumulate in each basin annually. Gulf LNG would conduct maintenance dredging of the supply docks on an as-needed basis, which is anticipated to be about every 3 years. Upon completion of construction, Gulf LNG would discontinue maintenance dredging at the South Supply Dock and allow the area to return to its natural bathymetric state. The Port of Pascagoula, which conducts maintenance dredging at the existing marine berth, would assume responsibility for maintenance dredging of the North Supply Dock.[2]

All of the 3.5 acres created at the South Marsh Mitigation Area as mitigation due to construction of the existing Terminal, would be impacted by the construction of the liquefaction facility, South Supply Dock, and the flare tower.

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[2] See attachment No. 8 of accession number 20170929-5228.

There are several transit routes that the barges could use before entering the Bayou Casotte Navigation Channel, dependent on the origin of the trip.

During construction, a temporary barge access channel would be dredged from the South Supply Dock along the outer perimeter of the proposed wetland mitigation site (dredging of about 200,000 cubic yards [cy] of material). Barges would use the temporary channel to install the perimeter riprap. The sediment removed for the channel would be temporarily placed within the proposed wetland mitigation site and then replaced in the temporary channel after the riprap is installed. All of the dredge material would be replaced in the temporary channel or contained within the marsh creation area, so off-site disposal would not be necessary.

2.2.1.6 Modifications to Existing Terminal Facilities

Several minor modifications to facilities at the existing Terminal are proposed as part of the Terminal Expansion. These modifications consist of the following:

- installation of three BOG compressors within the existing Terminal;
- installation of a new 115-kV substation;
- installation of an inlet gas filter;
- installation of ammonia and solvent storage tanks;
- installation of new loading pumps in the existing LNG storage tanks; and
- minor changes to the piping connected to the marine loading arms to permit bi-directional flow.

In addition, Gulf LNG would make minor modifications to the existing water intake structure. The Terminal Expansion would use the same water source as the existing Terminal, the Port of Pascagoula's Industrial Water Supply, for construction and operation of the expanded facility, including firewater. The Port of Pascagoula's Industrial Water Supply is obtained from the freshwater portion of the Pascagoula River about 14 miles north of the City of Pascagoula.

2.2.1.7 Associated Infrastructure

Infrastructure associated with the Terminal Expansion would include establishment of access roads within the Terminal Expansion site, partial removal of an existing access road, expansion of the existing shoreline protection wall, extension of the COE's existing berm, construction of a new utility/firewater tank, and spill containment, as described further below.

Access Roads

Gulf LNG would use existing public roads to access the Terminal Expansion site. In addition, the Project would include removal of a segment of an existing road and construction of new access roads within the Terminal Expansion site boundaries (see figure 2.2-1). Gulf LNG would continue to use the existing access road off SH-611 to access the existing Terminal. A portion of this existing access road along the northeastern corner of the storm protection wall would be demolished. New access roads would be constructed throughout the Terminal Expansion site. New access roads would be graveled or paved with asphalt. A temporary heavy haul access road within the Terminal Expansion site would follow the existing access road located along the earthen berm dike around the perimeter of the BCDMMS.

Gulf LNG would also construct two heavy haul roads to connect the North and South Supply Docks with the existing Terminal and the Terminal Expansion (see figure 2.2-1).

Storm Protection System

Gulf LNG would extend the existing storm protection system surrounding the existing Terminal to encompass the Terminal Expansion facilities. The new storm surge protection system would consist of a new concrete wall with a top elevation of 27 feet NAVD and a new earthen berm (an extension of the existing COE berm) with a top elevation of 27 feet NAVD. The berm would be constructed to provide both storm surge protection for the Terminal as well as providing the new dredge spoils perimeter for that corresponding portion of the BCDMMS. Following initial construction of the berm by Gulf LNG, the COE, in order to expand capacity of the BCDMMS, would extend the berm to a height of 39.2 feet NAVD. The COE would be responsible for maintaining the berm during operation of the Project.

The new storm protection concrete wall would connect to the existing wall near the southeast corner of the existing facilities and extend along the southern perimeter of the Terminal Expansion site until tying into the new earthen berm that would extend along the east and northeast sides of the Terminal Expansion site (see figure 2.2-1). The concrete wall would be sloped into the earthen berm and the berm designed to withstand wave force due to storm surge and would be protected from wave-induced scour with protective armor stone and from seepage by providing sheet pile cut-off along its length. In addition, the berm would be designed to withstand anticipated future COE dredge spoil site loads. The portion of the existing storm protection system between the existing Terminal and the new storm protection concrete wall and new berm would be removed. Gulf LNG has not determined a final plan to extend the storm protection system. Once a final plan has been determined, Gulf LNG would submit the final plan for FERC staff to review.

There are two gates in the existing storm protection wall: one at the main entrance and one near the berthing facility. The existing steel-roller flood gates, about 30 feet wide at the main gate and 17 feet wide at the berthing facility, would remain in place and continue to be used during construction and operation of the Terminal Expansion. The gates seal at the base and on both sides when closed for storm events. As part of the Project, a third flood gate would be installed to allow transport of construction materials and equipment from the South Supply Dock to the new facilities via the South Heavy Haul Road. Gulf LNG would install this flood gate would be installed in the new storm protection concrete wall in the southwest portion of the Terminal Expansion, and east of the South Supply Dock (see figure 2.2-1). It would also be a steel-roller gate that would seal along the sill and on both sides when closed for storm events.

Firewater Facilities

As noted above, the Terminal Expansion would use the same water source for firewater as the existing Terminal. The firewater delivery system would be expanded to meet the firefighting needs of the expanded Terminal. The expanded firewater system would be designed in accordance with the requirements of the NFPA 59A.

Spill Containment System

Gulf LNG would construct separate containment systems for refrigerant and LNG to contain the materials in the event of an accidental release.

2.2.1.8 Administration and Maintenance Buildings

Gulf LNG would relocate the Terminal's existing administrative building to a site east of and near the North Supply Dock. The administrative building and parking lot would impact about 1.3 acres of the

North Marsh Mitigation Area created as mitigation due to construction of the existing Terminal. The Terminal's existing warehouse/maintenance building would be relocated within the Terminal Expansion site. The proposed locations of the administrative building and the warehouse/maintenance building are depicted on figure 2.2-1.

2.2.1.9 Construction Staging Areas and Construction Support Areas

Gulf LNG would use 11.7 acres of land within the proposed Terminal Expansion area for on-site construction staging areas (see figure 2.2-1). Gulf LNG would impact about 4.2 acres of the North Marsh Mitigation Area for a construction staging area. In addition, Gulf LNG would use six off-site construction support areas (CSA) for staging, laydown, contractor yards, fabrication, and parking (see figure 2.0-1). Details regarding each construction staging area are provided below.

- CSA-1 (Knight Yard #1): A 16-acre property about 5 miles north of the existing Terminal on Colmer Drive. The property currently includes existing parking, warehousing, office space, and undeveloped areas. Following construction of the Project, Gulf LNG would restore CSA-1 to landowner specifications.
- CSA-2 (Knight Yard #2): A 1.8-acre property behind an existing warehouse on SH-611 about 4 miles north of the existing Terminal. The current owner has filled the property with rock. Gulf LNG would use CSA-2 for storage and parking during construction of the Terminal Expansion. Following construction of the Project, Gulf LNG would restore CSA-2 to landowner specifications.
- CSA-3 (Louise Street): A 7.8-acre property about 2.8 miles northwest of the existing Terminal on Louise Street. CSA-3 (Louise Street), which is owned by Gulf LNG, is currently used for warehousing and equipment storage. Gulf LNG would continue the present use of this site during and after Project construction.
- CSA-4 (Port Property): A 16.2-acre property about 2.5 miles north of the existing Terminal within the Port of Pascagoula's property off SH-611. The property is an existing industrial site and was previously used as a construction support area for the existing Terminal. Following construction of the Project, Gulf LNG would restore CSA-4 to landowner specifications.
- CSA-5 (Chevron Property): A 34.5-acre property adjacent to the existing Terminal to the north. Portions of the property are existing industrial and portions are wetlands. Following construction of the Project, CSA-5 would be restored according to landowner specifications.
- CSA-6 (Bosarge Property): An 18.1-acre property on Bayou Casotte Parkway about 2.5 miles north-northwest of the existing Terminal. The property is an existing industrial site currently developed as a parking lot. Gulf LNG would use CSA-6 for additional parking during construction. Following construction of the Project, CSA-6 would be restored according to landowner specifications.

2.2.2 Pipeline Modifications

Gulf LNG would modify two existing pipeline metering stations and the existing Gulf LNG Pipeline at the existing Terminal to enable bi-directional (north/south) flow capability.

At the Destin and Gulfstream interconnections, Gulf LNG would install two pipeline segments at each interconnect and the necessary switching valves to allow the existing metering stations to meter natural gas flow to the Terminal Expansion while retaining the ability to meter natural gas flow from the existing Terminal to the distribution pipelines. Gulf LNG would install a 30-inch-diameter 200-foot-long pipeline segment and a 30-inch-diameter 40-foot pipeline segment at the Gulfstream Meter Station. Additionally, Gulf LNG would install a 36-inch-diameter 240-foot-long pipeline segment and a 36-inch-diameter 210-foot pipeline segment at the Destin Meter Station. All existing instrumentation at the meter stations would remain unchanged. In addition, Gulf LNG would install filters at both interconnections to remove trace quantities of solids, which could affect the liquefaction equipment. Gulf LNG would construct the modifications within the existing fenced and graveled areas, with the exception of 0.1 acre of temporary workspace outside the fence line of the existing Gulfstream Meter Station but within the existing pipeline right-of-way. No other equipment within the existing facilities would be affected.

Transco would also make modifications to the existing and jointly owned Transco/FGT Interconnection to permit bi-directional flow. These modifications would be constructed by Transco and would be reviewed by the FERC under its blanket certificate process. According to Gulf LNG, modifications at the Transco/FGT Interconnection would be completed between October 2023 and March 2024.

The Gulf LNG Pipeline connection to the existing Terminal, which is within the existing Terminal boundaries, would also be modified to allow bi-directional flow and to provide a connection to the inlet of the pretreatment facilities of the liquefaction process. The flow capacity of the existing Gulf LNG Pipeline would not change.

The Destin and Gulfstream Meter Stations and the Transco/FGT Interconnection already have existing permanent access roads to each facility.

2.3 IMPACTS AND MITIGATION

2.3.1 Loss of Terrestrial Wildlife Habitat

Construction and operation of the Terminal Expansion would temporarily and permanently affect about 50.7 acres of terrestrial wildlife habitat, including wetlands (38.7 acres), upland forest (8.5 acres), and open land habitat (3.5 acres). The permanent conversion of wildlife habitat within the Project area to industrial-use land would reduce available acreage for foraging, hunting, nesting, and resting/migratory stopover habitat. However, there is a large amount of suitable habitat in nearby areas, including federal and state reserves and preserves like the Grand Bay Savanna Coastal Reserve, Grand Bay National Estuarine Research Reserve (Grand Bay NERR), Grand Bay National Wildlife Refuge (Grand Bay NWR), and the Gulf Islands National Seashore. The western boundary of the Grand Bay Savanna Coastal Preserve abuts the eastern edge of the BCDMMS; the Project footprint is about 700 feet west of the boundary. The Grand Bay NERR and Grand Bay NWR are about 1.5 and 9.0 miles east of the Terminal Expansion site, respectively. The Gulf Islands National Seashore is a chain of islands about 6.5 miles south of the Terminal Expansion site. These special status areas provide habitat for wildlife that is similar to that of the Terminal Expansion site (FERC, 2006).

Gulf LNG is working with the FWS to develop impact mitigation and minimization measures for migratory birds. Based on these consultations, Gulf LNG developed its *Migratory Bird Impact Assessment and Conservation Plan* (*Migratory Bird Plan*) and submitted it to the FWS in August 2018. Consultations with the FWS are ongoing, and we have recommended in our draft environmental impact statement (EIS) that Gulf LNG submit its final *Migratory Bird Plan* to the Commission prior to construction.

2.3.2 Lighting Impacts

Construction lighting could adversely affect protected species by exposing them to predators and by reducing the length of night that many species use for foraging, sheltering, and mating (Florida Atlantic University, no date). Aquatic species in the area are likely acclimated to the current ambient noise and light, due to the industrial nature of Bayou Casotte (FERC, 2006). To minimize impacts on protected species, nighttime construction lighting would be temporarily located at specific locations where construction would be ongoing and would be removed upon completion. Generally, construction and operational lighting of the supply docks and adjacent areas would be installed as close as possible to the locations needing illumination; these lights would also be shielded to direct light downward to minimize light impacts on adjacent areas. Industry within the Project area already contributes to nighttime artificial light levels. We have determined that Gulf LNG's proposed light placement and shielding methods to minimize lighting impacts would reduce artificial lighting impacts on protected species to greatest extent practicable.

Navigation lighting at the proposed flare tower has the potential to affect federally protected birds by causing them to collide with structures or to become disoriented during migration. Most bird collisions occur at night, when navigation lighting is most visible. Navigation safety lights can attract birds during periods of low visibility and cause disorientation (Avery et al., 1976; Caldwell and Wallace, 1966; Gauthreaux and Besler, 2006; Longcore et al., 2013). To the extent practicable, Gulf LNG would incorporate appropriate measures from the *2013 U.S. Fish and Wildlife Revised Voluntary Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning* into the Project's lighting design to reduce light pollution and minimize lighting-related impacts on birds (FWS, 2013). Gulf LNG's design would include minimization measures such as the installation of lights that only meet the minimum requirements for obstruction avoidance and pilot warning, and omitting the use of guy wires in tower design to reduced Project lighting impacts on federally listed species.

2.3.3 Turbidity and Sedimentation

Offshore Project-related activities, such as dredging, filling, and ballast water discharge would increase sedimentation and turbidity at the sites, potentially resulting in minor, temporary, and direct impacts on protected species. Increases in turbidity may cause protected species to avoid the immediate area of construction or cause their prey to be displaced. As suspended sediments are redeposited on the seafloor down-current, there may be additional mortality or dispersal of prey species. Dredging would be the largest source of increased turbidity and sedimentation levels for the Project. However, we expect these impacts to be short-term and minor given the proportion of available habitat within Mississippi Sound that would be affected. Although protected species may temporarily be displaced during construction, they would be expected to return to these areas after the pipeline has been installed and sediments are redeposited (FERC, 2006).

Impacts on the seafloor would occur as a result of Project activities, which include activities such as mechanical dredging, filling, and pile driving. All of these activities may have the potential to remove bottom habitat and either smother and/or crush benthic organisms and aquatic vegetation that could serve as a food source for protected species. In addition, dredging would increase water depths. All seafloor impacts would be localized to the immediate area in which the construction activity is occurring. Because of the acreage that would be affected, dredging and filling activities at the supply docks and wetland mitigation site would be the largest source of seafloor impacts. Initial dredging for the supply docks would affect 15.3 acres of seafloor habitat; maintenance dredging would impact varying and lesser acreages thereafter. As mentioned previously, wetland mitigation site creation would require about 50 acres of fill over open water, permanently converting all seafloor habitat to estuarine emergent (EEM) wetlands at the mitigation site. No oyster or submerged aquatic vegetation resources are located in the Project footprint (State of Mississippi and the National Oceanic and Atmospheric Administration [NOAA], 1995), and as a result, the construction of the proposed Project would not impact these resources.

The total impact on the seafloor from Project activities would be minimal when compared to the total amount of suitable seafloor habitat (including Gulf sturgeon critical habitat) available within the Mississippi Sound. The Project is located within Unit 2 and 8 of the designated critical habitat for the Gulf sturgeon and includes the Pascagoula River (Unit 2) and 62 square miles of the Mississippi Sound nearshore area (Unit 8) (COE, 2014), while Project impacts on open water habitat. Impacts on the seafloor from these activities would occur in localized areas, and, with the exception of the wetland mitigation site, it is expected that protected species would leave the area of construction and return upon completion of disturbance. Further, the applicant would be required to adhere with its COE permit as well as the conditions outlined in the EIS to minimize impacts on the seafloor as a result of construction activities. In addition, according to the *Dredging and Disposal Plan*, Gulf LNG would install and maintain turbidity curtains around the dredge area to limit the transport of turbid water beyond the vicinity of the dredging operations. Therefore, adverse impacts on federally listed species due to Project-related impacts on the seafloor are not expected.

2.3.4 Mobilization of Contaminated Sediments

Dredging and filling could also mobilize contaminated sediments. Contaminated sediments can have both direct adverse impacts on bottom fauna, and indirect effects as the toxic substances move up the food chain (Castro and Reckendorf, 1995). Gulf LNG tested sediments at the proposed dredging areas for the supply docks; this testing determined that the sampled sediments have either no or very low levels of contaminants. Gulf LNG tested BCDMMS sediments that would be used for fill at the Terminal Expansion site; sediments from station 10 may have had elevated contaminant levels of arsenic and cadmium, but still met the permissible concentrations for ocean disposal. Gulf LNG proposes to blend these sediments with the other sediments removed from the BCDMMS. Gulf LNG would consult with the Mississippi Department of Environmental Quality (MDEQ) and the COE prior to construction to determine if the blended sediments would be appropriate for use at the Terminal Expansion site. Any sediment not used would be transported to an approved site for upland disposal.

2.3.5 Underwater Noise

NMFS has identified pile-driving activities as having the potential to affect protected species (NOAA, 2012a). Other noise-related impacts that may occur as a result of Project activities include noise associated with construction vessels and equipment, and noise associated with marine vessel traffic during operations. These potential impacts and the measures Gulf LNG proposes to employ to minimize noise impacts are discussed below.

2.3.5.1 Pile Driving

Gulf LNG has proposed to build the supply docks using offshore pile-driving methods. Noise generated from this activity could impact protected species. The noise could result in the species' temporary displacement from the area of construction.

As part of the installation of each of the two docks, the sheet piles would be driven to a depth of 32 feet below msl with a vibratory hammer. Gulf LNG estimates that installation of the sheet piling for both of the supply docks would require a total of 60 10-hour construction days. This estimate assumes each section of sheet piling would require about 45 minutes to drive into place and that 8 sections would be installed per day. This would result in about 6 hours of vibratory pile driving occurring throughout each 10-hour working day.

Vibratory pile driving near and within the Bayou Casotte waters could cause concussive noise and generate underwater sound pressure waves that could adversely affect nearby marine organisms, including fish, sea turtles, and marine mammals. Underwater noise levels are commonly referred to as a ratio of the underwater sound pressure to a common reference pressure of 1 micropascal (μPa), which is expressed in decibels (dB) of sound intensity as dB referenced to 1 μPa (i.e., dB re: μPa).[3] Three types of sound measurement are generally used to evaluate the effects of sound on aquatic species: peak sound pressure level (SPL), root mean square (RMS), and cumulative sound exposure level (SEL). Peak SPL is the largest absolute value of instantaneous sound pressure. RMS represents the effective pressure and intensity produced by a sound source, and cumulative SEL is the sound energy accumulated in a given time period.[4] There are insufficient peer-reviewed reliable data available for determining the noise level that would trigger the onset of behavior disturbance in aquatic species; however, as a conservative measure, the Southeast Regional Office of NMFS generally uses 150 dB re: 1 μPa as the threshold for behavior effects to fish species of particular concern, 160 dB re: 1 μPa RMS for behavioral effects on sea turtles, and 120 dB re: 1 μPa RMS[5] for behavioral effects on marine mammals (NMFS 2018a). Noise levels in excess of these thresholds can cause temporary behavior changes (startle and stress) that could decrease species' ability to avoid predators. The current interim thresholds protective of injury to fish are a peak SPL of 206 dB re: 1 μPa and cumulative SELs resulting from a vibratory hammer of 234 dB re: 1 μPa^2-s for fish and sea turtles 102 grams or greater and 191 dB re: 1 μPa^2-s for fish of less than 102 grams (NMFS, 2018a). The threshold protective of injury to the cetacean group that includes dolphins is a cumulative SEL of 198 dB re: 1 μPa^2 –s (no peak level or RMS is provided for vibratory hammers; NMFS, 2018a; NMFS, 2018b).

Impacts on aquatic organisms associated with pile driving are generally lessened through use of a vibratory hammer (as opposed to an impact hammer), in part due to the slower amount of time it takes for a vibratory hammer to reach peak SPLs and the lower overall peak SPL, RMS, and cumulative SEL associated with vibratory hammers (WSDOT, 2017; NMFS, 2018a). Recent studies used by NMFS to create effects analyses of pile driving noise on fishes suggest a vibratory hammer would typically be expected to produce a peak SPL of no more than 182 dB re: 1 μPa, an RMS of 165 dB re: 1 μPa, and a cumulative SEL of 165 dB re: 1 μPa^2-s (Buehler et. al., 2015). Calculations using the NMFS worksheet for analyzing the effects of pile driving on aquatic species indicate noise from the vibratory hammers would diminish to less than 150 dB re: 1 μPa within 330 feet of the location of the pile driver. Calculations further indicate that cumulative SEL would diminish to less than 234 dB re: 1 μPa^2-s within 1 foot and less than 191 dB re: 1 μPa^2-s within 330 feet of the location of the pile driver (NMFS, 2018a). According to Gulf LNG, proofing of the sheet pile using an impact hammer would not be necessary. In summary, vibratory pile driving noise would be unlikely to cause injury or behavioral changes to aquatic organisms beyond 330 feet from the location of the pile driver. Additionally, in February of 2019, Gulf LNG filed a *Sheet Pile Driving Mitigation Plan*[6] that described the NMFS-recommended best management practices (BMP) Gulf LNG would implement, including reducing the vibratory hammer energy levels, to reduce pile driving-related noise impacts on aquatic organisms.

2.3.5.2 Marine Vessel Noise

Noise generated from offshore vessels associated with Project construction and operation could cause protected species to temporarily disperse from, or avoid, areas where Project-related activities are occurring. Such impacts could temporarily displace protected species from commonly used foraging, breeding, or resting habitats. Aquatic species at the proposed supply dock areas are likely acclimated to noise associated with frequent marine traffic at the existing Terminal, and as previously stated, no foraging habitat has been identified at these sites. Further, Gulf LNG is not proposing to increase the number of

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[3] For comparison, air sounds have a reference pressure of 20 μPa, though the reference pressure for air measurements is not generally stated when presenting sound data.

[4] The unit for cumulative SEL is dB re: 1 μPa^2 per second (s); NMFS assumes this accumulation occurs continuously unless there is a break of at least 12 hours (Stadler and Woodbury, 2009).

[5] The 120 dB re: 1 μPa RMS value is the threshold used for vibratory pile driving; the threshold used for impact pile-driving is 160 dB re: 1 μPa RMS.

[6] See attachment 17 of accession number 20190219-5042.

LNG carriers or change the transit route that is currently authorized at the existing Terminal. Therefore, impacts on protected species in the vicinity of the supply docks due to noise generated by marine vessels is not expected to occur.

Periodic increases in underwater noise levels that would occur during ship transits associated with the Project could affect protected species that frequent deeper, offshore waters. It is anticipated that species would generally avoid areas with high noise levels during construction and operation of the proposed Project. Therefore, noise-related impacts associated with marine vessel traffic is only expected to temporarily displace protected species, resulting in no long-term impacts.

2.3.6 Vessel Strikes

Collisions between LNG shipping vessels operating within the Project area and protected species could occur causing injury or mortality. Most protected species inhabiting offshore waters within LNG shipping lands (i.e., sea turtles, whales, and the West Indian manatee) would be expected to avoid construction vessels if they are encountered within the Project area, resulting in their temporary displacement (FERC, 2006). It has been observed that sea turtles dive as an avoidance behavior to oncoming vessels, but this behavior may actually make the turtles more vulnerable as diving could place them in contact with the vessel's propellers or in the undertow created by the vessel.

Gulf LNG has committed to provide LNG ship captains with the *Vessel Strike Avoidance Measures and Reporting for Mariners*[7] (*Strike Avoidance Procedures*), which outline collision avoidance measures. Gulf LNG would instruct vessel operators and crews to follow the guidelines listed in the *Strike Avoidance Procedures*, which include:

- providing vessel crews with protected species identification training;
- maintaining a vigilant watch for marine protected species and slowing down or altering their course to avoid striking protected species;
- when whales are sighted, maintaining a distance of 100 yards or greater between the whale and the vessel;
- reducing vessel speed to 10 knots or less when mother and calf pairs, groups, or large assemblages of cetaceans are observed near an underway vessel (when safety permits);
- checking with various communication media for general information regarding avoiding ship strikes; and
- reporting any sightings of any injured or dead protected species immediately, regardless of whether the injury or death is caused by your vessel.

Gulf LNG would also include these *Strike Avoidance Procedures* in all commercial shipping agreements made with shippers using the Terminal. Therefore, vessel strikes would be unlikely to occur and would not adversely affect federally listed marine species.

2.3.7 Offshore Spills or Leaks of Hazardous Materials

Accidental spills or leaks of hazardous materials could occur during construction and operation in both nearshore and offshore waters. This would cause an adverse effect of water quality, which could negatively impact protected species using the area. Depending on the size of the release, species could

[7] Available at: https://sero.nmfs.noaa.gov/protected_resources/section_7/guidance_docs/documents/copy_of_vessel_strike_avoidance_february_2008.pdf.

experience direct injury or mortality. Refueling during Project construction and operations would not take place at the Terminal Expansion. Construction and LNG shipping vessels would refuel at sites designed for that purpose. Gulf LNG has not decided the exact refueling station(s) it would use, but they would most likely be located away from the Project in Bayou Casotte Harbor. Therefore, the greatest likelihood for a fuel spill to occur would be associated with a large collision or other accident. However, there are no records of such an event occurring with LNG shipping vessels. Because such incidents are highly unlikely to occur, associated adverse impacts on protected species are also very unlikely.

In the unlikely event that a release occurs in open water, it would be contained and removed to the extent possible, and the remaining sheen would be allowed to dissipate. Gulf LNG would minimize potential impacts associated with spills or leaks of hazardous materials during construction by implementing its *Spill Prevention Containment and Countermeasures Plan* (*SPCC Plan*). LNG carriers would operate within the international standards for oil spill prevention and control.

2.3.8 Stormwater Runoff

Stormwater discharges at the Terminal Expansion would be covered by appropriate permits, such as Gulf LNG's National Pollutant Discharge Elimination System (NPDES) permit, that include conditions to protect water quality. In addition, Gulf LNG would adhere to guidelines in its *Stormwater Pollution Prevention Plan* (*SWPPP*) and its *SPCC Plan* to further prevent significant adverse impacts from occurring. All stormwater collected within the walled Terminal Expansion area would be pumped and discharged into the Mississippi Sound through both the existing and new outfalls at the existing Terminal's berthing area. Species in this area are already acclimated to freshwater runoff areas, and no adverse impacts are anticipated.

2.4 IMPACT ASSESSMENT OF PROTECTED SPECIES

As previously stated, the Project would be located in areas with species under both the FWS and NMFS jurisdictions. The following discussions provide the determination of the effect of the Project on the species identified as being under their jurisdiction.

2.4.1 U.S. Fish and Wildlife Service

A total of nine species were identified as being under the jurisdiction of only the FWS. This includes four endangered species, three threatened species, and two species that are currently under review.

2.4.1.1 Alabama Red-bellied Turtle

The Alabama red-bellied turtle occurs most commonly in the backwaters of upper Mobile Bay in areas with dense, submerged vegetation generally 1 to 2 m deep. It can also occur in river channels, and as a straggler in brackish water and salt marsh areas. It uses dense beds of vegetation for basking (NatureServe, 2015). The Alabama red-bellied turtle is known to occur in Jackson County, Mississippi (FWS, 2014). It seasonally inhabits salt marsh areas near the mouth of the West Pascagoula River and has been observed on Horn Island in the Mississippi Sound (Leary et al., 2008). No suitable basking or nesting sites were observed in the vicinity of the Project for this species, and there is no record of this species in the Bayou Casotte area. However, this species has been observed in similar habitat in Jackson County. Therefore, we have determined that the Project *is not likely to adversely affect* the Alabama red-bellied turtle.

2.4.1.2 Least Tern and Interior Least Tern

The least tern is one of the smallest of the tern species. It ranges from Maine to Venezuela and winters from the Gulf Coast southward. The coastal population breeds in the three coastal counties of Mississippi, including Jackson County. It typically nests on seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers (NatureServe, 2015). The interior populations nest on sparsely vegetated sandbars in the Mississippi River (MDWFP, 2001). While the coastal population of the least tern is federally listed as endangered, it is not state-listed as threatened or endangered. The interior least tern is both federally and state-listed as endangered (FWS, 2018; MNHP, 2015).

During biological surveys, Gulf LNG determined that there was no suitable nesting habitat for the least tern or the interior least tern on the Project site. However, the species could still forage on the site and in the general area and could be displaced during construction and operation to abundant suitable habitat adjacent to the Project area. Therefore, we have determined that the Project *is not likely to adversely affect* either the coastal or interior species of the least tern.

2.4.1.3 Eastern Black Rail

The eastern black rail inhabits both freshwater and saltwater marshes in the United States, Central America, and South America, wintering in the southernmost part of its breeding range (FWS, 2019). Opportunistic feeders, can be found on both the Gulf and Atlantic coasts, in both marsh and upland habitat in a variety of vegetative cover (FWS, 2019). The FWS has proposed to list the eastern black rail as an ESA threatened species.

The last sighting of black rails in Jackson County was in 1980 (Watts, 2016). Between 2010 and 2017, no confirmed records of the black rail were documented in Mississippi (FWS, 2019). No biological surveys for black rail have been conducted. Although suitable habitat for this species occurs within the Project area, there has not been a confirmed sighting of the eastern black rail in Jackson County, Mississippi between 1980 and 2016. Therefore, we have determined that the Project would not contribute to a trend toward federal listing of the eastern black rail. If the species is listed, the FERC would re-consult with the FWS regarding the eastern black rail.

2.4.1.4 Piping Plover

The piping plover typically breeds and forages along sandy beaches and mudflats (NatureServe, 2015). It is a migratory species that winters in Atlantic and Gulf coastal regions of the United States and several Caribbean islands, and breeds in the northern United States and Canada. This species mainly uses wide, flat, open, sandy beaches to forage. Nesting territories occur on open beaches near small creeks or wetlands. Piping plover eat mostly insects, spiders, and crustaceans that occur on open beaches or mudflats. Threats to this species include habitat loss and degradation, particularly of coastal beaches, and nest disturbance and predation (FWS, 2015a).

Foraging habitat for the piping plover is present in the existing marsh mitigation area south of the existing Terminal. This site was created by Gulf LNG to mitigate for impacts during construction of the existing Terminal. During a COE visit to the Terminal Expansion site on December 15, 2014, two individuals were observed; however, the lack of habitat and increasingly industrialized nature of the Terminal Expansion site and immediately surrounding area, would limit the likelihood that the species would use the small amount of existing shoreline. Although the Project would result in some habitat loss, the piping plover likely occurs as an uncommon non-breeding winter visitor to the site. Further, there is abundant suitable habitat adjacent to the Project area. Navigation lighting at the proposed flare tower has the potential to affect birds by causing them to collide with structures or to become disoriented during migration. Most bird collisions occur at night, when navigation lighting is most visible. As discussed in section 2.3.2, to the extent practicable, Gulf LNG would incorporate appropriate measures from FWS's guidance to minimize lighting-related impacts on birds (FWS, 2013). Gulf LNG's design would include minimization measures such as the installation of lights that only meet the minimum requirements for obstruction avoidance and pilot warning, and omitting the use of guy wires in tower design to reduced Project lighting impacts on federally listed species. During construction, installation of piles for the Terminal Expansion and supply docks would generate noise. Given the industrialized nature of the Project area, it is likely that most avian species are accustomed to the level of noise generated by these activities or would avoid the construction area. Therefore, we have determined that the Project is *not likely to adversely affect* the piping plover.

2.4.1.5 Rufa Red Knot

The rufa red knot migrates long distances between nesting areas in mid- and high-arctic latitudes and southern non-breeding habitats as far as the coastal United States (Ridgely et al., 2003). The rufa red knot is thought to occur in Jackson County, Mississippi (FWS, 2014). This species was not observed in the vicinity of the Project, but there is suitable wintering foraging habitat (intertidal and other marine areas) at the Terminal Expansion site. The species could be present as a rare non-breeding visitor on the site during winter, fall, or spring migration (Cornell, 2015). The primary impacts of the Project on the rufa red knot would be the loss of foraging habitat. However, there is ample suitable foraging habitat for the rufa red knot in adjacent areas.

As stated in section 2.3.2, increased lighting during construction and operation could affect birds by causing them to collide with structures or to become disoriented during migration. However, Gulf LNG would use down-lighting to minimize the spread of light outside of the Project site and would incorporate the FWS recommendations regarding lighting into the Project lighting design to reduce light pollution and minimize lighting-related impacts on the red knot and all bird species. Therefore, we have determined that the Project *is not likely to adversely affect* the rufa red knot.

2.4.1.6 Wood Stork

The wood stork breeds in Mexico and migrates to the United States' Gulf Coast to forage (Audubon, 2014). The federal government considers wood storks observed in Mississippi to be visitors from Mexico and Central America and thus, they are not considered endangered. They prefer to forage in ponds, freshwater wetlands, flooded pastures, bayheads, and other shallow water (MDWFP, 2001). On the Mississippi Gulf Coast, wood storks primarily use the shallow areas of oxbows and wooded sloughs along the floodplains of large rivers and streams, particularly the Pascagoula River. Wood storks are occasionally observed in salt marshes along the Gulf Coast. Wood storks could occur at or near the Terminal Expansion site as non-breeding winter transients, but the site likely would not be a preferred stopover area. No sightings occurred during field surveys, and there are no known occurrences in the vicinity of the Project. Because there is an abundance of suitable habitat adjacent to the Project area and the species mobility, we have determined that the Project *is not likely to adversely affect* the wood stork.

2.4.1.7 West Indian Manatee

The West Indian manatee is federally listed as endangered and can be found in marine, estuarine, and freshwater environments. Manatees generally seek out natural warm water sites to forage, drink, and rest, including areas where industrial facilities discharge warm water. Most of their time is spent in freshwater and estuarine environments, but manatees will venture into salt water to travel to different locations. Manatees are herbivores that feed on a large variety of plants, including submerged, emergent, and floating vegetation. Mating can occur at any time of year and, while calving peaks in the spring months, calves may be present in any area at any time of the year and usually remain with the mother for 2 years. Major threats to this species include boat collisions, habitat loss, and forage species loss (FWS, 2015b).

Potential impacts on the West Indian manatee would be similar to those for whales. As noted by the Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) (2001), no manatee foraging habitat has been observed in the vicinity of the Project, and manatees that may be observed within the area would likely be summer migrants (transients). Dredging and pile driving for construction for the supply docks, and the presence of and noise from barges and barge support vessels during construction and operation could affect the West Indian manatee. According to the *Dredging and Disposal Plan*, Gulf LNG would install and maintain turbidity curtains around the dredge area to limit the transport of turbid water beyond the vicinity of the dredging operations. Gulf LNG would use a vibratory hammer to install sheet pile at the supply docks, and would follow NMFS-recommended BMPs to reduce pile driving-related noise impacts on aquatic organisms. Although an occasional summer migrant manatee could pass through the area, there is a low risk of impacts from collisions with barges and support vessels. Gulf LNG would minimize collision with marine mammals by adhering to measures in the *Strike Avoidance Plan*. Based on the infrequent occurrence of the West Indian manatee in the Project area, the likelihood that any impacts on the species would be minor if they occurred, Gulf LNG's adherence to the *Strike Avoidance Plan* along with their commitment to continue consultation with NMFS to minimize potential impacts on protected species from vessel traffic, Gulf LNG's plan to use a vibratory hammer during offshore pile driving and follow NMFS-recommended BMPs to reduce pile driving-related noise impacts on aquatic organisms, and Gulf LNG's intent to use turbidity curtains during dredging, we have determined that the Project *is not likely to adversely affect* the West Indian manatee.

2.4.1.8 Saltmarsh Topminnow

The saltmarsh topminnow is endemic to brackish waters from Galveston Bay, Texas to the western panhandle of Florida. This species lives in estuaries, salt marshes, and back water sloughs, and breed in shallow, flooded marshes from March to August. This species is in decline largely due to habitat destruction caused by dredging and dredged material placement, dock and other bulk-head construction along marsh edges, shoreline erosion, and hurricanes (NOAA, 2009).

The filling of EEM wetlands and construction of the supply docks at the Terminal Expansion site would permanently eliminate some potential saltmarsh topminnow habitat. Impacts on habitat at the South Supply Dock are expected to be temporary as that area would be allowed to restore naturally following construction. Direct impacts, such as injury or mortality, could also occur during fill placement in wetlands. We expect that impacts on saltmarsh topminnow habitat would be offset by the creation of the EEM wetlands at a 50-acre site just south of the Terminal Expansion as part of Gulf LNG's wetland mitigation plan. Therefore, we conclude that the Project *would not contribute to a trend toward federal listing* of the saltmarsh topminnow.

2.4.2 National Marine Fisheries Service

A total of six marine mammal species were identified as being under the jurisdiction of only NMFS. This includes five endangered species and one species that is currently under review.

2.4.2.1 Whales

There are five federally protected species of whales with the potential to occur within the vicinity of the Project area; all are listed as endangered. The blue whale, fin whale, humpback whale, sei whale, and sperm whale, have all been observed in the Gulf of Mexico (COE, 2014). The Bryde's whale, which has been petitioned for listing as endangered, is also present in the Gulf of Mexico. Of these species, only the sperm whale and Bryde's whale are year-round residents of the Gulf of Mexico (Davis et al., 2000). The four remaining species are considered rare in the area. NMFS indicated that observations of blue, fin, humpback, and sei whales in the Gulf of Mexico were likely juveniles straying from the normal range of these stocks or are only occasional transients (NOAA, 2005). If present, these whales would most likely be in deeper, open waters and would not be expected to swim in nearshore areas.

The blue whale is the largest living animal on earth. Blue whales are migratory, moving toward the poles in the spring for feeding and returning to the subtropics in the fall to mate (NOAA, 1998). They generally prefer colder, open water, but the young are born in warmer waters of lower latitudes. The blue whale was historically over-harvested; however, continued decline of the species may be due to alterations in the food chain from commercial fishing and whaling (NatureServe, 2015).

Sei and fin whales are widely distributed in the world's oceans. Most populations of these whales were reduced by extensive commercial whaling in the mid-twentieth century. Although it is considered uncommon, the fin whale is known to occur in the Gulf of Mexico. Sei whales, however, are considered uncommon in the Atlantic waters off of the United States and tend to avoid semi-enclosed waterbodies such as the Gulf of Mexico (NOAA, 2010; 2011). The similarity of the sei and fin whales has caused confusion as to the whales' actual distribution and frequency of occurrence (NOAA, 2010).

Humpback whales are found in all oceans of the world, generally occurring in water over continental shelves, along their edges, and around some oceanic islands (NOAA, 1991). However, this species rarely occurs in the Gulf of Mexico. Humpback whale populations were historically depleted by over-harvesting and continue to be threatened by marine pollution, disturbance by vessel traffic, and entanglement in fishing gear (NatureServe, 2015).

Sperm whales occur widely throughout the world's oceans (American Cetacean Society, 2006). In the Gulf of Mexico, their population is concentrated along the upper continental slope at water depths between 600 and 3,300 feet (Jochens et al., 2008). They dive up to 1,640 feet to feed, primarily preying on medium-sized, deep-water squid (American Cetacean Society, 2006). Historical declines in sperm whale populations have been due to over-harvest by commercial whaling operations, which peaked at about 29,000 whales per year in the mid-1960s. The best estimate of abundance for sperm whales in oceanic waters of the northern Gulf of Mexico is 1,315 from data collected between 1996 and 2001 (NatureServe, 2015).

Bryde's whales are the only resident baleen whales in the Gulf of Mexico. They prefer highly productive tropical, subtropical, and warm temperate waters worldwide and can weigh up to 90,000 pounds and reach 55 feet in length. The best abundance estimate available for northern Gulf of Mexico Bryde's whales is 33 (NOAA, 2017). The primary threats facing this species are underwater noise, collisions with ships, and exposure to pollution. The Bryde's whale is currently proposed for listing and is under review.

Potential Whale Impacts

Dredging and dredged material placement would cause temporary, localized elevations in turbidity and would also generate underwater noise. However, dredging and dredged material placement would take place in nearshore waters along the Terminal Expansion site where whale species do not typically occur. Individuals that would travel in nearshore waters would be expected to avoid the area during dredging activities due to the high levels of turbidity and construction noise.

Underwater noise generated by pile driving has the potential to adversely affect whales. Whales depend on sound as they hunt for food, detect predators, find mates, and maintain their awareness in the sea; pile driving noise can impact whales by elevating ambient noise levels to the point of interfering with biologically important signals. Conversely, sounds emitted by whales for communication and identification can be masked and go unheard due to the increased noise in the marine environment. Gulf LNG would use a vibratory hammer during offshore pile driving and would follow NMFS-recommended BMPs to reduce pile driving-related noise impacts on aquatic organisms. Noise related to the pile driving would not be expected to extend beyond the immediate vicinity of the Project area.

Whale Conclusions

With the exception of the sperm whale and Bryde's whale, the federally endangered whale species that could be affected by the Project are not generally found in the Gulf of Mexico however, suitable habitat may be present within the Project area. Federally endangered whales that do occur in the Gulf of Mexico are generally found in offshore waters. In addition, impacts to occasional whale visitors in nearshore waters would be mitigated through Gulf LNG's plan to use a vibratory hammer during offshore pile driving and follow NMFS-recommended BMPs to reduce pile driving-related noise impacts on aquatic organisms. Therefore, Project activities in nearshore waters associated with the Terminal Expansion are not likely to affect these species. Since federally endangered whales that do occur in the Gulf of Mexico are generally found in offshore waters, we have determined that the Project *is not likely to adversely affect* blue, fin, humpback, sei, and sperm whales and *would not contribute to a trend toward federal listing* for Bryde's whales.

2.4.3 U.S. Fish and Wildlife Service and National Marine Fisheries Service

A total of seven species are under the jurisdiction of both the FWS and NMFS. This includes four endangered and three threatened species.

2.4.3.1 Gulf Sturgeon and Critical Habitat

The entire offshore portion of the Project area within the Mississippi Sound is designated as critical habitat for Gulf sturgeon (*Acipenser oxyrinchus desotoi*) (NOAA, 2007). Project activities (such as dredging, dredged material placement, and pile driving) can increase underwater noise and nighttime light levels; spills or leaks of hazardous materials from construction equipment or vessels could also potentially affect Gulf sturgeon or their critical habitat.

The Gulf sturgeon is a distinct subspecies of Atlantic sturgeon, historically observed from Charlotte Harbor, Florida to the Mississippi River (Ross, 2001). The Gulf sturgeon is an anadromous fish that migrates from saltwater into large coastal rivers in the spring between February and April. Reproductive fish move from the mouths of coastal rivers upriver to spawn. At present, the only known spawning locations in Mississippi are at Bouie Creek (about 160 miles north-northwest of the Project) and at the Pearl River (about 75 miles to the west of the Project). However, spawning may also occur in the Chickasawhay River about 225 miles north of the Project (FWS, 1995; GSMFC, 2005).

In late October through early November, adult sturgeon move downstream and forage in the estuaries adjacent to the mouth of rivers (Fox et al., 2001; 2002; Harris et al., 2005). They remain in the estuaries until winter temperatures drop, and then return to saltwater for the coldest 3 to 4 months of the winter (FWS, 1995; GSMFC, 2005). Adult Gulf sturgeons do not appear to feed during summer months when they reside in rivers (Wooley and Crateau, 1985; Gu et al., 2001).

When in estuary habitats, the diet of Gulf sturgeon comprises benthic organisms and varies locally. In the Suwannee River estuary in Florida, the diet is dominated by brachiopods (*Glottidia pyrimidata*); however, amphipods (*Ampelisca* spp.), brittle stars (*Ophiactis abyssicola*), and lancelets (*Amphioxus* spp.) are also included (Huff, 1975; Mason and Clugston, 1993). In Choctawhatchee Bay, Florida, the ghost shrimp (*Lepidophthalmus louisianensis*) is the major diet component and (Fox et al., 2002).

Potential Gulf Sturgeon Impacts

Adult Gulf sturgeon pass through the area in the vicinity of the Project at the mouth of the Pascagoula River on their outward migration to, and subsequent return from, the offshore barrier islands during the winter feeding period (FERC, 2006). Activities such as dredging and dredged material placement, increases in noise, and spills or leaks of hazardous materials could potentially affect Gulf sturgeon and its critical habitat in the vicinity of the Project.

Turbidity resulting from dredging activities is not in itself a problem for Gulf sturgeon, which naturally prefer turbid environments (LeBreton et al., 2004). However, increases in biological oxygen demand associated with turbidity resulting from disruption of reduced or anoxic sediments during dredging may cause sturgeon, if present, to avoid the area until dissolved oxygen levels increase. According to the *Dredging and Disposal Plan*, Gulf LNG would install and maintain turbidity curtains around the dredge area to limit the transport of turbid water beyond the vicinity of the dredging operations.

Gulf LNG's proposed wetland mitigation site is also designated as critical habitat for the Gulf sturgeon. Placement of dredged material at this site would bury soft-bottom sediment and result in temporary and localized increases in turbidity. While the turbidity (and the associated decrease in dissolved oxygen) is not expected to adversely affect the sturgeon, covering soft-bottom sediment and raising the elevation of the site would preclude its use as Gulf sturgeon habitat. However, it is expected that the Gulf sturgeon would use suitable habitat available in nearby, adjacent areas.

Pile driving has the potential to create repetitive noise that may be harmful to Gulf sturgeon in close proximity to the activity. However, other engine noises, small work boats, and general activity associated with pile driving are likely to elicit an avoidance response from the Gulf sturgeon that would keep them away from the construction area. Gulf LNG has also committed to using a soft-start technique when initiating all pile-driving activities. This technique is designed to elicit an avoidance response from fish in the vicinity, causing them to temporarily leave the area for the duration of the pile driving. The soft-start technique consists of commencing pile driving at energy levels, then increasing to full-energy levels over a period of time sufficient for aquatic species to leave the area. This technique would thereby reduce the likelihood that fish would be exposed to injury causing sound levels (Savery and Associates, 2010). In addition, impacts to Gulf sturgeon would be mitigated through Gulf LNG's plan to use a vibratory hammer during offshore pile driving and follow NMFS-recommended BMPs to reduce pile driving-related noise impacts on aquatic organisms.

Nighttime construction lighting could also result in adverse impacts on Gulf sturgeon. Gulf LNG would minimize the use of night lighting to the extent practicable and would employ mitigation measures to limit the spread of light to adjacent areas. Further, Gulf sturgeon in the area have likely acclimated to lighted conditions due to industrial activities at the existing Terminal and nearby industrial facilities.

Critical Habitat

The Project is in a portion of Mississippi Sound that NMFS has designated as final Gulf sturgeon critical habitat. Critical habitat includes open bays, including Pascagoula Bay, Point aux Chenes Bay, Grand Bay, and Sandy Bay. The northern boundary of the Mississippi Sound critical habitat is mainland shorelines between Heron Bay Point, Mississippi and Point aux Pins, Alabama (FWS, 1995; GSMFC, 2005). The southern boundary of the Mississippi Sound critical habitat is 1.2 miles offshore of the barrier islands (defined at 33 CFR 80.815). There are seven primary constituent elements associated with the designated critical habitat for Gulf sturgeon. The designation of primary constituent elements (PCEs) helps to focus conservation efforts and impact minimization measures on those critical elements of the habitat that are essential to the conservation of the species. There are four PCEs of the designated critical habitat that are relevant to the Project: abundant food items, water quality, sediment quality, and safe and unobstructed migratory pathways.

Abundant Food Items

Known common prey items, such as brachiopods, amphipods, brittle stars, lancelets, and ghost shrimp, are either lacking or less dense (lower abundance) in benthic samples from the Project site than from known foraging areas, such as the Suwanee River or Choctawhatchee Bay. In contrast, the benthic community in the ship berthing and maneuvering area is dominated by macroinfaunal species that are known colonizers (e.g., the polychaete *Mediomastus* spp. and the bivalve *Gemma gemma*) (FERC, 2006). These opportunistic species are highly dominant in number, comprising over 60 percent of all benthic macroinfauna (FERC, 2006). Initial recolonization of dredged areas would commence in a matter of days or weeks, and these areas would become functional benthic communities similar to pre-dredge conditions or to adjacent reference locations in about 12 to 18 months (FERC, 2006). However, later successional stages of benthic recolonization would be more gradual (Applied Biology, Inc., 1979; Blake et al., 1996; Desprez, 2000; Hammer et al., 2005). Therefore, the temporary loss of benthos resulting from dredging of critical habitat, and the potential permanent shift in the benthic community that would reestablish in the deeper areas, would not result in an adverse modification of this primary constituent element, nor would it adversely affect Gulf sturgeon conservation as the impact is localized and short-term to temporary.

Construction of the wetland mitigation site would result in the permanent loss of about 50 acres of soft-bottom sediment. It is likely that benthic fauna such as polychaetes and oligochaetes would be buried during construction, resulting in a loss of prey available in the vicinity of the mitigation site. However, we do not anticipate substantial adverse impacts on the Gulf sturgeon given the abundance of soft-bottom habitat that is characteristic of the Mississippi Sound east and west of the mitigation site, which is inhabited by the same types of prey species that would be lost as a result of the construction of the wetland mitigation site.

Water Quality

Salinity near the Terminal Expansion site is higher than at the known feeding area at the mouth of the Pascagoula River, but is within the range observed in other areas known to be used by subadult and adult life stages (FERC, 2006). Other parameters measured near the Terminal Expansion site, such as dissolved oxygen, pH, and temperature, are within normal ranges (FERC, 2006). Other water quality parameters not specifically measured, such as hardness, turbidity, or contaminants, are likely to be similar to the characteristics of much of Mississippi Sound. As stated in section 2.3.4, analysis of sediment at the proposed supply dock basin showed that either very low, or no contaminants are present in the sediments at this site. Therefore, dredging would not result in any significant adverse effects on water quality when introduced into the water column. Further, Project-related spills or leaks of hazardous materials are unlikely to occur, and should one occur, Gulf LNG would adhere to its *SPCC Plan* to minimize impacts. Other than temporary and localized increases in turbidity during construction and maintenance dredging, the Project is not expected to alter water quality characteristics of the critical habitat. In addition, Gulf LNG would implement measures in its *Gulf LNG Plan* and *Gulf LNG Procedures* during construction of the Terminal Expansion to minimize the release of heavily sediment-laden water to sensitive resource areas and to prevent the release of contaminated discharges, thereby reducing the impact of the Project on water quality. Therefore, the Project would not result in adverse impacts on this primary constituent element. Temporary turbidity-related impacts on water quality would be minimized to the extent practicable and would not be significant.

Sediment Quality

The existing surficial sediments at the Terminal Expansion site are primarily sandy with no or very low concentrations of contaminants. Analysis of sediment collected at the proposed supply dock basins revealed that the sediments are suitable for beneficial use (BU). Therefore, dredging and filling activities at the Terminal Expansion would not cause the spread of contaminated sediments.

As mentioned previously, results of the analytical and toxicity testing conducted by Gulf LNG confirmed that sediment from nine of the BCDMMS sample locations can be used for BU. According to Gulf LNG, about 10.4 acres of sediments around station 10 may have elevated contaminant levels of arsenic and cadmium (Fugro, 2007). Because these sediments would meet the permissible concentration requirements for ocean disposal, Gulf LNG proposes to blend these sediments with the other sediments removed from the BCDMMS. Gulf LNG would consult with the MDEQ and the COE prior to construction to determine if the blended sediments would be appropriate for use at the Terminal Expansion site. Any sediment not used would be transported to an approved site for upland disposal.

Project-related spill or leaks of hazardous substances would have the most potential to affect sediment quality at the Terminal Expansion site. Should an unlikely release occur, Gulf LNG would minimize impacts through the use of its *SPCC Plan*. Therefore, due to the lack of contaminated sediments at the supply docks sites, Gulf LNG's ongoing correspondence with the MDEQ regarding the quality of fill that would be placed at the wetland mitigation site, and the unlikelihood of a Project-related release of hazardous materials at the Terminal Expansion, adverse impacts on this primary constituent element are not likely to occur.

Safe and Unobstructed Migratory Pathways

The movements of any subadult or adult Gulf sturgeon through the area would not be prevented by any of the proposed in-water structures or work associated with the Project. The dredged basins of the supply docks would be short enough to prevent the creation of a false inlet which could confuse the sturgeon and result in them accidentally moving upstream into freshwater at the mouth of the Pascagoula River. Subadult and adult Gulf sturgeon overwintering in Choctawatchee Bay were generally found to occupy the sandy shoreline habitat at depths of 2 to 3 meters (NOAA, 2007). Much of the in-water portion of the Project would be in shallow water (less than 4 feet) that would not likely be used currently for migration or for foraging by adults. While construction of the supply docks could result in some minor alterations to the movement patterns of Gulf sturgeon, the supply dock pilings would not obstruct any major Gulf sturgeon migratory pathways near the Project area. Therefore, the Project would not result in a meaningful alteration of the safe and unobstructed migratory pathways primary constituent element.

Gulf Sturgeon Conclusions

Gulf LNG would minimize impacts associated with dredging and lighting to the extent practicable, and hazardous spills are not likely to occur. Further, Gulf sturgeon in the vicinity of the Project are likely acclimated with industrial conditions and would avoid the area during construction and maintenance dredging. With the exception of the proposed compensatory wetland mitigation site, constructing and operating the Project would not result in adverse impacts on the Gulf sturgeon or its designated critical habitat and these impacts would be minimal given the abundance of similar suitable habitat adjacent to the Project area. Further, given the limited abundance of forage species currently in the Project area, creation of this wetland area could minimally increase the forage species abundance for Gulf sturgeon. Therefore, we have determined that construction and operation of the Project *is not likely to adversely affect* the Gulf sturgeon or its designated critical habitat.

2.4.3.2 Smalltooth Sawfish

The smalltooth sawfish belongs to a group of fish called elasmobranchs that includes rays, skates, and sharks. Although shark-like in appearance, they are actually rays, as their gills and mouths are found on the underside of their bodies. Sawfish get their name from their distinct rostrum—a long, flat snout edged with teeth—that looks like a saw. Smalltooth sawfish live in tropical seas and estuaries (semi-enclosed areas where rivers meet the sea) of the Atlantic Ocean. They are most at home in shallow, coastal waters, and sometimes enter the lower reaches of freshwater river systems. In the United States, they can be found off the coast of Florida. Smalltooth sawfish populations have declined dramatically due to habitat loss associated with coastal development and accidental capture in fisheries (NOAA, 2018). Suitable habitat is not present within the Project area, but juveniles of this species could occur as transients. In addition, Gulf LNG would minimize impacts associated with dredging and lighting to the extent practicable, and hazardous spills are not likely to occur. Therefore, we have determined that construction and operation of the Project *is not likely to adversely affect* the smalltooth sawfish or its designated critical habitat.

2.4.3.3 Sea Turtles

Four species of federally listed threatened and endangered sea turtles (Kemp's ridley, leatherback, green, and loggerhead) possibly occur in the waters near the Terminal Expansion in Jackson County, Mississippi (FERC, 2006). An additional species, the federally endangered hawksbill sea turtle, is not likely to occur near the Terminal Expansion site but could be present along LNG shipping routes (NOAA, 1993).

The federally endangered Kemp's ridley sea turtle is the smallest of the Gulf of Mexico sea turtle species. It occurs mainly in the coastal areas of the Gulf of Mexico and the U.S. Atlantic seaboard. Nesting occurs mainly in Mexico from May to July, but Kemp's ridley sea turtles also nest in small numbers along the Gulf Coast, primarily in southern Texas. Juveniles and sub-adults occupy shallow, coastal regions and are commonly associated with crab-laden, sandy or muddy water bottoms; young turtles often float on mats of *Sargassum* sp. Kemp's ridley sea turtles feed mostly on swimming crabs, but their diet also includes fish, jellyfish, and mollusks. The primary threat to this species is capture and entanglement in fishing gear, such as shrimp trawls, gill nets, and longlines. Egg collection by humans has also historically been a threat to the population (NOAA, 2015a). Nesting areas for the Kemp's ridley sea turtle are not present in or near the Terminal Expansion site; however, they could use the waters of the Mississippi Sound in the immediate vicinity of the Project during foraging.

The federally endangered leatherback sea turtle spends most of its time in the open sea, returning to nesting beaches during the reproductive cycle. They may be present in coastal waters only when nesting or following jellyfish concentrations. They feed mainly on soft-bodied animals, such as jellyfish and salps. Leatherbacks are the most migratory and wide ranging sea turtles. They have designated critical habitat in the U.S. Virgin Islands, the U.S. west coast, and Puerto Rico. The largest nesting assemblages are found on the coasts of northern South America and West Africa (NOAA, 2015b). Suitable nesting habitat for this species is not available in the vicinity of the Project.

The green sea turtle is federally listed as threatened. Green sea turtles inhabit both open ocean zones and coastal areas. Hatchlings are thought to live in deeper, offshore areas for the first several years of their lives where they feed on pelagic plants and animals near the water's surface (NOAA, 2015c). Once juveniles reach a certain age and size, they migrate to nearshore foraging grounds, and become almost exclusively herbivorous. Green sea turtles nest on beaches. The two largest nesting populations are in Costa Rica and along the Great Barrier Reef in Australia (NOAA, 2015c). Suitable nesting habitat for this species is not available in the vicinity of the Project (NOAA, 1993).

The loggerhead sea turtle is federally listed as either threatened or endangered, depending on the distinct population segment. The greatest threats to this sea turtle include coastal development, incidental capture by commercial fisheries, illegal intentional harvest, and pollution. Loggerhead sea turtles inhabit continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. Loggerheads were named for their relatively large heads, which support powerful jaws and enable them to feed on hard-shelled prey, such as whelks and conch. Loggerhead sea turtles nest from April to September in the southeastern United States. The FWS designated about 685 miles of nesting beaches in the Atlantic and Gulf coasts, including in Mississippi, as critical habitat for the loggerhead sea turtle. The nearest critical habitat to the Terminal Expansion is about 8 miles south (NOAA, 2015d). While no suitable nesting habitat occurs in the vicinity of the Terminal Expansion, the loggerhead sea turtle is likely the most common turtle offshore of the Terminal Expansion site.

The hawksbill is a small to medium-sized sea turtle that inhabits the tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. Although it has been recorded in the coastal waters of Mississippi, it is considered rare. Nesting occurs on undisturbed, deep-sand beaches, from high-energy ocean beaches to tiny pocket beaches several meters wide bounded by crevices of cliff walls; most typically beaches used by nesting turtles are low-energy, with woody vegetation near the waterline. In the continental United States, nesting sites are restricted to Florida where nesting is sporadic (NOAA and FWS, 1993).

It is thought that weedlines in the Gulf of Mexico serve as foraging habitat for post-hatchling hawksbills, whereas juvenile and adult hawksbill sea turtles inhabit coral reefs where they feed on sponges (NOAA and FWS, 1993). Hawksbills are also known to inhabit mangrove-fringed bays and estuaries, particularly along the eastern shore of continents where coral reefs are absent. Due to the lack of suitable foraging and nesting habitats, there is a low probability of this species occurring near the onshore Project area.

Potential Sea Turtle Impacts

There is no nesting habitat for sea turtles in the vicinity of the Terminal Expansion. Although foraging and transit habitat for the Kemp's ridley sea is present, the level of industrial activity in the area makes it highly unlikely that the Kemp's ridley sea turtle would use any habitat near the Terminal Expansion. If, however, sea turtles were present, they would be sufficiently mobile to avoid the area during the driving of sheet piles and dredging.

During construction, installation of sheet piles for the supply docks and the initial and maintenance dredging of the supply dock basins would generate noise and increased turbidity. The Port of Pascagoula would also create noise and a temporary increase in turbidity during maintenance dredging of the North Supply Dock. However, the Port of Pascagoula conducts annual maintenance dredging of the nearby Bayou Casotte Navigation Channel and Gulf LNG periodically conducts maintenance dredging at the adjacent marine berth of the existing Terminal. As a result, it is likely that most aquatic species are accustomed to the level of noise generated by dredging and the temporary and minor increases in turbidity. Furthermore, according to the *Dredging and Disposal Plan*, Gulf LNG would install and maintain turbidity curtains around the dredge area to limit the transport of turbid water beyond the vicinity of the dredging operations. In addition, Gulf LNG would use a vibratory hammer during offshore pile driving and follow NMFS-recommended BMPs to reduce pile driving-related noise impacts on aquatic organisms. Impacts on aquatic species, including sea turtles, due to noise and occasional increases in turbidity during construction and operation of the Terminal Expansion would be minor due to the size of the supply docks, the short duration of construction, and the current frequency of dredging and other marine activities in the area.

Due to the lack of available habitat and avoidance of the area due to current industrial activities, sea turtles would likely continue to avoid the area near the Terminal Expansion. To minimize dredging impacts, Gulf LNG proposes to use a hydraulic dredge, which is not likely to entrain healthy sea turtles due to the noisy, slow moving nature of these types of dredges (NOAA, 2012b).

Potential impacts associated with Project lighting would be similar to those for the Gulf sturgeon. Like the Gulf sturgeon, sea turtles are likely acclimated to the current ambient light levels due to the industrial nature of Bayou Casotte and would seek nearby suitable habitat. As there is no sea turtle nesting habitat within the Project area, lighting impacts on nesting behavior would not occur.

Sea Turtle Conclusions

Gulf LNG did not observe any suitable sea turtle habitat or individuals during site surveys. In addition, foraging and transit habitats for the sea turtles are limited near the Terminal Expansion site. Construction barges and support vessels delivering equipment and materials to the site could travel through portions of the Gulf of Mexico during transit to the supply docks and could impact sea turtles. However, the barges would typically be very slow moving and easy for sea turtles to avoid. Therefore, based on the limited nesting, foraging, and transit habitat, Gulf LNG's measures to minimize impacts from dredging, lighting, pile driving, spills, and surface water runoff, and Gulf LNG's adherence to the *Strike Avoidance Plan* for construction vessels, we have determined that the Project *is not likely to adversely affect* the loggerhead, Kemp's ridley, green, leatherback, or hawksbill sea turtle species.

2.5 CONCLUSION

Twenty-two species (including 19 federally listed species and three species that have been proposed for listing) were identified as occurring or potentially occurring in the vicinity of the Project. Based on the impact avoidance, minimization, and mitigation measures detailed in this document, these species are not expected to be adversely affected by the construction or operation of the Project, because these species are either transient in nature (i.e., migratory or highly mobile over large territories); are unlikely to adversely respond to temporary and permanent impacts associated with the proposed Project and facilities; or there is a lack of suitable foraging or nesting habitat within the Project area.

In addition, we have determined that with the implementation of the FWS's and NMFS's avoidance and minimization recommendations, Gulf LNG's proposed construction procedures and mitigation measures described in its application, compliance with federal and state permit conditions, and adherence to our recommendations, the Project *is not likely to adversely affect* federally listed species. These construction procedures and mitigation measures include adhering to NMFS's and FWS's specific avoidance and minimization recommendations and complying with environmental conditions as stipulated in federal and state permits. Therefore, we conclude that requesting formal consultation with the FWS and with NMFS for this proposed Project is not required.

On November 21, 2018 we requested the FWS and the NMFS accept the BA, which was provided in the draft EIS, and concur with our determinations of effect for the Project. On February 22, 2019 the FWS agreed with our determinations of effect for those species under their jurisdiction. A response from the NMFS has not been received.

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APPENDIX C

ESSENTIAL FISH HABITAT

LIST OF TABLES

LIST OF ACRONYMS

CFR	Code of Federal Regulations
cfs	cubic feet per second
COE	Army Corps of Engineers
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
cy	cubic yards
dB	decibels
EEM	estuarine emergent
EFH	essential fish habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	*Endangered Species Act of 1973*
FERC	Federal Energy Regulatory Commission
FMP	Fishery Management Plan
GLE	Gulf LNG Energy, LLC
GLP	Gulf LNG Pipeline
GMFMC	Gulf of Mexico Fisheries Management Council
Gulf LLC	Gulf LNG Liquefaction, LLC
JCPA	Jackson County Port Authority
LNG	liquefied natural gas
MDEQ	Mississippi Department of Environmental Quality
MSA	*Magnuson-Stevens Fishery Conservation and Management Act of 1976*
msl	mean sea level
NEPA	*National Environmental Policy Act of 1969*
NGA	*Natural Gas Act of 1938*
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
Plan	*Upland Erosion Control, Revegetation, and Maintenance Plan*
Procedures	*Wetland and Waterbody Construction and Mitigation Procedures*
Project	Gulf LNG Liquefaction Project
SEL	sound exposure level
SPL	sound pressure level
SPCC Plan	*Spill Prevention, Control and Countermeasure Plan*
SWPPP	*Stormwater Pollution Prevention Plan*
USCG	U.S. Coast Guard
μPa	micropascal

1.0 INTRODUCTION

On June 19, 2015, Gulf Liquefied Natural Gas (LNG) Liquefaction Company, LLC (Gulf LLC),[1] Gulf LNG Energy, LLC (GLE), and Gulf LNG Pipeline, LLC (GLP) filed an application with the Federal Energy Regulatory Commission (Commission or FERC). Pursuant to Section 3 of the *Natural Gas Act of 1938*, as amended (NGA), Gulf LLC and GLE requested authorization to site, construct, and operate liquefaction and export facilities adjacent to and integrated with the existing GLE LNG Import Terminal (existing Terminal) in Jackson County, Mississippi. The proposed action is called the Terminal Expansion herein. The combined Gulf LLC, GLE, and GLP actions and facilities are referred to herein as the Gulf LNG Liquefaction Project (Project), and the applicants are collectively referred to as Gulf LNG. A description of the proposed action is provided in section 2.0 of the Project Environmental Impact Statement (EIS).

The *Magnuson-Stevens Fishery Conservation and Management Act of 1976*, as amended (MSA) was passed in order to promote fish conservation and management. The MSA granted the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) legislative authority for fisheries regulation within the United States' exclusive economic zone; a country's exclusive economic zone is a jurisdictional area containing all waters from 3 to 200 miles offshore, depending on specific geographical features. NMFS established eight regional fishery management councils, each responsible for the proper management and harvest of finfish and shellfish resources within their respective geographic regions. These fishery management councils have developed region-specific fisheries management plans (FMP), which outline measures to ensure the proper management and harvest of finfish and shellfish species within federal waters.

Recognizing that many marine fisheries are dependent on nearshore and estuarine environments for at least part of their life cycles, new habitat conservation provisions to the MSA (Public Law 94-265, as amended by the *Sustainable Fisheries Act of 1996* and Public Law 104-297, as amended in 1998) were added, along with other goals, to promote more effective habitat management and protection of marine fisheries. The protection of the marine environments important to marine fisheries, referred to as essential fish habitat (EFH), is required in the review of projects conducted under federal permits, licenses, or other authorities that affect or have the potential to affect such habitat. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 United States Code 1802(10)). Biological, chemical, and physical characteristics of water and substrate are used to define EFH types; these habitat characteristics are then compared to the life cycle requirements for each considered species. A proposed action that would affect one of these defining characteristics (such as water temperature or water depth) would have an impact on EFH. Section 2.0 addresses EFH types in further detail.

Federal agencies that authorize, fund, or undertake activities that may adversely impact EFH must consult with NMFS. Although absolute criteria have not been established for conducting EFH consultations, NMFS recommends for EFH consultations to be consolidated through interagency coordination for other statute requirements such as the *National Environmental Policy Act of 1969*, as amended (NEPA) and the *Endangered Species Act of 1973*, as amended (ESA), in order to reduce duplication and improve efficiency. Generally, the EFH consultation process includes the following steps:

1. **Notification** – The action agency should clearly state the process being used for EFH consultations (e.g., incorporating EFH consultation into the EIS).

[1] Gulf LNG Liquefaction Company, LLC is a Kinder Morgan operated company.

2. **EFH Assessment** – The action agency should prepare an EFH Assessment that includes both identification of affected EFH and an assessment of impacts. Specifically, the EFH should include:
   a. a description of the proposed action;
   b. an analysis of the effects (including cumulative effects) of the proposed action on EFH, the managed fish species, and major prey species;
   c. the federal agency's views regarding the effects of the action on EFH; and
   d. proposed mitigation, if applicable.
3. **EFH Conservation Recommendations** – After reviewing the EFH assessment, NMFS provides recommendations to the action agency regarding measures that can be taken by that agency to conserve EFH.
4. **Agency Response** – The action agency must respond to NMFS within 30 days of receiving the NMFS' recommendations to conserve EFH. The action agency may notify NMFS that a full response to conservation recommendations will be provided by a specified completion date agreeable to all parties. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact activity on EFH.

1.1 CONSULTATION PROCESS

For the existing Terminal (the LNG Clean Energy Project, docket numbers CP06-12 and CP06-13), the FERC staff prepared an EIS and an EFH assessment to assess the Terminal's construction and operation impacts on EFH and EFH species (FERC, 2006). As a part of those documents, the FERC staff consulted with NMFS about dredging, accidental releases of LNG, the number of LNG carriers, and potential LNG carrier transit routes (NMFS reference number F/SER/46: MT). In a January 22, 2007 letter to the FERC, NMFS concurred with our[2] determination that based on the implementation of conservation measures and the compensatory mitigation plan developed by Gulf LNG, the construction and operation of the Terminal would not have substantial adverse impacts on EFH or EFH species. Many of the potential EFH impacts from the existing Terminal, including LNG carrier transit routes, were addressed in the original 2006 assessment and are incorporated into this document by reference. This updated EFH assessment includes the discussion of ballast water discharge impacts from the LNG carriers, which were not addressed in our 2006 EFH analysis. Only impacts associated with the proposed construction and operation of the Terminal Expansion are discussed in this assessment.

The FERC staff attended conference calls with NMFS, which included input from NMFS regarding the EFH assessment for the Project, on December 10, 2014, June 29, 2015, and September 23, 2015. The FERC staff proposes to incorporate EFH consultations for the Terminal Expansion with the other interagency coordination procedures required under NEPA. As part of the consultation process, we requested the NMFS accept the EFH Assessment, which was provided in the draft EIS, and concur with our determinations of effect for the Project. On December 10, 2018 the NMFS agreed with our determination that the Project would not adversely affect EFH.

1.2 ESSENTIAL FISH HABITAT OVERVIEW

Our analysis of the effects, including cumulative effects, of the proposed action and associated mitigation on EFH, managed fish species, and major prey species, and our views regarding the effects of the proposed action on EFH are provided in the following sections.

[2] "We," "us," and "our" refer to the environmental and engineering staff of the FERC's Office of Energy Projects.

Based on our review of the Project and in consultation with NMFS, we have concluded that construction and operation of the Project could affect EFH for 16 species, including: brown shrimp (*Penaeus aztecus*), white shrimp (*Penaeus setiferus*), gray snapper (*Lutjanus synagris*), lane snapper (*Lutjanus griseus*), red drum (*Sciaenops ocellatus*), Spanish mackerel (*Scomberomorus maculatus*), Atlantic sharpnose shark (*Rhizoprionodon terraenovae*), blacknose shark (*Carcharhinus acronotus*), blacktip shark (*Carcharhinus limbatus*), bonnethead shark (*Sphyrna tiburo)*, bull shark (*Carcharhinus leucas*), finetooth shark (*Carcharhinus isodon*), giant hammerhead shark (*Sphyrna mokarran*), scalloped hammerhead shark (*Sphyrna lewini*), spinner shark (*Carcharhinus brevipinna*), and tiger shark (*Galeocerdo cuvieri*) (see table 1) (Gulf of Mexico Fisheries Management Council [GMFMC], 1998; 2004; 2005; NMFS, 2009a).

TABLE 1

Essential Fish Habitat Species Potentially Affected by the Terminal Expansion

Common Name	Scientific Name	Life Stages in Estuarine Habitat
Brown shrimp	*Penaeus aztecus*	Post-larval, early juvenile
White shrimp	*Penaeus setiferus*	Post-larval, early juvenile
Gray snapper	*Lutjanus griseus*	Adult
Lane snapper	*Lutjanus griseus*	Adult
Red drum	*Sciaenops ocellatus*	Larval, post-larval, early juvenile, adult
Spanish mackerel	*Scomberomorus maculatus*	Early juvenile, late juvenile, adult
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	Neonate, juvenile, adult
Blacknose shark	*Carcharhinus acronotus*	Adult
Blacktip shark	*Carcharhinus limbatus*	Neonate, juvenile, adult
Bonnethead shark	*Sphyrna tiburo*	Neonate, juvenile, adult
Bull shark	*Carcharhinus leucas*	Neonate, juvenile, adult
Finetooth shark	*Carcharhinus isodon*	Neonate, juvenile, adult
Great hammerhead shark	*Sphyrna mokarran*	Neonate, juvenile, adult
Scalloped hammerhead shark	*Sphyrna lewini*	Neonate, juvenile, adult
Spinner shark	*Carcharhinus brevipinna*	Juvenile
Tiger shark	*Galeocerdo cuvieri*	Juvenile

Source: GMFMC,1998; 2004; 2005; NMFS, 2009a

In addition to being designated as EFH for a variety of federally managed species, the Project area may provide nursery, foraging, and refuge habitats that support various recreationally and economically important marine fishery species such as Atlantic croaker, southern flounder, Gulf menhaden, spot, striped mullet, and blue crab. Such estuarine-dependent species serve as prey for other fisheries managed by the GMFMC and highly migratory species managed by NMFS.

2.0 ESSENTIAL FISH HABITAT

All estuarine systems of the Gulf of Mexico are considered essential habitat for fish species managed by the GMFMC (GMFMC, 1998). In 2005, the GMFMC amended seven FMPs in accordance with Subpart J of 50 Code of Federal Regulations (CFR) Part 600. The 2005 EFH Amendment defined EFH as areas of higher species density, based on the NOAA Atlas and functional relationships analysis for the following FMPs: Red Drum, Reef Fish, Coastal Migratory Pelagics, Shrimp, Stone Crab, Spiny Lobster, and Coral. In 2011, federal management of stone crab was removed (76 Federal Register 59064).

EFH is characterized as occurring within three zones: estuarine (inside barrier islands and estuaries), nearshore (60 feet or less in depth), and offshore (greater than 60 feet in depth). The GMFMC defines 12 standard habitat types underlying the estuarine water column, based on a combination of substrate and biogenic structure descriptions, which are present in the Gulf of Mexico. These 12 standard habitat types include: submerged aquatic vegetation (e.g., seagrasses, benthic algae), mangroves, drifting algae, emergent marshes (e.g., tidal wetlands, salt marshes, tidal creeks, rivers/streams), sand/shell bottoms, soft bottoms (e.g., mud, clay bottoms, silt), hard bottoms (e.g., live hard bottoms, low-relief irregular bottoms, high-relief irregular bottoms), oyster reefs, banks/shoals, reefs (e.g., reef halos, patch reefs, deep reefs), shelf edge/slope, and pelagic (GMFMC, 2004).

All impacts associated with the Terminal Expansion are located within the estuarine zone of the Mississippi Sound. The EFH that may be affected by the proposed Terminal Expansion includes estuarine water column, soft bottom sediment (i.e., estuarine benthic habitat), and emergent marsh (i.e., estuarine emergent [EEM] wetlands) (see table 2). Estuarine water column habitat serves as EFH for several species and their prey at various life stages by providing habitat for spawning, breeding, and foraging. Fish communities within the water column are determined by factors such as salinity, temperature, dissolved oxygen, and turbidity. The affected estuarine benthic habitat consists of subtidal unconsolidated, mixed sediments devoid of submerged aquatic vegetation or oyster reefs. This EFH type serves as important nursery and feeding areas for many fish and invertebrates, including bottom-dwelling (demersal) fish that prey upon aquatic species living on and in the sediments. Abutting emergent marsh provides important nursery and feeding areas and a source of protection from predation for many fish and invertebrate species.

TABLE 2

Essential Fish Habitat Present in Mississippi Sound

Habitat Type	Species	Life Stage
Estuarine Soft Bottom		
	Brown shrimp	Post-larval, early juvenile
	White shrimp	Post-larval, early juvenile
	Gray snapper	Adult
	Lane snapper	Early juvenile, late juvenile
	Red drum	Larval, post-larval, early juvenile, adult
Estuarine Emergent Marsh		
	Brown shrimp	Post-larval, early juvenile
	White shrimp	Post-larval, early juvenile
	Red drum	Larval, post-larval, early juvenile, adult
Estuarine Water Column		
	Spanish mackerel	Early juvenile, late juvenile, adult
Estuarine a/		
	Atlantic sharpnose shark	Neonate, juvenile, adult
	Blacknose shark	Adult
	Blacktip shark	Adult
	Bonnethead shark	Neonate, juvenile, adult
	Bull shark	Neonate, juvenile, adult
	Finetooth shark	Neonate, juvenile, adult
	Great hammerhead shark	Neonate, juvenile, adult
	Scalloped hammerhead shark	Neonate, juvenile, adult
	Spinner shark	Juvenile
	Tiger shark	Juvenile

Sources: GMFMC, 2004; NMFS, 2006

a Information regarding specific estuarine habitats utilized by highly migratory species (sharks) is not provided by the GMFMC; therefore, the habitat type is not further refined.

3.0 FEDERALLY MANAGED SPECIES WITH ESSENTIAL FISH HABITAT IN THE PROJECT AREA

A detailed description of the life history characteristics and habitat preferences of each federally managed species in the Project area is provided below and is based primarily on the research referenced in Gulf LNG's application to the FERC, both Gulf LNG's and our consultation with NMFS, and a review of the applicable FMPs. Unless otherwise noted, the specific sources of information are provided in the citations at the end of each subsection.

3.1 SHRIMP FISHERY OF THE GULF OF MEXICO

Shrimp species within the Gulf of Mexico use a variety of habitats including estuarine and open ocean habitats as they grow from planktonic larvae to spawning adults. Larvae are primarily found in the open ocean. As larvae progress into the post-larval life stage, they begin to move into the benthic estuarine habitats. Adult habitat use varies between species and season but typically ranges from nearshore to offshore (GMFMC, 1981).

3.1.1 Brown Shrimp

Brown shrimp eggs and larvae inhabit offshore marine environments where spawning takes place. The eggs remain on the bottom (demersal) but larvae are present in the water column (planktonic). Brown shrimp begin to migrate to estuarine habitats as post-larvae, migrating on flood tides at night from February through April. The juvenile stage occurs within estuarine habitats, and post-larval and juvenile brown shrimp are common to highly abundant in all Gulf of Mexico estuaries from Apalachicola Bay in Florida to the Mexican border, although they are generally not present between December and February. They are typically associated with shallow vegetated habitats, silty sand, and non-vegetated mud bottom but densities are highest in marsh edge habitat and submerged vegetation. At maturity, the juveniles migrate back to ocean waters. Larval brown shrimp feed on phytoplankton and zooplankton; post-larvae feed on epiphytes (plants growing on other plants), phytoplankton, and detritus; juveniles and adults prey on polychaete worms, amphipods, chironomid larvae, algae, and detritus (GMFMC, 1998).

3.1.2 White Shrimp

White shrimp eggs and larvae inhabit nearshore marine waters. The eggs are demersal and the larvae are planktonic. Post-larvae migrate into estuarine habitats from May through November, with peaks occurring from June through September. After entering the estuaries, post-larval white shrimp become benthic and are generally present year-round in shallow water estuarine habitats on muddy-sandy substrates with high organic detritus content or in estuarine marsh habitats. Densities of post-larval and juvenile white shrimp are usually highest in marsh edge and submerged aquatic vegetation habitats. Juveniles are common to highly abundant in all Gulf of Mexico estuaries from the Suwannee River in Florida to Texas. When they reach maturity, they migrate from estuarine habitats back to marine habitats in late August and September. Larval white shrimp feed on phytoplankton and zooplankton, post-larvae feed on epiphytes, phytoplankton, and detritus, and juveniles and adults prey on polychaetes, amphipods, chironomid larvae, algae, and detritus (GMFMC, 1998).

3.2 REEF FISHERY OF THE GULF OF MEXICO

Throughout all life stages, estuarine-dependent and nearshore reef fish and snapper-grouper species are found inshore of the 100-foot contour in habitats such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (salt marshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial and coral reefs; and live/hard bottom. Snappers are common in all warm marine waters. Although most are inshore dwellers, some occur in open-water. Some species enter estuaries and mangroves, with the latter functioning as nursery grounds (GMFMC, 2004).

3.2.1 Gray Snapper

Gray snapper are considered to be one of the most abundant inshore snappers. They occur in marine, estuarine, and riverine habitats and are present within areas from about 20 miles offshore to inshore coastal plain freshwater creeks and rivers. Eggs and larvae are planktonic and occur primarily in offshore shelf waters. Post-larvae move into estuarine habitat and are often present over dense beds of submerged aquatic vegetation. Juveniles are present in estuaries, channels, bayous, ponds, submerged aquatic vegetation beds, marshes, mangrove swamps, and freshwater creeks. Adults are demersal and mid-water dwellers and may be present in mangroves, sandy beds of submerged aquatic vegetation, and coral reefs, or over sandy, muddy, or rocky bottoms. Juvenile gray snapper feed on estuarine-dependent prey, such as small shrimp, copepods, amphipods, and larval fish. Adults feed primarily on fish and secondarily on crustaceans (GMFMC, 1998).

3.2.2 Lane Snapper

Lane snapper occur throughout the shelf areas of the Gulf of Mexico from shallow waters to depths of about 400 feet. Lane snapper are demersal fish. Adults occur offshore over sandy bottoms, natural channels, banks, and reef structures. Juveniles off of the Gulf States use shallow, sandy, or muddy bottoms as nurseries. Habitat preferences of larvae and post-larvae are not well known. Lane snapper spawn from March to September throughout their range, with peak spawning occurring in July and August. Both sexes are able to spawn after the first year. Lane snapper are opportunistic predators feeding on a variety of prey such as small bottom fishes as well as shrimp, crabs, and cephalopods (Florida Museum, 2015; GMFMC, 1998).

3.3 RED DRUM FISHERY OF THE GULF OF MEXICO

3.3.1 Red Drum

Red drum occur in a variety of habitats in the Gulf of Mexico, ranging from water depths of about 130 feet offshore to very shallow estuarine waters. Red drum can tolerate salinities ranging from freshwater to highly saline water. They commonly occur in nearly all estuaries of the Gulf of Mexico year-round where they are present over a variety of substrates, including sand, mud, and oyster reefs. Estuarine wetlands are especially important as nursery habitat for larval, juvenile, and sub-adult red drum, and are also important habitat for the prey species of all life stages. Larval and post-larval red drum prey on mysids, amphipods, and shrimp. As they develop into juveniles their diet shifts to primarily crabs and fish. Crustaceans, including shrimp and crab, and fish are the most important prey items in the adult red drum diet (GMFMC, 1998).

3.4 COASTAL MIGRATORY PELAGIC SPECIES OF THE GULF OF MEXICO

Generally, the coastal migratory pelagic species are commonly distributed throughout the Gulf of Mexico from estuaries to marine waters. The distribution of these species is dictated by water temperature and salinity. The coastal migratory pelagic species infrequently occur in water less than 20 degrees Celsius and generally prefer high salinities. However, Spanish mackerels tolerate brackish waters and may often inhabit estuaries as nursery habitat (GMFMC, 1998).

3.4.1 Spanish Mackerel

The Spanish mackerel is a coastal migratory pelagic species that occurs over depths to 246 feet in the coastal zone of the Gulf of Mexico. Adults of this species are usually present in coastal waters out to the edge of the continental shelf. Adults inhabit higher salinity estuarine areas during seasonal migration, but are considered rare and infrequent in some Gulf of Mexico estuaries. Spawning grounds are offshore where spawning takes place from May to October. Nursery areas have been reported in estuaries and coastal waters year-round. Larvae most frequently occur offshore over the inner continental shelf in water depths from 30 to about 275 feet, but are most common in depths of less than 165 feet. Juveniles are present offshore, in beach surf, and also in estuaries, sounds, and marshes. However, they are generally not considered estuarine dependent. Most juveniles occur in waters ranging in depth from about 30 to 60 feet. Though occurring in waters of varying salinity, the juveniles appear to prefer marine salinity (GMFMC, 1998).

3.5 ATLANTIC HIGHLY MIGRATORY SPECIES IN THE GULF OF MEXICO

Highly migratory species may utilize a variety of coastal and ocean habitats. Sharks are the only highly migratory species pertinent to the Project. Shark habitat can be described in four broad categories: coastal, pelagic, coastal-pelagic, and deep-dwelling. Coastal species inhabit estuaries, nearshore areas, the continental shelf, and the continental slope. Atlantic sharpnose, blacknose, blacktip, bonnethead, bull, finetooth, great and scalloped hammerheads, spinner, and tiger sharks are all considered coastal species. Adult sharks are broadly distributed as adults, but often utilize estuaries as pupping and nursery areas during pupping season and through their neonate and young-of-year life stages (NMFS, 2009a; 1999).

3.5.1 Atlantic Sharpnose Shark

EFH for the adult stage of the Atlantic sharpnose shark is identified as waters less than 164 feet in depth from Mississippi Sound to Galveston and Laguna Madre, Texas (NMFS, 1999; 2002). The Atlantic sharpnose shark is a small coastal species that is a common year-round resident in the Gulf of Mexico. They are highly abundant in depths of less than 30 feet from spring through the fall. Juvenile and adult sharpnose sharks migrate to coastal waters beginning in April, with neonate sharks following in June. All life stages of the sharpnose shark generally remain inshore throughout the summer before emigrating offshore in the fall. Sharpnose sharks prey on a mix of rayed-fishes and invertebrates as juveniles and primarily rayed-fishes as adults (Carlson and Brusher, 1999; Carlson 2002; Bethea et al., 2006; Drymon et al., 2010, 2011).

3.5.2 Blacknose Shark

The EFH for blacknose shark is identified as shallow coastal waters, bays and estuaries (NMFS, 2009a). The blacknose shark is an inshore species that occurs primarily over sandy and coral bottoms in coastal tropical and warm temperate waters. Juveniles typically occur in shallow waters and adults in deeper waters, to depths of about 30 feet. Blacknose sharks are thought to breed annually in late spring to early summer in the Gulf of Mexico. Their prey consists of small bony fishes such as pinfish, croakers, and anchovies, as well as octopuses (Florida Museum, 2015).

3.5.3 Blacktip Shark

The EFH for blacktip shark is identified as waters shallower than 82 feet from the Florida Keys to Cedar Key, Florida and Cape San Blas, Florida to the Mississippi River delta, and from Galveston, Texas to Mexico (NMFS, 1999; 2002). Blacktip sharks are present in shallow coastal waters and in the offshore surface waters of continental shelves. Young-of-year and juvenile blacktip sharks have been captured in large numbers throughout Mississippi Sound and in Mobile Bay at depths less than 30 feet and salinities between 18 and 20 parts per thousand (Benson, 1982; NMFS, 1999; Parsons and Hoffmayer, 2007). Pupping occurs in the estuarine waters of shallow bay systems of the Gulf of Mexico throughout the spring and summer. Neonate blacktip sharks use estuarine waters as nurseries throughout the summer and fall and then migrate to deeper waters along with juveniles and adults as water temperatures decrease in the fall (NMFS, 2009a). Blacktip sharks primarily feed on fishes as well as rays, squid, shrimp and crabs (Florida Museum, 2015).

3.5.4 Bonnethead Shark

The EFH for bonnethead shark is identified as shallow coastal waters, inlets, and estuaries in the Gulf of Mexico (NMFS, 2009a). The bonnethead shark is a small hammerhead shark found in coastal waters at depths less than 82 feet between Mobile Bay, Alabama and San Padre Island, Texas. It may occur near inlets and estuaries, and often over sandy or muddy bottoms (Castro, 1983; NMFS, 1999; 2002).

Bonnethead sharks feed primarily on benthic crustaceans and molluscs, often within seagrass beds (NMFS, 2009b; Bethea et al., 2007).

3.5.5 Bull Shark

The EFH for bull shark is identified as shallow coastal waters, inlets, and estuaries in waters less than about 75 feet deep (NMFS, 2009a). The bull shark is managed under the Large Coastal Shark Management Unit through the Final Atlantic Consolidated FMP for Highly Migratory Species (NMFS, 2006). Bull sharks are a circumglobal species and in the Atlantic are distributed from Massachusetts to Florida, including the Gulf of Mexico. This shallow water species is common in both tropical and subtropical regions and in marine, estuarine, and freshwater habitats and can journey long distances up large rivers (NMFS, 1999). The bull shark typically occupies shallow coastal waters less than 90 feet deep and is generally demersal (Compagno, 1984). Bull shark nurseries have been recorded in low salinity estuaries extending from North Carolina to the Gulf of Mexico (McCandless et al., 2002). Mating occurs in late spring or early summer (June or July), with birth to live young occurring in estuaries and river mouths the following year, from April to June (Compagno, 1984; Castro, 1983). Bull sharks are opportunistic feeders that prey on a wide variety of bony fishes, shark species, and invertebrates. Additionally, stomach contents have revealed that this species also consumes sea turtles, sea birds, and marine mammals (Compagno, 1984).

3.5.6 Finetooth Shark

The EFH for finetooth shark is identified as shallow coastal areas such as bays and estuaries, out to depths of about 75 feet (NMFS, 2009a). They are managed under the Small Coastal Shark Management Unit through the Final Consolidated Atlantic Highly Migratory Species FMP (NMFS, 2006). In the Atlantic, the finetooth shark is distributed from North Carolina to Cuba and southern Brazil, including the Gulf of Mexico (Compagno, 1984). Little is known about habitat associations of this species. Finetooth sharks form large schools and are located in waters close to shore to depths of 10 meters (Compagno, 1984). Finetooth shark estuarine nursery areas have been documented from South Carolina to the Gulf of Mexico (Castro, 1993; McCandless et al., 2002). Finetooth sharks give birth to live young from May to June. This species feeds on bony fishes, crustaceans, and cephalopods (Compagno, 1984; Florida Museum, 2015).

3.5.7 Great Hammerhead Shark

EFH for the great hammerhead shark is identified as scattered coastal areas in the Gulf of Mexico from Alabama to Texas. Great hammerhead sharks are large, coastal, and semi-oceanic species that occur in coastal warm temperate and tropical waters, including the Gulf of Mexico. They may be found in shallow coastal areas such as over continental shelves and in lagoons but migrate seasonally to cooler waters during summer months. They give birth to live young during the spring and summer months. Great hammerheads have a varied diet, preying on bony fishes such as groupers, jacks, and flatfishes, other sharks, and invertebrates such as crabs, squid, and octopuses (NMFS, 2009a; Florida Museum, 2015).

3.5.8 Scalloped Hammerhead Shark

EFH for the scalloped hammerhead shark is identified as occurring off of Mississippi and Alabama from the shoreline to a depth of about 164 feet (NMFS, 1999; 2002). Scalloped hammerhead sharks are reported to enter enclosed bays and estuaries and are dependent upon coastal nursery habitats, where females give birth to live young during summers and neonates and juveniles may reside for extended periods (NMFS, 1999; 2002; Parsons and Hoffmayer, 2007; Duncan and Holland, 2006). Scalloped hammerhead sharks feed primarily on fish, including herring, mackerel, and anchovies, as well as invertebrates such as shrimp, crab, and squid (Florida Museum, 2015).

3.5.9 Spinner Shark

EFH for the spinner shark is identified as shallow coastal waters to a depth of about 600 feet. The spinner shark is a coastal-pelagic, warm-temperature and tropical species found inshore and over the continental shelf to depths upwards of 300 feet. They are considered highly migratory, moving inshore during the spring and summer to reproduce and feed. Spinner sharks bear live young at inshore locations. After birth, the pups move to shallow estuarine waters to gain protection from predators and find readily available prey. Spinner sharks feed primarily on pelagic bony fish, including herring, anchovies, mullet, bluefish, and tunas, as well as squid and octopuses (Compagno, 1984; Florida Museum, 2015).

3.5.10 Tiger Shark

EFH for the juvenile stage of the tiger shark is identified as waters shallower than 328 feet from Mississippi Sound to the Florida Keys (NMFS, 1999; 2002). Tiger sharks inhabit warm waters in deep oceanic and shallow coastal areas and the young are born in late May and early June in shallow coastal bay systems in the Gulf of Mexico (Florida Museum, 2015). Juvenile tiger sharks are considered to be nocturnal feeders, foraging for bony fishes and squid among benthic substrates (Lowe et al., 1996).

4.0 POTENTIAL EFFECTS ON ESSENTIAL FISH HABITAT

Gulf LNG would conduct the majority of the construction activities for the Terminal Expansion on land as discussed in section 2.3 of the EIS. With implementation of *Gulf LNG's Plan* and *Gulf LNG Procedures*[3] and Gulf LNG's updated *Spill Prevention, Control and Countermeasure Plan* (*SPCC Plan*), we conclude the potential for land-based activities to affect EFH or EFH species would be negligible; therefore, this EFH assessment primarily focuses on activities associated with the construction and operation of the North and South Supply Docks, filling of tidal marsh, dredging the wetland mitigation site barge access channel, and burying of soft bottom sediment for establishment of the compensatory wetland mitigation site. Section 4.6.2.1 of the EIS discusses the impacts associated with these activities.

During construction of the supply docks, Gulf LNG would install all sheet piling and bulkhead backfill from shore. Barges would be moored to the supply docks using lines or wires secured to bollards built into the supply dock structures; therefore, no mooring dolphins or other types of piling would be installed at the site. After installation of the piles, Gulf LNG would dredge the basins adjacent to the supply docks to a depth of 12 feet below mean sea level (msl). Dredging would remove about 100,000 cubic yards (cy) of sediment from 9.1 acres at the North Supply Dock and about 100,000 cy of sediment from 6.4 acres at the South Supply Dock. Gulf LNG would also permanently impact about 27.8 acres of EEM wetlands to accommodate construction staging areas, including heavy haul roads adjacent to the North and South Supply Docks, a new control and administrative building near the North Supply Dock, new Terminal Expansion facilities near the South Supply Dock, and the establishment of the flare exclusion zone.

Upon completion of construction of the Terminal Expansion, Gulf LNG would completely remove the South Supply Dock and restore the adjacent shoreline to pre-construction conditions. Gulf LNG would transfer ownership of the North Supply Dock to the Jackson County Port Authority (JCPA); the dock would remain part of the Project and used occasionally for delivery of materials, supplies, and equipment during operation. Gulf LNG estimates, based on similar sediment deposition rates for the existing LNG carrier berth, that about 10,000 cy of sediment would accumulate in each basin annually. Gulf LNG would conduct maintenance dredging of the supply docks on an as-needed basis, which is anticipated to be about every 3

[3] Gulf LNG would implement the measures and procedures identified in the 2013 FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures).

years. Upon completion of construction, Gulf LNG would discontinue maintenance dredging at the South Supply Dock and allow the area to return to its natural bathymetric state. The JCPA, which conducts maintenance dredging at the existing marine berth, would assume responsibility for maintenance dredging of the North Supply Dock.[4]

As mitigation for the permanent impacts on wetlands at the Terminal Expansion, Gulf LNG would build a 50-acre coastal marsh site adjacent to the existing U.S. Army Corps of Engineers (COE)-created wetland mitigation site located along the southern edge of the Terminal Expansion property. An about 50-acre area would be enclosed, armored with riprap, filled with sediments from the COE Tombigbee Project (323,000 cy), and planted with native EEM wetland vegetation, primarily smooth cordgrass and black needlerush. The resulting site would consist of an intertidal vegetation complex of high and low marsh vegetation and tidal channels open to the Mississippi Sound through passive tidal inlets in the site's perimeter berm.

In order to construct the wetland mitigation site, Gulf LNG would dredge a channel beginning at the South Supply Dock and extending around the perimeter of the proposed wetland mitigation site to an approximate depth of 8 to 10 feet below msl. Sediment dredged from the barge access channel would total about 200,000 cy and would take about 100 days to complete. The dredged access channel would comprise the footprint of the perimeter berm. Barges would use the dredged channel to access the wetland mitigation site to deliver rock for the containment berm proposed for its perimeter. Gulf LNG would store the dredged sediment from the channel in the proposed mitigation site and then replace it in the dredged channel as the perimeter berm was constructed (i.e., the channel would be filled and rock would be placed over the just-filled portion of the channel).

Construction and operation of the Project have the potential to cause alteration and degradation of EFH. Potential effects on EFH would primarily consist of increased turbidity, decreased water quality, and increased sediment disturbance, suspension, and deposition (in the form of fill) in the area. The primary actions that may cause this include dredging, pile driving, and the filling of emergent marsh (GMFMC, 1998). Other Project-related activities with the potential to affect EFH include exacerbation of shoreline erosion due to construction vessel wakes and increased noise from vessels; increased lighting at the work dock area; discharge of hydrostatic test water into the waters adjacent to the existing marine berth; accidental release of petroleum products during construction; runoff from the Terminal Expansion site; and discharge of ballast water by LNG carriers during operation of the Terminal Expansion (GMFMC, 1998). The potential effects of all of these activities on EFH or EFH species are discussed below.

4.1 DREDGING

Gulf LNG would use either a hydraulic or clamshell dredge to remove sediment from the supply dock basins and wetland mitigation site barge access channel. Dredging would temporarily increase suspended sediment and turbidity in the water column, which would result in a temporary lowering of the water quality within a localized area surrounding dredging activities. Increases in turbidity can adversely affect fish physiology and behavior, resulting in less healthy individuals, reductions in fertility, and reduced foraging. However, turbidity levels are not expected to rise substantially above ambient conditions or exceed Mississippi Department of Environmental Quality (MDEQ) limits relative to ambient conditions. The COE (2014) reported that turbidity levels associated with dredging conducted during the construction of the berthing slip for the existing Terminal and other historical dredging operations in Mississippi Sound did not exceed MDEQ limits. Further, the COE (2014) reported that the effects of temporarily increased levels of suspended sediments due to dredging would be comparable to the common passage of a storm front with high winds and heavy wave action. The COE (2014) also reported that increased turbidity is typically confined to the time during dredging and about 2 to 3 hours after dredging ceases; after that time

[4] See attachment No. 8 of accession number 20170929-5228.

period, suspended solids settle to background levels and the water column habitat is would be expected to revert to normal conditions. Gulf LNG filed a draft *Dredging and Disposal Plan* with the Commission on August 29, 2018[5] in which Gulf LNG states it would install and maintain turbidity curtains around the area being excavated to limit the transport of turbid water beyond the vicinity of the dredging operations. Additionally, the *Dredging and Disposal Plan* notes that Gulf LNG would monitor dredging-induced turbidity in accordance with any MDEQ Section 401 permit requirements and report any turbidity levels that exceed limits provided in the permit. Therefore, we conclude the increase in turbidity due to dredging of the supply docks would be minor, temporary, and localized to the area immediately surrounding the supply docks and the wetland mitigation site barge access channel.

One or more life stages of any of the 16 managed EFH species may be present during the period of active dredging. However, a most of these species are mobile enough to avoid the dredging activities, dredging would be of limited duration (less than 6 months), and Gulf LNG would consult with NMFS to determine the most appropriate times of year for dredging at the supply docks to minimize impacts on EFH. Based on those measures and the ambient conditions of marine waters in the area to be dredged, we conclude that the impacts of dredging on EFH or EFH species in the water column would be temporary and minor.

Dredging of the supply dock basins and the wetland mitigation site barge access channel may also affect EFH or EFH species through removal of the upper portion of estuarine benthic habitat. After completion of dredging, the direct mortality of the benthic community in the dredged area would result in reduced species richness, species abundance, and biomass in the area. This would reduce the amount of prey available for EFH species within the area of the supply docks and the wetland mitigation site barge access channel. However, polychaetes, oligochaetes, and other similar species would rapidly recolonize the disturbed areas after completion of dredging, as these species take advantage of unoccupied space in newly exposed sediments through natural processes and rapid population growth (MMS, 2004). We anticipate that, based on published data, both the initial dredging and the maintenance dredging for the supply docks and the one time dredging for the wetland mitigation site barge access channel would result in temporary to short-term impacts on the benthic community and that the EFH species could forage in other nearby EFH areas and return to the supply dock areas after repopulation of the prey base. As a result, the impacts on EFH species would be minor, localized, and temporary.

Dredging would also result in an increase in underwater noise. Depending on the type of dredge chosen by Gulf LNG, sound frequency and intensity associated with this activity could cause a change in aquatic species behavior in proximity to each supply dock or could cause species to avoid the area. Underwater noise levels are commonly referred to as a ratio of the underwater sound pressure to a common reference (i.e., decibels [dB] re: 1 micropascal [μPa]). There are insufficient peer-reviewed reliable data available for determining the noise level that would trigger the onset of behavior disturbance in fish; however, as a conservative measure, NMFS generally uses 150 dB re: μPa as the threshold for behavior effects on fish species of particular concern, citing that noise levels in excess of 150 dB re: 1 μPa can cause temporary behavior changes (startle and stress) that could decrease a fish's ability to avoid predators. The current interim thresholds protective of injury to fish are 206 dB re: 1 μPa (peak) and 187 dB re: 1 μPa (cumulative) sound exposure levels for fish 2 grams or greater, and 183 dB re: 1 μPa (cumulative) sound exposure level for fish of less than 2 grams.

Peak noise levels underwater using a hydraulic dredge would be expected to be between 172 and 185 dB re: 1 μPa at 1 meter and would attenuate rapidly with distance (CEDA, 2011). Although noise levels would be above the threshold for changes in fish behavior, these levels would not exceed the threshold for injury or mortality in species. EFH species behavior may be affected, but these species would likely move out of the area temporarily during construction and return once underwater noise-generating

[5] See attachment No. 3 of accession number 20180829-5060.

activities cease. Underwater noise levels associated with a clamshell dredge would be much lower. The COE notes noise associated with clamshell dredging operations is likely significantly less than 120 re: 1 μPa (COE, 2015). In addition, aquatic resources within the Project area are likely accustomed to regular fluctuations in noise from nearby industrial activity and maintenance dredging. Under these considerations, we conclude that adverse impacts on EFH species due to dredging noise would be minor, localized, and temporary.

4.2 PILE DRIVING

Pile driving to install sheet piles at the North and South Supply Docks would cause rapid concussive noise and generate underwater sound pressure waves that could adversely affect nearby EFH species and prey. A vibratory hammer would be used to install the sheet pile. Gulf LNG estimates that installation of the sheet piling for both of the supply docks would require a total of 60 10-hour construction days. This estimate assumes each section of sheet piling would require about 45 minutes to drive into place and that 8 sections would be installed per day. This would result in about 6 hours of vibratory pile driving occurring throughout each 10-hour working day.

Recent studies used by NMFS to create effects analyses of pile driving noise on fishes suggest a vibratory hammer would typically be expected to produce peak sound pressure levels (SPL) of 175 dB re: 1 μPa and cumulative sound exposure levels (SEL) of 160 dB re: 1 μPa^2-s (Buehler et. al., 2015). According to Gulf LNG, proofing of the sheet pile using an impact hammer would not be necessary. The Southeast Regional Office of NMFS generally uses 150 dB re: 1 μPa as the threshold for behavioral effects on fish species of particular concern and the current interim thresholds protective of injury to fish are a peak SPL of 206 dB re: 1 μPa and cumulative SELs resulting from a vibratory hammer of 234 dB re: 1 μPa^2-s for fish 102 grams or greater and 191 dB re: 1 μPa^2-s for fish of less than 102 grams (NMFS, 2018). Calculations using the NMFS worksheet for analyzing the effects of pile driving on aquatic species indicate noise from the vibratory hammers would diminish to less than 150 dB re: 1 μPa within 330 feet of the location of the pile driver. Calculations further indicate that cumulative SEL would diminish to less than 234 dB re: 1 μPa2-s within 1 foot and less than 191 dB re: 1 μPa2-s within 330 feet of the location of the pile driver (NMFS, 2018). In summary, vibratory pile driving noise would be unlikely to cause injury or behavioral changes to aquatic organisms beyond 330 feet from the location of the pile driver. Additionally, Gulf LNG would follow NMFS-recommended BMPs to reduce pile driving-related noise impacts on aquatic organisms, including the following:

- employ a soft-start technique, wherein pile driving begins with low-impact hammering to produce noise levels above 150 dB re: 1 μPa but below the injury thresholds to drive mobile aquatic organisms away from the area; and
- conduct in-water acoustic noise monitoring to confirm that the noise impact zone where pile driving noise would result in injury to aquatic resources would not extend beyond 330 feet from the pile driving location.

Gulf LNG also noted in its *Sheet Pile Driving Mitigation Plan* that if results from the in-water acoustic monitoring indicate a larger noise impact zone that expected, Gulf LNG would implement steps to reduce noise levels such as reducing the vibratory hammer energy levels.[6] These practices would reduce the likelihood aquatic species would be exposed to injury-causing sound levels (Savery and Associates, 2010). Upon completion of the sound-causing activities, individuals would no longer avoid the area and would likely return. Therefore, we conclude that adverse impacts on EFH species due to pile driving would be temporary, localized, and minor.

[6] See attachment 17 of accession number 20190219-5042.

4.3 FILL OF EMERGENT MARSH

The Terminal Expansion would permanently impact intertidal vegetated habitat through the fill of about 24.7 acres of EEM wetlands and the inclusion of 3.1 acres of EEM wetlands within the flare exclusion zone. EFH species may be present in the vegetation and tidal channels of the wetlands, some of which may also serve as prey for other EFH species. Tidal wetlands also provide foraging and nursery habitat for ecologically and economically important fisheries species such as the blue crab and Gulf menhaden. We do not anticipate substantial adverse impacts on the EFH species at the population level given the presence of unaffected tidal wetlands in the vicinity of the Terminal Expansion, including between the existing marine berth and the North Supply Dock and as part of the Grand Bay National Estuarine Research Reserve immediately to the east. In addition, completion of the compensatory wetland mitigation site adjacent to the Terminal Expansion site would offset the loss of wetland function caused by the filling of the tidal marsh. As a result, we anticipate that impacts on intertidal vegetative EFH would be short- to long-term and minor.

Construction of the wetland mitigation site would result in the permanent loss of about 50 acres of soft bottom sediment EFH. It is likely benthic fauna such as polychaetes and oligochaetes would be buried during construction, resulting in a loss of prey available for EFH species in the vicinity of the mitigation site. However, we do not anticipate substantial adverse impacts on the EFH species at the population level given the abundance of soft bottom habitat east and west of the mitigation site. In addition to prey species, one or more life stages of any of the 16 managed EFH species may be present during the period of construction when the habitat would be filled. However most of these species are mobile enough to avoid the construction activities. As a result, we do not anticipate substantial adverse impacts on EFH species. Additionally, the mitigation site itself is intended in part to compensate for any impacts on EFH and EFH species that may result as part of its creation.

4.4 VESSEL TRAFFIC

The increase in barge and barge-support vessel traffic at and near the supply docks during construction would result in a short-term increase in vessel traffic and noise in the area. During operation, barges and their support vessels would only deliver supplies when necessary or to facilitate maintenance dredging at the supply docks. Barge movements and the movements of support vessels and other supply vessels are not expected to substantially increase shoreline erosion, benthic sediment disturbance, or prop scarring in the immediate area, primarily because the vessels are slow moving and do not create substantial wakes. Some benthic sediment disturbance could occur when the barges are offloading at the supply docks; however, the major increase in barge traffic would be short-term. Underwater noise generated by large vessels calling on the supply docks is estimated to be between 180 and 190 dB re: 1 μPa at 1 meter and would attenuate rapidly with distance (CEDA, 2011). Noise would be greatest during vessel transport to the supply docks. However, noise would attenuate at a faster rate during vessel movement, and aquatic species would be subjected to the noise for only a short period of time as the vessels pass. Vessels moored at the docks would produce noise during engine start-up and if idling. Idling noise would be lower as the propeller would not be in use. Noise levels of vessels calling on the supply docks would be similar to the noise currently generated by vessels transiting Bayou Casotte. Based on these considerations, we conclude there would be no substantial adverse impacts of increased noise on EFH and EFH species, given that barge and support vessel traffic would be consistent with current vessel traffic noise occurring in proximity to the Terminal Expansion.

4.5 INCREASED LIGHTING

During construction and operation of the supply docks, lighting would be installed to illuminate work areas and for the safety of workers. Gulf LNG would direct lighting at the supply docks on the construction activity being conducted and the general safety lighting would consist of downlighting to minimize impacts on aquatic species. Artificial lighting over coastal waters has been shown to attract both juvenile fishes and larger predators (Keenan et al., 2007; Becker et al., 2013). Illumination of waters adjacent to the supply docks may be detrimental to juvenile fishes that may otherwise be able to avoid predation under natural circumstances. However, aquatic species in the area are likely acclimated to the current ambient light from the existing Terminal, including lighting on the existing marine berth, and the industrial nature of Bayou Casotte. Therefore, adverse impacts on EFH species due to nighttime lighting would not be substantial. Although certain EFH species could be drawn to light that shines on waters outside the work areas and may be subject to increased predation, we conclude that there would not be substantial adverse impacts at the population level.

4.6 STORMWATER RUNOFF

Hydrostatic testing of the Terminal Expansion facilities would use water withdrawn from the Port of Pascagoula's Industrial Water Supply and not directly from Bayou Casotte; therefore, no impacts on EFH would result from water intake for this purpose. Discharge of the freshwater hydrostatic test water could cause minor localized turbidity and changes in salinity and temperature at the end of the outfall pipe. Gulf LNG would not add any chemicals or biocides to the test water and would conduct discharges in accordance with its National Pollutant Discharge Elimination System (NPDES) permit (MSG13). As a result, we do not anticipate that there would be any substantial adverse impacts on EFH or EFH species due to these discharges. Section 4.3.2 of the EIS provides additional information on hydrostatic testing for the proposed Terminal Expansion.

Gulf LNG would implement the revised *SPCC Plan* and its *Gulf LNG Plan* and *Gulf LNG Procedures* to minimize the potential for petroleum or hazardous materials spills from land equipment or vessels berthed at the supply docks during construction and operation and to avoid or minimize impacts if a spill were to occur. Implementation of these procedures would minimize response time and ensure appropriate cleanup actions are taken in the event of a spill. Therefore, we conclude there would not likely be a substantial adverse impact on EFH or EFH species as a result.

During operation, the conversion of land to impervious surface areas at the Terminal Expansion site would result in an increased volume of stormwater runoff. Stormwater runoff from the Terminal Expansion would be discharged through the existing stormwater outfall and two new outfalls that would be installed in the vicinity of the existing outfall. The stormwater would be discharged into Bayou Casotte. Stormwater runoff from areas with a likelihood of oil contamination would be curbed or diked and the runoff treated through an oil-water separator prior to discharge. As required by the existing NPDES permit, stormwater would be observed and tested prior to discharge. If there is no visible oil sheen, floating solids, or foam other than trace amounts, and if the pH is between 6.0 and 9.0, the stormwater would be discharged into Bayou Casotte through the stormwater outfall structure.

Discharge volumes would be similar to but greater than discharge volumes from the existing Terminal. The discharges could create temporary and localized changes in salinity and/or temperature, in the area of the outfalls; however, these changes would be similar to those from the discharges from the existing Terminal, and it is likely that the EFH species and prey in the vicinity of the Project are acclimated to such conditions. Operations would not produce contaminants such as nutrients or other oxygen demanding elements that would contribute to decreased dissolved oxygen. As a result, we conclude that there would be no substantial adverse impact on EFH or EFH species as a result of the discharge of stormwater runoff.

4.7 BALLAST WATER DISCHARGE

During operation of the Terminal Expansion, LNG carriers would discharge ballast water at the existing marine berth while taking on LNG. Discharge volumes would range between about 9.7 million gallons and 23.0 million gallons, depending on the size of the vessel. Impacts on water quality, such as changes in salinity, temperature, or dissolved oxygen, resulting from the discharged ballast water would be localized and temporary (FERC, 2015). Likewise, the effects of the localized changes in water quality on EFH species and prey would also be minimal. The ballast water discharges would typically occur over a non-continuous period of about 30 hours at a rate of about 29 cubic feet per second (cfs). The discharged ballast water would be expected to mix with the surrounding water column relatively quickly given the proximity of the marine berth to the mouth of the Pascagoula River, which has an average outflow of about 14,746 cfs, and its exposure to outflow from Bayou Casotte and wind and tidal driven currents of the Mississippi Sound (COE, 2014). Furthermore, estuarine species common to coastal Mississippi are generally tolerant of fluctuating environmental conditions (Elliott and Quintino, 2007). Therefore, we conclude that there would be no substantial adverse impacts on EFH or EFH species as a result of the ballast water discharge.

Ballast water is regarded as a major source for introducing invasive species to coastal areas (Bailey, 2015). Consequently, LNG captains must comply with the ballast water management and discharge requirements of both the U.S. Coast Guard (USCG) (33 CFR 151.2030) and the U.S. Environmental Protection Agency (EPA, 2013). All LNG carriers would use a USCG-approved Ballast Water Management System, which may include ballast water exchange in the open ocean or biocides treatment to destroy aquatic organisms in the ballast water. These regulations offer several options for ballast water management and are intended to limit the concentrations of organisms in ballast water discharges. The EPA regulates effluent discharge and requires actions such as training, management plans and practices, treatment measures, and monitoring, testing, and reporting requirements. All LNG carriers calling on the Terminal Expansion would be required to obtain a Vessel General Permit from the EPA, which, in part, regulates ballast water discharges under the authority of the NPDES permitting program. Therefore, we conclude that there would be no substantial adverse impacts on EFH or EFH species due to the introduction of exotic species resulting from the discharge of ballast water. Further, if biocides were included as part of a ballast water management technique, the concentration of residual biocides in the ballast water discharge would be required by the Vessel General Permit to meet or exceed regulatory limits for environmental compliance; therefore we conclude there would be no substantial adverse impacts on EFH or EFH species due to residual biocides in ballast water discharges.

Scouring of the benthic surface is another potential impact of ballast water discharge. Ballast water would be discharged by pumps regulated to maintain proper equilibrium with the volume of LNG being loaded onto the LNG carrier and would not be rapidly discharged. In addition, ballast water would be discharged horizontally, either through fittings located near the bottom of each side of the hull of the LNG carrier or through valves located above the waterline. In either instance, based on conservative calculations following Ervine and Flavey (1987), the force of the discharged water would be expected to dissipate prior to reaching the benthic surface at 42 feet below msl. Therefore, we conclude there would be no substantial adverse impacts on EFH.

LNG carriers would also withdraw water at the marine berth periodically to cool their boilers. Depending on the engine type, LNG carriers would take in between 15 and 42 million gallons of water for engine cooling while at the berth. The withdrawn water would be subsequently discharged back into Bayou Casotte. The potential impacts of a localized increase in water temperature due to the discharging of cooling water and entrainment of aquatic resources (e.g., the larvae of blue crab, white, brown, and pink shrimp, and assorted fish species) were assessed in the EIS for the existing Terminal (FERC, 2006) and are therefore not addressed herein.

4.8 CUMULATIVE IMPACTS

Cumulative impacts may result when the environmental effects associated with a proposed project are added to impacts associated with past, present, or reasonably foreseeable future projects within the area affected by the Project. Although individual impacts of the separate projects might be minor, the additive effects from all the projects could be significant. Additional discussion of cumulative impacts is provided in section 4.13 of the EIS.

Cumulative effects on EFH could occur due primarily to dredging or pile driving for several planned and currently in progress projects including: maintenance dredging conducted every 4 to 5 years at the Signal International, LLC East Bank Yard in Bayou Casotte; periodic dredging of the Pascagoula Harbor Navigation Channel; widening and dredging of the Pascagoula Navigation channel from Horn Island Pass to the entrance of Bayou Casotte Harbor for the Bayou Casotte Channel Improvement Project; maintenance dredging of the Bayou Casotte Ship Basin; and maintenance dredging of the North Supply Dock during operation of the Project.

The amount of material that would be dredged for these projects range from about 20,000 cy for the Signal International LLC East Bank to 3.4 million cy for the Bayou Casotte Harbor Channel Improvement Project, the largest dredging project within the cumulative impact area. While most of the planned dredging activities are currently in the planning stages, if those dredging activities occur at the same time, a cumulative impact on the water quality of Bayou Casotte may occur.

Prior to commencing dredging activities, Gulf LNG and the proponents of the other projects would be required to obtain authorization under Section 10/404 of the *Clean Water Act* (CWA) from the COE and corresponding Section 401 Water Quality Certification from the state. These authorizations would be contingent on the companies' use of best management practices to minimize effects on water quality and to ensure that state water quality standards are not violated. Additionally, the permits would require that the dredge material be tested before being disposed of in an approved offshore or onshore location. These measures would help to minimize any potential cumulative impacts on water quality as a result of foreseeable dredging activities in Bayou Casotte. Because water quality would return to pre-dredging conditions after dredging is completed, we conclude the resulting cumulative impact on EFH would not be substantial.

The impacts on EFH species of increases in turbidity due to dredging for the Terminal Expansion and the above projects would be temporary and localized to the dredged area and areas directly adjacent and a relatively short distance downstream. As a result, EFH species would experience localized effects. If dredging for the Project takes place at the same time as the Bayou Casotte Improvement Project, maintenance dredging of the Bayou Casotte Ship Basin, or the dredging activities at Signal International, LLC, the geographic extent of the temporary impacts would increase beyond the area affected by dredging for the supply docks. The impact area would be smaller if the dredging projects were not concurrent, but the total duration of impacts within the cumulative impact area would increase. In either case, we conclude that impacts in the cumulative impact area would not be substantial because these impacts would be temporary and localized and turbidity would return to pre-dredging levels after dredging is completed.

5.0 ESSENTIAL FISH HABITAT MITIGATION

Permanent impacts on EFH would occur due to the fill of emergent marsh and covering of shallow estuarine soft bottom habitat. In response, Gulf LNG has proposed in-kind compensatory mitigation for impacts on the emergent marsh EFH in the form of a 50-acre tidal marsh wetland at a site located directly offshore of the southern border of the proposed Terminal Expansion site.

Temporary impacts on shallow estuarine soft bottom EFH would result from dredging, pile driving, and other actions associated with construction and operation of the Project. For the dredging operations, Gulf LNG has analyzed EFH species seasonal abundance data from NOAA ELMR (2000) and other sources to determine whether scheduling construction during seasons of low abundance as a means to minimize potential EFH impacts would be feasible. These records indicate that eggs, larvae, and/or juveniles of at least one species are present during any given month of the year. Consequently, Gulf LNG would consult further with NMFS to assess how or whether the dredging schedule could be refined.

Additionally, Gulf LNG has already incorporated several strategies into the Project design to minimize potential impacts on EFH such as:

- requiring all vessels with ballast tanks to comply with comply with the ballast water management and discharge requirements of both the USCG (33 CFR 151.2030) and the EPA (EPA, 2013);
- updating the current Gulf LNG *SPCC Plan* and ensuring that Gulf LNG and their construction contractors would comply with all laws and regulations related to handling of fuels and lubricants, including 40 CFR 110, and related to vessel-to-vessel transfers, including 33 CFR 155; and
- ensuring Gulf LNG and their construction contractors follow the Gulf LNG *Stormwater Pollution Prevention Plan* (*SWPPP*) and abide by the Gulf LNG NPDES permit.

6.0 FERC'S VIEW REGARDING ESSENTIAL FISH HABITAT

Construction of the Terminal Expansion and the wetland mitigation site would involve permanent conversion of about 9.1 acres and short-term conversion of about 6.2 acres of shallow estuarine benthic habitat to deeper subtidal habitat and permanent conversion of about 50 acres of shallow estuarine habitat to intertidal vegetation habitat. This would result in direct mortality to benthic organisms. Construction and operation of the Terminal Expansion would also result in the permanent loss of 27.8 acres of EEM wetlands. However, the relatively small areas of estuarine water column and benthic habitat EFH impacted by construction and operation of the supply docks and construction of the mitigation site would be minor in consideration of the amount of similar habitat available in the vicinity of the Project, and Gulf LNG would offset the function of the impacted intertidal vegetative habitat by establishing the wetland mitigation site adjacent to the Terminal Expansion.

The depth to which the shallow estuarine benthic habitat would be dredged (12 feet below msl) would be generally shallow enough to prevent the onset of hypoxic conditions and subsequent permanent changes to benthic species diversity and total biomass (COE, 2014). At 12 feet below msl, the supply dock basins would be expected to recolonize with soft bottom benthic organisms soon after completion of dredging, thus providing a similar prey base for EFH species as the adjacent and nearby non-dredged areas (MMS, 2004). This temporary impact, as well as elevated water column turbidity levels, would re-occur with maintenance dredging, which would likely occur every 3 years. These events represent a minor increase in the already episodic nature of impacted benthic habitat and elevated turbidity due to relatively frequent maintenance dredging throughout Bayou Casotte and at the existing marine berth (the COE [2014] noted that maintenance dredging occurs within Bayou Casotte every 12 months).

Potential impacts on brown and white shrimp would be primarily limited to the post-larval and juvenile stages, as both stages occur in estuaries similar to the habitat present at the supply docks and wetland mitigation site. Adult stages of the species may also be present, but as most shrimp species approach adulthood, they migrate to deeper offshore waters. White shrimp may be present in inshore estuaries year-round, while brown shrimp are generally only present in estuaries between March and

November. Direct mortality could occur during active dredging or during the creation of the wetland mitigation site; however, individuals are mobile and many could avoid the dredging and construction areas. Until conditions are conducive for repopulation after completion of dredging, individuals could use areas with suitable EFH in the vicinity of the Terminal Expansion. Impacts from each of the construction activities discussed above are expected to be localized and temporary to short-term, as would impacts on the prey species of brown and white shrimp and their EFH. We do not anticipate any substantial adverse impacts on white or brown shrimp.

Various life stages of the gray snapper, lane snapper, red drum, Spanish mackerel and Atlantic sharpnose, blacknose, blacktip, bull, bonnethead, finetooth, hammerhead, spinner, and tiger sharks could be present in the vicinity of the Terminal Expansion during construction and operation. Direct mortality could occur during active dredging or creation of the wetland mitigation site, but individuals would likely avoid the area during construction. Prey of these species in the water column or in the benthos may be impacted by construction activities; however, as discussed above, the impacts would be temporary to short-term, as prey species would be expected to return to the water column after construction and benthic prey would be expected to rapidly recolonize the dredged areas. In the interim, given the mobility of each these managed species, individuals would be able to readily use other suitable EFH in the vicinity of the Terminal Expansion. In addition, potential impacts from each of the construction activities discussed above and potential impacts due to use of the North Supply Dock during operation would be temporary to short-term or, in the case of the wetland mitigation site, would result in new EFH. Therefore, we do not anticipate any substantial adverse impacts on gray snapper, red drum, Spanish mackerel, or Atlantic sharpnose, blacknose, blacktip, bull, bonnethead, finetooth, hammerhead, spinner, or tiger sharks.

Based on this information, we conclude that effects on EFH and EFH species in and near the construction area of the Terminal Expansion would be localized and temporary to short-term, particularly with respect to the regular industrial use of Bayou Casotte and the Mississippi Sound in the vicinity of the Terminal Expansion. Further, creation of new tidal marsh on the Mississippi Sound as mitigation for the tidal wetlands that would be lost due to the Terminal Expansion would provide additional habitat for EFH species. Therefore, the Terminal Expansion would not have a substantial adverse impact on EFH or EFH species in the area.

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APPENDIX D

Gulf LNG Upland Erosion Control, Revegetation, and Maintenance Plan

Gulf LNG Liquefaction Project

Docket No. CP15-__-000

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

Gulf LNG Liquefaction
Company, LLC
a Kinder Morgan operated company

Gulf LNG Liquefaction Company, LLC,
Gulf LNG Energy, LLC and
Gulf LNG Pipeline, LLC

569 Brookwood Center, Suite 749
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June 2015

Contents

Gulf LNG Liquefaction Project Upland Erosion Control, Revegetation, and Maintenance Plan

I. APPLICABILITY

Gulf LNG Liquefaction Company, LLC ("GLLC"), Gulf LNG Energy, LLC ("GLE"), and Gulf LNG Pipleline, LLC ("GLP") (together "Companies") are adopting the FERC Plan (May 2013 Version) for the Gulf LNG Liquefaction Project ("Project Plan"), without modifications other than what is necessary to differentiate the Project, as a discrete facility, from pipeline construction requirements. All modifications to the original wording are shown in ***bold italic font***. This Project Plan will apply to all non-wetland areas of the Project. Wetland and waterbody features are addressed in the Gulf LNG Liquefaction Project Wetland and Waterbody Construction and Mitigation Procedures ("Project Procedures").

Deviations that involve measures different from those contained in this Project Plan will only be permitted as certificated by the Commission or by written approval of the Director of the Office of Energy Projects (OEP), or his/her designee, unless specifically required in writing by another Federal, State, or land managing agency for the portion of the Project on its land. Companies will file other agency requirements with the Secretary of the Commission (Secretary) prior to construction.

II. SUPERVISION AND INSPECTION

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required onsite during construction and restoration (as defined by section V). The number and experience of Environmental Inspectors assigned to the Project shall be appropriate for the size ***of the construction area, the level of activity***, and the number/significance of resources affected.
2. Environmental Inspectors shall have peer status with all other activity inspectors.
3. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC's Orders, stipulations of other environmental permits or approvals, or landowner easement agreements; and to order appropriate corrective action.

B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) shall be responsible for:

1. Inspecting construction activities for compliance with the requirements of this Project Plan, the Project Procedures, the environmental conditions of the FERC's Orders, the mitigation measures proposed by project sponsor (as approved and/or modified by the Order), other environmental permits and approvals, and environmental requirements in landowner easement agreements.
2. Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;
3. Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction;
4. Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area;
5. Identifying erosion/sediment control and soil stabilization needs in all areas;
6. Ensuring that the design of slope breakers will not cause erosion or direct water into sensitive environmental resource areas, including cultural resource sites, wetlands, waterbodies, and sensitive species habitats;
7. Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into sensitive environmental resource areas, including wetlands, waterbodies, cultural resource sites, and sensitive species habitats; stopping dewatering activities if such deposition is occurring and ensuring the design of the discharge is changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities;
8. Ensuring that subsoil and topsoil are tested in agricultural and residential areas to measure compaction and determine the need for corrective action;
9. Advising the Chief Construction Inspector when environmental conditions (such as wet weather or frozen soils) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction;
10. Ensuring restoration of contours and topsoil;
11. Verifying that the soils imported for agricultural or residential use are certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner;
12. Ensuring that erosion control devices are properly installed to prevent sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, and sensitive species

habitats) and onto roads, and determining the need for additional erosion control devices;

13. Inspecting and ensuring the maintenance of temporary erosion control measures at least:

    a. on a daily basis in areas of active construction or equipment operation;

    b. on a weekly basis in areas with no construction or equipment operation; and

    c. within 24 hours of each 0.5 inch of rainfall;

14. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts;

15. Keeping records of compliance with the environmental conditions of the FERC's Orders, and the mitigation measures proposed by the Companies in the application submitted to the FERC, and other federal or state environmental permits during active construction and restoration;

16. Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase; and

17. Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with section III.E.

III. <u>PRECONSTRUCTION PLANNING</u>

Companies shall do the following before construction:

A. CONSTRUCTION WORK AREAS

1. Identify all construction work areas (e.g., construction right-of-way, extra work space areas, pipe storage and contractor yards, borrow and disposal areas, access roads) that would be needed for safe construction. ***Companies will*** ensure that appropriate cultural resources and biological surveys are conducted, as determined necessary by the appropriate federal and state agencies.

2. ***Companies will expand*** any required cultural resources and endangered species surveys in anticipation of the need for activities outside of authorized work areas.

3. Plan construction sequencing to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into sensitive environmental resource areas.

B. DRAIN TILE AND IRRIGATION SYSTEMS

There are no known drain tile irrigation systems in use within the Project area, however, if Companies become aware of a drain tile system, then Companies will:

1. Attempt to locate existing drain tiles and irrigation systems.
2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.
3. Develop procedures for constructing through drain-tiled areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.
4. Engage qualified drain tile specialists, as needed to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialists from the project area, if available.

C. GRAZING DEFERMENT

There are no known grazing areas associated with the Project. If additional areas are added to the Project footprint that include grazing areas, then Companies will:

Develop grazing deferment plans with willing landowners, grazing permittees, and land management agencies to minimize grazing disturbance of revegetation efforts.

D. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.

E. DISPOSAL PLANNING

Determine methods and locations for the regular collection, containment, and disposal of excess construction materials and debris (e.g., timber, slash, mats, garbage, drill cuttings and fluids, excess rock) throughout the construction process. Disposal of materials for beneficial reuse must not result in adverse environmental impact and is subject to compliance with all applicable survey, landowner or land management agency approval, and permit requirements.

F. AGENCY COORDINATION

Companies must coordinate with the appropriate local, state, and federal agencies as outlined in this Project Plan and/or required by the FERC's Orders.

1. Obtain written recommendations from the local soil conservation authorities or land management agencies regarding permanent erosion control and revegetation specifications.
2. Develop specific procedures in coordination with the appropriate agencies to prevent the introduction or spread of invasive species,

noxious weeds, and soil pests resulting from construction and restoration activities.

3. Develop specific procedures in coordination with the appropriate agencies and landowners, as necessary, to allow for livestock and wildlife movement and protection during construction.

4. Develop specific blasting procedures in coordination with the appropriate agencies that address pre- and post-blast inspections; advanced public notification; and mitigation measures for building foundations, groundwater wells, and springs. Use appropriate methods (e.g., blasting mats) to prevent damage to nearby structures and to prevent debris from entering sensitive environmental resource areas.

G. SPILL PREVENTION AND RESPONSE PROCEDURES

Companies will develop project-specific Spill Prevention and Response Procedures, as specified in section IV of the staff's Procedures. A copy must be filed with the Secretary of the FERC (Secretary) prior to construction and made available in the field on each construction spread. The filing requirement does not apply to projects constructed under the automatic authorization provisions in the FERC’s regulations.

H. RESIDENTIAL CONSTRUCTION

For all properties with residences located within 50 feet of construction work areas, ***Companies will***: avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified in landowner agreements; fence the edge of the construction work area for a distance of 100 feet on either side of the residence; and restore all lawn areas and landscaping immediately following clean up operations, or as specified in landowner agreements. If seasonal or other weather conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (sediment barriers and mulch) until conditions allow completion of restoration.

I. WINTER CONSTRUCTION PLANS

The Project location is in a geographic region not likely to be affected by winter weather conditions. Winter construction plans are not anticipated for the Project.

If construction is planned to occur during winter weather conditions, project sponsors shall develop and file a project-specific winter construction plan with the FERC application. This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC’s regulations.

The plan shall address:

1. winter construction procedures (e.g., snow handling and removal, access road construction and maintenance, soil handling under saturated or frozen conditions, topsoil stripping);

2. stabilization and monitoring procedures if ground conditions will delay restoration until the following spring (e.g., mulching and erosion controls, inspection and reporting, stormwater control during spring thaw conditions); and

3. final restoration procedures (e.g., subsidence and compaction repair, topsoil replacement, seeding).

IV. INSTALLATION

A. APPROVED AREAS OF DISTURBANCE

1. Project-related ground disturbance shall be limited to the construction right-of-way, extra work space areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved in the FERC's Orders. Any project- related ground disturbing activities outside these areas will require prior Director approval. This requirement does not apply to activities needed to comply with the Project Plan and Procedures (i.e., slope breakers, energy-dissipating devices, dewatering structures, drain tile system repairs) or minor field realignments and workspace shifts per landowner needs and requirements that do not affect other landowners or sensitive environmental resource areas. All construction or restoration activities outside of authorized areas are subject to all applicable survey and permit requirements, and landowner easement agreements.

2. The construction right-of-way width for a project shall not exceed 75 feet or that described in the FERC application unless otherwise modified by a FERC Order. However, in limited, non-wetland areas, this construction right-of- way width may be expanded by up to 25 feet without Director approval to accommodate full construction right-of-way topsoil segregation and to ensure safe construction where topographic conditions (e.g., side-slopes) or soil limitations require it. Twenty-five feet of extra construction right-of-way width may also be used in limited, non-wetland or non-forested areas for truck turn-arounds where no reasonable alternative access exists.

   Project use of these additional limited areas is subject to landowner or land management agency approval and compliance with all applicable survey and permit requirements. When additional areas are used, each one shall be identified and the need explained in the weekly or biweekly construction reports to the FERC, if required. The following material shall be included in the reports:

   a. the location of each additional area by station number and reference to previously filed alignment sheets, or updated alignment sheets showing the additional areas;

   b. identification of the filing at FERC containing evidence that the additional areas were previously surveyed; and

c. a statement that landowner approval has been obtained and is available in project files.

Prior written approval of the Director is required when the authorized construction right-of-way width would be expanded by more than 25 feet.

B. TOPSOIL SEGREGATION

1. Unless the landowner or land management agency specifically approves otherwise, prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench and subsoil storage area (ditch plus spoil side method) in:

    a. cultivated or rotated croplands, and managed pastures;

    b. residential areas;

    c. hayfields; and

    d. other areas at the landowner’s or land managing agency’s request.

2. In residential areas, importation of topsoil is an acceptable alternative to topsoil segregation.

3. Where topsoil segregation is required, Companies must:

    a. segregate at least 12 inches of topsoil in deep soils (more than 12 inches of topsoil); and

    b. make every effort to segregate the entire topsoil layer in soils with less than 12 inches of topsoil.

4. Maintain separation of salvaged topsoil and subsoil throughout all construction activities.

5. Segregated topsoil may not be used for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as a fill material.

6. Stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

C. DRAIN TILES

1. Mark locations of drain tiles damaged during construction.

2. Probe all drainage tile systems within the area of disturbance to check for damage.

3. Repair damaged drain tiles to their original or better condition. Do not use filter-covered drain tiles unless the local soil conservation authorities and the landowner agree. Use qualified specialists for testing and repairs.

4. For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems. For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).

D. IRRIGATION

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

E. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe and accessible conditions at all road crossings and access points during construction.
2. If crushed stone access pads are used in residential or agricultural areas, place the stone on synthetic fabric to facilitate removal.
3. Minimize the use of tracked equipment on public roadways. Remove any soil or gravel spilled or tracked onto roadways daily or more frequent as necessary to maintain safe road conditions. Repair any damages to roadway surfaces, shoulders, and bar ditches.

F. TEMPORARY EROSION CONTROL

Install temporary erosion controls immediately after initial disturbance of the soil. Temporary erosion controls must be properly maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

1. Temporary Slope Breakers

a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope breakers may be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.

b. Install temporary slope breakers on all disturbed areas, as necessary to avoid excessive erosion. Temporary slope breakers must be installed on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland, and road crossings at the following spacing (closer spacing shall be used if necessary):

Slope (%)	Spacing (feet)
5 - 15	300
>15 - 30	200
>30	100

c. Direct the outfall of each temporary slope breaker to a stable, well vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.

d. Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive environmental resource areas.

2. Temporary Trench Plugs

Temporary trench plugs are intended to segment a continuous open trench prior to backfill.

a. Temporary trench plugs may consist of unexcavated portions of the trench, compacted subsoil, sandbags, or some functional equivalent.

b. Position temporary trench plugs, as necessary, to reduce trenchline erosion and minimize the volume and velocity of trench water flow at the base of slopes.

3. Sediment Barriers

Sediment barriers are intended to stop the flow of sediments and to prevent the deposition of sediments beyond approved workspaces or into sensitive resources.

a. Sediment barriers may be constructed of materials such as silt fence, staked hay or straw bales, compacted earth (e.g., driveable berms across travelways), sand bags, or other appropriate materials.

b. At a minimum, install and maintain temporary sediment barriers across the entire construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetland, or road crossing until revegetation is successful as defined in this Project Plan. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.

c. Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.

4. Mulch

a. Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or its equivalent, unless the local soil conservation authority, landowner, or land managing agency approves otherwise in writing.

b. Mulch can consist of weed-free straw or hay, wood fiber hydromulch, erosion control fabric, or some functional equivalent.

c. Mulch all disturbed upland areas (except cultivated cropland) before seeding if:

(1) final grading and installation of permanent erosion control measures will not be completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas), as required in section V.A.1; or

(2) construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.

d. If mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.

e. If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).

f. Ensure that mulch is adequately anchored to minimize loss due to wind and water.

g. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies, except where the product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization.

h. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.

V. RESTORATION

A. CLEANUP

1. Commence cleanup operations immediately following backfill operations.

Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (i.e., temporary slope breakers, sediment barriers, and mulch) until conditions allow completion of cleanup.

If construction or restoration unexpectedly continues into the winter season when conditions could delay successful decompaction, topsoil replacement, or seeding until the following spring, file with the Secretary for the review and written approval of the Director, a winter construction plan (as specified in section III.I). This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed as specified in section IV.F. and inspected and maintained as specified in sections II.B.12 through 14. When access is no longer required the travel lane must be removed and the right-of-way restored.

3. Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench shall be considered construction debris, unless approved for use as mulch or for some other use on the construction work areas by the landowner or land managing agency.

4. Remove excess rock from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area shall be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.

5. Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.

6. Remove construction debris from all construction work areas unless the landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.

7. Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers

   a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.

   b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers.

c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.

d. At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Install trench breakers at wetland boundaries, as specified in the Procedures. Do not install trench breakers within a wetland.

2. Permanent Slope Breakers

a. Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction right-of-way, and prevent sediment deposition into sensitive resources. Permanent slope breakers may be constructed of materials such as soil, stone, or some functional equivalent.

b. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, unless requested by the landowner, using spacing recommendations obtained from the local soil conservation authority or land managing agency.

In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way:

Slope (%)	Spacing (feet)
5 - 15	300
>15 - 30	200
>30	100

c. Construct slope breakers to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of the breaker.

d. Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction right-of-way, they are subject to compliance with all applicable survey requirements.

C. SOIL COMPACTION MITIGATION

1. Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests.

2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil.

   If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

D. REVEGETATION

1. General

   a. The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted in section V.D.1.b.

   b. Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.

2. Soil Additives

   Fertilize and add soil pH modifiers in accordance with written recommendations obtained from the local soil conservation authority, land management agencies, or landowner. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as practicable after application.

3. Seeding Requirements

   a. Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed.

   b. Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or the request of the landowner or land management agency. Seeding is not required in cultivated croplands unless requested by the landowner.

   c. Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures discussed in section IV.F and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Dormant seeding or temporary seeding of annual species may also be used, if necessary, to establish cover, as approved by the Environmental

Inspector. Lawns may be seeded on a schedule established with the landowner.

d. In the absence of written recommendations from the local soil conservation authorities, seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting, subject to the specifications in section V.D.3.a through V.D.3.c.

e. Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.

f. Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydro).

g. In the absence of written recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary, a seed drill equipped with a cultipacker is preferred for seed application.

Broadcast or hydroseeding can be used in lieu of drilling at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding. In rocky soils or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the Environmental Inspector.

VI. <u>OFF-ROAD VEHICLE CONTROL</u>

To each owner or manager of forested lands, offer to install and maintain measures to control unauthorized vehicle access to the right-of-way. These measures may include:

A. signs;

B. fences with locking gates;

C. slash and timber barriers, pipe barriers, or a line of boulders across the right-of-way; and

D. conifers or other appropriate trees or shrubs across the right-of-way.

VII. <u>POST-CONSTRUCTION ACTIVITIES AND REPORTING</u>

A. MONITORING AND MAINTENANCE

1. Conduct follow-up inspections of all disturbed areas, as necessary, to determine the success of revegetation and address landowner concerns. At a minimum, conduct inspections after the first and second growing seasons.

2. Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise.

   Continue revegetation efforts until revegetation is successful.

3. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in agricultural areas until restoration is successful.

4. Restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the landowner or land managing agency per section V.A.6), revegetation is successful, and proper drainage has been restored.

5. Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion/leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife Service.

6. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and permanent access roads as necessary.

B. REPORTING

1. The project sponsor shall maintain records that identify by milepost:

   a. method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;

   b. acreage treated;

   c. dates of backfilling and seeding;

   d. names of landowners requesting special seeding treatment and a description of the follow-up actions;

   e. the location of any subsurface drainage repairs or improvements made during restoration; and

   f. any problem areas and how they were addressed.

2. The project sponsor shall file with the Secretary quarterly activity reports documenting the results of follow-up inspections required by section VII.A.1; any problem areas, including those identified by the landowner; and corrective actions taken for at least 2 years following construction.

   The requirement to file quarterly activity reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advanced notice provisions in the FERC's regulations.

APPENDIX E

Gulf LNG Wetland and Waterbody Construction and Mitigation Procedures

Gulf LNG Liquefaction Project

Docket No. CP15-__-000

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

Gulf LNG Liquefaction Company, LLC
a Kinder Morgan operated company

Gulf LNG Liquefaction Company, LLC,

Gulf LNG Energy, LLC and

Gulf LNG Pipeline, LLC

569 Brookwood Center, Suite 749
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June 2015

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

Gulf LNG Liquefaction Project

The table below identifies all changes proposed to the Wetland and Waterbody Construction and Mitigation Procedures for the Gulf LNG Liquefaction Project ("Project Procedures"). Within the text of the Project Procedures, the changes are ***italicized***.

Table of Changes		
Section	**Original Text**	**Proposed Text (Changes italicized in bold)**
VI.A.6	Do not locate aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with U.S. Department of Transportation regulations.	***Project facilities are proposed to be constructed within wetlands to be permanently filled as part of the Project, primarily due to logistical concerns and available space limitations. All wetland impacts will be appropriately mitigated, and construction of the aboveground structures will result in no net loss of wetlands. Companies will provide copies of the wetland delineation report, wetland mitigation plans, and U.S. Army Corps of Engineers/Mississippi Department of Marine Resources permits and approvals prior to Project construction.***
VI.B	INSTALLATION	***Project access roads, including the heavy haul road from the North Marine Off-Loading Facility (MOF) will be constructed in delineated wetland areas. Additionally, Companies propose to clear and fill wetland areas at CSA 5 to maximize the useable area of the site for construction support. Companies will provide appropriate mitigation for the unavoidable loss of wetlands due to Project construction. Companies will provide copies of the wetland delineation report, wetland mitigation plans, and U.S. Army Corps of Engineers/Mississippi Department of Marine Resources permits and approvals prior to Project construction.***
VI.D	POST-CONSTRUCTION MAINTENANCE AND REPORTING	***Wetlands within the Project footprint will be permanently filled and mitigated for by creation of tidal marsh at an offsite location. Design, construction, and monitoring of the mitigation site will be by approval of the U.S. Army Corps of Engineers, the Mississippi Department of Marine Resources, and other regulatory agencies. Companies will file copies of their plans, approvals, and monitoring reports with the Secretary for review and approval by the Director.***

Contents

Gulf LNG Liquefaction Project Wetland and Waterbody Construction and Mitigation Procedures

I. APPLICABILITY

A. Gulf LNG Liquefaction Company, LLC (“GLLC”), Gulf LNG Energy, LLC (“GLE”), and Gulf LNG Pipleline, LLC (“GLP”) (together “Companies”) are adopting the FERC Procedures (May 2013 Version) for its Gulf LNG Liquefaction Project (Project), with requested variances, as well as modifications that are necessary to differentiate the Project, as a discrete facility, from pipeline construction requirements (“Project Procedures”). All modifications to the original wording are shown in ***bold italic font***. These Project Procedures will apply to all wetland areas of the Project.

Deviations that involve measures different from those contained in these Project Procedures will only be permitted as certificated by the Commission or by written approval of the Director of the Office of Energy Projects (OEP), or his/her designee, unless specifically required in writing by another Federal, State, or land managing agency for the portion of the Project on its land. Companies will file other agency requirements with the Secretary of the Commission (Secretary) prior to construction.

The intent of these Project Procedures is to assist project sponsors by identifying baseline mitigation measures for minimizing the extent and duration of project-related disturbance on wetlands and waterbodies. Companies have specified in their application for a new FERC authorization, and in individual measures in ***the FERC*** Procedures it considers unnecessary, technically infeasible, or unsuitable due to local conditions and fully describes any alternative measures it would use. Companies also explain how these alternative measures would achieve a comparable level of mitigation.

Once the Project is authorized, Companies may request further changes as variances to the measures in these Project Procedures. The Director of the Office of Energy Projects (Director) will consider approval of variances upon Companies’ written request, if the Director agrees that a variance:

1. provides equal or better environmental protection;
2. is necessary because a portion of ***the FERC*** Procedures is infeasible or unworkable based on project-specific conditions; or
3. is specifically required in writing by another federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Project-related impacts on non-wetland areas are addressed in the Gulf LNG Liquefaction Project Upland Erosion Control, Revegetation, and Maintenance Plan (“Project Plan”).

B. DEFINITIONS

1. "Waterbody" includes any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes:

   a. "minor waterbody" includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing;

   b. "intermediate waterbody" includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of crossing; and

   c. "major waterbody" includes all waterbodies greater than 100 feet wide at the water's edge at the time of crossing.

2. "Wetland" includes any area that is not in actively cultivated or rotated cropland and that satisfies the requirements of the current federal methodology for identifying and delineating wetlands.

II. PRECONSTRUCTION FILING

A. The following information must be filed with the Secretary of the FERC (Secretary) prior to the beginning of construction, for the review and written approval by the Director:

1. site-specific justifications for extra work areas that would be closer than 50 feet from a waterbody or wetland; and

2. site-specific justifications for the use of a construction right-of-way greater than 75-feet-wide in wetlands.

B. The following information must be filed with the Secretary prior to the beginning of construction. These filing requirements do not apply to projects constructed under the automatic authorization provisions in the FERC's regulations:

1. Spill Prevention and Response Procedures specified in section IV.A;

2. a schedule identifying when trenching or blasting will occur within each waterbody greater than 10 feet wide, within any designated coldwater fishery, and within any waterbody identified as habitat for federally-listed threatened or endangered species. ***Companies*** will revise the schedule as necessary to provide FERC staff at least 14 days advance notice. Changes within this last 14-day period must provide for at least 48 hours advance notice;

3. plans for horizontal directional drills (HDD) under wetlands or waterbodies, specified in section V.B.6.d;

4. site-specific plans for major waterbody crossings, described in section V.B.9;

5. a wetland delineation report as described in section VI.A.1, if applicable; and

6. the hydrostatic testing information specified in section VII.B.3.

III. ENVIRONMENTAL INSPECTORS

A. At least one Environmental Inspector having knowledge of the wetland and waterbody conditions in the project area is required for each construction spread. The number and experience of Environmental Inspectors assigned to each
construction spread shall be appropriate for the length of the construction spread and the number/significance of resources affected.

B. The Environmental Inspector's responsibilities are outlined in the Upland Erosion
Control, Revegetation, and Maintenance Plan (Plan).

IV. PRECONSTRUCTION PLANNING

A. ***Companies will*** develop project-specific Spill Prevention and Response Procedures that meet applicable requirements of state and federal agencies. A copy must be filed with the Secretary prior to construction and made available in the field on each construction spread. This filing requirement does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

1. It ***is*** the responsibility of the ***Companies*** and their contractors to structure their operations in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to waterbodies or wetlands. ***Companies*** and their contractors must, at a minimum, ensure that:

a. all employees handling fuels and other hazardous materials are properly trained;

b. all equipment is in good operating order and inspected on a regular basis;

c. fuel trucks transporting fuel to on-site equipment travel only on approved access roads;

d. all equipment is parked overnight and/or fueled at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary. These activities can occur closer only if the Environmental Inspector determines that there is no reasonable alternative, and ***that Companies*** and their contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;

e. hazardous materials, including chemicals, fuels, and lubricating oils, are not stored within 100 feet of a wetland, waterbody, or designated municipal watershed area, unless the location is designated for such use by an appropriate governmental authority. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas;

f. concrete coating activities are not performed within 100 feet of a wetland or waterbody boundary, unless the location is an existing industrial site designated for such use. These activities can occur closer only if the Environmental Inspector determines that there is no reasonable alternative, and the project sponsor and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;

g. pumps operating within 100 feet of a waterbody or wetland boundary utilize appropriate secondary containment systems to prevent spills; and

h. bulk storage of hazardous materials, including chemicals, fuels, and lubricating oils have appropriate secondary containment systems to prevent spills.

2. ***Companies*** and their contractors ***will*** structure ***their*** operations in a manner that provides for the prompt and effective cleanup of spills of fuel and other hazardous materials. At a minimum, ***Companies*** and its contractors ***will***:

a. ensure that each construction crew (including cleanup crews) has on hand sufficient supplies of absorbent and barrier materials to allow the rapid containment and recovery of spilled materials and knows the procedure for reporting spills and unanticipated discoveries of contamination;

b. ensure that each construction crew has on hand sufficient tools and material to stop leaks;

c. know the contact names and telephone numbers for all local, state, and federal agencies (including, if necessary, the U. S. Coast Guard and the National Response Center) that must be notified of a spill; and

d. follow the requirements of those agencies in cleaning up the spill, in excavating and disposing of soils or other materials contaminated by a spill, and in collecting and disposing of waste generated during spill cleanup.

B. AGENCY COORDINATION

Companies will coordinate with the appropriate local, state, and federal agencies as outlined in these Project Procedures and in the FERC's Orders.

V. <u>WATERBODY CROSSINGS</u>

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply to the U.S. Army Corps of Engineers (COE), or its delegated agency, for the appropriate wetland and waterbody crossing permits.

2. Provide written notification to authorities responsible for potable surface water supply intakes located within 3 miles downstream of the crossing at least 1 week before beginning work in the waterbody, or as otherwise specified by that authority.

3. Apply for state-issued waterbody crossing permits and obtain individual or generic section 401 water quality certification or waiver.

4. Notify appropriate federal and state authorities at least 48 hours before beginning trenching or blasting within the waterbody, or as specified in applicable permits.

B. INSTALLATION

1. Time Window for Construction

Unless expressly permitted or further restricted by the appropriate federal or state agency in writing on a site-specific basis, instream work, except that required to install or remove equipment bridges, must occur during the following time windows:

a. coldwater fisheries - June 1 through September 30; and

b. coolwater and warmwater fisheries - June 1 through November 30.

2. Extra Work Areas

   a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.

   b. ***Companies will*** file with the Secretary for review and written approval by the Director, site-specific justification for each extra work area with a less than 50-foot setback from the water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. The justification must specify the conditions that will not permit a 50-foot setback and measures to ensure the waterbody is adequately protected.

   c. Limit the size of extra work areas to the minimum needed to construct the waterbody crossing.

3. General Crossing Procedures

   a. Comply with the COE, or its delegated agency, permit terms and conditions.

   b. Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.

   c. Where pipelines parallel a waterbody, maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right-of-way, except where maintaining this offset will result in greater environmental impact.

   d. Where waterbodies meander or have multiple channels, route the pipeline to minimize the number of waterbody crossings.

   e. Maintain adequate waterbody flow rates to protect aquatic life, and prevent the interruption of existing downstream uses.

   f. Waterbody buffers (e.g., extra work area setbacks, refueling restrictions) must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

g. Crossing of waterbodies when they are dry or frozen and not flowing may proceed using standard upland construction techniques in accordance with the Plan, provided that the Environmental Inspector verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. In the event of perceptible flow, the project sponsor must comply with all applicable Procedure requirements for "waterbodies" as defined in section I.B.1.

4. Spoil Pile Placement and Control

a. All spoil from minor and intermediate waterbody crossings, and upland spoil from major waterbody crossings, must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas as described in section V.B.2.

b. Use sediment barriers to prevent the flow of spoil or silt-laden water into any waterbody.

5. Equipment Bridges

a. Only clearing equipment and equipment necessary for installation of equipment bridges may cross waterbodies prior to bridge installation. Limit the number of such crossings of each waterbody to one per piece of clearing equipment.

b. Construct and maintain equipment bridges to allow unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:

(1) equipment pads and culvert(s);
(2) equipment pads or railroad car bridges without culverts;
(3) clean rock fill and culvert(s); and
(4) flexi-float or portable bridges.

Additional options for equipment bridges may be utilized that achieve the performance objectives noted above. Do not use soil to construct or stabilize equipment bridges.

c. Design and maintain each equipment bridge to withstand and pass the highest flow expected to occur while the bridge is in place. Align culverts to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of the culverts.

d. Design and maintain equipment bridges to prevent soil from entering the waterbody.

e. Remove temporary equipment bridges as soon as practicable after permanent seeding.

f. If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, remove temporary equipment bridges as soon as practicable after final cleanup.

g. Obtain any necessary approval from the COE, or the appropriate state agency for permanent bridges.

6. Dry-Ditch Crossing Methods

a. Unless approved otherwise by the appropriate federal or state agency, install the pipeline using one of the dry-ditch methods outlined below for crossings of waterbodies up to 30 feet wide (at the water's edge at the time of construction) that are state-designated as either coldwater or significant coolwater or warmwater fisheries, or federally-designated as critical habitat.

b. Dam and Pump

(1) The dam-and-pump method may be used without prior approval for crossings of waterbodies where pumps can adequately transfer streamflow volumes around the work area, and there are no concerns about sensitive species passage.

(2) Implementation of the dam-and-pump crossing method must meet the following performance criteria:

(i) use sufficient pumps, including on-site backup pumps, to maintain downstream flows;
(ii) construct dams with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
(iii) screen pump intakes to minimize entrainment of fish;
(iv) prevent streambed scour at pump discharge; and
(v) continuously monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

c. Flume Crossing

The flume crossing method requires implementation of the following steps:

(1) install flume pipe after blasting (if necessary), but before any trenching;

(2) use sand bag or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required to achieve an effective seal);

(3) properly align flume pipe(s) to prevent bank erosion and streambed scour;

(4) do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts; and

(5) remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

d. Horizontal Directional Drill

For each waterbody or wetland that would be crossed using the HDD method, file with the Secretary for the review and written approval by the Director, a plan that includes:

(1) site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction;

(2) justification that disturbed areas are limited to the minimum needed to construct the crossing;

(3) identification of any aboveground disturbance or clearing between the HDD entry and exit workspaces during construction;

(4) a description of how an inadvertent release of drilling mud would be contained and cleaned up; and

(5) a contingency plan for crossing the waterbody or wetland in the event the HDD is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

The requirement to file HDD plans does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

7. Crossings of Minor Waterbodies

Where a dry-ditch crossing is not required, minor waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

a. except for blasting and other rock breaking measures, complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours.

Streambanks and unconsolidated streambeds may require additional restoration after this period;

b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and

c. equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification or protected status (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described in section V.B.5.

8. Crossings of Intermediate Waterbodies

Where a dry-ditch crossing is not required, intermediate waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

a. complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible;

b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and

c. all other construction equipment must cross on an equipment bridge as specified in section V.B.5.

9. Crossings of Major Waterbodies

The Project does not involve the crossing of major waterbodies. If Project changes necessitate the crossing of major waterbodies, Companies will comply with the following requirements:

Before construction, *Companies will* file with the Secretary for the review and written approval by the Director a detailed, site-specific construction plan and scaled drawings identifying all areas to be disturbed by construction for each major waterbody crossing (the scaled drawings are not required for any offshore portions of pipeline projects). This plan must be developed in consultation with the appropriate state and federal agencies and shall include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues. The requirement to file major waterbody crossing plans does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

The Environmental Inspector may adjust the final placement of the erosion and sediment control structures in the field to maximize effectiveness.

10. Temporary Erosion and Sediment Control

Install sediment barriers (as defined in section IV.F.3.a of the Plan) immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan; however, the following specific measures must be implemented at stream crossings:

a. install sediment barriers across the entire construction right-of-way at all waterbody crossings, where necessary to prevent the flow of sediments into the waterbody. Removable sediment barriers (or driveable berms) must be installed across the travel lane. These removable sediment barriers can be removed during the construction day, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent;

b. where waterbodies are adjacent to the construction right-of-way and the right-of-way slopes toward the waterbody, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the waterbody; and

c. use temporary trench plugs at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody.

11. Trench Dewatering

Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in silt-laden water flowing into any waterbody. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

C. RESTORATION

1. Use clean gravel or native cobbles for the upper 1 foot of trench backfill in all waterbodies that contain coldwater fisheries.

2. For open-cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities. For dry-ditch crossings, complete streambed and bank stabilization before returning flow to the waterbody channel.

3. Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the Environmental Inspector.

4. Install erosion control fabric or a functional equivalent on waterbody banks at the time of final bank recontouring. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.

5. Application of riprap for bank stabilization must comply with COE, or its delegated agency, permit terms and conditions.

6. Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric.

7. Revegetate disturbed riparian areas with native species of conservation grasses, legumes, and woody species, similar in density to adjacent undisturbed lands.

8. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody. In addition, install sediment barriers as outlined in the Plan.

In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the waterbody.

9. Sections V.C.3 through V.C.7 above also apply to those perennial or intermittent streams not flowing at the time of construction.

D. POST-CONSTRUCTION MAINTENANCE

1. Limit routine vegetation mowing or clearing adjacent to waterbodies to allow a riparian strip at least 25 feet wide, as measured from the waterbody's mean high water mark, to permanently revegetate with native plant species across the entire construction right-of-way. However, to facilitate periodic

corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the permanent right-of-way. Do not conduct any routine vegetation mowing or clearing in riparian areas that are between HDD entry and exit points.

2. Do not use herbicides or pesticides in or within 100 feet of a waterbody except as allowed by the appropriate land management or state agency.

3. Time of year restrictions specified in section VII.A.5 of the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of riparian areas.

VI. WETLAND CROSSINGS

A. GENERAL

1. ***Companies will*** conduct a wetland delineation using the current federal methodology and file a wetland delineation report with the Secretary before construction. The requirement to file a wetland delineation report does not apply to projects constructed under the automatic authorization provisions in the FERC's regulations.

   This report shall identify:

   a. by milepost all wetlands that would be affected;

   b. the National Wetlands Inventory (NWI) classification for each wetland;

   c. the crossing length of each wetland in feet; and

   d. the area of permanent and temporary disturbance that would occur in each wetland by NWI classification type.

   The requirements outlined in this section do not apply to wetlands in actively cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoiling requirements, apply to these agricultural wetlands.

2. Route the pipeline to avoid wetland areas to the maximum extent possible. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. Where looping an existing pipeline, overlap the existing pipeline right-of-way with the new construction

right-of-way. In addition, locate the loop line no more than 25 feet away from the existing pipeline unless site-specific constraints would adversely affect the stability of the existing pipeline.

3. Limit the width of the construction right-of-way to 75 feet or less. Prior written approval of the Director is required where topographic conditions or soil limitations require that the construction right-of-way width within the boundaries of a federally delineated wetland be expanded beyond 75 feet. Early in the planning process the project sponsor is encouraged to identify site-specific areas where excessively wide trenches could occur and/or where spoil piles could be difficult to maintain because existing soils lack adequate unconfined compressive strength.

4. Wetland boundaries and buffers must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

5. Implement the measures of sections V and VI in the event a waterbody crossing is located within or adjacent to a wetland crossing. If all measures of sections V and VI cannot be met, the project sponsor must file with the Secretary a site-specific crossing plan for review and written approval by the Director before construction. This crossing plan shall address at a minimum:

   a. spoil control;

   b. equipment bridges;

   c. restoration of waterbody banks and wetland hydrology;

   d. timing of the waterbody crossing;

   e. method of crossing; and

   f. size and location of all extra work areas.

6. ***Project facilities are proposed to be constructed within wetlands to be permanently filled as part of the Project, primarily due to logistical concerns and available space limitations. All wetland impacts will be appropriately mitigated, and construction of the aboveground structures will result in no net loss of wetlands. Companies will provide copies of the wetland delineation report, wetland mitigation plans, and U.S. Army Corps of Engineers/Mississippi Department of Marine Resources permits and approvals prior to Project construction.***

B. INSTALLATION

Project access roads, including the heavy haul road from the North Marine Off-Loading Facility (MOF) will be constructed in delineated wetland areas. Additionally, Companies propose to clear and fill wetland areas at CSA 5 to maximize the useable area of the site for construction support. Companies will provide appropriate mitigation for the unavoidable loss of wetlands due to Project construction. Companies will provide copies of the wetland delineation report, wetland mitigation plans, and U.S. Army Corps of Engineers/Mississippi Department of Marine Resources permits and approvals prior to Project construction.

1. Extra Work Areas and Access Roads

    a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.

    b. ***Companies will*** file with the Secretary for review and written approval by the Director, site-specific justification for each extra work area with a less than 50-foot setback from wetland boundaries, except where adjacent upland consists of cultivated or rotated cropland or other disturbed land. The justification must specify the site-specific conditions that will not permit a 50-foot setback and measures to ensure the wetland is adequately protected.

    c. The construction right-of-way may be used for access when the wetland soil is firm enough to avoid rutting or the construction right-of-way has been appropriately stabilized to avoid rutting (e.g., with timber riprap, prefabricated equipment mats, or terra mats).

       In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction right-of-way.

    d. The only access roads, other than the construction right-of-way, that can be used in wetlands are those existing roads that can be used with no modifications or improvements, other than routine repair, and no impact on the wetland.

2. Crossing Procedures

    a. Comply with COE, or its delegated agency, permit terms and conditions.

b. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.

c. Use “push-pull” or “float” techniques to place the pipe in the trench where water and other site conditions allow.

d. Minimize the length of time that topsoil is segregated and the trench is open. Do not trench the wetland until the pipeline is assembled and ready for lowering in.

e. Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.

f. Cut vegetation just above ground level, leaving existing root systems in place, and remove it from the wetland for disposal.

The project sponsor can burn woody debris in wetlands, if approved by the COE and in accordance with state and local regulations, ensuring that all remaining woody debris is removed for disposal.

g. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless the Chief Inspector and Environmental Inspector determine that safety-related construction constraints require grading or the removal of tree stumps from under the working side of the construction right-of-way.

h. Segregate the top 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated. Immediately after backfilling is complete, restore the segregated topsoil to its original location.

i. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to support equipment on the construction right-of-way.

j. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or terra mats.

k. Remove all project-related material used to support equipment on the construction right-of-way upon completion of construction.

3. Temporary Sediment Control

Install sediment barriers (as defined in section IV.F.3.a of the Plan) immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Except as noted below in section VI.B.3.c, maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan.

a. Install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all wetland crossings where necessary to prevent sediment flow into the wetland.

b. Where wetlands are adjacent to the construction right-of-way and the right-of-way slopes toward the wetland, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil within the construction right-of-way and prevent sediment flow into the wetland.

c. Install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way through wetlands. Remove these sediment barriers during right-of-way cleanup.

4. Trench Dewatering

Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in silt-laden water flowing into any wetland. Remove the dewatering structures as soon as practicable after the completion of dewatering activities.

C. RESTORATION

1. Where the pipeline trench may drain a wetland, construct trench breakers at the wetland boundaries and/or seal the trench bottom as necessary to maintain the original wetland hydrology.

2. Restore pre-construction wetland contours to maintain the original wetland hydrology.

3. For each wetland crossed, install a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from the

wetland, or as needed to prevent sediment transport into the wetland. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.

4. Do not use fertilizer, lime, or mulch unless required in writing by the appropriate federal or state agency.

5. Consult with the appropriate federal or state agencies to develop a project-specific wetland restoration plan. The restoration plan shall include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of invasive species and noxious weeds (e.g., purple loosestrife and phragmites), and monitoring the success of the revegetation and weed control efforts. Provide this plan to the FERC staff upon request.

6. Until a project-specific wetland restoration plan is developed and/or implemented, temporarily revegetate the construction right-of-way with annual ryegrass at a rate of 40 pounds/acre (unless standing water is present).

7. Ensure that all disturbed areas successfully revegetate with wetland herbaceous and/or woody plant species.

8. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after revegetation and stabilization of adjacent upland areas are judged to be successful as specified in section VII.A.4 of the Plan.

D. POST-CONSTRUCTION MAINTENANCE AND REPORTING

Wetlands within the Project footprint will be permanently filled and mitigated for by creation of tidal marsh at an offsite location. Design, construction, and monitoring of the mitigation site will be by approval of the U.S. Army Corps of Engineers, the Mississippi Department of Marine Resources, and other regulatory agencies. Companies will file copies of its plans, approvals, and monitoring reports with the Secretary for review and approval by the Director.

1. Do not conduct routine vegetation mowing or clearing over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees within 15 feet of the pipeline with roots that could compromise the integrity of pipeline coating may be selectively cut and removed from the permanent right-of-way. Do not conduct any routine vegetation mowing or clearing in wetlands that are between HDD entry and exit points.

2. Do not use herbicides or pesticides in or within 100 feet of a wetland, except as allowed by the appropriate federal or state agency.

3. Time of year restrictions specified in section VII.A.5 of the Plan (April 15 – August 1 of any year) apply to routine mowing and clearing of wetland areas.

4. Monitor and record the success of wetland revegetation annually until wetland revegetation is successful.

5. Wetland revegetation shall be considered successful if all of the following criteria are satisfied:

   a. the affected wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology, and vegetation);

   b. vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;

   c. if natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and

   d. invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.

6. Within 3 years after construction, file a report with the Secretary identifying the status of the wetland revegetation efforts and documenting success as defined in section VI.D.5, above. The requirement to file wetland restoration reports with the Secretary does not apply to projects constructed under the automatic authorization, prior notice, or advance notice provisions in the FERC's regulations.

   For any wetland where revegetation is not successful at the end of 3 years after construction, develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively revegetate wetlands. Continue revegetation efforts and file a report annually documenting progress in these wetlands until wetland revegetation is successful.

VII. <u>HYDROSTATIC TESTING</u>

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply for state-issued water withdrawal permits, as required.

2. Apply for National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required.

3. Notify appropriate state agencies of intent to use specific sources at least 48 hours before testing activities unless they waive this requirement in writing.

B. GENERAL

1. Perform 100 percent radiographic inspection of all pipeline section welds or hydrotest the pipeline sections, before installation under waterbodies or wetlands.

2. If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetland, address secondary containment and refueling of these pumps in the project's Spill Prevention and Response Procedures.

3. The project sponsor shall file with the Secretary before construction a list identifying the location of all waterbodies proposed for use as a hydrostatic test water source or discharge location. This filing requirement does not apply to projects constructed under the automatic authorization provisions of the FERC's regulations.

C. INTAKE SOURCE AND RATE

1. Screen the intake hose to minimize the potential for entrainment of fish.

2. Do not use state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and/or local permitting agencies grant written permission.

3. Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.

4. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

D. DISCHARGE LOCATION, METHOD, AND RATE

1. Regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow.

2. Do not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

APPENDIX F

Gulf LNG's Unanticipated Discoveries and Emergency Procedures

Appendix 4.B
Unanticipated Discoveries and Emergency Procedures Plan

Archeological or historical sites occasionally are discovered during construction projects, regardless of whether the project area has been subjected to a complete and thorough cultural resources survey and archeological inventory. As a result, Gulf LNG Liquefaction Company, LLC has planned for unanticipated archeological discoveries. When the initial steps in the Section 106 process (i.e., the identification and evaluation of historic properties) indicate that historic properties are likely to be discovered as a result of an undertaking, an unexpected discoveries plan generally is developed for the treatment of such properties. This plan often is included as documentation submitted to the State Historic Preservation Officer (SHPO) as part of the effort to assess the effects of the undertaking (36 CFR 800.11 [a]). This document represents such a plan.

If unanticipated cultural resources are discovered, several steps will be undertaken. Initially, Gulf LNG Liquefaction Company, LLC will make reasonable efforts to avoid or minimize the damage to the cultural resource (36 CFR 800.11 [b][3]). If significant cultural resources that do not consist of human remains, funerary objects, sacred objects, or objects of traditional cultural patrimony (see Deposition of Human remains, below) are discovered, the SHPO and the Federal Energy Regulatory Commission (FERC) will be contacted. As much information as possible concerning the cultural resource, such as resource type (archeological or architectural), location, and size, as well as any information on its eligibility, will be provided to the SHPO and to the FERC.

Then, if required, a mitigation plan will be prepared for the cultural resource discovered. This plan will be sent to the SHPO and to the FERC archeologist for review and comment. The parties involved will be expected to respond with preliminary comments in a timely manner, and final comments will be expected relatively soon after the special request is made. Gulf LNG Liquefaction Company, LLC policy will be to avoid further destruction to the resource until a formal data recovery mitigation plan can be executed.

Disposition of Human Remains

The discovery and/or disturbance of human remains is a sensitive issue that must be addressed if the situation arises. It is possible that human remains could be encountered if an unmarked grave or a cemetery is impacted by the planned undertaking. If human remains are discovered inadvertently or cannot be avoided, treatment of the remains will comply with applicable portions of the Antiquities Law of Mississippi (Mississippi Code Sections 39-7-1 *et seq.*) and, if applicable, the Policy on Granting Burial Excavation Permits (October 11, 1985 of the Mississippi Department of Archives and History).

In practice, Gulf LNG Liquefaction Company, LLC will make a reasonable effort to identify and locate parties who can demonstrate direct kinship with the interred individuals. If such people are located, Gulf LNG Liquefaction Company, LLC will consult with them in a timely manner to determine the most appropriate treatment of the recovered burials. If the unanticipated discovery consists of Native American human remains or associated funerary remains, then Gulf LNG Liquefaction Company, LLC will consult the SHPO and the FERC archeologist immediately regarding the appropriate measures to handle such a discovery. If it can be determined adequately that the disturbed burials have an affinity to any federally recognized Native American group or to other ethnic groups, Gulf LNG Liquefaction Company, LLC will inform the FERC so that they can contact Native American groups.

If an association with a specific Native American group or other ethnic group cannot be made, then Gulf LNG Liquefaction Company, LLC will make a reasonable effort to locate and notify group(s) that may have a legitimate interest in the disposition of the remains based on a determination of generalized cultural affinity by a recognized professional. Qualified groups will be provided an opportunity to consult in determining the appropriate treatment of the interment. It will be the claimants' responsibility, however, to document and validate their claim.

Gulf LNG Liquefaction Company, LLC or its agents will treat all discovered human remains with dignity and respect until they are re-interred. Any costs that accrue as a result of consultation, treatment, curation, etc., will be the responsibility of Gulf LNG Liquefaction Company, LLC. If human remains are exposed inadvertently during construction, Gulf LNG Liquefaction Company, LLC will proceed as in the case of a normal emergency discovery situation. The county medical examiner or coroner will be notified; the SHPO and the FERC also will be contacted immediately. A qualified professional archeologist will investigate the reported discovery within two days. Written authorization of excavation or re-interment of any historic graves also will be obtained.

Based on previous correspondence and the requirements submitted with respect to this Project, the following agencies and/or Native American Tribes may need to be contacted, as appropriate, in the event of discovery and/or disturbance of unanticipated human remains:

Federal Energy Regulatory Commission 888
First Street, N.E.
Washington, DC 20426
202-502-8046

Mississippi Department of Archives and History
Historic Preservation Division

Jim Woodrick, Division Director
P. O. Box 571
Jackson, MS 39205-0571
601-576-6908

Jackson County Sheriff's Office
Charles Britt, Sheriff 3104
Magnolia St.
Pascagoula, MS
228-769-3024

Jackson County Coroner's Office
Vicki Broadus, RN, Coroner
4111 Amonett Street
Pascagoula, MS
228-769-3197

Native American Groups

Eastern Band of Cherokee Indians
Principal Chief Michell Hicks
P.O. Box 455
Cherokee, North Carolina 28719
828-497-7000

Mississippi Band of Choctaw Indians
Kenneth H. Carleton
Tribal Historic Preservation Officer/Archaeologist
101 Industrial Road
Choctaw, MS 39350
601-650-7316

Jenna Band of Choctaw Indians
Alina Shively
Tribal Historic Preservation Officer
1052 Chanaha Hina St, Trout, LA 71371
(318) 992-1205

Choctaw Nation of Oklahoma
Ian Thompson, PhD, RPA
Tribal Historic Preservation Officer
Senior Director Historic Preservation Dept.
Wheelock Academy Historic Site, Capitol Museum
580-924-8280

Chickasaw Nation

Karen Brunso, Tribal Historic Preservation Officer
Historic Preservation Office
P.O. Box 1548
Ada, Oklahoma 74821
(580) 399-6017
hpo@chickasaw.net

Tunica-Biloxi Tribe of Louisiana
Marshall Pierite, Chairman
150 Melacon Road, Marksville, LA 71351
(318) 253-9767

Muscogee (Creek) Nation
Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Historic and Cultural Preservation Office
Human Development Building
Hwy 75 & Loop 56
PO Box 580
Okmulgee, OK 74447
(918)732-7835

Quapaw Tribe of Oklahoma
Everett Bandy
Tribal Historic Preservation Officer
Quapaw Tribe of Oklahoma
PO Box 765
Quapaw, OK 74363

APPENDIX G

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN (SPCC)

2219 Sawdust Road #601 • The Woodlands, Texas 77380 USA • Tel: 281-955-9600 • Fax: 281-955-0369 • info@trpcorp.com • www.emergency-response-planning.com

Gulf LNG

SPCC

Plan Last Revised: 12/11/2018

Developed by:

TECHNICAL RESPONSE PLANNING

2219 Sawdust Road #601 • The Woodlands, Texas 77380 USA • Tel: 281-955-9600 • Fax : 281-955-0369 • info@trpcorp.com • www.emergency-response-planning.com

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DEFINITIONS

[40 CFR §112.2]

For the purposes of this part:

Adverse weather means weather conditions that make it difficult for response equipment and personnel to clean up or remove spilled oil, and that must be considered when identifying response systems and equipment in a response plan for the applicable operating environment. Factors to consider include significant wave height as specified in appendix E to this part (as appropriate), ice conditions, temperatures, weather-related visibility, and currents within the area in which the systems or equipment is intended to function.

Alteration means any work on a container involving cutting, burning, welding, or heating operations that changes the physical dimensions or configuration of the container.

Animal fat means a non-petroleum oil, fat, or grease of animal, fish, or marine mammal origin.

Breakout tank means a container used to relieve surges in an oil pipeline system or to receive and store oil transported by a pipeline for reinjection and continued transportation by pipeline.

Bulk storage container means any container used to store oil. These containers are used for purposes including, but not limited to, the storage of oil prior to use, while being used, or prior to further distribution in commerce. Oil-filled electrical, operating, or manufacturing equipment is not a bulk storage container.

Bunkered tank means a container constructed or placed in the ground by cutting the earth and re-covering the container in a manner that breaks the surrounding natural grade, or that lies above grade, and is covered with earth, sand, gravel, asphalt, or other material. A bunkered tank is considered an aboveground storage container for purposes of this part.

Completely buried tank means any container completely below grade and covered with earth, sand, gravel, asphalt, or other material. Containers in vaults, bunkered tanks, or partially buried tanks are considered aboveground storage containers for purposes of this part.

Complex means a facility possessing a combination of transportation-related and non-transportation-related components that is subject to the jurisdiction of more than one Federal agency under section 311(j) of the CWA.

Contiguous zone means the zone established by the United States under Article 24 of the Convention of the Territorial Sea and Contiguous Zone, that is contiguous to the territorial sea and that extends nine miles seaward from the outer limit of the territorial area.

Contract or other approved means means:

(1) A written contractual agreement with an oil spill removal organization that identifies and ensures the availability of the necessary personnel and equipment within appropriate response times; and/or

(2) A written certification by the owner or operator that the necessary personnel and equipment resources, owned or operated by the facility owner or operator, are available to respond to a discharge within appropriate response times; and/or

(3) Active membership in a local or regional oil spill removal organization that has identified and ensures adequate access through such membership to necessary personnel and equipment to respond to a discharge within appropriate response times in the specified geographic area; and/or

(4) Any other specific arrangement approved by the Regional Administrator upon request of the owner or operator.

Discharge includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of oil, but excludes discharges in compliance with a permit under section 402 of the CWA; discharges resulting from circumstances identified, reviewed, and made a part of the public record with respect to a permit issued or modified under section 402 of the CWA, and subject to a condition in such permit; or continuous or anticipated intermittent discharges from a point source, identified in a permit or permit application under section 402 of the CWA, that are caused by events occurring within the scope of relevant operating or treatment systems. For purposes of this part, the term discharge shall not include any discharge of oil that is authorized by a permit issued under section 13 of the River and Harbor Act of 1899 (33 U.S.C. 407).

Facility means any mobile or fixed, onshore or offshore building, property, parcel, lease, structure, installation, equipment, pipe, or pipeline (other than a vessel or a public vessel) used in oil well drilling operations, oil production, oil refining, oil storage, oil gathering, oil processing, oil transfer, oil distribution, and oil waste treatment, or in which oil is used, as described in appendix A to this part. The boundaries of a facility depend on several site-specific factors, including but not limited to, the ownership or operation of buildings, structures, and equipment on the same site and types of activity at the site. Contiguous or non-contiguous buildings, properties, parcels, leases, structures, installations, pipes, or pipelines under the ownership or operation of the same person may be considered separate facilities. Only this definition governs whether a facility is subject to this part.

Farm means a facility on a tract of land devoted to the production of crops or raising of animals, including fish, which produced and sold, or normally would have produced and sold, $1,000 or more of agricultural products during a year.

Fish and wildlife and sensitive environments means areas that may be identified by their legal designation or by evaluations of Area Committees (for planning) or members of the Federal On-Scene Coordinator's spill response structure (during responses). These areas may include wetlands, National and State parks, critical habitats for endangered or threatened species, wilderness and natural resource areas, marine sanctuaries and estuarine reserves, conservation areas, preserves, wildlife areas, wildlife refuges, wild and scenic rivers, recreational areas, national forests, Federal and State lands that are research national areas, heritage program areas, land trust areas, and historical and archaeological sites and parks. These areas may also include unique habitats such as aquaculture sites and agricultural surface water intakes, bird nesting areas, critical biological resource areas, designated migratory routes, and designated seasonal habitats.

Injury means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge, or exposure to a product of reactions resulting from a discharge.

Loading/unloading rack means a fixed structure (such as a platform, gangway) necessary for loading or unloading a tank truck or tank car, which is located at a facility subject to the requirements of this part. A loading/unloading rack includes a loading or unloading arm, and may include any combination of the following: piping assemblages, valves, pumps, shut-off devices, overfill sensors, or personnel safety devices.

Maximum extent practicable means within the limitations used to determine oil spill planning resources and response times for on-water recovery, shoreline protection, and cleanup for worst case discharges from onshore non-transportation-related facilities in adverse weather. It includes the planned capability to respond to a worst case discharge in adverse weather, as contained in a response plan that meets the requirements in § 112.20 or in a specific plan approved by the Regional Administrator.

Mobile refueler means a bulk storage container onboard a vehicle or towed, that is designed or used solely to store and transport fuel for transfer into or from an aircraft, motor vehicle, locomotive, vessel, ground service equipment, or other oil storage container.

Motive power container means any onboard bulk storage container used primarily to power the movement of a motor vehicle, or ancillary onboard oil-filled operational equipment. An onboard bulk storage container which is used to store or transfer oil for further distribution is not a motive power container. The definition of motive power container does not include oil drilling or workover equipment, including rigs.

Navigable waters of the United States means "navigable waters" as defined in section 502(7) of the FWPCA, and includes:

(1) All navigable waters of the United States, as defined in judicial decisions prior to passage of the 1972 Amendments to the FWPCA (Pub. L. 92-500), and tributaries of such waters;

(2) Interstate waters;

(3) Intrastate lakes, rivers, and streams which are utilized by interstate travelers for recreational or other purposes; and

(4) Intrastate lakes, rivers, and streams from which fish or shellfish are taken and sold in interstate commerce.

Non-petroleum oil means oil of any kind that is not petroleum-based, including but not limited to: Fats, oils, and greases of animal, fish, or marine mammal origin; and vegetable oils, including oils from seeds, nuts, fruits, and kernels.

Offshore facility means any facility of any kind (other than a vessel or public vessel) located in, on, or under any of the navigable waters of the United States, and any facility of any kind that is subject to the jurisdiction of the United States and is located in, on, or under any other waters.

Oil means oil of any kind or in any form, including, but not limited to: fats, oils, or greases of animal, fish, or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits, or kernels; and, other oils and greases, including petroleum, fuel oil, sludge, synthetic oils, mineral oils, oil refuse, or oil mixed with wastes other than dredged spoil.

Oil-filled operational equipment means equipment that includes an oil storage container (or multiple containers) in which the oil is present solely to support the function of the apparatus or the device. Oil-filled operational equipment is not considered a bulk storage container, and does not include oil-filled manufacturing equipment (flow-through process). Examples of oil-filled operational equipment include, but are not limited to, hydraulic systems, lubricating systems (e.g. , those for pumps, compressors and other rotating equipment, including pumpjack lubrication systems), gear boxes, machining coolant systems, heat transfer systems, transformers, circuit breakers, electrical switches, and other systems containing oil solely to enable the operation of the device.

Oil Spill Removal Organization means an entity that provides oil spill response resources, and includes any for-profit or not-for-profit contractor, cooperative, or in-house response resources that have been established in a geographic area to provide required response resources.

Onshore facility means any facility of any kind located in, on, or under any land within the United States, other than submerged lands.

Owner or operator means any person owning or operating an onshore facility or an offshore facility, and in the case of any abandoned offshore facility, the person who owned or operated or maintained the facility immediately prior to such abandonment.

Partially buried tank means a storage container that is partially inserted or constructed in the ground, but not entirely below grade, and not completely covered with earth, sand, gravel, asphalt, or other material. A partially buried tank is considered an aboveground storage container for purposes of this part.

Permanently closed means any container or facility for which:

(1) All liquid and sludge has been removed from each container and connecting line; and

(2) All connecting lines and piping have been disconnected from the container and blanked off, all valves (except for ventilation valves) have been closed and locked, and conspicuous signs have been posted on each container stating that it is a permanently closed container and noting the date of closure.

Person includes an individual, firm, corporation, association, or partnership.

Petroleum oil means petroleum in any form, including but not limited to crude oil, fuel oil, mineral oil, sludge, oil refuse, and refined products.

Produced water container means a storage container at an oil production facility used to store the produced water after initial oil/water separation, and prior to reinjection, beneficial reuse, discharge, or transfer for disposal.

Production facility means all structures (including but not limited to wells, platforms, or storage facilities), piping (including but not limited to flowlines or intra-facility gathering lines), or equipment (including but not limited to workover equipment, separation equipment, or auxiliary non-transportation-related equipment) used in the production, extraction, recovery, lifting, stabilization, separation or treating of oil (including condensate), or associated storage or measurement, and is located in an oil or gas field, at a facility. This definition governs whether such structures, piping, or equipment are subject to a specific section of this part.

Regional Administrator means the Regional Administrator of the Environmental Protection Agency, in and for the Region in which the facility is located.

Repair means any work necessary to maintain or restore a container to a condition suitable for safe operation, other than that necessary for ordinary, day-to-day maintenance to maintain the functional integrity of the container and that does not weaken the container.

Spill Prevention, Control, and Countermeasure Plan; SPCC Plan, or Plan means the document required by § 112.3 that details the equipment, workforce, procedures, and steps to prevent, control, and provide adequate countermeasures to a discharge. Storage capacity of a container means the shell capacity of the container. Transportation-related and non-transportation-related , as applied to an onshore or offshore facility, are defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the Environmental Protection Agency, dated November 24, 1971, (appendix A of this part).

United States means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, Guam, American Samoa, the U.S. Virgin Islands, and the Pacific Island Governments.

Vegetable oil means a non-petroleum oil or fat of vegetable origin, including but not limited to oils and fats derived from plant seeds, nuts, fruits, and kernels.

Vessel means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water, other than a public vessel.

Wetlands means those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include playa lakes, swamps, marshes, bogs, and similar areas such as sloughs, prairie potholes, wet meadows, prairie river overflows, mudflats, and natural ponds.

Worst case discharge for an onshore non-transportation-related facility means the largest foreseeable discharge in adverse weather conditions as determined using the worksheets in appendix D to this part.

[67 FR 47140, July 17, 2002, as amended at 71 FR 77290, Dec. 26, 2006; 73 FR 71943, Nov. 26, 2008; 73 FR 74300, Dec. 5, 2008]

REGULATORY CROSS REFERENCE TABLE

[40 CFR §112.7; §112.7(a)(1)&(5)]

This SPCC plan is organized in a manner designed to allow efficient use during an emergency as well as demonstrate this facility's conformance with the requirements listed in 40 CFR §112. This Regulatory Cross Reference Table may be used to identify the location of applicable regulatory requirements within this Plan as listed by regulatory citation.

SPCC RULE CITATION	DESCRIPTION OF RULE	PLAN SECTION(S)
§112.1	General Applicability and Scope	
(b)	General Applicability	1.0
(d)	Exemptions	1.0, 3.2.2
(e)	Statement of Compliance with other applicable laws	1.0, 4.5, 5.8
§112.2	Definitions	Preface
§112.3	Requirement to Prepare and Implement SPCC Plan	
(a)	Applicability	1.0
(d)(1)	Professional Engineer Certification	2.1, 2.2
(d)(2)	Owner/Operator Requirement to Implement	2.3
(e)	Plan Availability	1.0
§112.4	Amendment of Plan by EPA Regional Administrator	
(a)	EPA Discharge Notification	2.5.1, 4.3
(b)-(f)	Amendment of Plan by EPA Regional Administrator	2.5.2
§112.5	Amendment of the SPCC Plan	
(a)	Facility Changes	2.6.1
(b)	5 Year Review	2.6.2
(c)	P.E. Certification of Technical Amendments	2.6.1
§112.7	General requirements for SPCC Plans	1.0, 2.3
(a)(1)	Conformance with 40 CFR §112	1.0
(a)(2)	Deviations and Equivalent Environmental Protection	Preface
(a)(3)	Facility Physical Description and Diagram	3.0, Figure 3-1, Figure 3-2
(a)(3)(i)	Facility Oil Storage	3.2.2, Table 3-1 - Oil Storage
(a)(3)(ii)	Discharge Prevention Measures	3.2.3, 5.6
(a)(3)(iii)	Discharge/Drainage Controls	3.2.4, 5.2, Tables 3-1 & 3-2
(a)(3)(iv)	Spill Countermeasures	4.1
(a)(3)(v)	Disposal of Recovered Materials	4.1
(a)(3)(vi)	Contact List and Spill Notification	4.2, Preface
(a)(4)	Discharge Reporting Procedures	4.2
(a)(5)	SPCC Plan Organization for Discharge Response	Preface
(b)	Reasonable potential for equipment failure	5.1
(c)	Secondary Containment and Diversionary Structures	Table 3-2, 5.2
(d)	Secondary Containment Impracticability	5.2
(e)	Inspections, tests, and record keeping	5.3, 5.11.6
(f)	Personnel Training and Discharge Prevention Procedures	
(f)(1)	Personnel Instruction	5.4.1, 5.4.3
(f)(2)	Designated Person Accountable for Spill Prevention	5.4.2
(f)(3)	Annual Spill Briefing	5.4.3

[40 CFR §112.7; §112.7(a)(1)&(5)] (Continued)

SPCC RULE CITATION	DESCRIPTION OF RULE	PLAN SECTION(S)
(g)	Security (excluding oil production facilities)	5.5
(h)	Loading/unloading (excluding offshore facilities)	5.6
(i)	Brittle fracture evaluation requirements	5.7
(j)	Conformance with State and local requirements	1.0, 4.5, 5.8
(k)	Qualified Oil-filled operational Equipment	5.9
§112.8	Requirements for onshore facilities (excluding production facilities)	
(a)	General and specific requirements	1.0
(b)	Facility drainage	
(b)(1)	Restrain Drainage from Diked Storage Areas	5.10.1
(b)(2)	Valves Used on Diked Storage Areas	5.10.2
(b)(3)	Facility Drainage Systems from Undiked Storage Areas	5.10.3
(b)(4)	Final Discharge of Drainage	5.10.4
(b)(5)	Facility Drainage for Multiple Unit Treatment Systems	5.10.5
(c)	Bulk Storage Containers	
(c)(1)	Tank Compatibility with its Contents	5.11.1
(c)(2)	Diked Area Construction and Containment Volume for Storage Tanks	5.11.2
(c)(3)	Drainage of Rainwater from Diked Areas	5.11.3
(c)(4)	Corrosion Protection of Buried Metallic Storage Tanks	5.11.4
(c)(5)	Corrosion Protection of Partially Buried Metallic Storage Tanks	5.11.5
(c)(6)	Above Ground Tank Inspections	5.3, 5.11.6
(c)(7)	Control Leakage through Internal Heating Coils	5.11.7
(c)(8)	Engineered Overfill Prevention Features	5.11.8
(c)(9)	Observation of Effluent Treatment Facilities	5.11.9
(c)(10)	Visible Oil Leak Corrections	5.11.10
(c)(11)	Appropriate Position of Mobile or Portable Oil Storage Containers	5.11.11
(d)	Facility transfer operations, pumping, and facility process	
(d)(1)	Buried Piping Installation, Protection and Inspection	5.12.1
(d)(2)	Not-in-Service and Standby Service Terminal Connections	5.12.2
(d)(3)	Pipe Support Design	5.12.3
(d)(4)	Aboveground Valve and Pipeline Examination	5.12.4
(d)(5)	Aboveground Piping Protection from Vehicular Traffic	5.12.5
§112.20	Certification of Substantial Harm Determination	2.4, 5.13

DEVIATIONS AND EQUIVALENT ENVIRONMENTAL PROTECTION

SPCC RULE CITATION	SUMMARY OF DEVIATION AND EQUIVALENT PROTECTION	PLAN SECTION(S)

SPCC EMERGENCY CONTACT INFORMATION

* 24-hour number

SPCC Emergency Contact Information	
Primary Notification	
Gulf LNG Control Room Control Room Operator, Gulf LNG Energy, LLC	228-202-3601* (Office) ERL system initiator
Darwin Stillson Operations Supervisor, Kinder Morgan, Inc.	228-202-3649 (Office) 228-369-0331* (Mobile)
Steve Heard LNG Director, Kinder Morgan, Inc.	912-994-3806 (Office) 912-856-1884* (Mobile)
Frank Porter Senior Environmental Specialist II	205-325-3785 (Office) 205-410-9044* (Mobile)
Agency Notification	
National Response Center (NRC) - 24HR *Notification of NRC does not constitute notice to the state	800-424-8802* (Office) Reportable Spill Notification+
Mississippi Department of Environmental Quality (MDEQ)	601-961-5171 (Office) 800-222-6362* (Office)
Mississippi Emergency Management Agency (MEMA)	800-222-6362* (Office) 601-352-9100 (Alternate Phone)
Earl Ethridge Jackson County EMA	228-769-3111 (Office) Local Spill Notification
Jackson County Fire Department	228-769-3110 (Office)
Pascagoula Fire Department	228-762-3066 (Office) Emergency Services
Jackson County Sheriff Department	228-769-3064 (Office)
Pascagoula Police Department	228-762-2211 (Office)
Emergency Spill Response Contractors	
US Environmental - Spill Response	888-279-9930* (Office)
Aaron Oil	800-239-4549 (Office)
AMPOL	800-482-6765* (Office)
Action Environmental - 24HR	256-352-7097*

SUMMARY OF SPCC ACTIVITIES

Periodically, the maintenance of this SPCC Plan includes inspection of oil storage tanks and equipment, training of facility personnel, and record keeping. These actions are summarized below, with certain activities requiring documentation as noted below and within the SPCC Plan. For any questions regarding this SPCC document or changes, contact the EHS Department for assistance.

Activity	Frequency	SPCC Plan Reference
Spill Notification: Contact Gas Control to issue an Emergency Response Line (ERL) Notification	In the event of a spill or release	Page vii; Section 4.0
Containment Draining: Document secondary containment drainage for discharges to the ground or watercourse.	As required after rain events	Sections 5.11.3 & 6.0
Plan Review by Management	Every 5 years	Section 2.6.2
Periodic Visual Inspection: using Periodic SPCC Inspection Checklist in plan or equivalent	As noted in Table 3-1	Table 3-1 & Sections 5.3.1 & 6.0
Tank Integrity Testing: For tanks identified in this plan as requiring integrity testing according an industry standard.	As Noted in opsInfo	Table 3-1 & Section 5.3.2
Annual Visual Inspections: For tanks using Annual Visual Inspections in lieu of Integrity Testing, document using the Annual Inspection Checklist in plan or equivalent	Annually	Table 3-1 & Sections 5.3.2 & 6.0
Training: Provide SPCC Refresher training for oil-handling employees.	Annually	Section 5.4
Training: Provide Site Specific Plan review and Spill Briefing during a regularly scheduled safety meeting	Annually	Section 5.4
Record Retention: Inspection, training and other records must be maintained for 3 years	On-going	Section 5.3.5
Facility Changes: Immediately notify EHS of changes to facility storage tanks or secondary containment, such as tank additions, changes, removals, or repairs.	On-going	Sections 2.6.1 & 6.0

SECTION 1

1.0 GENERAL APPLICABILITY AND SCOPE

Last Revised:

1.1 Applicability and Scope

1.1 APPLICABILITY AND SCOPE

[40 CFR §112.1(b); 112.3(a)&(e); 112.7(a)(1)&(2)]

As required by Federal and State oil storage, transfer, and spill removal regulations, this Spill Prevention, Control, and Countermeasure Plan (SPCC Plan or Plan) has been prepared and implemented in accordance with the following provisions:

- **Federal Spill Prevention, Control, and Countermeasure (SPCC) Requirements** (40 CFR §112) - Oil Pollution Prevention at non-transportation related facilities meeting the following criteria:
  - Due to its location, could reasonably be expected to discharge oil in quantities that may be harmful into or upon the navigable waters of the United States or adjoining shorelines; and
  - Having a completely buried storage capacity in excess of 42,000 gallons of oil, excluding the capacity of a completely buried tank and connected underground piping, underground ancillary equipment, and containment systems, that is currently subject to all of the technical requirements of 40 CFR 280 or all of the technical requirements of a State program approved under part 281 (Underground Storage Tank regulations); or
  - Having an aggregate aboveground oil storage capacity in excess of 1,320 gallons, excluding containers with a capacity less than 55 gallons.
- **Other Applicable Requirements** - All applicable State Specific and Local Requirements are incorporated into this Plan as necessary.
- **Deviations from the Requirements** - All deviations from applicable requirements are summarized on page vii of this Plan.

The intended purpose of this SPCC Plan is to manage potential sources of oil releases, preclude a release to the environment, and outline appropriate initial responses in the event of an oil spill which could threaten human health or the environment. Although this Plan is consistent with federal requirements for SPCC Plans, the existence of this Plan for this facility does not necessarily reflect the determination that an SPCC Plan is required under federal law for this facility. The Plan for this facility may be established as a result of internal evaluations of appropriate facility management unrelated to federal requirements. In addition, the facility is a transportation-related onshore facility because it is part of an *"[i]nterstate and intrastate onshore and offshore pipeline systems including pumps and appurtenances related thereto as well as in-line or breakout storage tanks needed for the continuous operation of a pipeline system, and pipelines from onshore and offshore oil production facilities,"* as defined in 40 CFR 112.2 and Appendix A to Part 112-Memorandum of Understanding between the Secretary of Transportation and the Administrator of the Environmental Protection Agency. As such, this facility may contain compressor engines and other equipment that are part of and appurtenances to the pipeline system. While this equipment may store oil, the equipment and associated oil are transportation-related onshore facilities within DOT jurisdiction and not subject to the SPCC requirements and may therefore not be included in this plan. Any DOT jurisdictional equipment shown in this plan is shown only for reference.

A complete copy of this SPCC Plan is maintained at the facility, if the facility is normally attended at least four hours per day, or otherwise at the nearest regional field office and will be available to the EPA Regional Administrator for onsite review during normal working hours.

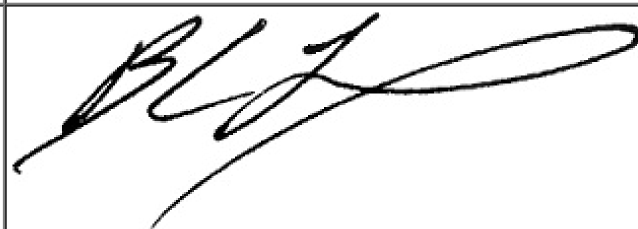
SECTION 2

Last Revised: December 11, 2018

2.0 CERTIFICATION AND REVIEWS

2.1 PROFESSIONAL ENGINEER CERTIFICATION

[40 CFR §112.3(d)(1)(i)]

40 CFR, Part 112.3(d) Professional Engineer Certification	
Being familiar with the provisions of 40 CFR, Part 112, I attest to the following: • I am familiar with the requirements of this part • I or my agent has visited and examined the Facility • The Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards, and with the requirements of this part • Procedures for required inspections and testing have been established • The Plan is adequate for the Facility	
Printed Name of Registered Professional Engineer:	Brian C. Laine
Signature of Registered Professional Engineer:	
Date:	3/24/2017
Registration No.:	19099
Seal: 	

Note: When Applicable, Certification is conditional pending satisfactory resolution of the required improvements listed in Section 2.1.1. Applicable: No

2.1.1 Certification Conditions

Rule Citation	Discrepancy	Remedy	Required Due Date	Date Completed / Completed By

2.2 DECLARATION OF THE AGENT FOR THE PROFESSIONAL ENGINEER

[40 CFR §112.3(d)(1)(ii)]

"I hereby certify that being familiar with provisions of the SPCC rules (40 CFR §112), I served as an agent for the Professional Engineer certifying this SPCC Plan by visiting the site, examining the facility, and providing technical details of the site layout and features, including but not limited to secondary containment construction details and dimensions."

Frank Porter

Senior EHS Specialist II

11/2/2016

2.3 MANAGEMENT COMMITMENT CERTIFICATION

[40 CFR §112.3(d)(2); §112.7; §112.7(d)(2)]

Management is committed to the implementation of the procedures outlined in this SPCC Plan and the prevention of releases of oil to navigable waters of the United States and the environment. Management understands that certification of this Plan by the Professional Engineer in no way relieves the owner or operator of this facility of the duty to prepare and fully implement this Plan in accordance with provisions of the SPCC rules (40 CFR §112). This SPCC Plan is approved by the management personnel below at a level of authority to commit the necessary resources to fully implement the Plan, including the commitment of manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that may be harmful.

"I hereby attest that I am familiar with the requirements outlined in this plan and am committed to dedicating any and all resources necessary to implement all provisions of this SPCC Plan."

Name:	Steve Heard	**Signature:**	Steve Heard
Title:	LNG Director	**Date:**	12/11/2018

2.4 CERTIFICATION OF SUBSTANTIAL HARM DETERMINATION

[40 CFR §112.20; Appendix C, Attachment C-II]

Facility distance to navigable water; mark the appropriate line.			
0-1/4 ☒	1/4-1/2 mile ☐	1/2 - 1 mile ☐	> 1 mile ☐
APPLICABILITY OF SUBSTANTIAL HARM CRITERIA			
Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?			
YES ☐ NO ☒			
Does the facility have a total oil storage capacity greater than or equal to one million gallons and, within any storage area, does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation?			
YES ☐ NO ☒			
Does the facility have a total oil storage capacity greater than or equal to one million gallons and is the facility located at a distance (as calculated using the appropriate formula in or a comparable formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments?			
YES ☐ NO ☒			
Does the facility have a total oil storage capacity greater than or equal to one million gallons and is the facility located at a distance (using the appropriate formula in or a comparable formula) such that a discharge from the facility would shut down a drinking water intake?			
YES ☐ NO ☒			
Does the facility have a total oil storage capacity greater than or equal to one million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last five years?			
YES ☐ NO ☒			

CERTIFICATION	
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and that based on my inquiry of those individuals responsible for obtaining information, I believe that the submitted information is true, accurate, and complete.	
Signature: Frank Porter	Date: 11/2/2016
Name: Frank Porter	Title: Senior EHS Specialist II

2.5 AMENDMENT OF PLAN BY EPA REGIONAL ADMINISTRATOR

2.5.1 EPA Discharge Notification

[40 CFR §112.4(a)]

In the event of a release of any kind, implement the ERL System (Section 4.2) to determine if the release is immediately reportable to State or Federal Agencies. The EPA requires notification of the Regional Administrator for any release or discharge of oil, in any form, from this facility directly or indirectly into or upon the navigable waters of the United States or its adjoining shorelines with more than:

- 1,000-gallons in a single discharge, or
- 42-gallons in each of two or more discharges occurring within any consecutive 12-month period

Contact EHS to document the discharge details for submittal to the EPA's Regional Administrator (RA) within sixty-days (60) of the spill event. Use the "EPA Release Notification Form," available in Section 6 or an equivalent form to ensure that all required information is reported to the EPA Regional Administrator. All spills meeting the criteria above shall be recorded on the Reportable Spill History Log included in Section 6 of this Plan.

2.5.2 Amendment of Plan by EPA Regional Administrator

[40 CFR §112.4(b)-(f)]

This section only applies in the event of a release of oil as described above. A copy of the information submitted to the EPA Regional Administrator will also be supplied to all applicable local and state agencies for their review. The EPA Regional Administrator will review comments from the local and state agencies and decide if amendments to this plan are required. The company will have 30 days to either comply with the required amendments to the Plan or to provide a written appeal in accordance with 40 CFR § 112.4.

2.6 SPCC REVIEWS AND AMENDMENTS

2.6.1 Facility Changes and Amendments

[40 CFR §112.5(a)&(c)]

In accordance with SPCC regulations, the owner or operator of a facility must *"Amend the SPCC Plan for your facility in accordance with the general requirements in § 112.7, and with any specific section of this part applicable to your facility, when there is a change in the facility design, construction, operation, or maintenance that materially affects its potential for a discharge as described in § 112.1(b)."* To this end, all facility modifications shall be reviewed to determine the modification's impact on the facility's potential for a discharge and required amendments to this Plan. This Plan will be reviewed periodically for changes to ensure continued compliance. Any changes identified can be documented utilizing the *Facility Change Form* in Section 6 of this plan and submitted to EHS Representative for the facility, who will determine if an amendment to the Plan is required. If an amendment is required, the EHS Representative will determine if the amendment is technical or administrative.

Technical amendments, such as changes to the facility's design, operation, or maintenance that *materially affect* the potential for an oil spill or release at the facility, will require a PE review and certification as soon as possible but within six (6) months after any changes are made at the facility.

Technical amendments include, but are not limited to:

- Adding, replacing, or removing of tanks
- Reconstruction, replacement, or installation of piping systems
- Construction, alteration, or demolition of secondary containment
- Modifications of testing, inspection, and maintenance procedures

Administrative amendments, such as changes to the facility's personnel or contact information that *does not materially affect* the potential for an oil spill or release at the facility, will not require a PE review and certification.

Administrative amendments can be made as necessary and include, but are not limited to:

- Changes or updates to facility personnel or contact information
- Changes to training materials
- Other non-technical text changes

Any amendments made to the Plan will be implemented as soon as possible but not later than six (6) months following the preparation of the amendment. All amendments to the Plan will be recorded in Table 2-1: *SPCC Plan Amendment Log*.

Plan review for identification of facility changes under this section will be conducted at a frequency that will allow identification of changes and preparation of Plan amendments prior to the 6 month deadline. Periodic review schedule and documentation of completion are maintained in the company's opsInfo compliance software system.

2.6.2 Five Year Review

[40 CFR §112.5(b)]

In addition to conducting periodic Plan reviews to identify required amendments due to facility changes, SPCC regulations require that the entire Plan be reviewed and evaluated at least once every 5 years to identify more effective prevention and control technologies. The plan must be amended if the review identifies new field proven, prevention and control technologies that will significantly reduce the likelihood of a discharge as described in 40 CFR §112.1(b). The amendment must be issued within 6 months of the review and the amendment must be implemented as soon as possible, but not later than 6 months after issuance.

The first review shall be completed within 5 years of the certification date shown is Section 2.1 of this plan. Documentation of this review is captured in Table 2-2 as well as in the company's opsInfo compliance tracking software system. Any identified Plan Amendments shall be recorded on Table 2-1.

Table 2-1 - SPCC Plan Amendment Log

Date of Amendment	General Description of Change Made[1]	Page Numbers of Changes	Name of Re-Certifying PE[2]	Name of Person Completing Amendment
11/2/2016	SPCC | 2.0 Certification and Reviews | 2.1 Professional Engineer Certification - Certification of plan in new template.	All	Brian C. Laine	Frank Porter
3/22/2017	SPCC | 3.0 Facility Information | 3.2 Facility Description | Table 3-1 - Oil Storage Several minor changes made to Table 3-1. Examples include: Updates to secondary containment calculations, containment type change for transformers in main transformer area, correction of containment capacity for unloading arm hydraulic unit.	Table 3-1	Brian Laine	Frank Porter
3/22/2017	SPCC | 7.0 Additional Documentation | 7.0 Additional Documentation Updated secondary containment calculation worksheet to accurately reflect capacities.	Section 7.0	Brian Laine	Frank Porter
3/24/2017	SPCC | 3.0 Facility Information | 3.2 Facility Description | Table 3-1 - Oil Storage Changed capacity of K-11 Used Oil tank on Table 3-1 to match tank ID/Name plate.	Table 3-1	Brian Laine	Frank Porter
3/24/2017	SPCC | 7.0 Additional Documentation | 7.0 Additional Documentation Updated the secondary containment calculations to reflect K-11 Used Oil Tank capacity as 132 gallons to match the capacity identified on the tank's ID/Name plate (500 L = 132 gallons).	Section 7 - Additional information. Secondary Containment Calculations.	Brian Laine	Frank Porter
3/24/2017	SPCC | 2.0 Certification and Reviews | 2.1 Professional Engineer Certification - Re-Certification based on 3/22/2017 and 3/24/2017 Modifications.	Table 3-1 and Section 7.0	Brian C. Laine	Brian Laine
12/11/2018	SPCC | SPCC Emergency Contact Information | SPCC Emergency Contact Information | Insert Darwin Stillson, Kinder Morgan, Inc. Updated Emergency Contact Info: removed J.Bockenstette & B.Gilliland, added D.Stillson	Preface - 8	Administrative change - PE not required	Frank Porter
12/11/2018	SPCC | 2.0 Certification and Reviews | 2.3 Management Commitment Certification Update to Management Certification: replaced B.Gilliland with S.Heard.	Page 2-5	Administrative change - PE not required	Frank Porter

[1] Note whether the change is technical amendment or administrative amendment. Technical changes will require a PE re-certification. See Section 2.6 for additional information on amendment requirements to this SPCC Plan.

[2] Non-technical or administrative changes do not require a PE certification.

Table 2-2 - SPCC Plan 5 Year Review Log

Date of Review	Representative, Name and Title[3]	Required Changes	SPCC Plan Review Finding
5/10/2018	Brian C. Laine PE, Manager Environmental Services	NA- No new applicable spill control technologies	I have completed review and evaluation of the SPCC Plan and WILL NOT amend the Plan as a result.

3 Representative conducting 5 year review should be familiar with SPCC regulations, the facility and applicable prevention and control technologies. For further details on the 5 year review, please see Section 2.6.2 of this document.

SECTION 3
3.0 FACILITY INFORMATION

Last Revised: August 10, 2017

3.1 FACILITY LOCATION INFORMATION

[40 CFR §112.7(a)(3)]

Facility Name:	Gulf LNG
Facility Location:	125 Industrial Road Pascagoula, MS 39581 30 ° 19 ' 28.73 " N / 88 ° 30 ' 15.56 " W Facility Location is shown on Figure 3-1 Site Location Map
Driving Directions to/from Pascagoula, MS:	From downtown Pascagoula, MS, head east on Pascagoula Street toward US-90. Turn right onto US-90 E/Denny Ave and travel 3.2 miles. Use the left lane to merge onto MS-63 and travel 0.4 mile. Continue onto MS-611/Industrial Road and travel 4.1 miles. Turn left onto the Gulf LNG access road and travel approximately 1 mile to the entrance of the facility.
Facility Owner / Operator:	Kinder Morgan - Gulf LNG Energy, LLC 125 Industrial Road Pascagoula, MS 39581

3.2 FACILITY DESCRIPTION

[40 CFR Part 112.7(a) (3)]

Gulf LNG Energy is a liquefied natural gas (LNG) receiving terminal, storage, and gasification facility in Jackson County Mississippi, southeast of the City of Pascagoula. LNG is supplied and delivered to Gulf LNG via LNG carriers, unloaded, stored in two LNG storage tanks, regasified, and delivered by sendout pipe to metering facilities which connect to nearby, third-party-owned, interstate natural gas transmission systems which supply United States gas markets, as well as a gas treatment facility. The facility includes storage facilities for oil, as defined in 40 CFR §112.2.

3.2.1 Proximity to Navigable Waters

[40 CFR §109.5(b)(1)]

Gulf LNG Energy is a port facility located immediately on the Bayou Casotte Channel in the Mississippi Sound

3.2.2 Location Map

[40 CFR §112.7; §112.7(a)(3)]

This location map shows the location of facility in relation to nearest population center as well as the nearest navigable waterways and pertinent topographic details that may be required to contain any releases from the facility prior to impacting the navigable water body.

FIGURE 3-1 - SITE LOCATION MAP

FIGURE 3-1 - SITE LOCATION MAP, CONTINUED

3.2.3 Facility Diagram

[40 CFR §112.7(a)(3)]

Per the requirements listed in 40 CFR §112.7 (a)(3); the facility diagram(s) on the following page(s) shows the location of the following facility elements if applicable to the site:

- Aboveground storage tanks with greater than 55 gallons of oil storage (including ID #, location, and contents);
- Underground storage tanks (including location and contents). This includes those that are subject to the SPCC rule or those that are exempt;
- Storage area(s) where mobile or portable containers (55 gallons or greater) are located;
- Transfer stations such as oil transfer areas including loading/unloading racks and loading/unloading areas;
- Oil-filled Operational Equipment (Containing 55 gallons or more) such as; hydraulic systems, lubricating systems, gear boxes, machining coolant systems, heat transfer systems, transformers, circuit breakers, electrical switches, and other systems containing oil solely to enable the operation of the device. (including location and contents);
- Connecting piping;
- Oil pits or ponds (at oil production facilities);
- Oil production facility stock tanks, separation equipment and produced water containers;
- Any other bulk storage or oil-filled operational equipment at an oil production facility; and
- Flow lines and intra-facility gathering lines at a production facility (this includes those that are subject to the SPCC rule and exempt intra-facility gathering lines subject to the requirements of 49 CFR part 192 or 195 as described in §112.1(d)(11)).

In addition to the required elements above, the facility diagram may also include the following information:

- Direction of flow in the event of a discharge (which can serve to address the SPCC requirement under §112.7(b));
- Storm drain inlets and surface waters that could be affected by a discharge;
- Location of firefighting equipment and pipe stands for foam application;
- Location of valves or drainage system control that could be used in the event of a discharge to contain oil on the site; and
- The location of important piping appurtenances such as valves, checks or other piping-related equipment (to aid in facility response and inspection efforts);

FIGURE 3-2 - FACILITY DIAGRAM

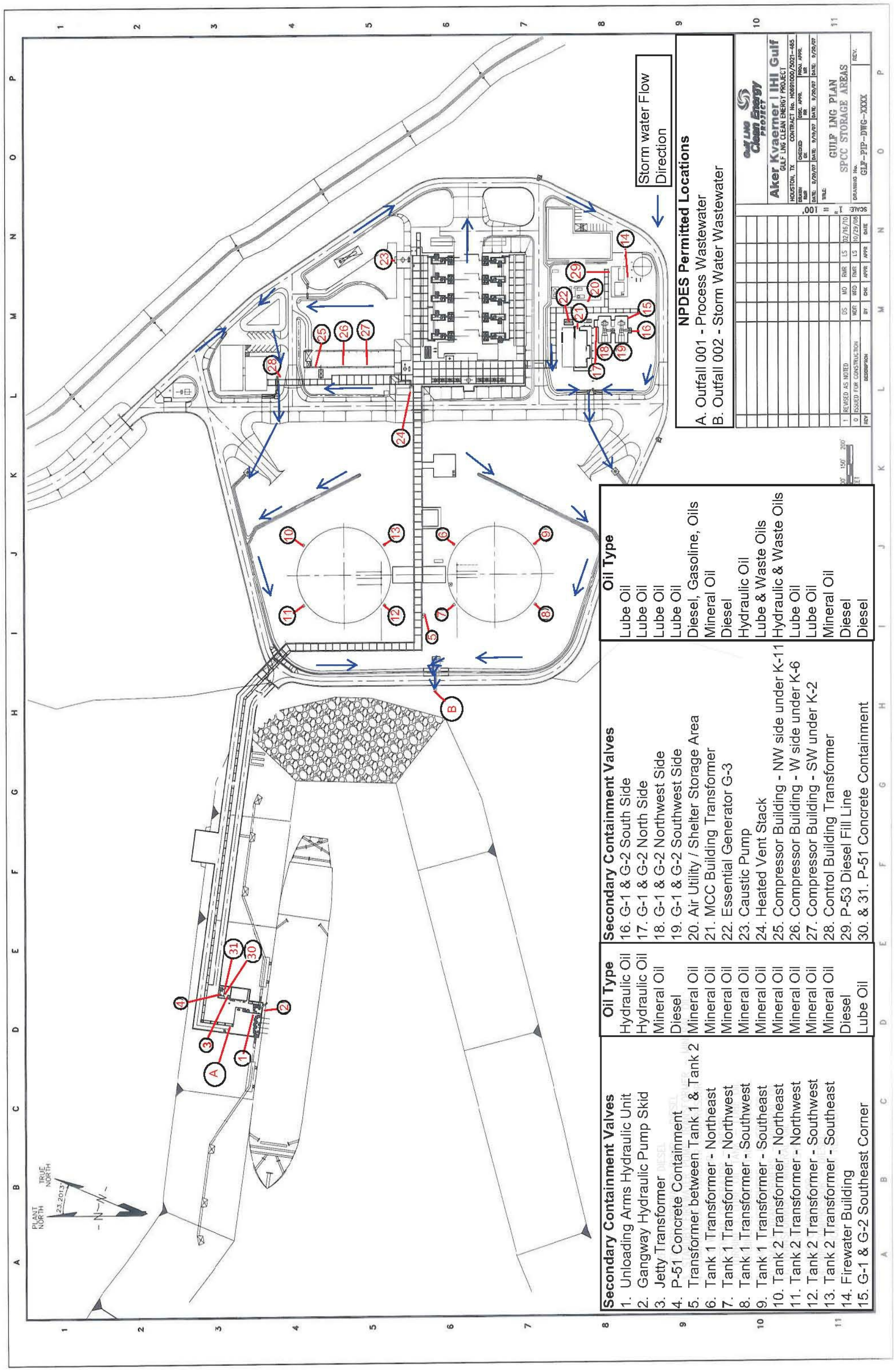
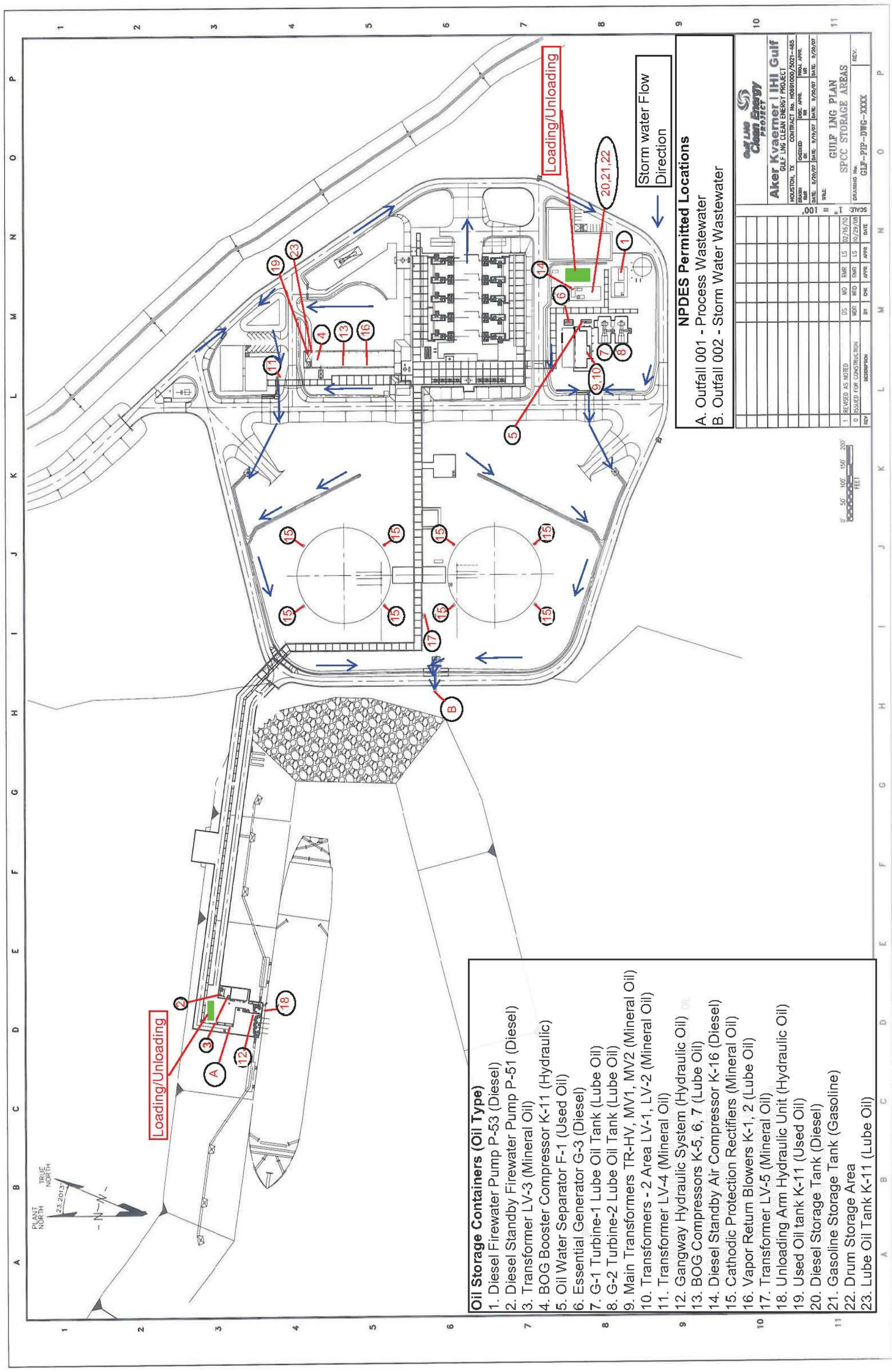


FIGURE 3-2 - FACILITY DIAGRAM, CONTINUED



3.2.4 Facility Oil Storage

Oil, as defined in 40 CFR §112.2, is stored at the facility. An inventory of the materials at the facility that are regulated under this SPCC Plan is presented in Table 3-1. The location of bulk oil storage containers and other qualified oil-filled equipment may be found on Figure 3-2 Facility Diagram.

The facility is a transportation-related onshore facility because it is part of an “[i]nterstate and intrastate onshore and offshore pipeline systems including pumps and appurtenances related thereto as well as in-line or breakout storage tanks needed for the continuous operation of a pipeline system, and pipelines from onshore and offshore oil production facilities,” as defined in 40 CFR 112.2 and Appendix A to Part 112-Memorandum of Understanding between the Secretary of Transportation and the Administrator of the Environmental Protection Agency. As such, this facility may contain compressor engines and other equipment that are part of and appurtenances to the pipeline system. While this equipment may store oil, the equipment and associated oil are transportation-related onshore facilities within DOT jurisdiction and not subject to the SPCC requirements and may therefore not be included in this Plan. Any DOT jurisdictional equipment shown in this Plan is shown only for reference.

3.2.5 Discharge Prevention Measures

[40 CFR §112.7(a)(3)(ii)]

This facility employs a variety of Discharge Prevention Measures including, but not limited to, oil handling employee and contractor training, equipment inspection and oil handling/loading/unloading procedures. Further detailed information on measures implemented at this facility is included in Section 5.0 of this document.

3.2.6 Discharge/Drainage Controls

[40 CFR §112.7(a)(3)(iii)]

The facility employs a variety of Discharge and Drainage Control systems, such as secondary containment around containers for the control of any drips, leaks, or spills that may occur. Detailed information can be found in Table 3-1 and Section 5.10 of this document.

Table 3-1 - Oil Storage

Per the requirements listed in 40 CFR §112.7 (a)(3) & (b); Table 3-1 identifies the contents and volume of each applicable storage container identified in Figure 3-2, including oil-filled operational equipment. Table 3-1 also identifies the following information:

- Overfill prevention method
- Secondary containment description and capacity
- Oil-filled Operational Equipment, noted as (OOE)
- Flow Through Process Vessels, noted as (PV)
- Maximum discharge rate and direction from the potential of equipment failure, such as transfer pipe, hose leaks or tank overfill.
- Integrity Testing and Inspection Methods:
    - PD = Periodic inspection conducted on a daily basis
    - PM = Periodic inspection conducted on a monthly basis
    - PQ = Periodic inspection conducted on a quarterly basis
    - AVI = Annual Visual Inspection
    - SP001 = Steel Tank Institute (STI) Standard SP001
    - API 12R = American Petroleum Institute (API) Standard 12R
    - API 653 = American Petroleum Institute (API) Standard 653
    - FTPI 2007-1 = Fiberglass Tank and Pipe Institute Standard 2007-1
- General Containment Methods should be identified as
    - Dikes, berms, or retaining walls sufficiently impervious to contain oil;
    - Curbing or drip pans;
    - Sumps and collection systems;
    - Culverting, gutters, or other drainage systems;
    - Weirs, booms, or other barriers;
    - Spill diversion ponds;
    - Retention ponds; or
    - Sorbent materials.

Bulk Storage Containers				Secondary Containment		Potential Discharge Prediction		Integrity Testing and Inspection
Container Name	Product Content	Storage Capacity (gal)	Overfill Prevention Feature	Containment Description	Capacity, Net. (gal)	Discharge Rate, Max. (gal/min)	Direction of Flow	Method
Diesel Firewater Pump P-53	Diesel	700	Liquid-Level Gauge	Double Wall Tank and Concrete Secondary Containment	>1,000	60	West	PM/AVI
Diesel Standby Firewater Pump P-51	Diesel	700	Liquid-Level Gauge	Double Wall Tank and Concrete Secondary Containment	798	60	Radial	PM/AVI
Transformer LV-3	Mineral Oil	228	No routine transfers	Concrete Dike	441	60	Radial	PM
BOG Booster Compressor K-11	Hydraulic Oil	68	Liquid-Level Gauge	Concrete Floor and Curbing for Shelter	>5,000	30	West	PM
Oily Water Separator F-1* (Not subject to SPCC)	Used Oil/Oily Water	8,000	Liquid-Level Gauge	Double Walled and coated. Leak detection system installed.	N/A - Process Vessel	60	N/A	N/A
Essential Generator G-3	Diesel	300	Liquid-Level Gauge	Double Wall and Secondary Containment	1,458	60	West	PM
G-1 Turbine 1	Lube Oil	1,600	Liquid-Level Gauge	Concrete Dike	>5,000	30	West	PM
G-2 Turbine 2	Lube Oil	1,600	Liquid-Level Gauge	Concrete Dike	>5,000	30	West	PM
Main Transformers (3) TR-HV, TR-MV1 & TR-MV2	Mineral Oil	10,430 (6,720, 1,855 & 1,855)	No routine transfers	Concrete curbing & flow to oil/water separator	NA - Flows to Oil/Water Separator	60	West	PM
Transformers (2) in Main Transformer Area LV-1 & LV-2	Mineral Oil	978 (489 & 489)	No routine transfers	Concrete curbing & flow to oil/water separator	NA - Flows to Oil/Water Separator	60	West	PM

Table 3-1 - Oil Storage, Continued

Bulk Storage Containers				Secondary Containment		Potential Discharge Prediction		Integrity Testing and Inspection
Container Name	Product Content	Storage Capacity (gal)	Overfill Prevention Feature	Containment Description	Capacity, Net. (gal)	Discharge Rate, Max. (gal/min)	Direction of Flow	Method
Transformer LV-4	Mineral Oil	228	No routine transfers	Concrete Dike	262	60	West	PM
Gangway Hydraulic System	Hydraulic Oil	100	No routine transfers	Secondary Containment Tank	111	30	Radial	PM
BOG Compressors (3) K-5, 6, 7	Lube Oil	330 (110 each)	No routine transfers	Concrete Floor and Curbing for Shelter	>5,000	30	West	PM
Diesel Standby Air Compressor K-16	Diesel	140	Liquid-Level Gauge	Concrete Dike	6,209	60	West	PM
Cathodic Protection Rectifiers (8)	Mineral Oil	880 (110 each)	No routine transfers	Concrete Dike	123 (each)	60	West	PM
Vapor Return Blowers K-1 & 2	Lube Oil	440 (220 each)	No routine transfers	Concrete Floor and Curbing for Shelter	>5,000	30	West	PM
Transformer LV-5	Mineral Oil	298	No routine transfers	Concrete Dike	350	60	West	PM
Unloading Arm Hydraulic Unit	Hydraulic Oil	53	No routine transfers	Concrete Dike	59	30	Radial	PM
K-11 Used Oil Tank	Used Oil	132	Liquid-Level Gauge	Double Wall Tank and Concrete Secondary Containment	>5,000	30	West	PM
Diesel Storage Tank	Diesel	120	Liquid-Level Gauge	Double Wall Tank and Concrete Secondary Containment	6,209	60	West	PM

Table 3-1 - Oil Storage, Continued

Bulk Storage Containers				Secondary Containment		Potential Discharge Prediction		Integrity Testing and Inspection
Container Name	Product Content	Storage Capacity (gal)	Overfill Prevention Feature	Containment Description	Capacity, Net. (gal)	Discharge Rate, Max. (gal/min)	Direction of Flow	Method
Gasoline Storage Tank	Gasoline	120	Liquid-Level Gauge	Double Wall Tank and Concrete Secondary Containment	6,209	60	West	PM
Miscellaneous Drum Storage	New and Used Oil	1,650 (Max 30 drums)	Visual Inspection	Concrete Dike	6,209	30	West	PM
K-11 Lube Oil Tank	Lube Oil	280	Liquid-Level Gauge	Double Wall Tank and Concrete Secondary Containment	>5,000	30	West	PM

Table 3-2 - Oil Transfer Areas

Per the requirements listed in 40 CFR §112.7 (a)(3) & (b); this table identifies the contents of each applicable storage container identified in Figure 3-2. A "transfer or loading/unloading area" is any area of a facility where oil is transferred between bulk storage containers and tank truck(s). These areas are subject to the general containment requirements of 112.7(c) using spill kits and/or other active response measures. Predicted Maximum Discharge Rate assumed to be from the potential of equipment failure, such as transfer pipe or hose leaks or tank overfill.

Transfer Area				Potential Discharge Prediction	
Name	**Location**	**Product Transferred**	**Secondary Containment Type**	**Discharge Rate, Max. (Gal/Min)**	**Direction of Flow**
Dock Transfer Area	End of dock	Diesel	Spill Kit, Immediate Response	100	Radial
Utility Shelter Area	East of Maintenance Bldg	Lube Oil, Used Oil, Diesel	Spill Kit, Immediate Response	100	South

Note: ** Items that are non-SPCC regulated and shown for reference only.

Table 3-3 - Secondary Containment Calculations

Secondary containment calculations can be found in Section 7.0 "Additional Documentation" of this plan.

SECTION 4

Last Revised: August 10, 2017

4.0 SPILL RESPONSE AND NOTIFICATION

4.1 SPILL COUNTERMEASURES AND RESPONSE PROCEDURES

[40 CFR §112.7(a)(3)(iv)&(v)]

This SPCC plan is developed to compliment the facility's Emergency Response Plan (ERP), which was developed in accordance with Kinder Morgan O&M Procedure 1900. The ERP contains elements of an oil spill contingency plan, as described in 40 CFR §112. Pertinent sections of the Emergency Response Plan for this SPCC Plan are as follows:

- **O&M Form OM1900-02 - Facility Personnel Responsibilities**
- **O&M Form OM1900-03 - Primary Notification Contacts**
- **O&M Form OM1900-04 - Emergency Contacts**
- **O&M Form OM1900-06 - Emergency Shutdown Device Locations**
- **O&M Form OM1900-07 - Facility Isolation**
- **O&M Form OM1900-10 - On Site Emergency Response Equipment**
- **O&M Form OM1900-11 - Contractors and Available Equipment**

The information in the ERP should be used to supplement the information available in this Plan.

All Incident Response Procedures shall be in accordance with O&M Procedures 159 and 1201. At a minimum, the following steps will be taken to reduce the magnitude of the spill and initiate containment and cleanup:

1. Account for personnel, assure their safety, and evacuate if a fire, explosion, or exposure hazard exists;
2. Remove all sources of ignition and position fire suppression equipment. Alert the local Fire Department if necessary;
3. Shut off pumps and close valves that allow fuel to flow to the segment of the system causing the spill. Plug or patch leak/discharge if possible;
4. Alert adjacent property owners/operators, as warranted by the incident;
5. As safety allows, attempt to contain the spill. Prevent or divert spilled fuel from approaching structures or draining towards water or storm drains using spill response material, such as sorbent material, spark-proof shovels, brooms, neoprene gloves, and other materials;
6. Once spill is safely contained, commence initial clean-up activities, including removal of oil from secondary containment via pumping and containerizing of impacted materials such as soil and used sorbent materials;
7. The Operations Supervisor or EHS representative will conduct a safety assessment and determine additional cleanup actions, as needed;
8. All recovered material will be placed in DOT approved containers (i.e., drums, roll-offs, etc.) and stored onsite pending waste characterization as coordinated by the facility's Environmental Representative. Based on waste characterization results, the Environmental Representative will coordinate proper handling/disposal/recycling in accordance with applicable laws and regulations; and
9. Update the Reportable Spill History Log in Section 6.

For all occurrences, the Incident Commander and the ERL System protocol will evaluate the incident for any additional requirements.

4.2 SPILL NOTIFICATION AND REPORTING PROCEDURES

[40 CFR §112.7(a)(3)(iv)&(v)]

In the event of a spill or release, utilize the Kinder Morgan Emergency Response Line (ERL) system by notifying Gas Control and implement the facility's Emergency Response Plan. The ERL process is designed to enhance and facilitate real-time communication of emergency events to all necessary Kinder Morgan stakeholders of incidents, including operations, corporate personnel, EHS, and local, state, or federal agency. Detailed notification and reporting procedures can be found in O&M Procedure 159 *"Emergency Reporting and Investigation."* Where required, determinations of agency notifications will be made by Kinder Morgan via the ERL system. In the event the ERL system is unavailable, notification can be made directly by the facility using the contact information provided in the *SPCC Emergency Contact Information* section of the document on Preface 8.

4.3 EPA DISCHARGE NOTIFICATION

[40 CFR §112.4(a)]

The EPA requires notification of the Regional Administrator for any release or discharge, in any form, from this facility directly or indirectly into or upon the navigable waters of the United States or its adjoining shorelines with more than:

- 1,000-gallons in a single discharge, or
- 42-gallons in each of two or more discharges occurring within any consecutive 12-month period

Contact EHS to document the discharge details for submittal to the EPA's Regional Administrator (RA) within sixty-days (60) of the spill event. Use the *"EPA Release Notification Form,"* available in Section 6 or an equivalent form to ensure that all required information is reported to the EPA Regional Administrator. All spills meeting the criteria above shall be recorded on the Reportable Spill History Log included in Section 6 of this Plan.

4.4 NATIONAL RESPONSE CENTER NOTIFICATION

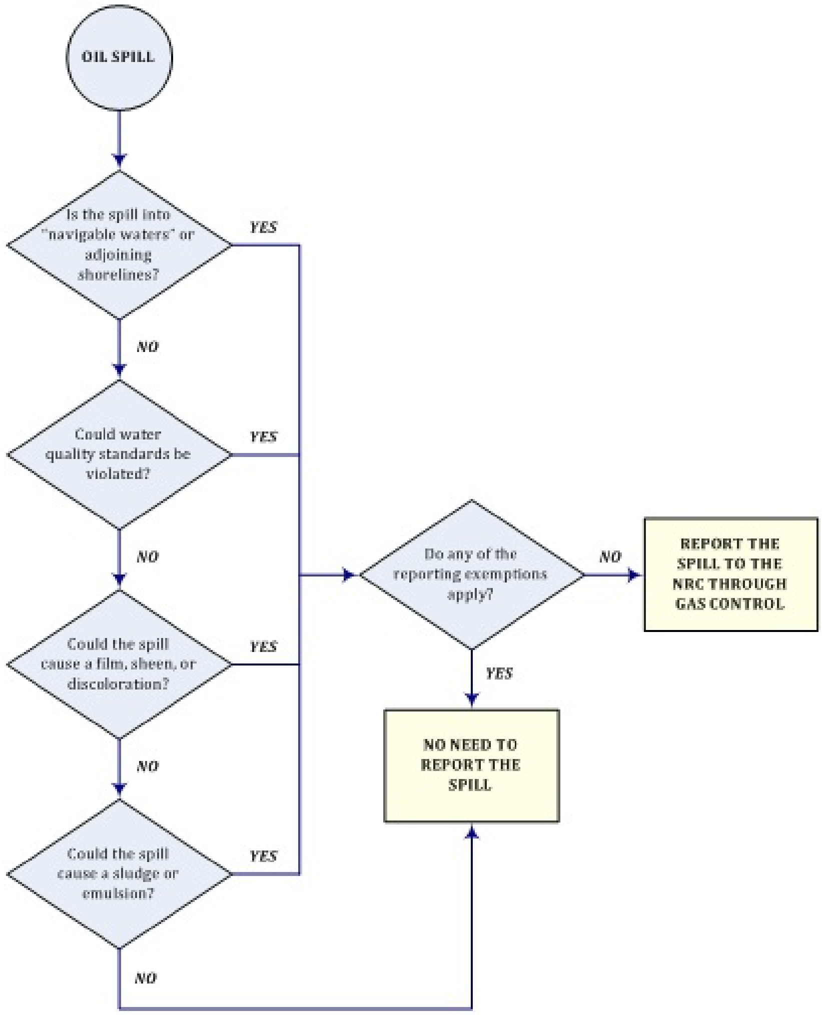
[40 CFR §110]

Certain spills or releases of oil products must be reported by the EHS Group to the National Response Center (NRC), as determined using the following flowchart. Note, this only applies to SPCC reporting criteria and does not account for reporting under other regulations, such as PHMSA. As previously noted, agency notification requirements will be determined by Kinder Morgan through the ERL System.

When notifying the National Response Center, be prepared to provide the following usually requested information:

- Name, organization and telephone number for caller
- Name, organization and contact information for party responsible for the incident
- Exact address or location of the incident
- Contact information of the Incident Commander
- Date and time of incident
- Cause of incident
- Type of oil discharged
- Estimated quantity discharged outside of containment
- Danger or threat posed by incident
- Number and type of injuries
- Weather conditions at the incident location
- Other information to help emergency personnel respond to incident

FIGURE 4-1 - NRC FEDERAL AGENCY REPORTING FLOWCHART



4.5 STATE AND LOCAL AGENCY NOTIFICATION

The State Agencies may also require notification of an oil spill or release to the appropriate agency office. Where required, notification to the State and Local Agencies will be made by Kinder Morgan via the ERL system.

SECTION 5

Last Revised: August 10, 2017

5.0 PREVENTION METHODS PROVIDED

SECTION 5
5.0 PREVENTION METHODS PROVIDED, CONTINUED

5.9 Oil Filled Operational Equipment

5.10 Facility Drainage

5.10.1 Restrain Drainage from Diked Storage Areas

5.10.2 Valves Used on Diked Storage Area

5.10.3 Facility Drainage System from Undiked Areas

5.10.4 Final Discharge of Drainage

5.10.5 Facility Drainage from Multiple Unit Treatment Systems and Equipment

5.11 Bulk Storage Tanks/Secondary Containment

5.11.1 Tank Compatibility with its Contents

5.11.2 Diked Area Construction and Containment Volume for Storage Tanks

5.11.3 Drainage of Rainwater from Diked Areas

5.11.4 Corrosion Protection of Buried Metallic Storage Tanks

5.11.5 Corrosion Protection of Partially Buried Metallic Storage Tanks

5.11.6 Aboveground Tank Inspections

5.11.7 Control of Leakage through Internal Heating Coils

5.11.8 Engineered Overfill Prevention Features

5.11.9 Observation of Disposal Facilities for Effluent Discharge

5.11.10 Visible Oil Leak Corrections from Tank Seams and Gaskets

5.11.11 Appropriate Position of Mobile or Portable Oil Storage Tanks

5.12 Facility Transfer Operations

5.12.1 Buried Piping Installation Protection and Installation

SECTION 5
5.0 PREVENTION METHODS PROVIDED, CONTINUED

5.12.2 Not in Service and Standby Service Terminal Connections

5.12.3 Pipe Support Design

5.12.4 Aboveground Valve and Pipeline Examination

5.12.5 Aboveground Piping Protection from Vehicular Traffic

5.13 Facility Response Plans

5.1 POTENTIAL FOR EQUIPMENT FAILURE

[40 CFR §112.7(b)]

An inventory of the materials at the facility that are regulated under this SPCC Plan is presented in Tables 3-1 & 3-2. This table outlines a variety of information including bulk and operational equipment storage units, product contents, total storage capacities and secondary containment capacities. The locations of the storage units listed in Table 3-1 can be found on Figure 3-2: *Facility Diagram*. A prediction of the reasonable potential failures, along with flow rate and direction is also available in Tables 3-1 & 3-2.

5.2 DRAINAGE CONTROL/DIVERSIONARY STRUCTURES AND CONTAINMENT

[40 CFR §112.7(c & d)]

A description of secondary containment and/or diversionary structures or equipment for each storage unit and petroleum-handling unit at the facility is included in Tables 3-1 and 3-2. These tables include a description of the type of containment, material of construction, and containment capacity for each secondary containment structure.

All secondary containment structures described in these tables have been evaluated by the certifying PE and have been determined to be sufficiently impervious as to contain spills long enough to allow for clean up to occur in time to prevent discharges to navigable waters or adjoining shorelines, as described in 40 CFR §112.1(b). Containment capacity calculations and/or specifications are provided in Table 3-3 of this SPCC Plan.

Containment and/or diversionary structures or equipment required to prevent a discharge at the facility are practicable and there are no determinations of impracticable secondary containment.

5.3 INSPECTIONS AND RECORD KEEPING

[40 CFR §112.7(e); 112.8(c)(6), (d)(1) & (d)(4)]

This facility has developed the following written procedures for conducting inspections and tests for this facility based on good engineering practice and accepted industry standards.

5.3.1 Periodic Visual Inspections

On a periodic basis, facility personnel will visually inspect the outside of all aboveground containers and equipment for signs of deterioration, discharges, or accumulation of oil inside secondary containment areas. The periodic visual inspection will also include inspection of the secondary containment structures. Document the inspection using the Periodic SPCC Inspection Checklist available in Section 6 or an equivalent checklist as approved by the certifying engineer. The frequency of the periodic inspection is identified in Table 3-1.

Accumulated precipitation that will prevent the berms from containing the volume of the largest tank shall be removed in accordance with Section 5.10.3 of this SPCC Plan. In addition, secondary containment and bermed areas will be visually inspected after abnormally heavy rainfall events for accumulation of precipitation.

Drums or totes brought on-site are built or tested to the standard(s) or in-process inspection and testing procedures established by the drum manufacturer or the drum recycler, as applicable. While on site, drums will be visually inspected and documented at least monthly.

5.3.2 Integrity Testing

Pursuant to 40 CFR 112.8(c)(6), each above ground container must be inspected or tested on a regular schedule and when material repairs are made. The type of integrity testing to be conducted has been determined in accordance with industry standards including the appropriate qualifications for personnel performing tests and inspections, the frequency and type of testing and inspections, which take into account container size, configuration, and design (such as containers that are: shop-built, field-erected, skid-mounted, elevated, equipped with a liner, double-walled, or partially buried). Examples of these integrity tests include but are not limited to: visual inspection, hydrostatic testing, radiographic testing, ultrasonic testing, acoustic emissions testing, or other systems of non-destructive testing. The inspection or testing method used must evaluate the condition of the tank's foundation or support system.

The facility has adopted the following philosophy on integrity testing:

- For shop-built containers of 5,001 to 30,000-gallon capacity meeting Steel Tank Institute (STI) Standard SP001 Category 1 requirements, where all sides of the container are visible or where all sides of the container are visible except the bottom and the bottom is sitting on an adequately designed, maintained, and inspected synthetic liner, annual visual inspections will be utilized in lieu of formal external integrity testing every 20 years as prescribed in STI SP001. These shop-built containers present a relatively low risk for catastrophic failure and annual visual inspections provide equivalent environmental protection for identifying corrosion and maintenance issues before they pose a significant catastrophic failure risk. For tanks meeting this criteria, the Annual Checklist for External Condition Examination of Section 6, or equivalent as approved by the certifying engineer, will be completed by December 31 of each year. Tanks meeting these criteria and utilizing this environmental equivalence determination are identified as AVI in Table 3-1.
- For tanks not meeting the above criteria, integrity tests will be conducted in accordance with the appropriate industry standard (i.e., STI SP001, API 653, etc) as identified in Table 3-1. Scope and schedules will be maintained at the facility in the vessel's prior integrity testing report as the scope and schedule will vary, in accordance industry standards, based on the results of the prior integrity tests. Integrity testing schedule will also be documented in opsInfo.
- For tanks subject to other integrity testing programs designed to meet DOT, PSM or other programs that are based on industry standards and meet the tank integrity testing requirements of SPCC, the integrity testing performed to meet those requirements are considered sufficient to meet the requirements of this part and do not need to be duplicated.

5.3.3 Aboveground Pipes, Valves, and Appurtenances

All aboveground pipes, valves, and appurtenances will be inspected on a monthly basis. The inspection will include an assessment of the general condition of flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces.

5.3.4 Buried Pipes, Valves, and Appurtenances

All buried pipes, valves, and appurtenances will be integrity and leak tested at the time of installation, modification, construction, relocation, or replacement.

5.3.5 Record Keeping

Document all inspections using the appropriate checklist available in Section 6 or an equivalent checklist (as approved by a Professional Engineer). The inspection checklist will be used to document the occurrence and description of inspections and integrity testing performed at the facility. Records of integrity tests should be maintained for comparison purposes. Signed and dated records of inspections and other pertinent information, such as spills, removal and disposal of spill contaminated materials, replacement or repair of equipment, and training are kept at the facility office for a minimum of 3 years.

5.4 PERSONNEL TRAINING AND SPILL PREVENTION PROCEDURES

[40 CFR §112.7(f)]

5.4.1 Personnel Instructions

Personnel handling oil at the facility are instructed on job responsibilities and duties. They are under the direct supervision of the facility manager who is responsible for establishing daily performance and duty guidelines. Annual training for oil-handling employees includes:

- Operation and maintenance of equipment to prevent the discharge of oil;
- Discharge procedures and protocols (cleanup methods and notification);
- Applicable pollution control laws, rules, and regulations; and
- General facility operations, which include instruction in proper inspection techniques, record keeping, and inventory control procedures.

Successful completion of this annual training includes successful completion of the Computer Based Training (CBT) or an instructor led training for all oil-handling personnel. A record of all training is maintained for a minimum of 3 years in Kinder Morgan's LMS training management system.

5.4.2 Designated Person Accountable for Spill Prevention

The Operations Supervisor of the facility, as identified in the emergency contacts section of this plan, is the primary person accountable for spill prevention. The Operations Supervisor may delegate the implementation of certain elements of this Plan to qualified oil-handling employees as necessary to prevent spills. The Operations Supervisor has the authority to commit all resources and personnel necessary for spill prevention and control at the facility.

5.4.3 Spill Prevention Briefings and Facility SPCC Plan Review

SPCC spill prevention briefings and facility SPCC Plan Reviews are held at least once a year to assure adequate understanding of the SPCC Plan for the facility. Briefings will highlight and describe known discharges as described in 40 CFR §112.1(b), or failures, malfunctioning components, and recently developed precautionary measures. This briefing and plan review will also highlight any changes to the facility during the last year, including but not limited to, changes in oil storage and facility personnel. Spill prevention briefings will be documented in Kinder Morgan's LMS system. Spill Prevention Briefing Record form in Section 6 is also available to document topics covered during the briefing if needed.

5.5 SITE SECURITY

[40 CFR §112.7(g)]

Site security measures are provided commensurate with the type of facility and facility location. Per SPCC regulation, onshore non-production facilities will comply with the following minimum site security requirements of 40 CFR §112.7(g). Any additional site security measures required to meet other regulatory requirements or internal company requirements are documented via a Site Security Assessment conducted in accordance O&M 510 *Security, Company Facilities*.

5.5.1 Fencing

All oil-handling, processing and storage areas are located within perimeter fencing, which provides security to protect against vandalism and access by unauthorized persons.

5.5.2 Flow Valves

Master flow and drain valves and any other valves that will permit direct outward flow of the tank's contents to the surface are located in areas only accessible by authorized personnel when in non-operating or non-standby status.

5.5.3 Start Controls

Where applicable, starter controls for all oil transfer pumps are kept in the off position and located in areas only accessible by authorized personnel when the pump is in a non-operating or non-standby status.

5.5.4 Pipeline Loading and Unloading Connections

All loading and unloading connections are located in areas only accessible by authorized personnel to prevent unauthorized usage. All loading and unloading piping and hoses are blind-flanged when not in service for a period of 6-months or more.

5.5.5 Lighting

Facility lighting to prevent and detect spills at night, as well as, prevent spills through acts of vandalism has been considered and where appropriate, adequate lighting is provided. To avoid undue attention, unattended facilities that are remotely located (away from inhabited areas) may not have facility lighting[4].

5.6 FACILITY LOADING/UNLOADING OPERATIONS

[40 CFR §112.7(a)(3)(ii) & (h)]

Occasionally, natural gas condensates and other oils may be taken from the facility and oil may be delivered to the facility by tank trucks. Facility or delivery personnel are present during all loading and unloading events in designated areas. Spill kits are available during loading and unloading operations to address minor spills or releases. In areas where storm water drains not tied to a treatment system may be impacted, drain covers shall be installed during loading operations. Actions to contain and report any spills resulting from the truck loading/unloading would be immediate.

Where loading and unloading racks (containing a fixed articulating loading arm) are available, the rack transfer area is provided with secondary containment to hold at least the maximum capacity of any single compartment of a tank car or tank truck. Warning signs, wheel chocks, or a complete vehicle walk-around are used at the loading/unloading racks to prevent vehicles from departing before complete disconnection of flexible or fixed transfer lines. The drivers remain with the trucks during transfer operations to monitor the transfer; inspect outlets, connections, and valves on the tanker truck before and after the transfer; and make adjustments as necessary.

All tank truck drivers are required to comply with Department of Transportation (DOT) regulations in 49 CFR Part 177 and facility standard operating procedures. All drivers must be authorized and certified by Kinder Morgan or its subsidiaries to load or unload product at the facility. Site specific truck loading and unloading procedures are in accordance with Kinder Morgan O&M Procedure 106.

5.7 BRITTLE FRACTURE EVALUATION

[40 CFR §112.7(i)]

All field-constructed aboveground containers and tanks that are repaired, altered, or reconstructed will be evaluated for risk of discharge or failure due to brittle fracture or other catastrophe. In addition, if there has been a change in service that might affect the risk of a discharge or failure due to fracture or other catastrophe, a brittle fracture tank evaluation will be completed. Based on the results of the evaluation, appropriate action will be taken.

5.8 CONFORMANCE WITH OTHER APPLICABLE GUIDELINES

[40 CFR §112.7(j)]

This Plan provides detailed discussions of conformance with the applicable requirements and other effective discharge prevention and containment procedures used at the facility. State environmental agency spill prevention and reporting requirements and state oil and gas commission spill prevention and reporting requirements have been included in this plan where applicable. In the event of a reportable release, notification to Federal, State and local agencies will be made by Kinder Morgan via the ERL system.

5.9 OIL FILLED OPERATIONAL EQUIPMENT

[40 CFR §112.7(k)]

Oil-filled operational equipment located at this facility have sufficient general secondary containment as described in 40 CFR §112.7(c) and may include: (i) Dikes, berms, or retaining walls sufficiently impervious to contain oil; (ii) Curbing or drip pans; (iii) Sumps and collection systems; (iv) Culverting, gutters, or other drainage systems; (v) Weirs, booms, or other barriers; (vi) Spill diversion ponds; (vii) Retention ponds; or (viii) Sorbent materials.

It is noted that certain oil-filled operational equipment may meet the qualification of not having a single discharge of more than 1,000 US gallons or no two discharges of 42 US gallons or more in the preceding 3 years as listed in 40 CFR §112.7(k)(1). Such qualified operational oil-filled equipment may opt to meet the alternative requirements to general secondary containment as described in 40 CFR §112.7(k)(2).

The alternative requirements include:

- Establishing and documenting facility procedures for equipment inspections or a monitoring program to detect equipment failure; and,
- Submittal of a Facility Response Plan under 40 CFR §112.20, or
    - Development of an Oil Spill Contingency Plan following the provisions of 40 CFR §109; and,
    - Written commitment of manpower, equipment, and material required to expeditiously control and remove any quantity of oil discharged that may be harmful.

5.10 FACILITY DRAINAGE

[40 CFR §112.8(b)]

Surface drainage within the facility is governed by surface topography. Storm water drainage flow arrows on Figure 3-2: *Facility Diagram* indicate the general direction of storm water flow for the site, as well as any other pertinent surface features that may affect surface flow or the ability to control an oil spill and prevent it from leaving the site.

5.10.1 Restrain Drainage from Diked Storage Areas

[40 CFR §112.8(b)(1)]

Within secondary containment structures, drainage is restrained by manual release valves. Precipitation that may accumulate in the containment areas is normally allowed to evaporate. If removal of the retained water within the containment structure is necessary, it will be inspected for the presence of oil (surface sheen) prior to discharge or removal. No oil will be discharged with storm water to the ground or into a storm water drain or effluent system that flows to an open watercourse. See Section 5.11.3 for further details regarding drainage and inspection of storm water in diked storage area.

5.10.2 Valves Used on Diked Storage Area

[40 CFR §112.8(b)(2)]

Diked or bermed areas at the facilities may be equipped with drainage valves. Where drain valves are installed, flapper-type drain valves are not used to drain diked areas. Manual open-and-close design drainage valves are utilized and are secured in the closed position when not in use.

5.10.3 Facility Drainage System from Undiked Areas

[40 CFR §112.8(b)(3)]

The undiked areas of the facility may contain aboveground transfer piping without containment sleeves, including loading/unloading areas, and operational equipment, whose primary purpose is not the storage of oil in bulk. A typical release from piping would consist of minor drips/leaks. For sites with aboveground piping located in undiked areas, the facility is equipped with spill kits and absorbents to be used as general secondary containment in the event of a leak from the above ground piping. This type of active containment is appropriate to prevent discharged oil from reaching a navigable watercourse under 40 CFR §112.7(c). Regular inspections are made by facility operators and any leaks or releases will be immediately contained using on-site spill control equipment such as absorbent pads, socks, and granular absorbent. General surface drainage patterns at the facility are shown on Figure 3-2: *Facility Diagram*.

5.10.4 Final Discharge of Drainage

[40 CFR §112.8(b)(4)]

Drainage off the property follows natural drainage patterns, governed by surface topography. Any spill/flow originating from any storage container considered in this SPCC Plan would be contained on site through the use of passive and active secondary containment methods. No oil would be discharged from the property.

Personnel and equipment are available to construct additional emergency containment basins or dikes that would contain any spill should additional actions be required to prevent oil from leaving the site. Spilled oil that might accumulate will be contained with portable booms and recovered using a vacuum truck, pump, or other appropriate method, and then be properly disposed of or recycled. Detailed lists of available emergency equipment are maintained in the Emergency Response Plan in:

- **O&M Form OM1900-10 - On Site Emergency Response Equipment**
- **O&M Form OM1900-11 - Contractors and Available Equipment**

5.10.5 Facility Drainage from Multiple Unit Treatment Systems and Equipment

[40 CFR §112.8(b)(5)]

Not applicable; there is not a multiple unit treatment system with continuous treatment of drainage waters occurring at the facility.

5.11 BULK STORAGE TANKS/SECONDARY CONTAINMENT

[40 CFR §112.8(c)]

5.11.1 Tank Compatibility with its Contents

[40 CFR §112.8(c)(1)]

Materials used for all storage tanks are compatible with the product stored and the conditions of storage.

5.11.2 Diked Area Construction and Containment Volume for Storage Tanks

[40 CFR §112.8(c)(2)]

All bulk storage units are located within secondary containment structures large enough to contain the entire contents of the largest tank in the containment structure while allowing for adequate freeboard to contain precipitation events, unless the facility is covered by a Facility Response Plan under 40 CFR 112.20 or an Oil Spill Contingency Plan under 40 CFR 109. The type of containment and containment capacity are included in Tables 3-1 and 3-2. Detailed berm capacity calculations are provided in Table 3-3. Containment structure locations are shown in Figure 3-2: *Facility Diagram*. As Described in Section 5.2 of this Plan, all secondary containment structures described in these tables have been evaluated by the certifying PE and have been determined to be in accordance with good engineering practice and sufficiently impervious and sized as to contain spills long enough to allow for clean up to occur in time to prevent discharges to navigable waters or adjoining shorelines, as described in 40 CFR §112.1(b).

Diked areas will be maintained in a manner that ensures the integrity of the containment structure, including, but not limited to, the removal of vegetation, sealing of cracks in concrete containment walls, and repair of erosion of earthen berms. Diked areas will be inspected on a monthly basis according the Periodic SPCC Inspection Checklist included in Section 6 of this Plan. All identified maintenance and repair issues identified that could affect the ability of the containment structure to hold a spill until such time that it can be cleaned up will be completed as soon as practicable.

5.11.3 Drainage of Rainwater from Diked Areas

[40 CFR §112.8(c)(3)]

Accumulated precipitation that will prevent the berms from containing the volume of the largest tank will be removed. In addition, diked and bermed areas will be visually inspected after abnormally heavy rainfall events for excess rainwater accumulation. Rainwater may be removed from the secondary containment in a variety ways, including, but not limited to; transferring to storage tanks, discharge to onsite treatment systems, discharge to onsite evaporation systems, removal via vacuum truck, and draining to the ground.

For uncontaminated rainwater drained from a diked secondary containment area to the ground, into a storm drain or discharge of an effluent into an open watercourse, lake, or pond:

- The containment drainage or bypass valve will normally remain secured in the closed position;
- Accumulated rainwater will be inspected for the presence of oil that could cause a discharge to navigable waters or adjoining shorelines, as described in 40 CFR §112.1(b);
- The drainage or bypass valve will be opened and re-sealed under responsible supervision of trained oil-handling personnel; and,
- Records will be kept of discharge events sufficient to meet any other regulatory requirements, such as NPDES permits issued in accordance with 40 CFR §122.41. The *Secondary Containment Drainage Log* included in Section 6 of this SPCC Plan may be used to meet this requirement.

If the presence of oil is detected in rainwater that is to be discharged from a secondary containment area as described above, the oil will be removed from the secondary containment prior to discharge or the entire contents of the oily rainwater will be removed in some other manner, such as via vacuum truck or being pumped into a holding tank for disposal. Removed water is disposed of in accordance with applicable local, state, and federal regulations. Any water removed from the containment areas via approved methods other than discharging the water directly to the ground, into a storm drain or discharge of an effluent into an open watercourse, lake, or pond are not required to be inspected prior to discharge because there is no release as described in 40 CFR §112.8(c)(3).

5.11.4 Corrosion Protection of Buried Metallic Storage Tanks

[40 CFR §112.8(c)(4)]

Where applicable, buried metallic storage tanks at the facility will be provided with corrosion protection. Acceptable forms of corrosion protection include, but are not limited to, cathodic protection systems, rectifier systems, sacrificial anodes, or protective coatings.

5.11.5 Corrosion Protection of Partially Buried Metallic Storage Tanks

[40 CFR §112.8(c)(5)]

Where applicable, buried metallic storage tanks at the facility will be provided with corrosion protection. Acceptable forms of corrosion protection include, but are not limited to, cathodic protection systems, rectifier systems, sacrificial anodes, or protective coatings.

5.11.6 Aboveground Tank Inspections

[40 CFR §112.8(c)(6)]

On a periodic basis, as defined in Table 3-1, personnel will visually inspect the outside of all aboveground containers for signs of deterioration, discharges, or accumulation of oil inside diked areas and document the inspection on the periodic inspection checklist available in Section 6 or an equivalent checklist as approved by the certifying Professional Engineer. Signed and dated inspection records must be retained for 3 years. Details on Kinder Morgan's Tank Integrity Testing Program can be found in Section 5.3.2 of this document.

5.11.7 Control of Leakage through Internal Heating Coils

[40 CFR §112.8(c)(7)]

Not Applicable, steam heating coils are not utilized for bulk storage tanks. Where applicable, internal steam heating coils will be monitored for contamination at the steam returns and exhaust line.

5.11.8 Engineered Overfill Prevention Features

[40 CFR §112.8(c)(8)]

Automatically filled bulk-oil storage containers at the facility are equipped with overfill prevention devices as shown in Table 3-1. All overfill prevention devices are inspected and tested as part of the bulk storage tank examination and inspection protocol identified in Section 5.3 of this SPCC Plan. Site glasses and other gauges are inspected as part of the periodic visual inspection.

5.11.9 Observation of Disposal Facilities for Effluent Discharge

[40 CFR §112.8(c)(9)]

Where facility effluent treatment systems are utilized, the facility will inspect the system for possible upsets that could cause a discharge of oil.

5.11.10 Visible Oil Leak Corrections from Tank Seams and Gaskets

[40 CFR §112.8(c)(10)]

On-site personnel shall immediately repair any visible oil leaks at the facility, including but not limited to leaks from seams, gaskets, piping, pumps, valves, rivets, and bolts. Any spilled oil is cleaned up immediately using on-site spill response equipment and supplies.

5.11.11 Appropriate Position of Mobile or Portable Oil Storage Tanks

[40 CFR §112.8(c)(11)]

To prevent discharges of oil as described in 40 CFR §112.1(b), mobile or portable oil storage tanks greater than 55 US gallons in size are positioned and/or located within secondary containment of sufficient size to contain the entire contents of the largest container with sufficient freeboard for containing precipitation.

5.12 FACILITY TRANSFER OPERATIONS

[40 CFR §112.8(d)]

5.12.1 Buried Piping Installation Protection and Installation

[40 CFR §112.8(d)(1)]

Kinder Morgan has developed procedures for protecting buried metallic pipelines from external corrosion in conformance with applicable codes, accepted industry practices and company specifications. The following conditions are included in the program.

All buried piping that is installed or replaced on or after August 16, 2002 are provided with protective wrapping and coating and cathodic protection, or otherwise satisfy the corrosion protection provisions for piping in 40 CFR Part 280 or a state program approved under 40 CFR §281. Buried piping installed or replaced prior to August 16, 2002 are provided with protective wrapping and coating and cathodic protection if soil conditions warrant. Any buried equipment will be visually inspected for corrosion whenever exposed through excavation. Further inspection and correction will be conducted on the affected metal equipment if problems are identified.

5.12.2 Not in Service and Standby Service Terminal Connections

[40 CFR §112.8(d)(2)]

When an oil transfer pipe is not in service or is in a standby service for an extended period of time, such as six months or greater, the pipe is ball-plugged or blind-flanged at the transfer point and is marked as to its tie-in connection.

5.12.3 Pipe Support Design

[40 CFR §112.8(d)(3)]

All pipe supports at the facility are designed to minimize abrasion and corrosion and to allow for expansion and contraction. Pipe supports are routinely inspected as part of the monthly visual inspections described in Section 5.2 of this SPCC Plan.

5.12.4 Aboveground Valve and Pipeline Examination

[40 CFR §112.8(d)(4)]

All aboveground valves and pipelines are routinely inspected as described in Section 5.3 of this SPCC Plan.

5.12.5 Aboveground Piping Protection from Vehicular Traffic

[40 CFR §112.8(d)(5)]

Where applicable, vehicular traffic is warned by clearance signs to ensure that vehicles will not endanger aboveground piping at the facility.

5.13 FACILITY RESPONSE PLANS

[40 CFR §112.20 and §112.21]

Certification of Substantial Harm Determination, as defined in *40 CFR §112.20,* is included in Section 2.4 of this Plan. If the Substantial Harm Determination criteria are met, a Facility Response Plan shall be developed in accordance with *40 CFR §112.20* and *§112.21*.

SECTION 6
6.0 FORMS, LOGS AND CHECKLISTS

Last Revised:

Forms, Logs and Checklists

FORMS, LOGS AND CHECKLISTS

Click to view/print Reportable Spill History Log

REPORTABLE SPILL HISTORY LOG

In the event of a release of any kind, implement the ERL System (Section 4.2) to determine if the release is immediately reportable to State or Federal Agencies. The EPA requires notification of the Regional Administrator for any release or discharge of oil, in any form, from this facility directly or indirectly into or upon the navigable waters of the United States or its adjoining shorelines with more than:

- 1,000-gallons in a single discharge, or
- 42-gallons in each of two or more discharges occurring within any consecutive 12-month period

Contact EHS to document the discharge details for submittal to the EPA's Regional Administrator (RA) within sixty-days (60) of the spill event. Use the "*EPA Release Notification Form*," available in the Section 6 or an equivalent form to ensure that all required information is reported to the EPA Regional Administrator.

Date	Storage Unit	Cause of Release	Material Released	Quantity Released (gallons)	Quantity Recovered (gallons)	Water Body Impacted	Notes on Incident

FORMS, LOGS AND CHECKLISTS, CONTINUED

Click to view/print EPA Release Notification Form

EPA RELEASE NOTIFICATION FORM

INCIDENT DESCRIPTION

Reporter's Name		Title	
Office Phone No.		Mobile Phone No.	
Facility Address			
County		Owner's Address	
Spill Location			
Source/Cause of Discharge			
Date & Time of Discharge			
Spilled Product		Est. Quantity	
Water Impact	☐ Yes ☐ No	If yes, Est. Qty into Water	

RESPONSE ACTION(S)

Action(s) taken to Correct, Control, or Mitigate Release:			
Any Injuries		Any Fatalities	
Evacuation Needed		Number Evacuated	
Description of Impacted Media:			
Notification(s)	☐ National Response Center (NRC). (800) 424-8802		
(Check all that have been contacted)	☐ State		
	☐ Fire		
	☐ Police		
	☐ Others		

FORMS, LOGS AND CHECKLISTS, CONTINUED

Click to view/print Spill Prevention Briefing Record

SPILL PREVENTION BRIEFING RECORD

INSTRUCTIONS: Briefings will be scheduled and conducted by the owner or operators for operating personnel at intervals frequent enough to assure adequate understanding of the SPCC plan for this facility. These briefings should also highlight and describe known spill events or failures, malfunctioning components, and recently developed precautionary measures. During these briefings there will be an opportunity for facility operators and other personnel to share recommendations concerning health, safety and environmental issues encountered during operation of the facility. Completion of the “Spill Prevention Briefing Record” can be documented with the OM100-20 form (Training or Safety Attendance Record) and entered into LMS at the same time as the completion of the Site Specific SPCC Plan review.

NOTE: This spill briefing is separate from the **annual** SPCC training for oil-handling personnel.

Date: ______________________________

Attendees:

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Subjects and Issues:

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Recommendations and Suggestions:

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FORMS, LOGS AND CHECKLISTS, CONTINUED

Click to view/print Annual Checklist for External Condition Examination

ANNUAL CHECKLIST FOR EXTERNAL CONDITION EXAMINATION

Date of Inspection: ______________ Facility Name: ____

Tank Name/ID: ____

Inspector Name and Signature: ____

By December 31 of each year, complete this visual inspection for each tank which qualifies for frequent visual inspections. Retain a copy of the completed checklist for 36 months (3 years). Checklist follows API and STI Inspection Standards and guidelines for tank inspections. For questions on this checklist please contact your EHS representative.

A. IDENTIFICATION		
1. Size		
2. Date of Prior Inspection		
3. Measured or Estimated Liquid Level		
4. Tank Material		
5. What type of support is tank situated on (concrete, soil, etc.)?		
6. Contents		
INSPECTION ITEMS	**Yes/No/NA**	**CORRECTIVE ACTION***
B. FOUNDATION		
1. Tank properly supported, supports in good condition?		
2. Cracking or spalling of concrete pad or ring wall?		
3. Evidence of settlement or foundation washout?		
4. Grounding strap in good condition?		

Comments:
____
____
____

INSPECTION ITEMS	Yes/No/NA	CORRECTIVE ACTION
C. TANK BOTTOM		
1. Visible signs of leakage around tank bottom?		
2. Inadequate drainage away from tank?		
Comments: ______ ______ ______		
D. TANK SHELL		
1. Active leaks?		
2. Signs of past leakage?		
3. Problems with structural integrity (Distortions, Warping)?		
4. Coating condition unsatisfactory?		
5. Evidence of paint failure?		
6. Severe corrosion and/or pits?		
Comments: ______ ______ ______		
E. ROOF DECK		
1. Holes?		
2. Inadequate drainage off of deck?		
3. Coating condition unsatisfactory?		
4. Severe corrosion and/or pits?		
Comments: ______ ______ ______ ______		

INSPECTION ITEMS	Yes/No/NA	CORRECTIVE ACTION
F. VENTING		
1. Vents free of obstruction?		
2. Thief hatch and vent valve seals air tight?		
3. Emergency vent operable? Lift as required?		
4. All tank openings properly sealed?		
Comments:		
G. INSULATED TANKS		
1. Insulation in good condition?		
2. Are there noticeable areas of moisture on insulation?		
3. Mold on insulation?		
4. Is the insulation sufficiently protected from water intrusion?		
Comments:		
H. TANK CONTAINMENT		
1. Containment structure in satisfactory condition?		
2. Drainage pipes/valves fit for continued service?		
3. Tank area clear of trash and vegetation?		
Comments:		

INSPECTION ITEMS	Yes/No/NA	CORRECTIVE ACTION
I. APPURTENANCES/MISCELLANEOUS		
1. Gas blanket system operational (if applicable)?		
2. Stairways/walkways structurally sound?		
3. Proper warning signs in place?		
4. If fiberglass tanks, all metal parts bonded or gas blanket operational?		
5. Cathodic protection system operational?		
6. Rectifier Reading?		
7. Pipeline properly supported?		
8. Flanged connection bolts tight and fully engaged with no sign of wear or corrosion?		
9. Has the liquid level sensing device been tested to ensure proper operation?		
10. Tank liquid level gauge readable and in good condition?		
11. Are overfill protection devices in proper working condition?		
12. Is electrical equipment in good condition? (grounding lines, lights, control boxes, etc.)		
Comments: ______ ______ ______		
J. OTHER		
1. Are there other conditions that should be addressed for continued safe operation or that may affect the site SPCC plan?		
Comments: ______ ______ ______		

FORMS, LOGS AND CHECKLISTS, CONTINUED

Click to view/print Periodic SPCC Inspection Checklist

PERIODIC SPCC INSPECTION CHECKLIST

This SPCC periodic inspection checklist incorporates the elements of applicable industry standards (i.e., STI SP001, API 653) for frequent inspection of storage tanks as well as additional facility inspection requirements. This form (or an equivalent as authorized by the certifying PE) is to be completed at the frequency indicated in Table 3-1 and stored in the facility's environmental files for 3 years from the inspection date shown. All non-acceptable items identified shall be promptly noted and corrected. All corrective action shall be noted on this form along with the final completion date of corrective action.

This form is designed to be cover the entire facility; however multiple copies may be used to cover individual areas of the facility if required.

Date of Inspection: ___________________ Facility/Location: ____

Inspector Name and Signature: ____

INSPECTION ITEMS	ACCEPTABLE (YES/NO/NA)	CORRECTIVE ACTION*
A. BULK-STORAGE TANKS		
1. Seam integrity acceptable (no visible leaks)		
2. Equalizer lines in proper open/closed position		
3. Hi/Lo level alarms/shutdowns are operating (tested annually)		
4. Vacuum protection is unobstructed		
5. Tanks' hatches are latched closed		
6. External tank corrosion level acceptable		
7. Corrosion protection system is operating		
8. Tank foundations/supports in good condition		
9. Tank sides free of contact with soil		
10. Drain valves are operable and in the closed position		
11. Test liquid level sensing devices for proper operation		
12. Interstitial space of double-walled free of liquids using visual inspection or alarm indicator		
13. 55 Gallon Drums are in good working condition		
B. SECONDARY CONTAINMENTS		

INSPECTION ITEMS	ACCEPTABLE (YES/NO/NA)	CORRECTIVE ACTION*
1. Berms/firewalls free of erosion or integrity issues		
2. Foundation of firewall free of erosion		
3. Seals in joints of firewalls are intact		
4. Drain valves are closed and secured		
5. Drain valves have bull plugs or blind-flanges (unmanned locations)		
C. VESSELS AND EQUIPMENT		
1. Valve glands and bodies are in good condition		
2. Flange joints are properly aligned and tightened		
3. Gauge glasses are intact and operating		
4. Drip pan drains are unobstructed		
5. Equipment free of excess external corrosion		
D. PIPING AND PIPELINES		
1. Piping free of excess external corrosion		
2. Hi/Lo pressure shutdowns are operating (tested annually)		
3. Pipe supports adequately supporting pipe or pipeline		
4. Corrosion protection system is operating		
E. GENERAL FACILITY		

INSPECTION ITEMS	ACCEPTABLE (YES/NO/NA)	CORRECTIVE ACTION*
1. Drain ditches, catch basins, ponds, sumps are free of accumulated oil and operating properly		
2. Loading ground line is good condition		
3. Security gates are locked on a daily basis		
4. Any oil spills properly reported to EHS		
5. Spill kit(s) contents and equipment in good condition for spill response.		
6. All facility changes properly reported to EHS		

* Describe the corrective action(s) taken, referencing the number from above:

____

____

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FORMS, LOGS AND CHECKLISTS, CONTINUED

Click to view/print Facility Change Form

FACILITY CHANGE FORM

This form may be completed and submitted to the facility's Environmental Representative for determination of any required technical or administrative amendments to the SPCC Plan.

Facility/Location: ____

Inspector Name: ______________________ Date of Inspection: __________

Inspector Signature: ____

Date of Facility Change: __________

Description of Facility Change: ________________________________

____

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____

Did change include:

Adding, replacing or removing a storage tank (55 gallons or greater)? Yes / No

Construction, alteration or demolition of secondary containment? Yes / No

Reconstruction, replacement or installation of piping systems? Yes / No

Modifications of testing, inspection and maintenance procedures? Yes / No

Changes or updates facility response personnel or contact information? Yes / No

Changes to available spill response equipment or ability to respond to a spill? Yes / No

Any required amendments to the SPCC plan will be recorded in Table 2-1: *SPCC Plan Amendment Log.* All technical amendments will be certified by a professional engineer.

FORMS, LOGS AND CHECKLISTS, CONTINUED

Click to view/print Corrective Actions

SPCC CORRECTIVE ACTIONS

This form is to be used to record any corrective actions taken at the facility.

Issue / Deficiency	Corrective Action	Proposed Completion Date of Corrective Action	Actual Completion Date of Corrective Action	Name, Title and Signature Indicating that Corrective Action Was Completed

FORMS, LOGS AND CHECKLISTS, CONTINUED

Click to view/print Containment Drainage Log

CONTAINMENT DRAINAGE LOG

This form is to be used to meet the requirement described in Section 5.11.3 of this Plan. For uncontaminated rainwater drained from a diked secondary containment area to the ground, into a storm drain or discharge of an effluent into an open watercourse, lake, or pond:

- Visually inspect water for an oil slick or sheen
- Check for hydrocarbon odors
- If no signs of pollutants, you may discharge rain water
- If pollutants observed, Notify Operations Supervisor to conduct investigation and remove fluids by other means.
- Ensure all drain valves are sealed in the closed position after discharge is complete

Date	**Storage Unit**	**Cause of Liquid Accumulation**	**Appearance** (Visual, odor, etc.)	**Quantity Removed, Est.** (inches or gallons)	**Method of Removal**	**Time Valve Opened**	**Time Valve Closed**	**Inspected By:** (Full Name)

7.0 ADDITIONAL DOCUMENTATION

Click to view/print Secondary Containment Capacity Calculations - Gulf LNG

Secondary Containment Capacity Calculations

1. Diesel Firewater Pump Z-14
    a. Capacity: 700 gal
    b. Required Capacity: 700 gal + 10% = 770 gal
    c. Double Wall Tank and Secondary Containment
    d. Secondary Containment:
        i. Firewater Pump Building
        ii. Available Capacity: >1,000 gal

2. Diesel Standby Firewater Pump P-51
    a. Capacity: 700 gal
    b. Required Capacity: 700 gal + 10% = 770 gal
    c. Double Wall Tank and Secondary Containment
    d. Secondary Containment:
        i. 14' wide x 21' long x 1' high = 294 ft^3 = 2,199 gal
    e. Pump Skid (displacement):
        i. 10.5' wide x 16.5' long x 1' high = 173.25 ft^3 = 1296 gal
    f. Pedestals (displacement):
        i. Various sizes = 14 ft^3 = 105 gal
    g. Available Capacity:
        i. 2,199 gal – 1,296 gal – 105 gal = 798 gal

3. Transformer LV-3
    a. Capacity: 228 gal
    b. Required Capacity: 228 gal + 10% = 250.8 gal
    c. Secondary Containment:
        i. 7' wide x 10.5' long x 1' high = 73.5 ft^3 = 550 gal
    d. Transformer (displacement):
        i. 3.25' wide x 4.5' long x 1' high = 14.625 ft^3 = 109 gal
    e. Available Capacity:
        i. 550 gal – 109 gal = 441 gal

4. BOG Booster Compressor K-11
    a. Capacity: 68 gal
    b. Required Capacity: 68 gal + 10% = 75 gal
    c. Concrete Secondary Containment:
        i. BOG Compressor Shelter
        ii. Available Capacity: > 5,000 gal

5. Oil Water Separator F-1
    a. Capacity: 8,000 gal
    b. Required Capacity: 8,000 gal + 10% = 8,800 gal
    c. Double Walled
    d. Leak detection system installed

Secondary Containment Capacity Calculations

6. Essential Generator G-3
    a. Capacity: 300 gal
    b. Required Capacity: 300 gal + 10% = 330 gal
    c. Double Wall Tank and Secondary Containment
    d. Secondary Containment:
        i. 13.5’ wide x 23’ long x 10” high = 259 ft^3 = 1,937 gal
    e. G-3 Skid (displacement):
        i. 5.5’ wide x 14’ long x 10” high = 64 ft^3 = 479 gal
    f. Available Capacity:
        i. 1,937 gal – 479 gal = 1,458 gal

7. G-1 Turbine Lube Oil Tank
    a. Capacity: 1,600 gal
    b. Required Capacity: 1,600 gal + 10% = 1,760 gal
    c. Concrete Secondary Containment:
        i. GTG Containment Area
        ii. Available Capacity: >5,000 gal

8. G-2 Turbine Lube Oil Tank
    a. Capacity: 1,600 gal
    b. Required Capacity: 1,600 gal + 10% = 1,760 gal
    c. Concrete Secondary Containment:
        i. GTG Containment Area
        ii. Available Capacity: >5,000 gal

9. Main Transformers (3) TR-HV, TR-MV1 & TR-MV2
    a. Capacity: 10,430 gal total (6,720 gal + 1,855 gal + 1,855 gal)
    b. Concrete curbing & flow to oil/water separator

10. Transformers (2) in Main Transformer Area LV-1 & LV-2
    a. Capacity: 978 gal total (489 gal + 489 gal)
    b. Concrete curbing & flow to oil/water separator

11. Transformer LV-4
    a. Capacity: 228 gal
    b. Required Capacity: 228 gal + 10% = 251 gal
    c. Concrete Secondary Containment
    d. Secondary Containment:
        i. 82” wide x 110” long x 8” high = 72,160 in^3 = 312 gal
        ii. 22” wide x 26” long x 8” high = 4,576 in^3 = 20 gal
    e. Transformer (displacement):
        i. 40” wide x 50” long x 8” high = 16,000 in^3 = 70 gal
    f. Available Capacity:
        i. 312 gal + 20 gal – 70 gal = 262 gal

Secondary Containment Capacity Calculations

12. Gangway Hydraulic System
    a. Capacity: 100 gal
    b. Required Capacity: 100 gal + 10% = 110 gal
    c. Secondary Containment Tank
        i. 21” wide x 72” long x 17” high = 25,704 in^3 = 111 gal

13. BOG Compressors (3) K-5/6/7
    a. Capacity: 330 gal total (110 gal each)
    b. Required Capacity: 330 gal + 10% = 363 gal
    c. Concrete Secondary Containment:
        i. BOG Compressor Shelter
        ii. Available Capacity: >5,000 gal

14. Diesel Standby Air Compressor K-16
    a. Capacity: 140 gal
    b. Required Capacity: 140 gal + 10% = 154 gal
    c. Concrete Secondary Containment:
        i. Utility Shelter (diagram and calculations attached)
        ii. Available Capacity: 6,209 gal

15. Cathodic Protection Rectifiers (8)
    a. Capacity: 110 gal each (880 gal total)
    b. Required Capacity: 110 gal + 10% = 121 gal
    c. Concrete Secondary Containment
    d. Secondary Containment:
        i. 43” wide x 84” long x 10” high = 36,120 in^3 = 156 gal
    e. Rectifier (displacement):
        i. 21” wide x 36” long x 10” high = 7,560 in^3 = 33 gal
    f. Available Capacity:
        i. 156 gal – 33 gal = 123 gal

16. Vapor Return Blowers K-1/2
    a. Capacity: 440 gal total (220 gal each)
    b. Required Capacity: 440 gal + 10% = 484 gal
    c. Concrete Secondary Containment:
        i. BOG Compressor Shelter
        ii. Available Capacity: >5,000 gal

17. Transformer LV-5
    a. Capacity: 298 gal
    b. Required Capacity: 298 gal + 10% = 328 gal
    c. Concrete Secondary Containment
    d. Secondary Containment:
        i. 109” wide x 112” long x 8” high = 97,664 in^3 = 423 gal
    e. Transformer (displacement):
        i. 42” wide x 50” long x 8” high = 16,800 in^3 = 73 gal
    f. Available Capacity:
        i. 423 gal – 73 gal = 350 gal

Secondary Containment Capacity Calculations

18. Unloading Arm Hydraulic Unit
    a. Capacity: 53 gal
    b. Required Capacity: 53 gal + 10% = 59 gal
    c. Concrete Secondary Containment
    d. Secondary Containment:
        i. 60” wide x 60” long x 8” high = 28,800 in^3 = 124 gal
    e. Hydraulic Unit (displacement):
        i. 39” wide x 48” long x 8” high =14,976 in^3 = 65 gal
    f. Available Capacity:
        i. 124 gal – 65 gal = 59 gal

19. K-11 Used Oil Tank
    a. Capacity: 132 gal
    b. Required Capacity: 132 gal + 10% = 145 gal
    c. Double Wall Tank and Secondary Containment
    d. Concrete Secondary Containment:
        i. BOG Compressor Shelter
        ii. Available Capacity: >5,000 gal

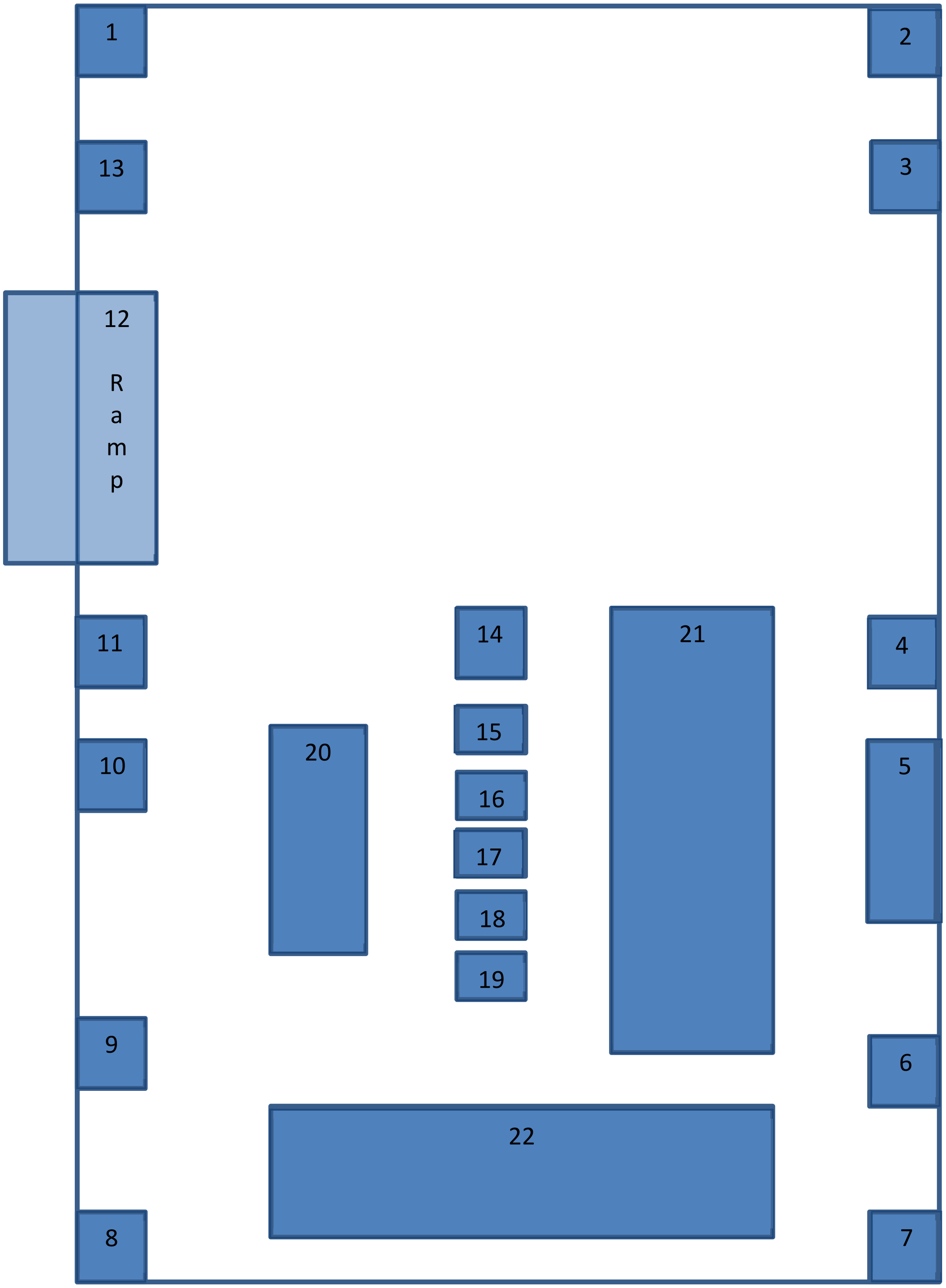
20. Diesel Storage Tank
    a. Capacity: 100 gal
    b. Required Capacity: 100 gal + 10% = 110 gal
    c. Double Wall Tank and Secondary Containment
        i. Utility Shelter (diagram and calculations attached)
        ii. Available Capacity: 6,209 gal

21. Gasoline Storage Tank
    a. Capacity: 75 gal
    b. Required Capacity: 75 gal + 10% = 83 gal
    c. Concrete Secondary Containment
        i. Utility Shelter (diagram and calculations attached)
        ii. Available Capacity: 6,209 gal

22. Miscellaneous Drum Storage
    a. Capacity: 1,650 gal (maximum of 30 drums, 55 gal each)
    b. Required Capacity: 1,650 gal + 10% = 1,815 gal
    c. Concrete Secondary Containment
        i. Utility Shelter (diagram and calculations attached)
        ii. Available Capacity: 6,209 gal

23. K-11 Lube Oil Tank
    a. Capacity: 280 gal
    b. Required Capacity: 280 gal + 10% = 308 gal
    c. Double Wall Tank and Secondary Containment
    d. Concrete Secondary Containment:
        i. BOG Compressor Shelter
        ii. Available Capacity: >5,000 gal

Utility Shelter
Secondary Containment Calculation



Utility Shelter	Inches		Inches		Inches	Cubic Inches	Cubic Feet
23	442	x	1008	x	4	1782144	1031

Pedestal	Inches	x	Inches		Inches	Cubic Inches	Cubic Feet
1	20	x	19	x	4	1520	
2	20	x	19	x	4	1520	
3	18	x	17	x	4	1224	
4	21	x	38	x	4	3192	
5	89	x	34	x	4	12104	
6	20	x	38	x	4	3040	
7	20	x	18	x	4	1440	
8	20	x	18	x	4	1440	
9	20	x	38	x	4	3040	
10	20	x	20	x	4	1600	
11	20	x	38	x	4	3040	
12	194	x	36	x	4	27936	
13	21	x	15	x	4	1260	
14	20	x	21	x	4	1680	
15	16	x	17	x	4	1088	
16	16	x	16	x	4	1024	
17	16	x	16	x	4	1024	
18	15	x	15	x	4	900	
19	16	x	16	x	4	1024	
20	120	x	42	x	4	20160	
21	246	x	108	x	4	106272	
22	293	x	130	x	4	152360	
						347888	**201**

Utility Shelter	1031	Cubic Feet	equals	7712
Pedestals	201	Cubic Feet	equals	1504
Adjusted Containment Area	830	Cubic Feet	equals	**6209 gallons**

APPENDIX H

Gulf LNG Plan for Unanticipated Discovery of Hazardous Materials

Plan for the Unanticipated Discovery of Hazardous Materials

Gulf LNG Liquefaction Company, LLC
a Kinder Morgan operated company

Gulf LNG Liquefaction Company, LLC,
Gulf LNG Energy, LLC and
Gulf LNG Pipeline, LLC

569 Brookwood Center, Suite 749
Birmingham, AL 35209

August 2015

Plan for the Unanticipated Discovery of Hazardous Materials

KINDER MORGAN INC.

Plan for the Unanticipated Discovery of Hazardous Materials

CONTENTS

1.0 Plan for the Unanticipated Discovery of Hazardous Materials

Contaminated soils or other, undocumented hazardous materials could be encountered during construction of the proposed Terminal and pipeline facilities. If such materials, as defined in applicable federal, state, and local regulations and guidelines, are encountered during construction of the Gulf LNG Liquefaction Project ("the Project"), Gulf LNG Liquefaction Company, LLC, Gulf LNG Energy, LLC, and Gulf LNG Pipeline Company, LLC (together "Companies") would implement the Plan for the Unanticipated Discovery of Hazardous Materials.

The procedures in this Plan for the Unanticipated Discovery of Hazardous Materials provide a basic framework for identifying and managing identified hazardous materials. Because of the wide range of properties and characteristics of "hazardous" materials, it is not practical to prepare a single, concise plan to address the investigation and management of unknown quantities of hazardous materials with a wide spectrum of hazardous characteristics. As a result, this Plan for the Unanticipated Discovery of Hazardous Materials is short and general, and is meant to apply to identification of relatively small volumes of hazardous materials with correspondingly "low" hazardous characteristics. In the event that large quantities of hazardous materials, or extremely hazardous substances are identified during construction, Companies will procure the services of a qualified third-party contractor to perform and/or oversee the initial investigation and potentially, sampling, removal, and disposal of impacted media. In such a case, this Plan for the Unanticipated Discovery of Hazardous Materials may be supplemented by the qualified third-party contractor with other, more intensive investigation and management measures that are specific to the suspected chemicals of concern.

2.0 Procedures

The procedures described below would be used to determine the extent, nature, and disposition of suspected contamination in areas which would be impacted by construction. The intent of these procedures is to mitigate impacts from unanticipated contaminated media during construction activities. This plan for management and handling of contaminated media encountered during construction includes the following:

- Excavation or subsurface activities;
- Contaminated media classification;
- Contaminated material handling and disposal requirements; and
- Dewatering and sedimentation control.

Potentially contaminated soil, material, and/or groundwater may be encountered during excavation, dewatering, or other Project construction activities. Typically, these media are identified by olfactory evidence (i.e., odors) or visual evidence (i.e., stained or discolored soil). In some cases, the presence of containers commonly associated with waste disposal, such as 55-gallon drums or 5-gallon buckets, might be indicative of the presence of potentially contaminated media.

A photo-ionization detector (PID) or similar device may be used by Companies' qualified third-party contractor to perform initial screening of soils suspected of being impacted by volatile organic compounds (e.g., gasoline, diesel, and hydraulic fluid, expected to be the most likely sources). Elevated PID readings will be verified through sampling and analysis. Sampling will be completed by the Companies' qualified third-party contractor. Once the PID has been "calibrated" with analytical data, the PID may be used to segregate impacted soils. Depending on the results of soil sample analysis, Companies may require collection and analysis of groundwater samples.

3.0 Management and Notification

The environmental inspectors ("EIs") will be responsible for ensuring that the contractor manages Project-related materials (e.g., soil and groundwater) in accordance with the Project permit conditions. In the event that the discovery of hazardous wastes or contaminated sites occurs, Companies would perform the following steps:

- Stop work associated with the hazardous wastes or contaminated sites;
- Cordon off or otherwise restrict access to the suspected area;
- Notify the EIs and construction manager;
- Secure the services of a qualified third-party contractor, if necessary;
- Notify the landowner(s) of the subjected parcel(s); and
- Consult with appropriate local, state, or federal regulatory agencies (as appropriate) with respect to the management and/or disposal of contaminated media.

4.0 Contaminated Material Storage

The construction contractor, under the supervision of the Companies' Environmental Manager and Inspectors, would identify where to stockpile or how to store suspected contaminated materials, including excavated spoils, or collected contaminated water.

An EI, in consultation with a qualified third-party contractor, if necessary would ensure that excavated materials, in particular contaminated material, are managed appropriately so as not to further spread environmental contaminants. Classifications such as "uncontaminated material," "non-hazardous contaminated material," or "hazardous materials" will be utilized to identify and manage material at the construction site. These material categories will be confirmed by chemical laboratory testing and appropriately managed in accordance with this Plan for the Unanticipated Discovery of Hazardous Materials. Materials will be managed in the interim period between detection or identification and receipt of analytical results (and ultimately disposal) in accordance with all applicable federal, state, and local government guidelines and regulations.

5.0 Safe Working Conditions

Where applicable, the construction contractor would be required to observe the following general provisions, which may be subject to alterations based on site conditions, to allow safe working conditions in performance of the work:

- All workers who will be managing, handling, or otherwise exposed to contaminated material will be appropriately trained for this task in accordance with all applicable federal, state, and local government guidelines and regulations;
- Allow EIs and/or a qualified third-party contractor to monitor material to determine requirements for handling and testing, along with disposition requirements for off-site disposal or treatment;
- Segregate excavated material based on field screening performed by the EIs and/or a qualified third-party contractor during excavation;
- Directly haul excavated, contaminated material off site to an off-site location approved by the Companies' EI and/or a qualified third-party contractor and avoid stockpiling of such material on site whenever possible;
- Do not remove regulated material from the site for disposal or treatment without an approval for off-site disposal at a permitted landfill and a United States Environmental Protection Agency ("EPA") hazardous waste manifest for off-site disposal or treatment of hazardous waste;
- Maintain Project documentation with accurate records of environmental conditions within the Project work area, material tracking and disposal transportation manifests, and disposal certifications. Documentation may include daily and monthly status reports or minutes of meetings;
- Suspend work in the area and notify Companies' EIs and/or a qualified third-party contractor if the presence of potentially hazardous conditions is evident. These conditions include, but are not limited to, buried containers, drums or tanks, or explosive conditions due to contaminated vapors. Secure the area in order to restrict access until the conditions can be resolved;
- Observe appropriate provisions when transporting excavated material, including: handling material within established right-of-way limits, cleaning any material from public streets, covering all trucks during material handling, and transporting contaminated material in accordance with applicable agency solid waste and hazardous waste regulations;
- Observe appropriate provisions when stockpiling excavated material, including: avoiding soil stockpiles whenever possible by direct hauling of excavated materials off site for disposal, managing site grades to facilitate surface drainage, and preventing dust and leaching from stockpiles (by covering and utilizing temporary

berms or silt fence barriers). The EIs and/or a qualified third-party contractor will routinely inspect stockpiles during construction and record inspection observations; and

- Stockpiled materials classified as hazardous waste will be appropriately handled by storing the excavated material in containers, tanks, or a containment building in accordance with state agency and Resource Conservation and Recovery Act ("RCRA") provisions for the less-than-90-day storage permit exemption [40 Code of Federal Regulations ("CFR") 262.34].

6.0 Dewatering Systems and Treatment

Design and operation of the dewatering systems, including treatment if necessary, would be completed by Companies' contractor. The dewatering systems will be designed to limit migration of potentially contaminated groundwater. Companies' contractor will prevent erosion or sedimentation from stockpiled material or other construction areas, obtain all required treatment and discharge permits (in accordance with federal, state, and local publicly owned treatment works' ("POTWs") requirements), and arrange for sampling and analysis of water as required by permit conditions.

The Companies' EI and/or a qualified third-party contractor will prepare a brief report discussing the investigation from discovery to disposal for each discrete area of contaminated soils or other, undocumented hazardous materials identified. The report will include basic information regarding the discovery date/method, sampling methods and procedures, materials management procedures, rationale for analytical methods chosen, results, and recommended disposal practices. Appended to each report will be complete copies of the chain of custody for each sample, the analytical report, and manifests/disposal records as appropriate.

APPENDIX I

Gulf LNG Storm Water Pollution Prevention Plan

DRAFT
Storm Water Pollution Prevention Plan for the Gulf LNG Liquefaction Project

Gulf LNG Liquefaction Company, LLC

Gulf LNG Energy, LLC

569 Brookwood Village, Suite 749
Birmingham, Alabama 35209

Summary

Gulf LNG Liquefaction Company, LLC ("GLLC") and Gulf LNG Energy, LLC ("GLE") (together "Companies"), are developing the proposed Gulf LNG Liquefaction Project ("Project"), which will add liquefaction and export capabilities to GLE's existing Gulf LNG Terminal ("Terminal") located in Jackson County, Mississippi (Figures 1 and 2, Attachment B). On June 19, 2015, GLLC and GLE filed an application with the Federal Energy Regulatory Commission ("FERC") in Docket No. CP15-521 pursuant to Section 3 of the Natural Gas Act, requesting authority to construct and operate new natural gas liquefaction and export facilities at GLE's existing liquefied natural gas ("LNG") regasification Terminal located in Jackson County, Mississippi, near Pascagoula. Additionally, pursuant to Section 7(c) of the Natural Gas Act and FERC regulations, Gulf LNG Pipeline ("GLP") notified the FERC that minor modifications will be made to the existing pipeline facilities that currently interconnect with the Terminal under GLP's blanket authorization from the FERC.

The Project facilities will allow liquefaction of domestic natural gas delivered by pipeline; storage of the LNG in the Terminal's existing LNG storage tanks, and loading of the stored LNG into LNG carriers ("LNGCs") via the Terminal's existing marine berthing facility. The Terminal will retain its current capability to receive, store, regasify, and deliver natural gas into the interstate pipeline system, as originally constructed, thereby making the Terminal bi-directional in terms of LNG import and export.

This Stormwater Pollution Prevention Plan ("SWPPP") has been prepared to support a Large Construction Notice of Intent for the construction activities associated with development of the Project. The Project also includes the construction of two marine off loading facilities designed and engineered to accommodate typical construction and transportation barges. Marine facility structures will be constructed from waterborne construction platforms. The construction activities associated with the marine facility are not addressed in this SWPPP as the work will be subject to storm water controls dictated by the conditions of the Application for Rivers and Harbors Act Section 10, Clean Water Act Section 404 Permit and Section 401 Water Quality Certification, which is being coordinated by the U.S. Army Corps of Engineers ("USACE") and Mississippi Department of Marine Resources ("MDMR"). The Mississippi Department of Environmental Quality ("MDEQ") Large Construction Storm Water General Permit ("LCGP") MSR10 outlines a set of provisions construction operators must follow to comply with the requirements of the National Pollution Discharge Elimination System ("NPDES") storm water regulations.

Development, implementation, and maintenance of this SWPPP will provide GLLC and its construction contractor with the framework for reducing soil erosion and minimizing pollutants in storm water during construction of the Project.

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TO BE PROVIDED DURING DETAILED ENGINEERING

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Appendix A: Supporting Calculations

TO BE PROVIDED DURING DETAILED ENGINEERING

1.0 INTRODUCTION

This Storm Water Pollution Prevention Plan ("SWPPP") has been prepared for the construction activities associated with the expansion of the Terminal site and construction of Project facilities, which are illustrated on Figure 1. The Project also includes the construction of a marine facility consisting of two Marine Offloading Facilities ("MOFs") and a salt marsh wetland mitigation site. Marine facility structures will be constructed from waterborne construction platforms. The construction activities associated with the marine facilities are not addressed in this SWPPP as the work will be subject to approval of the Application for Rivers and Harbors Act Section 10, Clean Water Act Section 404 Permit and Section 401 Water Quality Certification, which are being coordinated by the Mississippi Department of Marine Resources ("MDMR") and the U.S. Army Corps of Engineers ("USACE").

The Mississippi Department of Environmental Quality ("MDEQ") Large Construction Storm Water General Permit ("LCGP") MSR10 outlines a set of provisions construction operators must follow to comply with the requirements of the National Pollution Discharge Elimination System ("NPDES") storm water regulations. The LCGP covers site over five acres and will be adhered to, as required, by GLLC.

Development, implementation, and maintenance of this SWPPP will provide GLLC with the framework for reducing soil erosion and minimizing pollutants in storm water during construction of the Project.

2.0 PROJECT FACILITIES AND SITE DESCRIPTION

2.1 Project Facilities

The Project facilities applicable to this SWPPP will consist of the following major components:

- Construction Support Areas (“CSAs”)

- Salt Marsh Wetland Mitigation Site

- Facility Expansion
  - Metering facilities
  - Pipeline modifications
  - Pretreatment facilities
  - Liquefaction Trains
  - Ship loading modifications
  - Storm surge protection /containment wall extension
  - Utilities and support facilities

2.2 Site Condition – Before Construction

The existing site conditions are described as an existing LNG Terminal facility and vegetated land with elevations ranging from approximately three feet above sea level to thirteen feet above sea level. The uplands at the site were historcially formed by the unconfined placement of dredged material. The Bayou Casotte Dredged Material Management Site (“BCDMMS”) is currently utilized by the USACE and the Port of Pascagoula for placement of dredged material from the Bayou Casotte Channel. Outside of extraordinary events, the USACE has no plans for additional disposal of dredge material to be deposited into BCDMMS until 2021 (post-construction start). Impacts to wetlands will be mitigated for as required by the conditions of the Joint Permit and Notification filed with the Mississippi Department of Marine Resources in June 2015. Site drainage runs from the uplands to the surrounding wetlands and thence to Mississippi Sound. All storm water falling within the BCDMMS is contained and will continue to be contained within a containment dike.

2.3 Site Condition – After Construction

The entire site will be stabilized with gravel, concrete, and grass. All drainage inside the storm surge protection wall will be routed into a storm water wet well and will be pumped out into the Mississippi Sound. The storm surge protection wall will prevent sediment from leaving the site. Portions of the site will be expanded into the existing the BCDMMS, relocating a segment of the existing containment dike. Roads within the existing and expanded facility will be paved. A new paved permanent access road will be constructed from the storm surge protection wall to the flare tower. A temporary heavy haul road will be constructed from the existing access road to the dikes, to the north and south MOFs. A total of approximately 135.4 acres will be disturbed for the construction of the Terminal and associated temporary and permanent access roads.

2.4 Adjacent Properties

Adjacent properties include:

- The BCDMMS, which is located northeast of the existing Terminal
- The Chevron Pascagoula refinery, which is located north of the Terminal access road along its east-west corridor.

2.5 Soils

The area to be disturbed for the construction of the Project facilities generally consists of poorly draining, slowly permeating soils typical of those in marshes. Based on historical information, the existing terminal and surrounding area were submerged under the waters of the Mississippi Sound as recently as 1952. Soil borings completed during the geotechnical investigations for the original Terminal identified 35 to 50 feet of very soft to soft clays and very loose to loose sands and silts across the area and verify the extent of fill material added to this area. A significant portion of the property to be developed with the expansion of the existing terminal is currently located within the BCDMMS, an area that was also submerged under the waters of the Mississippi Sound. Soils are loose or soft in consistency and include sand, silt, sandy clays, and clayey sands. The water table is high and soils are saturated much of the year. Underlying this upper varied layer is a thick deposit of highly compressible soft gray clay containing lenses and pockets of fine sand. In the BCDMMS area, as expected, the surface soils consist of very soft to soft clays (dredged material). A significant portion (approximately 46 acres) of the land around the existing terminal that will be impacted by the proposed Project is currently within the BCDMMS. The BCDMMS is used by the USACE Mobile District for placement of dredged materials from maintenance activities in the Pascagoula Harbor area. Although the soils in this area are mapped as mucky sandy clay loam, frequently flooded, as described above, surface soils in this area are most likely former dredged material that has been deposited in the past 60 years over formerly submerged areas. Like the surface soils that currently underlie the existing terminal, these soils may or may not possess the chemical and physical characteristics of the Axis mucky sandy clay loam, frequently flooded.

Existing meter stations to be modified are located on loamy sands while the two MOFs, the North MOF and the South MOF, will be constructed in the open waters of the adjacent west Mississippi Sound, but outside the limits of the Bayou Casotte Shipping Channel. The North MOF will be a permanent structure while the South MOF will be used only during construction. The North MOF will be constructed adjacent to north edge of the existing Terminal and the existing marine berthing facility. The South MOF will be constructed adjacent to the south edge of the existing Terminal and the existing marine berthing facility. Since these will be constructed in open water and are not relevant to the SWPPP, brief references will be made but, no further detailed discussion will be included in this document.

At CSAs 1, 2, 3, 4, and 6, minor ground disturbing activities, such as leveling and surface improvement with aggregate, are proposed in upland areas consisting of silty loam, loamy sand, and fine sandy loam. At CSA 5, GLLC intends to clear the entire site and fill the onsite wetland areas in order to maximize the amount of useable space during construction, and to provide access to the Project site. Soils in this area consist of mucky sandy clay loam, frequently flooded.

2.6 Receiving Waters

2.6.1 Surface Water

The Project is located adjacent to the Mississippi Sound, south of the entrance to Bayou Casotte. The Mississippi Sound is a relatively shallow elongated estuary separated from the Gulf of Mexico by barrier islands and bounded on the north by small bays, marshes, bayous, rivers, and coastal beaches.

It is located in the Mississippi Coastal watershed or Coastal Streams Basin (U.S. Geological Survey ("USGS") cataloging number 03710009) which lies within the South Atlantic Gulf Region, Pascagoula Sub-region, and Pascagoula Mississippi Accounting Unit. The Mississippi Coastal watershed drains southern Mississippi with ultimate discharge into the Gulf of Mexico. The majority of the watershed falls within Harrison and Hancock Counties, with smaller portions encompassing Jackson, Stone, Pearl River, and Lamar Counties, as well as portions of Alabama.

2.6.2 Total Maximum Daily Loads

The Total Maximum Daily Load ("TMDL") is a calculation of the maximum amount of a pollutant a water body can receive and still meet water quality standards. Typically, the pollutants of concern associated with construction activity include sediment, and other sediment-related parameters (e.g., turbidity, total suspended solids, etc.). Other pollutants may also be of concern, depending on local conditions.

As required by the LCGP, if a TMDL has been established for the water where the Project will discharge and the TMDL (or the state authority) indicates that it applies to construction or storm water discharges, the Plan is required to be consistent with the requirements of that TMDL.

Neither the Environmental Protection Agency ("EPA") and/or the MDEQ have established TMDL requirements for discharge into the Mississippi Sound, the water body where the ultimate construction storm water discharge will occur. Accordingly, the construction storm water discharges from this Project will not be subject to specific TMDL requirements.

3.0 CONSTRUCTION SEQUENCE

The construction sequence for the SWPPP includes the construction of the temporary heavy haul road and dredging of the MOFs, followed by modifications to the BCDMMS and associated site prep, pilings, and construction of foundations - including the storm surge protection wall extension. Additionally, demolition of the existing storm surge protection wall and construction in the existing and new process areas will occur. The existing storm surge protection wall will remain in place and operate as intended until the new, modified storm surge protection wall is completed.

3.1 Mobilization, Construction Staging Areas, Heavy Haul Road

Upon receipt of Project permits and clearances, Project labor and supervision with necessary equipment will be mobilized to the site to prepare the temporary construction facilities and to commence site preparation earthworks activities. Additional labor and equipment will be mobilized to the site as required to facilitate each subsequent phase of the work.

Temporary facilities necessary to support Project construction will be located in the general vicinity of the Project. The temporary CSA facilities will include equipment and material laydown areas, contractor offices and parking areas, warehouses, and workshops. Due to space constraints within the existing facility, it will be necessary to locate and utilize a significant portion of the required temporary facilities offsite in the general Pascagoula area. Each of the proposed sites has been used previously for industrial purposes and will require a minimum amount of site preparation prior to use. Areas where sensitive resources have been identified (i.e., wetland features) at the CSAs will largely be excluded from use and will be protected during construction by fencing off and placing signs at no-access areas, and through implementation of BMPs, including the requirements of the Project Plan and Procedures. At CSA 5, GLLC intends to clear the entire site and fill the onsite wetland areas in order to maximize the amount of useable space during construction, and to provide access to the Project site.

GLLC also proposes to use two on-site areas totaling approximately 11.7 acres to support construction activities. One area is located at the northwest portion of the Project boundary adjacent to the North MOF, the North Marsh Staging Area, and the other area is located in the southeast portion of the Project boundary adjacent to the South MOF, the South Marsh Staging Area. These areas will be filled as necessary during initial site preparation for use during construction. Following temporary use, the North Marsh Staging Area will be incorporated into the permanent Terminal design for storage, parking, and turnarounds, and as the location of the new Terminal administrative offices. The South MOF will be removed after temporary use and the shoreline area restored.

Before construction work commences, the temporary erosion control devises (“ECDs”) will be installed around sensitive areas, along portions of the CSAs, north and south marsh staging areas, and along the temporary heavy haul road where necessary to prevent the unfiltered discharge of storm water runoff from the construction area into adjacent wetlands and the ultimate receiving waters. Construction entrance/exit structures will be installed at CSAs, as needed, to prevent mud from exiting the site.

Initial construction activities will include clearing and grubbing, leveling of existing grades and hauling and compacting imported soils to achieve the final elevation. ECDs will remain in place and be maintained throughout the duration of the construction work.

In the case segments of the temporary heavy haul road not located on the dike, infiltration ditches will be cut on both sides of the road inside of the ECDs as necessary to control stormwater runoff. Once the road has achieved its final sub base elevation, a base course material will be placed as a final surface to stabilize the underlying compacted soils and to provide for suitable vehicular access. The road embankment slopes on both sides of will be stabilization. ECDs will remain in place and be maintained throughout the duration of the construction work.

Specifically, heavy haul road construction sequence steps include:

- Implement ECDs
- Clear vegetation
- Grub to remove organic material
- Scarify and re-compact loose soils to a recommended density.
- Place geogrid and geotextile fabric
- Place 8 or 12 inches of imported fill and compact to a recommended density
- Cut road side ditches
- Place remainder of fill to achieve the sub base elevation
- Stabilized road final top surface with an approved MDOT base course material
- Stabilized road embankments with hydro-seeding
- Maintain SWPPP control measures

3.2 Expansion of Existing Facility

Approximately 120.0 acres of land will be disturbed in order to expand the existing Terminal site (this total excludes MOFs). This area is vegetated, with elevations ranging from three feet to thirteen feet, and slopes varying from one to four percent. The soils consist of previously placed dredged materials a portion of which are located within the BCDMMS. Prior to construction, ECDs will be installed, as necessary to prevent the unfiltered discharge of storm water runoff from the construction area into adjacent wetlands and the ultimate receiving waters.

Two LNG trains and associated facilities will be constructed in this area.

The grade will then be cut, which will expose soft to firm clay fill or fine grained clayey sandy fill. To provide a good working surface, the exposed surface soil will be chemically stabilized with lime-fly ash to a depth of eight to ten inches and then be re-compacted. Any free water will be drained from the site by establishing positive drainage with ditches or pumping from the sumps. Low lying areas with standing water will be backfilled with coarse aggregate such that standing water is no longer exposed. A non-woven, needle-punched geo-fabric will be placed over, and in good contact with, the prepared ground surface prior to placement of general fill. A bi-axial Geogrid equivalent to Tensar BX 1200 will be placed on top of the geofabric and extend at least 10 feet beyond the toe of the proposed general fill. This will act as a separator between the subgrade and the structural fill used to raise the site elevation to the design level. The initial fill layer will be 16 inches thick of well graded, coarse aggregate over the geofabric and compacted.

A second bi-axial Geogrid layer will then be placed over the well graded aggregate. A 16-inch thick second layer of well-graded aggregate will be placed over the second bi-axial Geogrid. Aggregate layer will be compacted and general fill will then be placed and compacted to raise the site grade to elevation 4 feet.

Select fill will be used to raise the grade in areas from elevation 4 feet to the design grade of elevations, varying from 10 to 15 feet, and placed in uniform loose lifts not exceeding eight inches thick and extending across the entire planed raised area. The estimated volumes of material required to raise the grade across the Project construction areas, and for construction of the storm surge protection wall and the storm water protection system, are 816,887 cubic yards and 258,110 cubic yards, respectively.

Site grading will also include finish grading of the entire site for roadways, culverts, ditches, ramps and swales etc. Finish grading will include concrete paving, with curbs for surfaced process areas, general gravel surfacing and applications of top soils, seeding and mulching for grass areas.

The existing Terminal is currently surrounded by the storm surge protection wall. The wall protects the existing Terminal from a storm surge event. It will be extended and supplemented to encircle the entire expanded Terminal facility, including the new liquefaction facilities. The perimeter system extension will start just east of the facility’s southeast corner and encircle the planned expansion area, ajoining the existing section located on the north side of the facility in the vicinity of the current main facility gate, thus providing a full surround enclosure for the purposes of storm surge.

The existing storm surge protection system is approximately 1,800 feet in length. The extended (new) storm surge protection system for the new facilities will consist of a new earthen perimeter levee and a new concrete wall. The earthen perimeter levee will be constructed on the north and east sections of the Project site. The earthen levee will connect the two ends of the existing levee for the BCDMMS that will be bisected by the new Project area; one end on the northwest side and the other on the southeast side of the Project area. The concrete wall will be located on the south side of the Project area. This wall will be tied into the existing storm surge protection wall on the west and the new levee on the east.

The new perimeter levee footprint will be cleared and grubbed to remove woody vegetation and then stripped of 12 inches of organic material. A sheet pile will then be driven in the center of the levee. The stripped area will be covered with geotextile fabric and the fabric will be covered with a geogrid material. Clean sand will be placed on the geogrid material. Over this clean sand, clayed sand base material will be placed to bring the levee up to the bottom of the crushed stone surface. The exterior and interior of the levee will have a slope of 3:1. Both exterior and interior surfaces will be plated with on-site clayey silt dredged material. Crushed stone slope protection material will be used on the interior surface and armor rock slope protection material will be used on the exterior surface of the levee. Similar to the existing Terminal's surge wall construction methodology, a 40 foot wide work platform section will be required to construct the wall and install necessary piles. The wall construction area will be cleared, grubbed and stripped similar to the earthen levee. In addition, the area will be excavated and sand will be placed on the geogrid material. Additional geogrid material will then be placed on top of the sand and stone material will be placed and compacted to form the new premier levee.

Before construction work commences on the new facilities, ECDs will be installed. Two silt fences placed five feet apart will be installed at the outside limits of the storm surge protection wall and sediment basins will be constructed to prevent sediments and pollutants from entering into the adjacent wetlands and ultimately into Mississippi Sound. Swales will direct concentrated storm water flow collected from overland runoff to the temporary sediment basins. The swales will be designed to maintain velocities at three feet per second or less to control erosion. Check filter dams will be constructed to slow down the flow and filter sediments that are eroded from un-stabilized areas. The temporary sediment basins will be sized in accordance with MSR10.

After the grading has been finished, a suitable base material will be placed and compacted; the base material will serve as a soil stabilizer. A temporary sediment basin will remain and serve as a temporary storm water collection pond to control storm water retained within the wall prior to release through gravity outfall with flap gate and gate valve protection. Furthermore, the temporary ECDs installed at the perimeter of the wall will be removed after the wall is complete.

Construction sequence steps:

- Implement ECDs
- Construct temporary sediment basins
- Clear vegetation
- Grub below grade to remove organic materials
- Re-grade landscape by excavating and filling areas to the designed elevations, compact as necessary
- Place geogrid or geotextile fabric
- Construct swales
- Construct storm surge protection wall
- Remove ECDs around wall
- Maintain remaining ECDs during construction of Project facilities

3.3 Construction Duration

The duration of construction activities associated with this SWPPP is expected to be approximately 64 months.

4.0 EROSION AND SEDIMENT CONTROL MEASURES

The purpose of this section is to identify the types of erosion and sediment controls that will or may be used during construction. The controls will provide soil stabilization for disturbed areas and structural controls to divert runoff and remove sediment.

4.1 Vegetative Control and Soil Stabilization Practices

Vegetation Preservation

All vegetated areas adjacent to construction work areas will be left in place as the construction areas are being disturbed.

Dust Control

Roads and surfaces that have been cleared and grubbed will be periodically sprayed with water to prevent or reduce dust emissions. Dust control will be an on-going practice throughout the construction period.

Stabilized Soil

Soil will be stabilized using agricultural limestone at the entry/exit point of the site and along roadways. This material will also be used to stabilize much of the areas once complete.

Hydro-Seeding

Hydro-seeding typically consists of applying a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydro-mulch equipment. Any areas that are disturbed during the course of the construction activities, which do not have specific surface treatment specifically indicated, will be hydro-seeded.

Construction Road Surfacing

Construction roads in will be surfaced with an approved MDOT base course material immediately after the sub base is prepared.

4.2 Structural Control Practices

Check Filter Dams

Check Filter Dams are constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. Check Filter Dams will be placed in drainage ditches near their respective outfalls. Check Filter Dams will be installed immediately following completion of the ditch. Check Filter Dams are illustrated on drawing DW-1424-008, provided in Part 5.

Erosion Control Devices

ECDs will be placed around the perimeter of the proposed perimeter storm surge protection wall as well as on both sides of the access road. ECDs will be maintained and will not be removed until final stabilizing measures, such as hydro-seeding or mulching, have been installed and are functioning, or the storm surge protection wall is installed preventing uncontrolled run off to wetlands and the receiving water. ECDs are illustrated on drawing DW-1424-009, provided in Part 5.

Construction Entrance/Exit

Construction Entrance/Exit structures will be installed. Construction Entrance/Exit Structures are illustrated in Part 5.

Swales

Swales are used to intercept runoff and divert it around un-stabilized areas or divert sediment laden runoff to an erosion control device. Swales are illustrated in Part 5.

Sediment Basins

Sediment basins are used to precipitate sediment out of runoff draining from an un-stabilized area. The drainage area to a single Sediment basin shall not exceed twenty-five (25) acres. The basins will be cleaned when the capacity has been reduced by half. Sediment basins are illustrated in Part 5.

Pipe Slope Drains

Pipe slope drains will be used to channel concentrated runoff that the swales carry from Phase III, down a temporary road bank slope to Phase II, to an energy dissipater, and to another drainage swale system. Pipe Slope Drains are illustrated in Part 5.

4.3 Structural Control Practices – Others Available for Use

Diversion/Interceptor/Perimeter Dikes

Dikes are used to intercept runoff and divert it around un-stabilized areas or to divert sediment laden runoff to an erosion control device. Dikes are illustrated in Part 5.

Paved Flumes

A paved flume may be used in lieu of pipe slope drains to drain storm water. Paved flumes are illustrated in Part 5.

4.4 Coordination of Control Measures with Construction Activities

Structural controls will be coordinated with construction activities so the controls are in place before construction begins. The following practices will be coordinated with construction activities:

- The temporary perimeter controls (ECDs) will be installed before clearing and grading begins.
- Clearing, grubbing and grading will not occur in an area until it is necessary for construction to proceed.
- The stabilized construction site entrance and sediment basins will be constructed before clearing and grading begins in the Terminal expansion area.
- Once construction activities cease permanently in an area, that area will be stabilized, in accordance with Figure 6.

4.5 Supporting Calculations

The Project's storm water calculations will based based on the Natural Resources Conservation Service ("NRCS") Technical Release 55 ("TR-55") Method. TR-55 is a procedure to calculate and analyze the storm water runoff volume, peak rate of discharge, hydrographs and storage volumes required for storm water management structures in small watersheds.

The TR-55 method provides several options to calculate storm water runoff. The option used on this Project was the Graphical Peak Discharge ("GPD"). The storm data that GPD calculations require are, Time of Concentration, Storm Frequency, Drainage areas, Runoff Curve Numbers ("CN"), and Rainfall Distribution Type.

The Project's storm water calculations will be provided during detailed engineering.

4.5.1 Calculation Results Summary

TO BE PROVIDED DURING DETAILED ENGINEERING

5.0 IMPLEMENTATION SEQUENCE

During detailed engineering, GLLC will prepare a detailed listing of construction activities, which coordinates the timing of major land-disturbing activities together with the necessary erosion and sedimentation control measures planned for the Project.

6.0 MODIFICATION OF CONTROLS

This Plan, including the site erosion and sediment control plans and applicable structural control measures (see Part 5), will be revised whenever there is a change in the design, construction method, operation, maintenance procedure, etc., that may impact the discharge of 'pollutants' to the receiving water.

The plan will also be amended if inspections or investigations by site staff or by local, state, or federal officials determine that the controls are ineffective in eliminating or significantly reducing pollutants in storm water discharges from the construction site. Modifications to this Plan must be made within seven (7) calendar days following significant changes or inspections that require such modifications. See Part 6 for the Plan Amendment Log.

7.0 POST CONSTRUCTION CONTROL MEASURES

Stabilization measures shall be initiated as soon as possible in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased, unless the duration of the temporary stoppage will be less than 21 days. See Figure 6 for final surface soil stabilization treatments.

8.0 NON-STORM WATER DISCHARGE MANAGEMENT

The following non-storm water discharges have been reviewed and found to be permissible under the SWPPP:

- Fire hydrant flushing
- Waters used to wash vehicles where detergents are not used
- Waters used to control dust
- Potable water including uncontaminated water line flushing
- Routine external building wash down that does not use detergents
- Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred and where detergents are not used
- Uncontaminated ground water or spring water
- Uncontaminated air conditioning or compressor condensate
- Foundation or footing drains where flows are not contaminated with process materials such as solvents
- Uncontaminated excavation dewatering
- Landscape irrigation

Other non-storm water discharges will be eliminated to the extent feasible at the construction site. However, in the event other non-storm water discharges become necessary during construction, appropriate management practices will be developed and the SWPPP will be formally amended per the procedures described in Section 6.0.

9.0 HOUSEKEEPING PRACTICES

Good housekeeping and spill control practices will be followed during construction in order to minimize storm water contamination.

9.1 Spill Prevention Control and Countermeasure Plan

A Spill Prevention Control and Countermeasure (“SPCC”) Plan, specifically tailored for the construction activities was submitted to FERC and will be implemented in accordance with the EPA’s rules and guidelines set forth in Title 40 Code of Federal Regulations, Part 112. A copy of the SPCC Plan is provided in Part 11. The SPCC Plan will be updated and tailored effectively, as needed, to eliminate fuel, lubricating oil or other hazardous material from entering into the receiving waters caused by change in design, construction method, operation, maintenance procedure, etc. The updates will be made in accordance with the SWPPP Amendment Process.

9.2 Designated Areas for Equipment Maintenance and Repairs at the Site

A designated area will be provided to maintain and repair equipment that requires regular maintenance. Equipment that ceases to function or operate properly, and has been mobilized to an area other than a designated area, will be repaired at the location where it ceased to function. Operators or mechanics will be trained to properly prepare the area for minimization of impacts in the event of a spill (i.e., drip/drain pans, oil-absorbent materials, temporary containment dikes, etc.) and to report spills to the SWPPP Coordinator.

9.3 Concrete Chute Wash Off Handling

Vehicles handling concrete shall wash off the concrete chutes into a pit that has been lined with impervious material. The material shall be hauled off to a local approved site for disposal.

9.4 Construction and Non-Hazardous Waste Materials

All solid non-hazardous waste materials will be collected and stored in metal dumpsters rented from a local, licensed, solid waste management company. All trash and construction debris from the site will be deposited in the dumpsters. The dumpsters will be emptied as necessary, or as required by local regulation. Waste material shall be hauled to a local approved land fill site. Any disposal will be in accordance with federal, state, and local regulations. Burying of construction materials on site will not be permitted. All personnel will be instructed regarding the correct procedure for collection, storage, and disposal of waste materials.

9.5 Storage and Handling of Potentially Toxic Materials

All potentially toxic material such as paint, acid, solvents, and asphalt products, chemical additives for soil stabilization, and concrete curing compounds or additives shall be segregated and stored in a metal building with proper ventilation. The metal building shall be impounded with an impervious bottom material and a wall one (1) foot high, to contain spills from reaching the ground surface. Toxic materials shall be properly labeled and have a material safety data sheet ("MSDS") for proper usage and safety when handling the material on file at the site. Personnel shall be trained in accordance to the Occupational Safety and Health Administration guideline on handling hazardous material. The SPCC Plan contains appropriate provisions for the storage and handling of potentially toxic materials.

9.6 Vehicle and Vehicle Tracking

All vehicles exiting the Construction Site will travel through construction entrance/exit structural controls to prevent mud from tracking onto the public road. Any mud or clots of soil that deposit on the public road at the exit point will be scrapped up and disposed of.

9.7 Sanitary Facilities

Construction office structures will be provided with sanitary facilities and appropriate holding tanks. Holding tanks will be pumped out and serviced as required by conditions and by local regulation. Pump out and service will be performed by an approved sanitary waste management contractor.

Sanitary waste from outdoor portable units shall be collected as necessary and as required by local regulation. Service will be provided by an approved sanitary waste management contractor.

9.8 Significant Material Inventory

Pollutants that result from clearing, grading, excavation, and building materials, and have the potential to be present in storm water runoff, are listed in Table 9-1. This table includes information regarding material type, chemical and physical description, and the specific regulated storm water pollutants associated with each material. The list of Potential Construction Site Storm Water Pollutants will be maintained and updated as necessary to reflect existing site inventories.

Table 9-1 Potential Construction Site Storm Water Pollutants

MATERIAL TRADE NAME	CHEMICAL / PHYSICAL DESCRIPTION	STORM WATER POLLUTANTS (1)
Pesticides (insecticides, fungicides, herbicides, rodenticides)	Various colored to colorless liquid, powder, pellets, or grains	Chlorinated hydrocarbons, organophosphates, carbamates, arsenic
Fertilizer	Liquid or solid grains	Nitrogen, phosphorous
Cleaning Solvents	Colorless, Liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates
Asphalt	Black solid	Oil, petroleum distillates
Concrete	White solid	Limestone, sand
Glue, Adhesives	White or yellow liquid	Polymers, epoxies
Paints	Various colored liquid	Metal oxides, stoddard solvent, talc, calcium carbonate, arsenic
Curing Compounds	Creamy white liquid	Naphtha
Wastewater from construction equipment washing	Water	Soil, oil & grease, solids
Hydraulic oil / fluids	Brown oily petroleum hydrocarbon	Mineral oil
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes
Antifreeze / Coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)
Erosion sediments	Solid Particles	Soil, Sediment

(1) Data obtained from Material Safety Data Sheets (MSDS) when available

10.0 RESPONSIBILITIES, INSPECTIONS & MAINTENANCE PROCEDURES

10.1 On-Site Operator

Table 10-1 defines the role and responsibilities of on-site operators.

Table 10-1 On-site Operators' Roles and Responsibilities

OPERATOR	ROLE	PERMIT STATUS	RESPONSIBILITIES
GLLC	Owner	Co-Permittee	Operational control over the construction plans & specifications, including the ability to make modifications to those plans and specifications
To Be Determined	Prime Contractor	Co-Permittee	Day-to-day operational control of those activities at the site, including the activities of subcontractors, which are necessary to ensure compliance with SWPPP

This SWPPP has been developed to address construction activities occurring on site. All entities working at this site will adhere to the requirements of the SWPPP to ensure the protection of water quality. Each operator will have equal responsibility for maintaining compliance with the requirements of the LCGP. Identified representatives from each permitted entity will share in the maintenance and inspection tasks required by this SWPPP.

10.2 Responsibilities

GLLC will designate a SWPPP Project Coordinator ("Coordinator"), who has the authority to stop activities that violate the environmental conditions of the LCGP or other applicable local, state, or federal permit. More specifically, the Coordinator's duties include but are not limited to the following:

- Establish the SWPPP Team;
- Implement the SWPPP;
- Implement and oversee employee training;

- Conduct, or provide for, inspection and monitoring activities;
- Oversee maintenance of control measures;
- Identify other potential pollutant sources and make sure they are added to the plan;
- Identify deficiencies in the SWPPP and make sure they are corrected; and
- Confirm that changes in construction plans are addressed in the SWPPP.

The SWPPP Team will be comprised its Coordinator and Inspectors. The Inspectors will work under the direction of the Coordinator to assist in such tasks as confirming that housekeeping and monitoring procedures are implemented, confirming the integrity of the structural control measures, and assisting in documenting compliance requirements of the LCGP. Table 10-2 lists the members of the SWPPP Team along with their respective responsibilities.

Table 10-2 SWPPP Team Responsibilities

Team Member	Responsibility
Coordinator	Coordinates overall implementation of SWPPP, updates plan as needed, conducts routine inspections, reviews Best Management Practices, and communicates with the Prime Contractor concerning plan modifications and storm water related activities concerning fuel oil pipeline and storage.
Vegetative and Structural Control Inspectors	Inspects erosion and sediment control measures to see if they have been installed according to the SWPPP and reports necessary repairs to structural controls and maintenance requirements.
Environmental Inspector(s)	Reviews and determines if the plan is in compliance with MDEQ LCGP MSR10 Guidelines

The ultimate FERC Authorization for the Project is anticipated to require the Environmental Inspector(s) to be responsible for the following storm water associated components:

- Compliance with the requirements of this SWPPP, the environmental conditions of the FERC Authorization, and other applicable environmental permits and approvals;
- Identifying, documenting, and overseeing corrective actions, as necessary to bring activities back into compliance;
- Verifying the limits of authorized construction work areas and locations of access roads are properly marked before clearing;

10.3 Inspections

Inspection and maintenance of temporary erosion control measures will be performed at least every seven days, and: after each rainfall event having precipitation greater than half an inch.

Discharge locations must be inspected to ascertain whether erosion control measures are effective in preventing significant impact to the receiving waters. Where discharge locations are not accessible, nearby downstream locations will be inspected to the extent that such inspections are practicable.

Locations where vehicles enter or exit the site will be inspected for evidence of off-site sediment tracking.

Each inspection required by this permit, shall be documented by an Inspection Report Filed on the Inspection and Certification Form (See Part 7). Completed forms shall be retained within Part 8 of this permit document for three years after the permit expires or is terminated. In addition to the required entries on the Inspection and Certification Form, the following information shall be entered:

- Weather information for the period since the last inspection (or commencement of construction activity if first inspection) including:
  - Best estimate of the beginning of each storm event
  - Duration of each storm event
- Weather information and a description of discharges occurring at the time of inspection
- Location(s) of discharges of sediment or other pollutants from site
- Locations of control measures that need to be maintained
- Locations of control measures that failed to operate as designed or proved inadequate for a particular location
- Locations where additional control measures are needed that did not exist at the time of inspection and
- Corrective action required including changes to the SWPPP necessary and

implementation dates.

The report must identify incidents of non-compliance with the permit conditions. Where a report does not identify incident of non-compliance, the report must contain a signed certification, per the permit signatory requirements, that the construction Project or site is in compliance with the SWPPP and the permit.

10.4 Maintenance Procedures

All erosion and sediment control measures and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections identify control measures that are not operating effectively, maintenance must be performed at the earliest date possible, but no more than seven (7) calendar days after initial identification of the problem. Table 10-3 describes the typical maintenance procedures for the sediment control measures shown on Figures 3 through 5.

Table 10-3 Maintenance Procedures for Erosion and Sediment Control Measures

CONTROL	MAINTENANCE PROCEDURE
Check Filter Dams	• Sediment will be removed when it reaches a height of six inches
Silt Fence	• Repaired as needed when fence becomes torn, knocked down, under-cut, or other event that causes fence to not perform as designed. • Sediment will be removed from fence when design capacity is reduced by 1/3.
Construction Entrance/ Exit	• If off-site sediment tracking has occurred, sediment on the roadway will be swept daily • Entrance will be maintained as necessary to minimize off-site tracking
Swales	• Repair swale banks and grade bottom to issue positive flow.
Sediment Basin	• Sediment will be removed from basin when design capacity is reduced to 27 cubic yards or the sediment has reached one foot.
Pipe Slope Drains	• Sediment will be removed at the energy dissipater with a height of six inches.

11.0 EMPLOYEE CONTINUING EDUCATION AND TRAINING

An employee-training program will be developed and implemented to educate employees about the requirements of the SWPPP. All employees will be trained prior to their first day of work on the construction site. This education program will include background on the components and goals of the SWPPP as well as hands-on training. Training topics will include (but are not limited to):

- Erosion control measures applicable to the Project;
- Spill prevention and response;
- Proper material handling;
- Disposal and control of waste;
- Equipment fueling, and proper storage, washing, and inspection procedures;
- Endangered or threatened plant or animal species that have been identified as potentially being impacted by the Project;
- Cultural resources that have been identified as potentially being impacted by the Project.

12.0 TERMINATION OF COVERAGE

A Notice of Termination shall be submitted to the Permit Board 30 days after the following conditions are met:

- Final Stabilization has been achieved on portions of the site for which the coverage recipient is responsible;
- Other owner(s) or operator have assumed control over areas of the site that have not achieved final stabilization.

13.0 RETENTION OF RECORDS

Copies of the SWPPP and documentation required by this permit, including records of data used to complete this permit, will be retained for at least three years from the date this permit coverage expires or is terminated.

14.0 REFERENCES

1. Mississippi Storm Water Pollution Prevention Plan (SWPPP) Guidance Manual for Construction Activities by General Permits Branch, Office of Pollution Control, dated May 2005.

2. Coastal Construction Manual, Forth Edition, Federal Emergency Management Agency (FEMA) – Mitigation Directorate.

FIGURES

TO BE PROVIDED DURING DETAILED ENGINEERING

PART 5: Drawings – Erosion and Sediment Control Measures

TO BE PROVIDED DURING DETAILED ENGINEERING

PART 6: Record of Storm Water Pollution Prevention Plan Amendments

TO BE PROVIDED

PART 7: Construction Activity Records

TO BE PROVIDED

PART 8: Completed Inspection and Certification Forms

TO BE PROVIDED

PART 9: Upland Erosion Control, Revegetation and Maintenance Plan

TO BE PROVIDED

PART 10: Wetland and Waterbody Construction and Mitigation Procedures

TO BE PROVIDED

PART 11: Spill Prevention, Containment, and Countermeasure Plan

TO BE PROVIDED

APPENDIX J

Gulf LNG Migratory Bird Impact Assessment and Conservation Plan

MIGRATORY BIRD
IMPACT ASSESSMENT AND CONSERVATION PLAN

Gulf LNG Liquefaction Project

JACKSON COUNTY, MISSISSIPPI

Gulf LNG Liquefaction Company, LLC
a Kinder Morgan operated company

Gulf LNG Liquefaction Company, LLC,
Gulf LNG Energy, LLC and
Gulf LNG Pipeline, LLC

Submitted to:

U.S. Fish and Wildlife Service
Mississippi Field Office Ecological Services
6578 Dogwood View Pkwy, Suite A
Jackson, MS 39213

August 2018

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LIST OF ACRONYMS

BA	Biological Assessment
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
BVA	Barry A.Vittor & Associates, Inc.
CH2M	CH2M Hill Engineers, Inc.
CSA	construction support area
Companies	Gulf LNG Liquefaction Company, LLC, Gulf LNG Energy, LLC and Gulf LNG Pipeline, LLC
EEM	estuarine emergent wetland
ESA	Endangered Species Act
ESD	emergency shutdown
FERC	Federal Energy Regulatory Commission
GLE	Gulf LNG Energy Company, L.L.C.
GLLC	Gulf LNG Liquefaction Company, L.L.C.
GLP	Gulf LNG Pipeline Company, L.L.C.
MBTA	Migratory Bird Treaty Act
MOF	marine offloading facility
MOU	Memorandum of Understanding
MP	milepost
OD	outside-diameter
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
Plan	Migratory Bird Impact Assessment and Conservation Plan
Project	Gulf LNG Liquefaction Project
PSS	palustrine scrub-shrub
ROW	right-of-way
T&E	Threatened and Endangered
Terminal	The existing Gulf LNG Terminal in Jackson County, Mississippi
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 INTRODUCTION

Gulf LNG Liquefaction Company, LLC ("GLLC"), an affiliate of Gulf LNG Energy, LLC ("GLE") and Gulf LNG Pipeline, LLC ("GLP", together, "Companies"), intend to add liquefaction and export capabilities to GLE's existing liquefied natural gas ("LNG") import terminal ("Gulf LNG Terminal" or "Terminal") located near the City of Pascagoula in Jackson County, Mississippi. GLLC filed its application with the Federal Energy Regulatory Commission ("FERC") on June 19, 2015. The Project, currently under review, has been assigned FERC Docket No. CP15-521-000. Construction requires clearing of vegetation and ground disturbances which may occur during breeding and nesting seasons for migratory birds.

This Migratory Bird Impact Assessment and Conservation Plan ("Plan") provides a summary of habitat types identified within the Project area; likely impacts to those habitats from construction of the Project; migratory birds likely to be found in the Project area and protected under the Migratory Bird Treaty Act ("MBTA") of 1918 (16 United States Code ["U.S.C."] §§ 703-712), the Bald and Golden Eagle Protection Act ("BGEPA") (16 U.S.C. §§ 668-668d); and an assessment and analysis of potential impacts to migratory birds identified by the United States Fish and Wildlife Service ("USFWS") as Birds of Conservation Concern ("BCC").

To evaluate potential MBTA and BCC concerns, a desktop review and field habitat assessment was conducted to identify bird species known or likely to occur within the Project area based on existing breeding bird survey data, field survey information, and the habitat types impacted by the Project. Migratory birds likely to occur in the Project area and species of State concern are also identified. However, the major focus of this Plan is on USFWS BCC species due to their high conservation priority status.

1.1 PROJECT OVERVIEW

The Project will involve construction in two phases of two liquefaction trains, each capable of producing approximately 5 million tonnes per annum (5 MTPA) of LNG for export, along with the required support utilities and infrastructure and modifications to the GLE Terminal, GLP Pipeline, and certain GLP meter stations to enable bidirectional operations. The Project will be located within areas previously evaluated and assessed in conjunction with the FERC's earlier review and approval of the Terminal in Docket No. CP06-12. The Project will be constructed on approximately 135 acres[1] adjacent to and encompassing the existing Terminal south of Pascagoula, Mississippi, and at six offsite construction support areas ("CSAs") totaling about 94.5 acres (Appendix A). These totals include modifications to be made at two existing metering facilities on the Gulf LNG pipeline. Total acreage for the metering facilities is approximately 3 acres.

The footprint of the proposed Project facilities is shown on Project site figures in Appendix A. Construction of the Project will be performed primarily within the indicated Project footprint, which includes additional land area adjacent to the Terminal that will be acquired through a lease agreement with the Port of Pascagoula and the State of Mississippi. Two marine offloading

[1] Includes two marine offloading facilities

facilities ("MOFs") will be constructed in support of Project construction. The North MOF will remain as a permanent structure, but the South MOF will be removed upon completion of construction activities. Access to the Project site will be via existing public roads. Additional access roads will be developed as internal features within the Project footprint, and impacts for these roads are included in the overall Project impact analyses.

Additional offsite areas will be required for Project staging, warehouse yards, contractor offices, and parking. The use of offsite areas will be negotiated with private landowners for the duration of the construction period.

1.2 REGULATORY GUIDANCE

Migratory Bird Treaty Act

Birds likely to occur in the Project area include those listed under the MBTA (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended) (USFWS 2011). The USFWS is the principal federal agency charged with protecting and enhancing populations and habitat of migratory bird species. A migratory bird is any species or family of birds that live or reproduce in or migrate across international borders at some point during their annual life cycle. The MBTA established federal responsibilities for protecting nearly all species of birds, eggs, and nests (USFWS 2011). A total of 1,007 species are protected under the MBTA (USFWS 2011). Those species not protected by the MBTA include game birds, such as the ring-necked pheasant and wild turkey, and non-native invasive species, such as the European starling and house sparrow. Despite the title, the MBTA also protects birds that are not migratory, such as mourning doves and chickadees.

Bald and Golden Eagle Protection Act

The BGEPA provides additional protection to bald and golden eagles. The BGEPA prohibits the take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit [16 U.S.C. § 668(a)]. "Take" under this statute is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb" 50 C.F.R. § 22.3. "Disturb," in turn, is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." Id. If a proposed project or action would occur in areas where nesting, feeding, or roosting eagles occur, then project proponents may need to take additional conservation measures to achieve compliance with the BGEPA.

United States Fish and Wildlife Service Birds of Conservation Concern

The USFWS BCC are those species, subspecies, and populations of migratory and non-migratory birds that the USFWS has determined to be the highest priority for conservation actions (USFWS 2008). The purpose of the BCC list is to prevent or remove the need for additional threatened and endangered ("T&E") species listings under the Endangered Species Act ("ESA") by implementing proactive management and conservation actions needed to conserve these species. The USFWS maintains a list of BCC (USFWS 2008) in which species are prioritized and listed by Bird Conservation Regions ("BCRs"). The United States is divided into 35 different BCRs. The Project area is located in BCR 27: the Southeastern Coastal Plain.

Executive Order 13186

Executive Order 13186 of January 10, 2001, identifies the responsibility of federal agencies to protect migratory birds and their habitats, and directs executive departments and agencies to undertake actions that will further implement the MBTA. Executive Order 13186 includes a directive for federal agencies to develop a memorandum of understanding ("MOU") with the USFWS to promote the conservation of migratory bird populations, including their habitats, when their actions have, or are likely to have, a measurable negative effect on migratory bird populations. Whereas the MBTA only protects migratory birds, Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. In March 2011, the FERC and the USFWS entered into a MOU regarding the implementation of Executive Order 13186.

2.0 METHODS

Working with CH2M Hill Engineers, Inc. ("CH2M"), representatives of Barry A.Vittor & Associates ("BVA") conducted biological surveys of approximately 88 acres in the vicinity of the existing Terminal and surrounding Project areas on several occasions in June-July, 2014. Surveys were not completed within the boundaries of the Bayou Casotte Dredge Material Management Site ("BCDMMS"), which comprises an estimated 46 acres to be developed with liquefaction and support facilities (i.e., the Gulf LNG Site) within the approximate 120-acre BCDMMS area. Five of the CSAs were surveyed in August 2014. Additional surveys at CSA 5 (10 acres added to increase the study area to 44.3 acres) and the newly added CSA 6 (18 acres) were conducted on March 24 and 25, 2015. These areas were surveyed for sensitive environmental features (e.g., T&E species and their potential habitat, wetlands, and waterbodies). Offshore areas (approximately 15.5 acres) where Project facilities are proposed were not surveyed during this field effort.

3.0 RESULTS

This section presents a description of the habitats traversed by the Project, and identifies the specific migratory bird species (with their associated habitat preferences), and the bird species expected to occur in or near the Project area.

3.1 HABITATS LIKELY TO BE IMPACTED IN THE PROJECT AREA

The Project facilities are proposed for construction at GLE's existing Terminal site, which is located in Jackson County, Mississippi at the end of Highway 611 and is situated adjacent to the federally maintained Bayou Casotte Navigation Channel on the Mississippi Sound. The Terminal is part of the Port of Pascagoula. The existing Terminal site consists of approximately 33 acres of commercial/industrial land. The proposed Project modifications to the Terminal will consist of land areas immediately adjacent to and within the existing Terminal footprint. Some of the existing Terminal footprint (11.24 ac) will be modified to incorporate the liquefaction facilities; however, 22.74 ac used during construction will remain essentially unchanged from the existing footprint. As discussed previously, the Project will require six offsite CSAs near the Terminal. The proposed CSAs consist of land previously used for commercial/industrial activities. Additionally, the existing Destin Metering Station, the existing Gulfstream Metering Station, and the existing Transco/FGT Interconnect will be modified to achieve bi-directional flow as a part of the Project.

The predominant land use type within the area of the proposed Project is commercial/industrial land (the existing Terminal facilities, consisting of structures, asphalt, and gravel), estuarine emergent ("EEM") wetlands, and the adjacent BCDMMS. Land use within the proposed Project boundaries also includes open water and scrub-shrub areas adjacent to the existing Terminal facility.

Existing land uses surrounding the proposed Project area, including the proposed offsite CSAs and metering facilities, consist of a mixture of industrial and commercial land, residential land, upland forest, scrub-shrub, open space, estuarine emergent and palustrine wetlands and open water (Bayou Casotte Harbor and Mississippi Sound). The proposed Project boundary at the Terminal and surrounding areas are zoned industrial.

3.2 MIGRATORY BIRD SPECIES IN OR NEAR THE PROJECT AREA

Avian diversity within the Project site and the surrounding area is species-rich, especially in regard to shore birds, wading birds, and waterfowl. Previous experience with this site and other adjacent coastal areas in Mississippi and Alabama has shown the property to contain one of the highest concentrations of birdlife in the region. The proposed Project site is an important stop-over area for migratory shorebirds in the spring and fall seasons, offering both foraging and resting habitat necessary to rebuild fat reserves. The property also hosts a large wintering aggregation of shorebirds and waterfowl. The isolation of the site and relatively pristine marsh habitat provides adequate protection from human disturbance and is ideal for large congregations of birds. The surrounding area is also a well-known location for local and visiting birders. Sanctioned field trips to the adjacent Chevron Plant are organized and run at least twice a year. Table 1 presents a list of migratory bird species expected to occur in Mississippi coastal areas of Jackson County.

During a limited survey by BVA on March 18, 2005, 49 species of the birds listed in Table 1 were observed at the Terminal site, as noted in the table by superscript. The most numerous birds observed were shore birds. Eleven species of shorebirds were observed along the tidal mud flats and shoreline of Mississippi Sound bordering the Terminal site. Although not observed, dunlin (*Caldidris alpina*) is expected to occur. No effort was made to count individual numbers for each species, but total shorebird numbers were estimated at approximately 500 individuals in the various flocks. A single individual of Wilson's plover (*Charadrius wilsonia*) was observed on the Terminal site. This species is tracked by the Mississippi Natural Heritage Program ("MNHP") as critically imperiled (S1). Wilson's plover is one of two dozen taxa ranked as a species of "high concern" in the 2004 update of the U.S. Shorebird Conservation Plan (U.S. Shorebird Conservation Plan 2004 and Brown et al. 2001, respectively). The remainder of the 49 species observed consisted of wading birds, waterfowl, raptors, and perching birds. No individual bird species were noted during the June – August 2014 field surveys, but two additional species (American bittern and Cooper's hawk) were observed during the October 13, 2014, survey (Table 1).

TABLE 1
Commonly Occurring Bird Species in Coastal Jackson County, Mississippi, and Bird Species Observed in the Project Vicinity

Common Name	Scientific Name
Shore Birds	
American Oystercatcher [1,2]	*Haematopus palliatus*
Black Skimmer [1]	*Rynchops niger*
Forster's Tern [1]	*Sterna forsteri*
Least Tern [1]	*Sterna albifrons*
Caspian Tern [1]	*Sterna caspia*
Gull-billed Tern [1]	*Sterna nilotica*
Royal Tern [1]	*Sterna maxima*
Sandwich Tern [1]	*Sterna sandvicensis*
Common Tern [1]	*Sterna hirundo*
Snowy Plover [1]	*Charadrius alexandrinus*
Wilson's Plover [2]	*Charadrius wilsonia*
Killdeer [2]	*Charadrius vociferus*
American Avocet [1]	*Recurvirostra americana*
Black-necked Stilt [1, 2]	*Himantopus mexicanus*
Herring Gull [2]	*Larus argentatus*
Laughing Gull [1, 2]	*Larus atricilla*
Brown Pelican [1,2]	*Pelecanus occidentalis*
American White Pelican [1]	*Pelecanus erythrorhynchos*
Double-crested Cormorant [2]	*Phalacrocorax auritus*
Western Sandpiper [2]	*Calidris mauri*
Least Sandpiper [2]	*Calidris minutilla*
Stilt Sandpiper [2]	*Calidris himantopus*
Wading Birds	
Great Blue Heron [1]	*Ardea herodias*
Little Blue Heron [1, 2]	*Egretta caerulea*
Tricolored Heron [1,2]	*Egretta tricolor*
Green Heron [1]	*Butorides viresans*
Yellow-crowned Night Heron [1]	*Nyctanassa violacea*
Black-crowned Night Heron [1]	*Nycticorox*
Snowy Egret [1,2]	*Egretta thula*
Cattle Egret [1]	*Bubulcus ibis*
Great Egret [1,2]	*Ardea alba*
Reddish Egret [1]	*Egretta rufescens*

TABLE 1
Commonly Occurring Bird Species in Coastal Jackson County, Mississippi, and Bird Species Observed in the Project Vicinity

Common Name	Scientific Name
White-faced Ibis [1]	*Plegadis chihi*
Glossy Ibis [1]	*Plegadis facinellus*
White Ibis [1,2]	*Eudocimus albus*
Least Bittern [1]	*Ixobrychus exilis*
American Bittern [1, 3]	*Botaurus lentiginosus*
King Rail [1]	*Rallus elegans*
Clapper Rail [1,2]	*Rallus longirostris*
Virginia Rail [2]	*Rallus limicola*
Purple Gallinule [1]	*Porphyrula martinica*
Common Gallinule [1]	*Gallinula chloropus*
Sora [2]	*Porzana carolina*
Greater Yellowlegs [2]	*Tringa melanoleuca*
Lesser Yellowlegs [2]	*Tringa flavipes*
Willet [2]	*Catoptrophorus semipalmatus*
Waterfowl	
Greater Scaup [2]	*Aythya marila*
Lesser Scaup [1,2]	*Aythya affinis*
Ringneck [1]	*Athya collaris*
Gadwall [1]	*Anas strepera*
Blue –winged Teal [2]	*Anas discors*
Green-winged Teal [1]	*Anas carolinenis*
Mallard [1]	*Anas playtyrhynchos*
American Widgeon [1]	*Anas americana*
Northern Pintail [1]	*Anas acuta*
American Coot [1]	*Fulica americana*
Wood Duck [1]	*Aix sponsa*
Mottled Duck [1,2]	*Anas fulvigula*
Hooded Merganser [2]	*Lophodytes cucullatus*
Red-breasted Merganser [2]	*Mergus serrator*
Raptors	
Osprey [1,2]	*Pandion haliaetus*
Black Vulture [1]	*Corvus ossifragus*
Northern Harrier [1,2]	*Circus cyaneus*
American Kestrel [1,2]	*Falco sparverius*
Red-tailed Hawk [2]	*Buteo jamaicensis*
Cooper’s Hawk [3]	*Accipiter cooperii*
Perching Birds	
Gray Kingbird [1]	*Tyrannus dominicensis*

TABLE 1
Commonly Occurring Bird Species in Coastal Jackson County, Mississippi, and Bird Species Observed in the Project Vicinity

Common Name	Scientific Name
Eastern Kingbird [2]	*Tryannus*
Eastern Phoebe [2]	*Sayornis phoebe*
Fish Crow [1]	*Corvus ossifragus*
Marsh Wren [1,2]	*Cistothrous palustris*
Eastern Meadowlark [1]	*Sturnella magna*
Red-winged Blackbird [1,2]	*Agelaius phoeniceus*
Boat-tailed Grackle [1]	*Quiscalus major*
Seaside Sparrow [1]	*Ammodramus maritimus*
Mourning Dove [2]	*Zenaida macrooura*
Purple Martin [2]	*Progne subis*
Tree Sallow [2]	*Tachycineta*
Gray Catbird [2]	*Dumetella carolinensis*
Northern Mockingbird [2]	*Mimus polyglottos*
Cedar Waxwing [2]	*Bombycilla cedrorum*
Yellow-rumped Warbler [2]	*Dendroica coronata*
Yellow-throated Warbler [2]	*Dendroica dominica*
Eastern Towhee [2]	*Pipilo erythropthalmus*
Savannah Sparrow [2]	*Passerculus sandwichensis*
Swamp Sparrow [2]	*Melospiza georgiana*
Brown-headed Blackbird [2]	*Molothrus alter*
Northern Cardinal [2]	*Cardinalis*

[1] Denotes commonly occurring species.
[2] Denotes species observed on the Project site during March 18, 2005 survey.
[3] Denotes species observed on Project site during October 13, 2014 wetland survey.
Survey taxonomy follows that of the American Ornithological Union's Checklist of North American Birds, Seventh Edition
Common bird species source: USACE, 1983

Avian species found on the open waters of Mississippi Sound bordering the site primarily include gulls and terns, but also pelicans, cormorants, and waterfowl (Table 1). Pelagic deepwater species such as shearwaters (Family Procellariidae) storm petrels, (Family Hydrobatidae), and tropicbirds (Family Phaethontidae) occur well past the 100 fathom depth in the Gulf of Mexico and are not expected nearshore except as wind-blown vagrants from hurricanes and tropical storm events. These latter species could be encountered offshore by LNG carriers ("LNGCs").

Examples of locally breeding gulls and tern species found during the summer months include the resident laughing gull (*Larus atricilla*), least tern (*Sterna antillarum*) royal tern (*Sterna maxima*), Caspian tern (*Sterna caspia*), sandwich tern (*Sterna sandvicensis*), common tern (*Sterna hirundo*) and gull-billed tern (*Sterna nilotica*). Black skimmer (*Rhynchops niger*) is also a common resident. Less common (i.e., not listed as common in Table 1) individuals of sooty tern (*Sterna fuscata*) may possibly occur as occasional waifs.

During the winter months, the year-round residents (laughing gull, royal tern, and Caspian tern) are present, plus an influx of migratory species and winter residents, such as Forster's tern (*Sterna forsteri*) and herring gull (*Larus argentatus*). Several other less common species not listed in Table 1 also may be found in the area in winter. These species include the ring-billed gull (*Larus delawarensis*) and Bonaparte's gull (*Larus philadelphia*). Possible vagrants, rare, and accidental species include Franklin's gull (*Larus pipixcan*), great black-backed gull (*Larus marinus*), lesser black-backed gull (*Larus fuscus*), and glaucous gull (*Larus hyperboreus*). There are a few records of brown noddy (*Anous stolidus*) from the Mississippi coast, all related to tropical storms. Both parasitic jaeger (*Stercorarius parasiticus*) and pomarine jaeger (*Stercorarius pomarinus*) have been documented in the open waters in Mississippi Sound. Parasitic jaeger has been recorded annually since 1974, primarily during the winter months (dates range from August to May 6; Turcotte & Watts, 1999). Pomarine jaeger is considered accidental in Mississippi, usually occurring further offshore than parasitic jaeger (Turcotte & Watts 1999).

Examples of the Order Pelecaniformes found on open water areas near the Project site include brown pelican (*Pelecanus occidentalis*) and the American white pelican (*Pelecanus erythrorhynchos*; primarily in the winter months). Less common species not listed in Table 1 include the magnificent frigate bird (*Fregata magnificens*), which might be expected as occasional visitors during the summer months and during spring migration. The northern gannet (*Morus bassanus*) also may occur offshore in slightly deeper waters in the winter season. The masked booby (*Sula dactylatra*) would be a casual to accidental vagrant during the summer months. The winter months would see large numbers of double-crested cormorants (*Phalacrocorax auritus*) with occasional non-breeding individuals remaining over the summer.

Wintering waterfowl may be found in large rafts just offshore of the Project site. Common species (Table 1) and less common species (not listed in Table 1) include redhead (*Aythya americana*), ring-necked duck (*Aythya collaris*), greater and lesser scaup (*A. marila* & *A. affinis*), all three scoters; surf scoter (*Melanitta perspicillata*; rare in winter), black scoter (*Melanitta nigra*; rare in winter), white-winged scoter (*Melanitta fusca*; rare in winter), bufflehead (*Bucephala albeola*; common in winter), common goldeneye (*Bucephala clangula)*, long-tailed duck (*Clangula hyemalis*; rare), red-breasted merganser (*Mergus serrator*; common), common merganser (*Mergus merganser*; extremely rare), hooded merganser (*Lophodytes cucullatus*), and ruddy duck (*Oxyura jamaicensis*). Common loon (*Gavia immer*) would be the most expected loon species offshore in winter with perhaps a few lingering into the summer months. Red-throated (*Gavia stellata)* and Pacific loon (*Gavia pacifica*) are occasionally sighted along the upper Gulf Coast in winter. Wintering grebes would consist primarily of horned grebe (*Podiceps auritus*) and also eared grebe (*Podiceps nigricollis*); less frequently encountered.

Other species of migratory birds that are not shore birds, wading birds, or waterfowl also may occur at the Project site. These species (Passeriformes or perching birds and raptors) may be seasonal migratory transients or residents in the coastal area, or both, depending on the species. These species could use the Project sites and the adjacent and surrounding areas for resting, foraging, or nesting. The perching birds and raptors use onshore habitats, from marshes to uplands, for foraging; some raptors (e.g., osprey) also may use offshore areas for foraging.

TABLE 2
State Bird Species of Concern Identified for the Project Area [1]

Common Name	Scientific Name	Heritage Rank	Presence of Habitat
Gull-Billed Tern	*Gelochelidon nilotica*	S1B, S3, S4N	Listed by MDWFP letter of August 27, 2014, as a species of concern possibly occurring within 2 miles of the proposed Project area.
Least Tern	*Sternula antilllarum*	S3B	Listed by MDWFP letter of August 27, 2014, as a species of concern possibly occurring within 2 miles of the proposed Project area; the coastal population is distinct from the interior least tern; possible foraging habitat near the Project area.
Royal Tern	*Thalasseus maximus*	S1B, S4N	Listed by MDWFP letter of August 27, 2014, as a species of concern possibly occurring within 2 miles of the proposed Project area; prefers ocean coasts for breeding; possible foraging habitat near the Project area.

[1] Includes species identified in letters from MDWFP dated May 12, 2014, and August 27, 2014.

State Rank:
S1 - Critically imperiled in Mississippi because of extreme rarity (5 or fewer occurrences or very few remaining individuals or ac) or because of some factor(s) making it vulnerable to extirpation.
S2 - Imperiled in Mississippi because of rarity (6 to 20 occurrences or few remaining individuals or ac) or because of some factor(s) making it vulnerable to extirpation.
S3 - Rare or uncommon in Mississippi (on the order of 21 to 100 occurrences).
S4 – Apparently secure.
B – Breeding
N – Non-breeding

Source: NatureServe 2014

3.3 BIRDS OF CONSERVATION CONCERN WITHIN THE PROJECT AREA

The Project is located in Bird Conservation Region ("BCR") 27 - Southeastern Coastal Plain. This region includes extensive riverine swamps and marsh complexes along the Atlantic and Gulf Coasts, which provide critical wintering areas, important wintering and spring migration areas, and important nesting and foraging habitats for various migratory bird species, including Birds of Conservation Concern. Birds of Conservation Concern does not include birds that are game birds, are federal threatened or endangered species, are peripheral to the U.S., are resident game birds (except for candidate species), or are non-native. Birds of Conservation Concern in this region that could be affected by the Project are listed in Table 3 (USFWS 2008).

TABLE 3
USFWS Birds of Conservation Concern for BCR 27 - Southeastern Coastal Plain (USFWS 2008)

Red-throated Loon	Sandwich Tern
Black-capped Petrel (nb)	Black Skimmer
Audubon's Shearwater (nb)	Common Ground-Dove
American Bittern (nb)	Chuck-will's-widow
Least Bittern	Whip-poor-will
Roseate Spoonbill (nb)	Red-headed Woodpecker
Swallow-tailed Kite	Loggerhead Shrike
Bald Eagle (b)	Brown-headed Nuthatch
American Kestrel (paulus ssp.)	Bewick's Wren (bewickii ssp.)
Peregrine Falcon (b)	Sedge Wren (nb)
Yellow Rail (nb)	Wood Thrush
Black Rail	Blue-winged Warbler
Limpkin	Black-throated Green Warbler
Snowy Plover (c)	Prairie Warbler
Wilson’s Plover	Cerulean Warbler
American Oystercatcher	Prothonotary Warbler
Solitary Sandpiper (nb)	Swainson's Warbler
Upland Sandpiper (nb)	Kentucky Warbler
Whimbrel (nb)	Bachman's Sparrow
Long-billed Curlew (nb)	Henslow's Sparrow
Marbled Godwit (nb)	LeConte's Sparrow (nb)
Red Knot (rufa ssp.) (a) (nb)	Nelson's Sharp-tailed Sparrow (nb)
Semipalmated Sandpiper (Eastern) (nb)	Saltmarsh Sharp-tailed Sparrow (nb)
Buff-breasted Sandpiper (nb)	Seaside Sparrow (c)
Short-billed Dowitcher (nb)	Painted Bunting
Least Tern (c)	Rusty Blackbird (nb)
Gull-billed Tern	Sandwich Tern

(a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) Migratory Bird Treaty Act protection uncertain or lacking, (nb) non-breeding in this BCR

Priority bird species from this list include the Painted Bunting, Bachman’s Sparrow, Swainson’s Warbler, and Loggerhead Shrike.

Painted Bunting

Painted buntings are colorful medium-sized finches that forage on the ground in dense cover or among grasses. Migrating and summer breeding populations are known from the general Project area (Cornell 2015e). Migrating painted buntings prefer dense weeds and semi-open forest understory. They breed in dense brush and prefer areas adjacent to thick grassy areas or woodland edges. None of these preferred habitats occur at any of the Project sites.

Bachman's Sparrow

Bachman's sparrow is a plain sparrow, brownish gray above and buffy underneath and occurs along the Gulf coast (Dunning 2006). It feeds on grass seeds and insects. This bird breeds on the coastal plain and piedmont of the southeast U.S. from extreme south Virginia south to central Florida and west to east Texas and southeast Oklahoma, including in the general Project area. It nests in pine woodlands and open habitats with a dense ground layer of grasses and a few dense shrubs with an open understory. None of this habitat occurs at any of the Project sites.

Swainson's Warbler

Cornell (2015f) describes this bird as a "skulking bird of the southern canebrakes and rhododendron thickets" that would go undetected, except for its "loud, ringing song." It is a summer breeding resident in the general Project area and breeds in forests with thick undergrowth. It feeds on insects and spiders by foraging on the forest floor. None of its preferred habitat is on any of the Project sites.

Loggerhead Shrike

Cornell (2015g) describes the loggerhead shrike as a "songbird with a raptors habits." This species is a year-round resident in the general Project area and inhabits open country with short vegetation and a few shrubs or low trees, particularly those with spines or thorns. Shrikes forage around agricultural fields, pastures, and other, similar open areas, including roadsides. They have a broad diet, including insects and other arthropods, amphibians, reptiles, small mammals, and birds. Shrikes prefer nesting in shrubs and trees, but will nest in brush piles and similar areas. Preferred nesting and foraging habitat does not occur on any of the Project sites.

3.3 IMPACTS TO OTHER SPECIES OF CONCERN

Piping Plover

Although suitable habitat exists at the Project site for piping plover, it is suitable wintering (foraging) habitat. Critical wintering habitat also exists on the barrier islands across Mississippi Sound. While not observed during surveys, two individual piping plovers were observed incidentally at the Expanded Terminal site during a USACE site visit in December 2014. The piping plover would not nest at the Project site.

The primary impacts from the Project on the piping plover would be disturbance of foraging during construction, the loss of any preferred foraging areas of sandy flats and sandy mudflats by the filling of these areas, and the installation of the liquefaction facilities and support areas. The overall impact on foraging is expected to be negligible, however, because although the piping plover has been observed at the Expanded Terminal site, it is not commonly observed there, and there is ample suitable foraging habitat for the piping plover in adjacent areas and on the barrier islands offshore. Development of the proposed Gulf LNG mitigation site likely would provide foraging opportunities for this species.

Project construction and operations will add to the existing lighting at the Project site and the broader Port area, but potential impacts on migrating piping plovers is expected to be negligible. To the extent they are compatible with the operational and safety needs of the Expanded Terminal, recommendations from the USFWS will be incorporated into the Project lighting design to reduce light pollution and minimize avian mortality resulting from collisions with the proposed flare structure. For these reasons, Project impacts on the piping plover are expected to be negligible.

Brown Pelican

Although suitable habitat was observed at the Project site for the brown pelican, no rookeries were observed during surveys, and, in fact, the Mississippi Museum of Natural Science (MDWFP 2014) characterizes the brown pelican as not nesting in Mississippi. As of 2010, there were no known nesting records of brown pelicans in Mississippi (Defenders of Wildlife 2010). Where brown pelicans nest, they usually prefer small, predator-free coastal islands, an environment not represented by the Project site. Therefore, the Project is unlikely to affect individual or breeding brown pelicans.

Brown pelicans are known to roost/loaf and feed along Mississippi's Gulf Coast, but no roosting/loafing brown pelicans have been observed at the Project site, so pelican roosting/loafing would not be affected by construction and operation of the new facilities. Individual brown pelicans have been observed foraging in proximity to the south marsh mitigation area of the Project area. Foraging brown pelicans likely would avoid construction activities, but the area of avoidance would be negligible compared to foraging habitat available in adjacent areas, and brown pelicans likely would reclaim any lost foraging area once construction is completed. Brown pelican interaction with the operation of the new facilities would be similar to what occurs with the existing facilities, and no adverse impacts on brown pelicans related to the existing facilities have been noted.

In summary, the Project is unlikely to directly impact brown pelican individuals, including their nests and young. In addition, the Project is unlikely to indirectly impact brown pelicans' behavior, particularly their foraging and roosting behavior.

Red Knot

Although suitable habitat exists at the Expanded Terminal site for the red knot, it is suitable wintering (foraging) habitat. The red knot would not nest at the Project site. If the red knot occurs at the Expanded Terminal site, the primary impacts from the Project on this species would be disturbance of foraging during construction, the loss of any preferred foraging areas by the filling of these areas, and the installation of the liquefaction facilities and support areas. The overall impact on foraging is expected to be negligible, however, because in addition to the lack of evidence that the red knot uses the Project site, there is ample suitable foraging habitat for the species in adjacent areas.

Peregrine Falcon

The presence of peregrine falcons in the proposed Project area is unlikely. Suitable nesting habitat is not present on the site; however, potential foraging habitat may be present in the shore area, particularly during waterfowl migration periods from April to mid-May and in September and October (Turcotte and Watts 1999). A large wintering aggregation of waterfowl and shorebirds, which would offer ideal prey for this species, are within the vicinity of the Project, but not at the Project site. Construction activities, including dredging and filling, may have a temporary impact on foraging (an insignificant amount of potential foraging habitat will be removed by the North MOF dock), but there is ample and probably better foraging habitat in adjacent areas.

Peregrine falcons prefer to perch and nest on tall structures, such as skyscrapers, water towers, cliffs, and power pylons. It is possible a peregrine falcon in the Project area could be attracted to the flare tower as a potential perching site, which could make it vulnerable to injury or death in the event the flare was activated while it was perching. However, the probability that a rare falcon would perch on the flare tower at the same time the flare was activated is extremely low, and assessment of potential impacts related to this combination of events is highly speculative. Because the peregrine falcon occurs in the Project area as a non-breeding winter population, it is unlikely the flare tower would be used as a nesting site. Therefore, impacts to nesting falcons will not occur from Project activities.

Mississippi Sandhill Crane

While the Mississippi sandhill crane could occur as a migratory transient on the Project sites (more likely at the Expanded Terminal site or adjacent to it), there is no habitat attractive to it on the sites. Because the species is highly unlikely to occur on the Project sites, there will be no impacts on this species.

Bald Eagle

The presence of the bald eagle in the proposed Project area is unlikely. Suitable nesting habitat is not present on the site. However, the waters of Mississippi Sound may provide foraging habitat, and construction activities, including dredging, may have a temporary impact on foraging habitat (an insignificant amount of potential foraging habitat will be removed by the North MOF dock). Because it is unlikely that the bald eagle uses the area around the Project site for foraging and because there is ample foraging area for this species elsewhere, construction and operation of the proposed Project is not expected to have a significant impact on this species or its habitat.

Wood Stork

The wood stork occurs in Jackson County only as a non-breeding winter resident. While wood stork individuals could occur in the coastal parts of the Project (Expanded Terminal site) as transients, there is better foraging habitat in the area (Grand Bay Savanna). If a wood stork did stop on one of the Project sites, the primary potential Project impact would be to cause it to move to another foraging area. No mitigative action is needed to avoid impacts to this species.

Gull-Billed Tern

The gull-billed tern could occur on the Expanded Terminal site as a forager, but sufficient gravelly or sandy beach nesting habitat does not occur at this site. Gull-billed terns could be displaced temporarily from feeding and resting at the site during construction and operation of the Project, but ample alternative habitat exists in adjacent areas. Other than temporary or inconsequential displacement, no impacts to this species are expected to occur from Project activities, and no mitigative action is needed to avoid or minimize impacts.

Least Tern

No suitable nesting habitat (sandy or gravelly beaches) for the least tern exists on the Project site, but the species could forage in the area. Construction activities, including dredging and filling and operation of the proposed Project, could displace terns from foraging areas temporarily, but ample adjacent habitat exists for foraging. Other than this temporary or inconsequential displacement, no impacts to this species are expected to occur from Project activities, and no mitigative action is needed to avoid or minimize impacts.

Royal Tern

The royal tern may occur in the Project area, but would be seen only resting at the Expanded Terminal site, because there is no nesting habitat there. It does breed along the Gulf coast, but prefers ocean beaches for nesting. Foraging for this plunging bird species is over open water. At most, individuals of this species would be displaced temporarily by Project activities to adjacent foraging and resting habitat, which is plentiful in the area. Impacts to this species, if any, would be temporary and insignificant overall.

4.0 IMPACTS AND MITIGATION

The Project has the potential to affect migratory birds, including birds of conservation concern. The majority of the offsite Project areas (CSAs and metering facilities) are previously developed sites and activities at these locations is unlikely to affect migratory bird species. The primary areas of disturbance that might affect roosting, foraging, and nesting behavior of migratory birds is at CSA 5, where the Companies propose to clear and fill the entirety of the site; however, the forested component of this site is considered suboptimal habitat due to the predominance of exotic tree species (Chinese tallow) and considerable disturbance from previous industrial activities. Construction at the MOFs associated with the Project may disrupt foraging activities of some species of birds, and construction at the Expanded Terminal would temporarily limit foraging, resting, and nesting activities at EEM areas adjacent to the existing Terminal.

The primary construction impacts to migratory birds and bird habitat will result from the cutting, clearing, and/or removal of existing vegetation at the Expanded Terminal site. These actions likely will remove nesting habitat and could impact migratory birds through the loss of nests (including those with eggs and/or young). Other impacts could include possible loss of migratory birds themselves, reduction in migratory bird productivity, displacement, or loss of second nesting opportunities. Of these potential impacts, only the loss of second nesting activities represents a significant probability. The other impacts are unlikely, because of the relatively small area of impact and the availability of ample suitable available habitat adjacent to the Project. If site preparation at the Expanded Terminal occurs during the nesting season, GLLC will adopt USFWS guidelines specific to the area to avoid impacts to nesting birds. These guidelines may involve pre-construction nesting surveys, the removal of nesting habitat before the start of nesting, or another conservation method that is consistent with current Service guidance regarding the MBTA.

Another potential impact to migratory birds and resident species, including listed species and species of concern, is collision with the flare tower. The proposed flare is located on the immediate coastline (~100 meters inland), occurring within a region well recognized as an important migratory pathway and stopover area for migrating passerines. The Project area is also a known congregation area for large numbers of wintering and migrating shorebirds. The placement of towers on coastlines and along migratory routes has been identified as especially dangerous for migrating birds.

To the extent it is compatible with the operational and safety needs of the Expanded Terminal, GLLC will incorporate the appropriate measures from the USFWS 2013 guidelines for communication towers into its flare design to minimize impacts to migratory birds (USFWS 2013b). This information is provided to the USFWS in the Project Biological Assessment ("BA"), which addresses threatened and endangered migratory birds, and it is expected that if the USFWS requires additional protective measures for threatened and endangered migratory birds, they will provide those requirements subsequent to their review of the BA. Those requirements will be protective of all migratory birds, whether specifically protected or not.

The flare tower will have no guy wires. The primary potential impact of the flare tower on migratory birds likely would be from lighting at night that could attract birds into colliding with the tower. To reduce impacts on migratory birds related to the lighting, GLLC will install hazard lights that meet only the minimum requirements for pilot warning and obstruction avoidance and will use other lighting criteria (acceptable to the Federal Aviation Administration) specified in the guidelines to reduce the potential for bird collisions. To the extent allowed by Homeland Security, other lighting at the facility will be down-shielded and of the minimum intensity required to provide adequate lighting for remote monitoring and security.

Bird nesting in the typical flare derrick structure is generally not a major concern, because the open structure of the derrick is not conducive to nest building. This contrasts with nest building in overhead transmission line towers, where bird nesting has been a common problem. The close spaced bracing of the horizontal truss structures of overhead transmission line towers are ideally suitable for nest building. There are no comparable close spaced bracings in the open structure of the flare derrick. Further, it has been observed that birds do not normally nest near flare tips. The reason for this is not clear, but it could be due to the heat and noise near the tip itself. GLLC will monitor the flare structure for bird nesting activities. If an issue with bird nesting is identified, GLLC will work with USFWS to develop appropriate mitigation specific to the situation.

Dredging or filling of wetlands for construction and operation of the Project will result in permanent impacts to coastal marsh and freshwater wetland. GLLC proposes to create approximately 50 acres of tidal salt marsh as compensatory mitigation for unavoidable losses of wetlands associated with the Project.

Tidal marsh vegetation will be composed predominantly of smooth cordgrass (*Spartina alternaflora*) and black needlerush (*Juncus roemerianus*), supplemented with other plants from nearby marshes and other planted tidal marsh species. Hydrologic connection to the site would be created through tidal channels that would also provide access to the Mississippi Sound for fisheries and aquatic resources. A successful marsh creation adjacent to the existing USACE marsh would enhance and enlarge coastal habitat to provide contiguous wetland foraging and nesting habitat along the Mississippi coastline.

5.0 SUMMARY

The Project is in a region of extensive riverine swamps and marsh complexes that provide critical wintering areas, important wintering and spring migration areas, and important nesting and foraging habitats for various migratory bird species, including Birds of Conservation Concern. The Project area most likely to harbor migratory birds is the Expanded Terminal area; however, no evidence of nesting was observed during surveys. The CSA and metering station components of the Project would not be attractive to migratory birds. The Expanded Terminal area could provide nesting habitat for some migratory birds.

Several migratory bird species and Birds of Conservation Concern may be present on or adjacent to the Expanded Terminal site at various times throughout the year or may occur as transients along the Mississippi Sound (including Bayou Casotte) or even temporarily within the Expanded Terminal boundaries. Migratory birds occur within the Project area year round. It should be noted that although the primary concern with the Project is for impacts to nesting migratory birds there could also be impacts to migration and wintering habitat for these species. Some of these species may be displaced temporarily from feeding, resting, and nesting areas, if any; (no nesting activity or nests were observed during surveys) as construction progresses for the Project.

Ample alternative habitat exists in adjacent areas, and because of their mobility, birds will be expected to use these other available habitat areas during construction. This adjacent habitat also likely will be used to replace habitat that is occupied by the installed Project facilities or otherwise becomes unsuitable because of Project operational activities. Because ample alternative habitat is available in the Project area for migratory birds and Birds of Conservation Concern, it is not likely that the construction or operation of the Project will cause a long-term change in migration patterns through the area or otherwise significantly affect these species.

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APPENDIX K

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